

**A308 Windmill Road, junction with
Cadbury Road, Sunbury-on-Thames,
Spelthorne, TW16 7HX.**

**Inclusion of Controlled Pedestrian
Crossing Facilities on Windmill Road and
Cadbury Road.**

Feasibility Report

December 2015

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1. INTRODUCTION

Cadbury Road and Windmill Road are the northern and southern arms at the traffic signal controlled junction of Staines Road West/Cadbury Road/Windmill Road in Sunbury-on-Thames (see Figure 1). These roads are 'A' classified roads with Cadbury Road being a single carriageway road, whilst the section of Windmill Road where it meets Staines Road West is a dual carriageway road. The speed limit on Cadbury Road and Windmill Road is 30mph, whilst Staines Road West is a 40mph speed limit road.

Currently, controlled pedestrian crossing facilities have been incorporated into the existing traffic signals across both arms of Staines Road West, whilst uncontrolled pedestrian crossing facilities are across both Cadbury Road and Windmill Road arms. Hence pedestrians crossing these uncontrolled arms of the junction must make their own judgement as to when it is safe to cross the road, by observing traffic movement across the junction and waiting for a safe opportunity.

The purpose of this report is therefore to assess the feasibility of providing controlled pedestrian crossing facilities across Cadbury Road and Windmill Road arms of this junction.

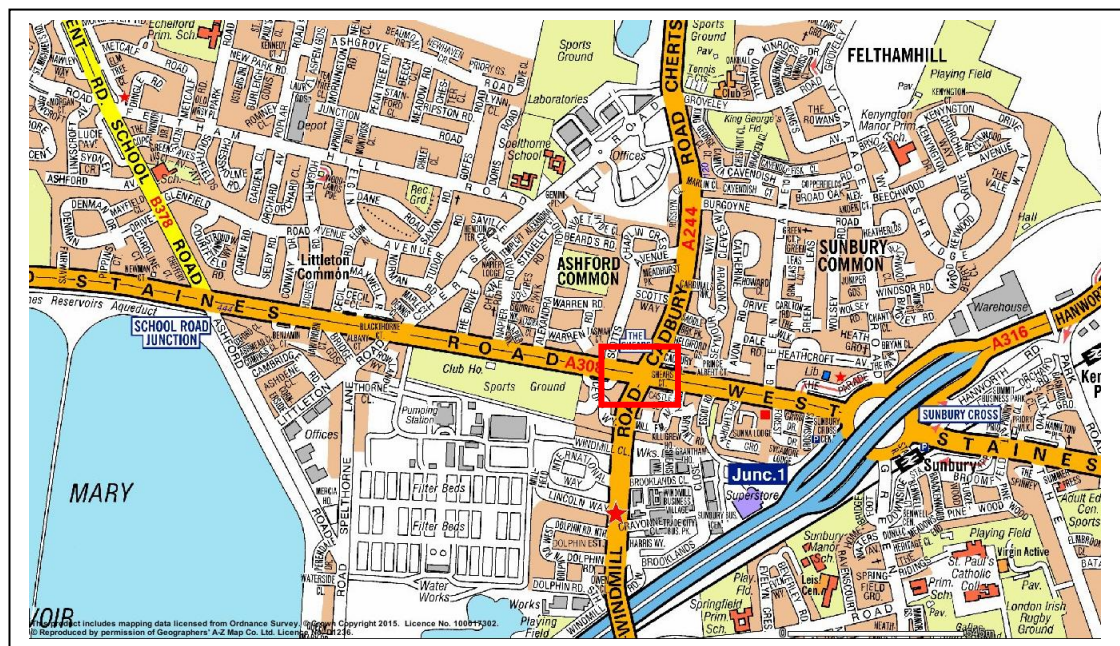


Figure 1 – Windmill Road/Cadbury Road/Staines Road West junction

2. SITE ANALYSIS

Traffic signal controlled pedestrian crossing facilities exists across both arms of Staines Road West and with the pedestrian refuges provided across these arms, enable the phasing of these crossings to operate with other traffic arms of the junctions. The pedestrian refuges on Cadbury Road and Windmill Road serves as uncontrolled pedestrian crossing points.

Windmill Road has 4 approaching traffic lanes into the junction and a very wide exit lane. The carriageway width at the traffic signals is approximately 20 metres.

However there are 2 sets of pedestrian refuges, which are approximately 2 metres in width to differentiate the traffic lane movements.

Cadbury Road has a banned right turn into Staines Road West incorporated into the existing traffic signals, 2 approaching traffic lanes, a pedestrian refuge and approximately 14 metres in width.

Both approaches of Staines Road West has 2 ahead/left turning lanes and a right turn filter lanes, which operates with the pedestrian crossings phase at the exits of this road.

3. **DATA COLLECTION**

3.1 **Statutory Authorities Plant Request**

Due to the location of this site and the major nature of this junction it is likely that most of the major utility companies will have underground apparatus running through or nearby to the junction. An in depth evaluation of these would be undertaken at detailed design stage should an option be progressed in order to establish any diversionary or protective works required and the likely costs.

That said, whilst developing this feasibility study and the associated option the likely impact on underground services has been considered and any works proposed as part of the option designed in such a way that the impact on underground services should be minimal and therefore unlikely to generate significant diversionary or protective requirements. Clearly however, the existing SCC signal equipment will be affected as it may require additional ducting and/or re-cabling.

3.2 **Collision Data**

The recorded collision data shows that there were 26 collisions during the 6 year period between 2009 and 2014. Table 1 shows the number of collisions and the classification of collisions involving pedestrians, pedal cycles and motorcycles within the vicinity of this junction.

Table 1 – Collision classification

Year	Nature of Collision		Pedestrians	Pedal Cycles	M/C
	Serious	Slight			
2009	-	3	-	-	-
2010	-	3	-	-	1
2011	-	7		1	1
2012	-	4	-	-	-
2013	1	3	1	-	-
2014		5		1	
Total	1	25	1	2	2

The one recorded serious injury collision in Table 1, which occurred at this junction in April 2013, involved a pedestrian who crossed the road into the central island and began to cross the other part of the road believing all traffic lanes were stopped at the 'red' traffic signal. However the right turning traffic lanes were on 'green' and the pedestrian clipped the side of the vehicle.

Majority of the collisions at this junction were rear-end collisions and right turning drivers colliding with other drivers travelling straight ahead.

3.3 Pedestrian survey analysis

Pedestrian surveys were undertaken on 3rd, 5th and 7th November 2015 from 7am to 7pm to determine the pedestrian movements across the various arms of this junction. Figure 2 shows the volume of pedestrians recorded during the survey period crossing any arm of this junction, whilst Table 2 shows the volume of pedestrians recorded crossing the road during the morning, afternoon and evening peak periods (7am -10am, 12- 2pm and 4pm-7pm).

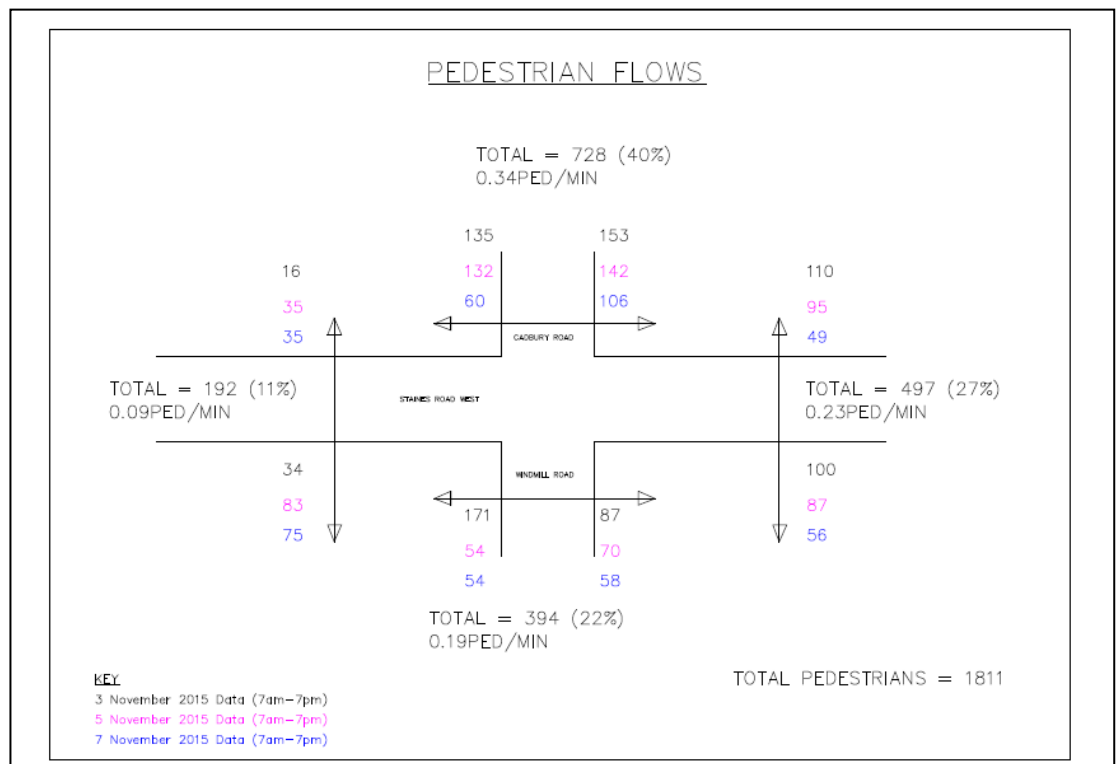


Figure 2 – Pedestrian movement during the survey period.

The recorded survey in Figure 2 shows that Cadbury Road, which has uncontrolled pedestrian crossing facilities, takes the majority of pedestrian movements at this junction with approximately 1 ped/min recorded crossing any arm of this junction. The recorded data shows a low pedestrian demand for this location.

Although there was a low pedestrian demand over the 3 days the survey was undertaken, the demand was doubled during the peak periods of the day as

shown in Table 2. The morning peak period for the 3rd and 5th November recorded the highest pedestrian volume.

Table 2 – Peak periods pedestrian movements

ROAD	Pedestrian Movement									
	3 November 2015			5 November 2015			7 November 2015			TOTAL
	AM Peak	Lunch Time	PM Peak	AM Peak	Lunch Time	PM Peak	AM Peak	Lunch Time	PM Peak	
Cadbury Road	91	31	75	86	41	73	20	30	57	504
Windmill Road	58	15	46	44	15	17	16	15	52	278
Staines Road West (E)	69	25	40	66	16	34	16	20	26	312
Staines Road West (W)	38	4	17	28	9	23	9	5	15	148
TOTAL	256	75	178	224	81	147	61	70	150	1242
(ped/min)	1.42	0.63	1.0	1.24	0.68	0.82	0.34	0.58	0.83	

3.4 Traffic survey analysis

The recorded traffic volume during the survey period shows Cadbury Road contributed to 12% of the traffic volume into this junction with Windmill Road contributing 20% (see Table 3). Whilst there was approximately 13% and 21% of traffic volume exiting these two roads. Staines Road West recorded the highest traffic volume using this junction. Traffic movement into the individual arms and dispersal into the other arms are attached in Appendix A.

Table 3 – Traffic volume over the survey period

		TRAFFIC INTO	TRAFFIC OUT
Cadbury Road	Volume	13,569	15,204
	%	12	13
Windmill Road	Volume	23,261	23,747
	%	20	21
Staines Road West(E)	Volume	37,549	40,281
	%	33	35
Staines Road West(W)	Volume	39,972	35,119
	%	35	31
Total Traffic Volume		114,351	114,351

Table 4 – Traffic volume during the peak periods

TRAFFIC FROM ROAD	TRAFFIC VOLUME DISPERSAL INTO OTHER 3 ARMS														
	03-Nov-15					05-Nov-15					07-Nov-15				
	AM	Lunch	PM	TOTAL	veh/min	AM	Lunch	PM	TOTAL	veh/min	AM	Lunch	PM	TOTAL	veh/min
Cadbury Road	1214	706	1550	3470	7.23	1243	698	1485	3426	7.14	748	720	919	2387	4.97
Staines Road West (E)	3417	2043	3647	9107	18.97	3432	2052	3839	9323	19.42	1798	2174	2990	6962	14.50
Windmill Road	2417	1297	2720	6434	13.40	2582	1352	3070	7004	14.59	1180	1505	1725	4410	9.19
Staines Road West (W)	3778	1899	3746	9423	19.63	4083	1988	3902	9973	20.78	2272	2416	3159	7847	16.35
TOTAL	10826	5945	11663			11340	6090	12296			5998	6815	8793		
veh/min	60.14	49.54	64.79			63.00	50.75	68.31			33.32	56.79	48.85		
DAILY TOTAL		28434					29726					21606			
DAILY PEAK (veh/min)		59.24					61.93					45.01			

During the peak periods, as shown in Table 4, there was approximately 14 vehicles/minute entering from Windmill Road arm of the junction with Cadbury Road approximately 8 vehicles/minute. The data also shows that there were approximately 60 vehicles/minute using this junction.

4. DISCUSSION AND OPTIONS

Investigations and analysis of the traffic/pedestrian surveys at the above junction showed a low pedestrian demand for this junction, Cadbury Road was recorded as the most used arm of the junction by pedestrians, with an average of approximately 1 ped/min crossing this arm of the junction. However Cadbury Road was also recorded as having the lowest traffic volume entering or exiting this arm of this junction. The reduction in traffic volumes on this road can possibly be attributed to the existing banned right turn into Staines Road West.

Windmill Road arm was recorded as only having the 3rd highest pedestrian demand and the second lowest number of vehicles entering or exiting, which is consistent with the A308 itself being the majority flow in terms of vehicles.

The majority of vehicles entering from the Cadbury Road arm continued straight on into Windmill Road (66%) and in terms of vehicles entering from the Windmill Road arm, there was a relatively even split of vehicles turning left (37%) and going straight on (38%). These figures for Windmill Road suggest that there is no need to have two dedicated right turn lanes as at present.

With the high traffic volumes on all approaches into this junction, pedestrians crossing both arms of Staines Road West can easily do that with the assistance of the controlled pedestrian crossing point located across each arm of the junction. However pedestrians crossing Cadbury Road and Windmill Road will have to wait until the traffic signals across these arms are on 'red' before they can cross into the pedestrian refuges. With the exit lanes of these arms, they have to cross when there is a gap in the traffic. However with approximately 13% of the traffic volume exiting onto Cadbury Road and 20% into Windmill Road it will be difficult for them to cross these arms safely. Should a collision occur involving a pedestrian crossing either Cadbury Road or Windmill Road arms of the junction, it will be recorded as a serious injury collision if not fatal. This has already been demonstrated in the only pedestrian collision that occurred at this junction in April 2013 being a serious injury collision.

From a pedestrian safety point it would therefore seem logical to provide controlled pedestrian facilities across Cadbury Road and Windmill Road arms of this junction, as pedestrians will have to negotiate 5 lanes of traffic across Windmill Road to cross this arm of the junction.

The collision records showed that most of the collisions at this junction were rear-end collisions and right turning collisions; therefore antiskid surfacing should be applied to all approaching arms into this junction to improve skidding resistance, safety and reduce the number of rear-end collisions. In addition, the intergreen periods between the different stages of the traffic movements should be reviewed to reduce the number of the right turning collisions.

4.1 Option 1 – Do nothing

This is a feasible option but it would not contribute to enhancing Surrey County Council's road infrastructure and would not proactively seek to improve safety and reduce accidents so it is not recommended.

Estimated guide price £zero

4.2 Option 2 – Pedestrian crossings facilities on Cadbury Road and Windmill Road arms of the existing traffic signal controlled junction.

Implement controlled pedestrian crossing facilities across Cadbury Road and Windmill Road arms of this junction. In addition, modifications to the existing pedestrian refuges across these arms of the junction are necessary to ensure the pedestrian phases across these arms can operate with other traffic movement to improve the capacity and operation of this junction. The pedestrian refuges modifications can be accommodated by reduction in traffic lanes and widths. See Appendix B.

Since the stages of the traffic signals will be modelled to accommodate the additional pedestrian crossings, the right turning from Cadbury Road into Staines Road West has been incorporated into the proposed traffic signal arrangement to improve the operation of the junction.

Based on this data, we estimate that incorporating the suggested pedestrian crossing facilities for Windmill Road and Cadbury Road into the existing traffic signal arrangement will generate a relatively small reduction in capacity of approximately 12% to the operation of the junction, as they can be phased and included into the existing signal stages. In the proposed layout (Appendix B) phase D doesn't now run in stage 2 (Appendix C), only in stage 3. Looking at the traffic flows, 12% of the total traffic of the junction is phase D in stage 2. If all this flow is moved to stage 3 it will reduce the capacity of the junction by 12%. This reduction in capacity is an estimated figure based on the traffic flows and the true impact can only be known by undertaking a full traffic modelling exercise.

The estimated cost of the modification to this junction is £140,000

5. RECOMENDATION:

The additional controlled pedestrian crossing facilities across Cadbury Road and Windmill Road together with the right turn from Cadbury Road into Staines Road at this signal controlled junction as discussed in Section 4.2 offers an improvement to pedestrian safety as well as the wider community.

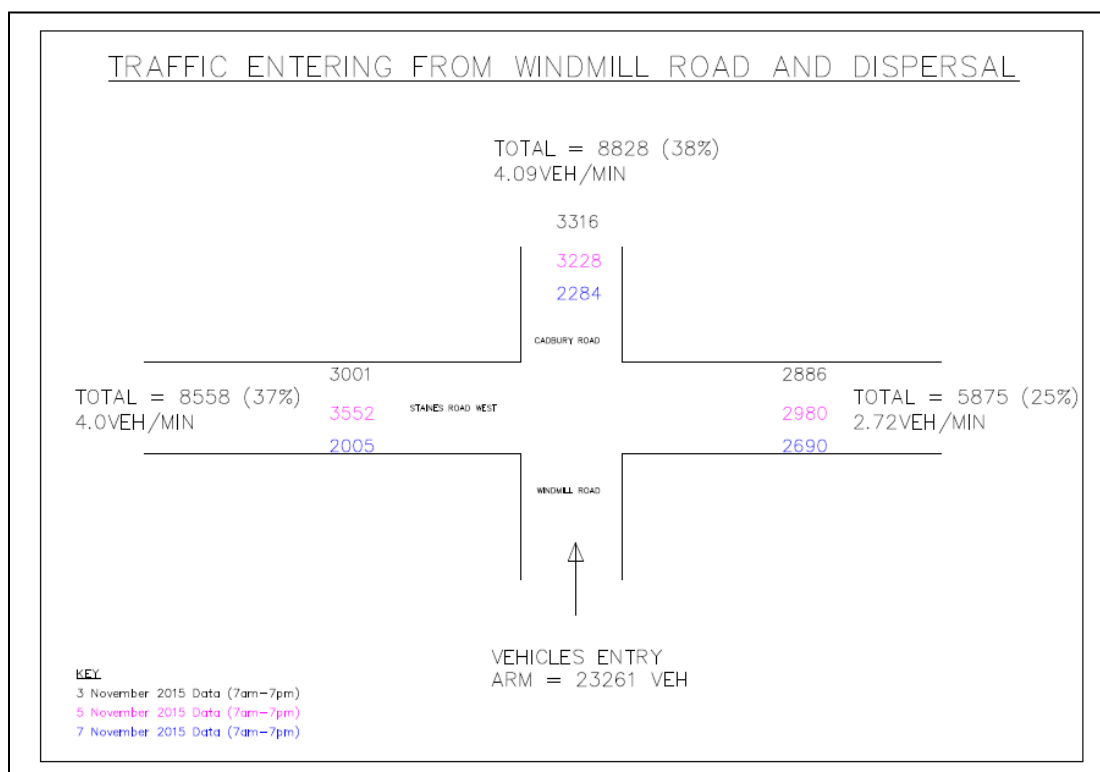
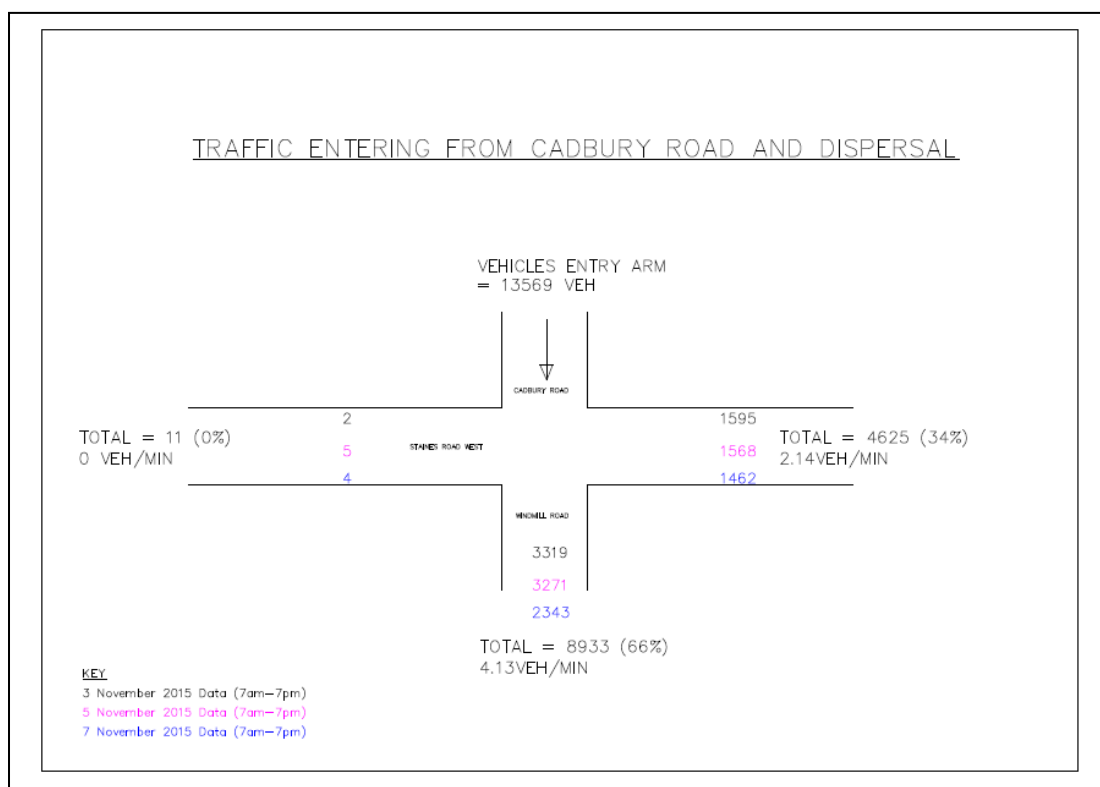
It is therefore recommended that option 2 as described in section 4.2 is progressed.

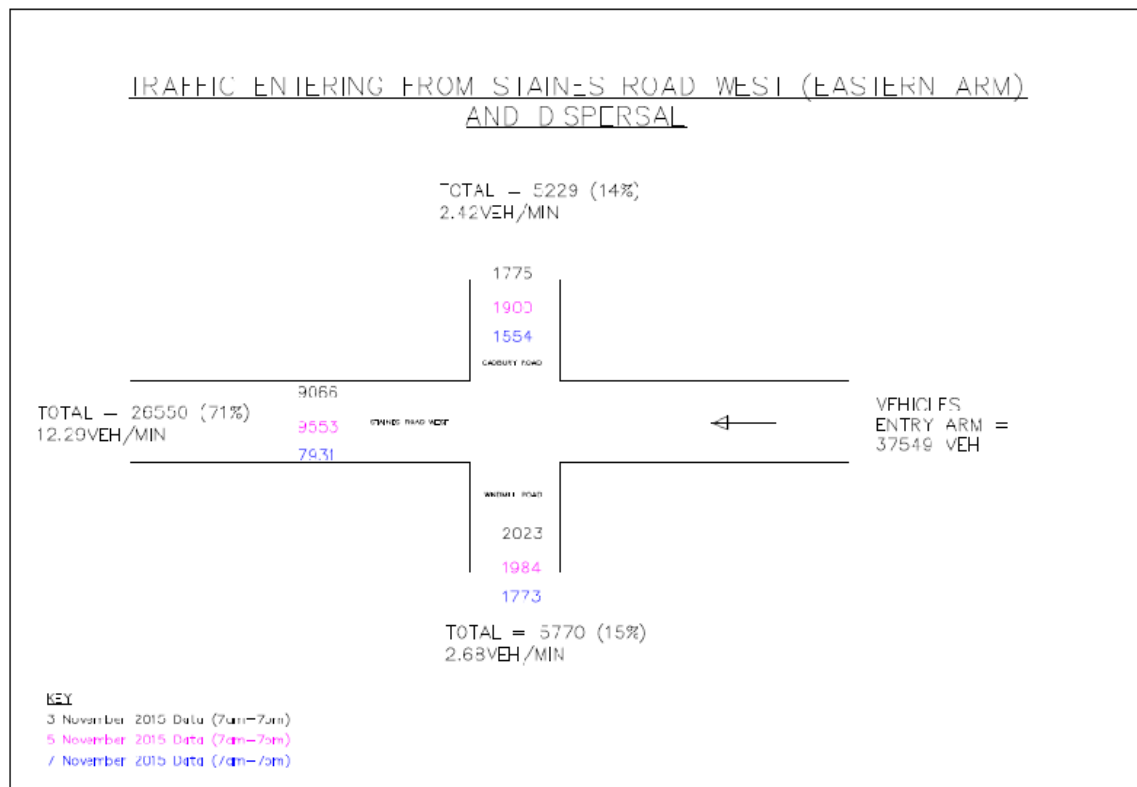
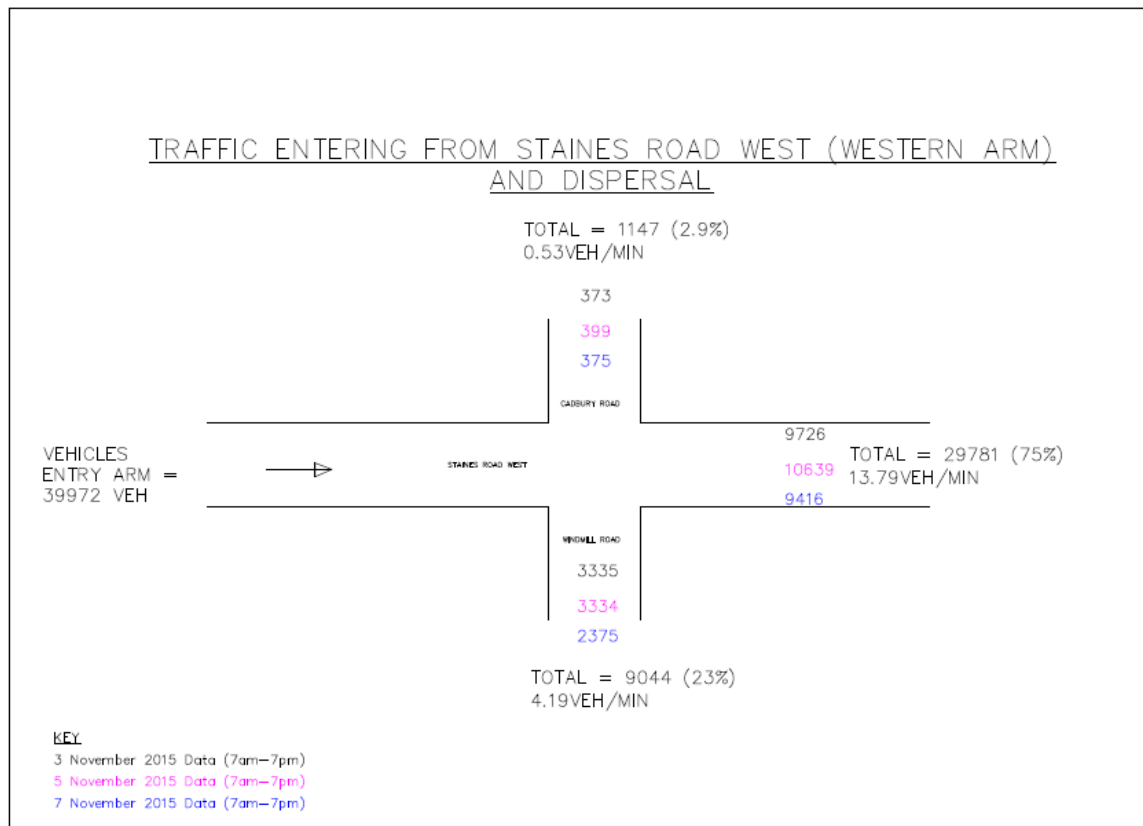
6. APPENDICIES

Appendix A – Traffic from Individual Arms and Dispersal

Appendix B – Proposed Traffic Signal Layout

Appendix C - Existing Traffic Signal Layout

APPENDIX A – Traffic Entering from Individual Arms and Dispersal**APPENDIX A – Traffic Entering from Individual Arms and Dispersal**



APPENDIX B – Proposed Traffic Signal Layout



