

Review of Safety Cameras in Cambridgeshire and Peterborough

Site Review and Outline Proposals – May 2018

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Author: Matt Staton

1. Summary

The Cambridgeshire and Peterborough Road Safety Partnership has operated a network of safety cameras for over 20 years. With the exception of five average speed camera systems installed in the last 10 years all the existing fixed cameras use wet-film. This technology is coming to the end of its operational life in the next 12 months.

The camera strategy employed by the partnership to install fixed camera sites has had a significant effect on the higher severity collisions in the vicinity of camera sites.

Proposals are put forward to digitalise 24 of the existing fixed sites and decommission four [4] that have not been operational for some time. The remaining 15 sites are recommended to be subjected to further investigation as improvements in technology or planned infrastructure investment may mean a fixed camera would not provide the most cost effective casualty/speed reduction solution.

It is estimated the like-for-like replacement of wet-film cameras with their digital equivalent will require between £500k-£600k capital investment. This does not take into account the possibility of introducing more expensive ASC systems at any of the sites being investigated further, or any potential savings related to economies of scale.

In addition to this, it is estimated approximately £62k per annum of revenue funding will be required to cover the running costs of the sites i.e. electricity, maintenance and communications.

2. Introduction

The Cambridgeshire and Road Safety Partnership vision is to prevent all road deaths across Cambridgeshire and Peterborough and to significantly reduce the severity of injuries and subsequent costs and social impacts from road traffic collisions. The existing safety cameras in Cambridgeshire and Peterborough were all installed on a casualty reduction basis at sites that have had a history of personal injury collisions where speed was considered a factor. Part of this review will examine whether the installation of cameras has had the desired casualty reduction effect in Cambridgeshire and Peterborough, and will also examine research evidence around the effectiveness of safety cameras.

It is recognised that the wet film cameras will become obsolete in the near future due to withdrawal of calibration services by the main suppliers and difficulties in sourcing the film itself and parts to repair both the cameras and the film processing equipment. The end of life for our wet-film camera operations is expected to be the end of March 2019. While this provides a threat to camera operation, the fact that technology has advanced significantly since the cameras were first installed also provides an opportunity to review each site to see if the current solution remains the most appropriate and cost-effective one.

3. Review of existing strategy

The first section of this report comprises a review of the existing strategy relating to safety camera implementation. This review examined studies related to fixed cameras (Allsop, 2013) and average speed cameras (Owen, Ursachi & Allsop, 2016) to assess the effectiveness of camera sites in Cambridgeshire and Peterborough. Both these studies looked to exclude the effect of regression to the mean (RTM) by removing the site selection period (SSP) from before data. Data relating to the exact SSP used for each site was not available so the SSP has been assumed as the first three of the four years prior to installation, based on known methodology applied in the partnership area at the time, however it may be that for some camera sites where installation took place outside the normal cycle (e.g. due to significant delays) this may not have been the case.

3.1. Fixed camera sites

The first analysis conducted examined the effect of the safety camera strategy on personal injury collisions (PIC). Allsop's (2013) method provides estimates of multiples for the effect of camera establishment on the number of collisions in the vicinity of cameras. As part of his review Allsop (2013) found that for all sites in Cambridgeshire and Peterborough up to 2010 the effect of camera establishment on PIC is not distinguishable from the background reduction in PIC ($m_c = 1.025$; 95% CI = 0.955, 1.100).

The same analysis was conducted for fatal and serious collisions (FSC) in the vicinity of cameras and Allsop (2013) found a significant reduction in FSC for camera sites in Cambridgeshire and Peterborough ($m_c = 0.588$; 95% CI = 0.486, 0.711).

This shows that the fixed sites installed by the partnership have had a significant effect in reducing the number of fatal and serious collisions but no discernible effect on the overall number of personal injury collisions in the vicinity of the sites.

Appendix 1 provides multiples (m_c) for the effect of camera establishment for each camera updated to 2015 data.

The analysis continued to examine any changes in the severity of collisions in the vicinity of camera sites by considering the number of casualties per collision, proportion of collisions that were fatal or serious, the proportion of casualties that were KSI and the number of KSI

per fatal or serious collisions before and after implementation. This found that in the vicinity of cameras across Cambridgeshire and Peterborough:

- the number of casualties per collision was 1.24 after, compared with 1.29 before;
- the proportion of collisions that were fatal or serious was 10.1% after, compared with 19.6% before;
- the proportion of casualties that are KSI was 8.8% after, compared with 17.1% before; and
- the number of people KSI per fatal or serious collision was 1.073 after, compared with 1.130 before.

In terms of severity of collisions, this indicates that in the vicinity of cameras in Cambridgeshire and Peterborough, the number of casualties per collision was about 4% lower, the proportion of collisions that were fatal or serious was about 49% lower, the proportion of casualties that were KSI was about 49% lower, and the number of people killed or seriously injured per fatal or serious collision occurring was about 5% lower after establishment of cameras compared to before their establishment.

This fits with the estimated multiples and shows that the camera strategy employed by the partnership to install fixed camera sites has had a significant effect on the higher severity collisions but not on the overall number of personal injury collisions in the vicinity of camera sites.

3.2. Average Speed Cameras (ASC)

Cambridgeshire and Peterborough have six average speed camera (ASC) systems:

- A14 Huntingdon to Girton (Highways England)
- A14 Girton to Fen Ditton (Highways England)
- A1 Buckden
- B1096 Ramsey Forty Foot
- B1091 Peterborough Road, Stanground
- A1139 Fletton Parkway, Peterborough

As the number of sites is small and two of the sites have only been installed in the last few years it was deemed most appropriate to consider the national effectiveness of ASC systems where the data set is much larger and more robust. Owen, Ursachi and Allsop (2016) found that, on average, the ASC sites analysed saw fatal and serious collisions fall 25-46% and personal injury collisions fall 9-22%.

This shows that where a problem affecting a route is identified, ASC systems are effective in reducing collisions along the entire route.

4. Proposals

As this review relates to the installation and operation of the Local Authority safety cameras, the Highways England sites (those on the trunk road network) are not discussed below. Appendix 1 shows the statistical analysis of each fixed camera site using Allsop's (2013) methodology applied to data from 1990-2015 and this has been the basis for the proposals outlined below. However, confidence intervals for evidence of effectiveness at individual camera level are very wide, particularly for FSC, therefore the discussion below also considers other factors, including likely upgrade costs and sites specific issues such as vandalism, changes to the road environment or condition of the current infrastructure.

The review has separated the existing sites into three specific groups:

- Group 1 - Sites where it is deemed that the existing fixed camera is the most appropriate solution and therefore digitalisation of the fixed site is seen as the most appropriate course of action.
- Group 2 - Sites where it is deemed that the existing fixed camera is no longer required and therefore the site should be considered for decommissioning.
- Group 3 - Sites where an alternative solution to a fixed camera, e.g. ASC, may be more appropriate, but would require further investigation.

Due to the success of the current strategy for safety camera implementation, as outlined above, the majority of sites (24, including two red light cameras) fall into Group 1. There are four [4] sites that fall into Group 2 and should be considered for decommissioning. The remaining 15 sites are identified as requiring further investigation as like-for-like replacement with a fixed camera may not be the most cost-effective solution. Appendix 2 shows the proposed action for each site.

The proposed groupings lend themselves to a phased approach to digitalisation:

- *Phase one* would see the procurement of infrastructure and cameras for the 24 sites in group 1 and the decommissioning of the 4 sites in group 2. This would aim to be implemented as close to March 2019 as the procurement process allows.
- *Phase two* would be informed by investigations of the remaining 14 sites in group 3. Investigations would be carried out while phase one is being implemented.

5. Costs

Based on cost estimates received from suppliers in the past few years it is estimated the like-for-like replacement of wet-film cameras with their digital equivalent will require between £500k-£600k capital investment. This does not take into account the possibility of

introducing more expensive ASC systems at any of the sites being investigated further, or any potential savings related to economies of scale.

In addition to this, ongoing revenue funding of approximately £62k per annum will be required to cover the running costs of the sites i.e. electricity, maintenance and communications.

The breakdown of how these estimates have been calculated is shown in Appendix 3.

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Appendix 1 – Statistical Analysis of Fixed Camera Sites – data 1990-2015

Camera site	Personal Injury collisions (PIC)				Fatal and serious collisions (FSC)				PIC m _c	95% confidence		FSC m _c	95% confidence	
	b	B	a	A	b	B	a	A						
C1	53	27193	107	39672	8	5739	6	6088	1.358	0.971	1.900	0.628	0.213	1.851
C2	13	21154	49	45408	5	4681	7	7063	1.631	0.874	3.043	0.773	0.240	2.494
C3	5	15444	58	51415	1	3627	7	8161	2.904	1.143	7.375	1.556	0.183	13.196
C5	11	27193	18	39672	4	5739	5	6088	1.028	0.478	2.210	0.943	0.246	3.606
C6	10	21154	19	45408	4	4681	2	7063	0.805	0.368	1.758	0.265	0.047	1.498
C7	13	24205	39	42420	6	5236	1	6560	1.590	0.838	3.016	0.114	0.013	0.989
C8	40	27193	70	39672	10	5739	2	6088	1.170	0.787	1.740	0.171	0.036	0.807
C9	35	24205	67	42420	5	5236	9	6560	1.062	0.700	1.612	1.197	0.392	3.653
C10	13	21154	53	45408	3	4681	9	7063	1.764	0.950	3.275	1.491	0.393	5.657
C12	17	27193	17	39672	4	5739	2	6088	0.647	0.326	1.286	0.377	0.067	2.131
C16	40	29941	43	36657	12	6211	4	5612	0.857	0.552	1.329	0.341	0.107	1.081
C17	10	29941	17	36657	1	6211	4	5612	1.262	0.569	2.801	2.213	0.237	20.710
C18	11	29941	22	36657	0	6211	1	5612	1.497	0.715	3.134	1.107		
C19	37	29941	86	36657	6	6211	12	5612	1.849	1.248	2.739	1.897	0.698	5.157
C20	27	29941	63	36657	4	6211	3	5612	1.838	1.160	2.911	0.664	0.144	3.059
C21	53	32956	65	33625	8	6687	6	5158	1.180	0.815	1.708	0.864	0.293	2.545
C22	33	32956	52	33625	5	6687	4	5158	1.499	0.960	2.339	0.864	0.226	3.306
C24	13	32956	30	33625	5	6687	1	5158	2.100	1.081	4.080	0.216	0.024	1.932
C25	20	32956	21	33625	5	6687	4	5158	0.980	0.525	1.831	0.864	0.226	3.306
C26	23	32956	27	33625	5	6687	3	5158	1.103	0.625	1.945	0.648	0.150	2.793
C28	12	35988	20	30651	4	7141	2	4703	1.806	0.870	3.749	0.607	0.107	3.433
C29	82	35988	119	30651	20	7141	11	4703	1.683	1.263	2.243	0.795	0.375	1.685
C30	66	35988	101	30651	9	7141	9	4703	1.770	1.290	2.429	1.367	0.532	3.508
C31	81	35988	79	30651	7	7141	10	4703	1.131	0.824	1.552	1.898	0.708	5.086
C32	68	35988	91	30651	14	7141	10	4703	1.548	1.124	2.134	1.012	0.442	2.317

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C34	7	35988	5	30651	1	7141	0	4703	0.734	0.228	2.367			
C35	57	38962	63	27699	8	7596	7	4257	1.528	1.060	2.202	1.388	0.493	3.907
C36	34	38962	35	27699	7	7596	4	4257	1.407	0.869	2.277	0.892	0.255	3.125
C37	8	38962	3	27699	3	7596	0	4257	0.469	0.121	1.816			
C38	9	38962	6	27699	2	7596	2	4257	0.844	0.294	2.422	1.190	0.161	8.790
C39	34	41914	14	24693	5	8042	1	3787	0.679	0.360	1.281	0.354	0.040	3.165
C40	29	41914	20	24693	7	8042	3	3787	1.132	0.633	2.024	0.796	0.200	3.166
C41	17	60106	0	7378	5	10812	0	1166						
P1	11	24205	31	42420	4	5236	6	6560	1.474	0.731	2.974	0.958	0.263	3.483
P2	24	32956	21	33625	3	6687	3	5158	0.823	0.453	1.497	0.972	0.190	4.977
P7	32	35988	28	30651	2	7141	2	4703	0.996	0.594	1.672	1.012	0.137	7.480
P8	120	35988	234	30651	18	7141	15	4703	2.271	1.814	2.842	1.199	0.596	2.412
P9	44	41914	28	24693	6	8042	6	3787	1.056	0.651	1.713	1.820	0.574	5.776
P10	28	41914	14	24693	8	8042	1	3787	0.819	0.426	1.577	0.236	0.028	1.968
T1	18	29941	22	36657	6	6211	2	5612	0.946	0.501	1.786	0.316	0.062	1.619
T2	18	29941	22	36657	6	6211	2	5612	0.946	0.501	1.786	0.316	0.062	1.619
T17	11	29941	7	36657	5	6211	0	5612	0.476	0.181	1.253			
T18	6	29941	10	36657	2	6211	3	5612	1.167	0.415	3.278	1.107	0.178	6.870

Key

b = collisions in the vicinity of camera site before installation (excluding SSP)

B = collisions in the CPRSP area (excl. trunk roads) for same time period as b

a = collisions in the vicinity of camera site after installation

A = collisions in the CPRSP area (excl. trunk roads) for same time period as a

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Appendix 2 – Proposals for existing fixed camera sites

Ref	Location	Camera	Column type	Proposed group	Comment
001/2	A1134 Elizabeth Way (B/d), Cambridge	Gatso	standard	1 - digitalise	High non-compliance
003	A605 Eastrea Rd, Whittlesey	Gatso	standard	3 - investigate	Route review required
007	A1134 Barnwell Rd, Cambridge	Gatso	standard	1 - digitalise	High non-compliance
010	A1134 Perne Rd, Cambridge	Gatso	standard	1 - digitalise	
012	A141 Old Hurst	Gatso	smart	1 - digitalise	
013	Oundle Road, Orton Longueville, Peterborough	Gatso	smart	2 - remove	Currently bagged
014	A1134 Newmarket Rd, Cambridge	Gatso	standard	3 - investigate	GCP scheme on route – need to see if safety issues can be addressed through scheme
015	B198 Cromwell Rd, Wisbech	Gatso	standard	1 - digitalise	
020	Goldhay Way, Peterborough	Gatso	standard	2 - remove	Currently bagged
021	B1050 Station Rd, Willingham	Gatso	smart	1 - digitalise	
022/23	A1307 Huntingdon Rd (B/d), Cambridge	Gatso	standard	3 - investigate	New cycle scheme changes environment – need to assess impact
026	B1040 Woodhurst, Huntingdon	Gatso	smart	1 - digitalise	
027	C292 Victoria Avenue, Cambridge	Gatso	standard	1 - digitalise	
028	A605 Peterborough Rd, Whittlesey	Gatso	standard	3 - investigate	Route review required
029	A1309 High St, Trumpington	Gatso	standard	1 - digitalise	
030	B1049 Histon Rd, Cambridge	Gatso	standard	3 - investigate	New cycle scheme proposed – need to see if safety issues can be addressed through scheme
031	A603 Wimpole Rd, Barton, Cambridge	Gatso	standard	1 - digitalise	Need to address visibility issues – review location
033	A142 Chatteris	Gatso	smart	3 - investigate	Route study underway
034/35	B198 Lynn Rd (B/d), Wisbech	Gatso	standard	1 - digitalise	
039	B1167 The Causeway, Thorney	Gatso	standard	1 - digitalise	

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040	B1167 Wisbech Rd, Thorney	Gatso	standard	1 - digitalise	
041	B1514 St John's St, Huntingdon	Gatso	standard	1 - digitalise	
042	A603 Barton Rd, Cambridge	Gatso	standard	1 - digitalise	
043	A1307 Park Hill, Horseheath	Truvelo	-	3 - investigate	GCP scheme on route – need to see if safety issues can be addressed through scheme
044	B1101 The Avenue, March	Gatso	smart	1 - digitalise	
045	A605 Elton	Gatso	smart	3 - investigate	Route issue, so possible ASC system
046/47	A1134 Newmarket Rd (Garlic Row), Cambridge	Gatso	standard	3 - investigate	GCP scheme on route – need to see if safety issues can be addressed through scheme
048	A1134 Mowbray Rd, Cambridge	Gatso	standard	1 - digitalise	
049	C235 Cherry Hinton Rd, Cambridge	Gatso	standard	2 - remove	Now 20mph
050	A1307 Hills Rd, Cambridge	Gatso	standard	3 - investigate	Route issue, so possible ASC system
051	A605 Syers Lane, Whittlesey	Gatso	standard	3 - investigate	Route review required
052	Lincoln Rd (Millfield), Peterborough	Gatso	standard	3 - investigate	Public realm scheme being looked at
053	A15 Bourges Boulevard, Peterborough	Gatso	standard	1 - digitalise	High non-compliance
055	A10 Brandon Creek, Littleport	Gatso	standard	2 - remove	Currently bagged
056	B1047 Ditton Lane, Cambridge	Gatso	standard	1 - digitalise	Would benefit from being bi-directional
057	A1309 Milton Road, Cambridge	Gatso	smart	1 - digitalise	
058	A1123 Needingworth Rd, Bluntisham	Gatso	smart	1 - digitalise	
059/60	A605 Whittlesey Rd, Stanground (2 cameras)	Gatso	standard	3 - investigate	Route review required
061	A605 King's Delph, Whittlesey	Gatso	standard	3 - investigate	Route review required
062	Cromwell Rd, St Neots	Gatso	standard	1 - digitalise	
9901	Cambridge St, St Neots (RED LIGHT)	RLGatso	smart	1 - digitalise	
9902	Huntingdon St, St Neots (RED LIGHT)	RLGatso	smart	1 - digitalise	

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	Capital	Revenue
	£	£/Yr
Back office equipment	29000	
Smart pole upgrade (6)	4900	
Renew power supply	500	
New feeder pillar	150	
New smart pole (6)	14400	
Annual Digital camera cost (2)	8735.3	
Annual insurance (4)		335
Power supply (7)		60
Annual Communications cost / site(1)		
cambs		240.12
Peterborough		423.12
Annual site maintenance contract per site		400
Annual camera calibration (5)		318
Secondary check mark replacement (3)		250

Appendix 3 – estimated procurement costs

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Costs	£	Nr							
Instation	29000	1			29000				
Smartpole upgrade cost	5550	8			44400				
Mk3	15050	30			451500				
Running cost CCC	1603.12	32			51299.84				
Running cost PCC	1786.12	6			10716.72				
Initial procurement cost								524900	
1st year running cost								62016.56	
Total cost - Year 1								586916.6	

- (1) based upon 3G provided by service provider with private network
- (2) (a) Proportion of camera cost attributed to each site based upon 9 cameras in the partnership; so $9/34$ th's of camera cost ($£33000$) = 8735.3
- (3) based upon replacement every 2 years @500 inc TM +£250/year
- (4) Based upon existing provision divided by number $11335/34 = £335$ each/year
- (5) based upon 9 cameras in partnership $1200 * 9 / 34 = 318$
- (6) including router @£900
- (7) no figure available therefore best estimate