



**SURREY**  
COUNTY COUNCIL

# **Analysis of Motor Vehicle, Cycle and Pedestrian Movements**

**A23/Cross Oak Lane/Hoadley Road,  
Horley**



## Amendment List

Issue/ Revision	Date	Officers	Reviewed by	Comment
1	21.03.23	JL	WB	

File name:

H:\Modelling\project\A23\_CrossOakLane\ A23\_CrossOakLane\_Report\_March2023\_Final.docx

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# 1 Introduction

## Purpose and Location

## Introduction

### Location

The report focuses on the area surrounding the junction where the A23 Bonehurst Road and Cross Oak Lane meet, in the Reigate and Banstead borough of Surrey, highlighted in Figure 1. This junction lies approximately 180m west of the trainline between Horley and Salfords, and slightly over a kilometre north of Chequers roundabout in Horley. Cross Oak Lane leads to a mostly rural area east of Horley; but importantly it provides access to business parks just off the A23 as well as the 'North-East Sector' and Langshott areas of the town via Orchard Drive.

Immediately north of the A23/Cross Oak Lane junction, Hoadley Road joins the A23 from the west. Hoadley Road is a recently developed road which provides access to part of the Westvale Park 'North-West Sector' development as well as the smaller Mulberry Park housing scheme. Currently the western end of Hoadley Road is closed, with Road Safety Audits being undertaken: it's possible that use of this junction will be restricted.

Although the Hoadley Road signalled junction with the A23 has been in operation since the summer of 2021, the road itself is used by construction traffic only. Pedestrian and cyclist facilities still need to be installed.

Apart from other local communities, this section of the A23 also serves more business parks and industrial estates in the Salfords area as well as the East Surrey Hospital. For this reason, the A23 is an important corridor between Horley, Gatwick and the M23 spur in the south and Redhill and Reigate to the north.



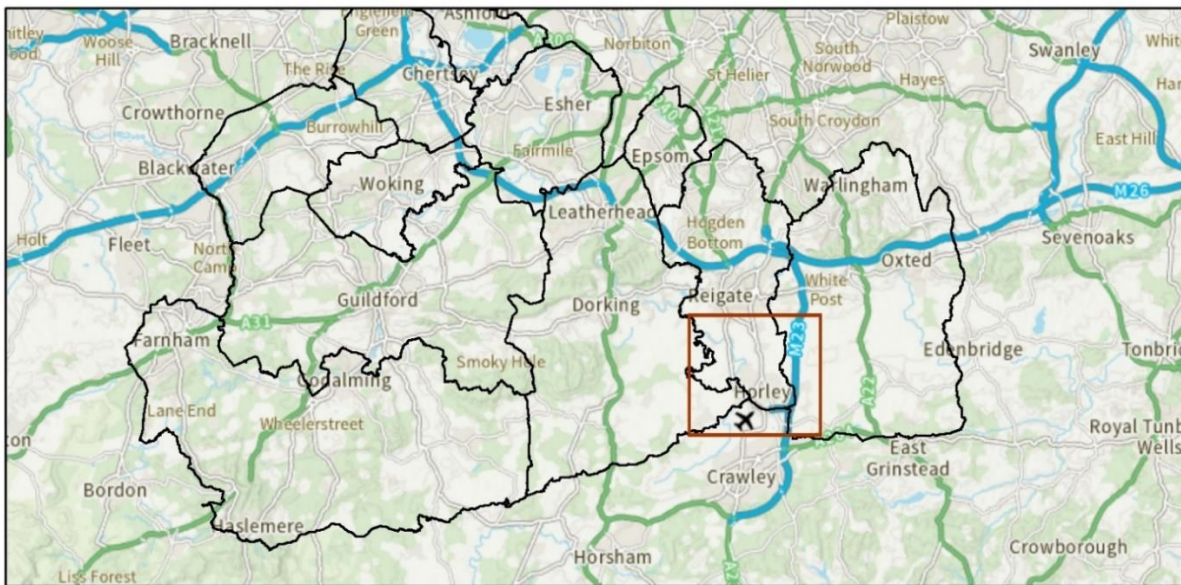
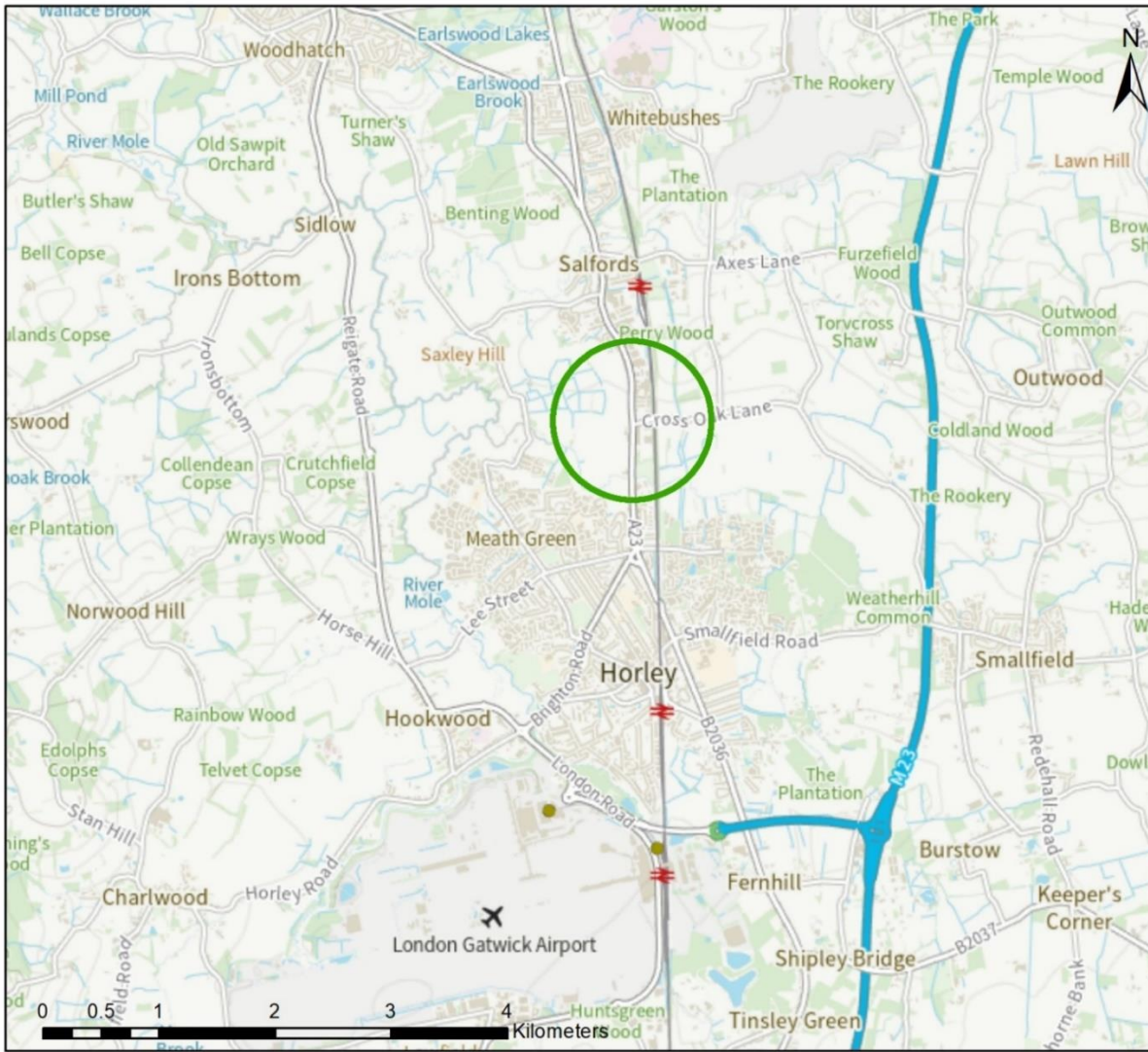


Figure 1 shows two maps. The top map shows the study area at a local scale. The green ring shows the position of Cross Oak Lane's and Hoadley Road's junction with the A23. The map underneath shows the borders of Surrey and the boroughs/districts within. The red box shows the extents of the map above.

# **2 Motor Vehicle, Pedestrian and Cycle Analysis**

**Analysis and Interpretation  
of Survey and ATC Data**

# Data Overview

The data used to inform this report has been collected using two different methods. The majority of survey data has been obtained from manual classified counts, and there is one dataset collected from an automatic cycle count site.

Manual counts involve enumerators recording each passing vehicle, typically at a junction, noting the type of vehicle and whatever turning movement they may make. These surveys are one day counts, recording data from 07:00 until 19:00.

The automatic cycle count (ACC) is a permanent site recording the number of bicycles passing that particular point. The ACC records data every day, giving a greater consistency to results. Such sites are located on highway links (i.e. between junctions) as the equipment used is unable to record turning movements.

The sites included in this report are listed below, alongside the type of survey employed:

- **A23 Bonehurst Road/Cross Oak Lane – One day manual classified counts**
- **A23 Bonehurst Road/Hoadley Road – One day manual classified counts**
- **A23 Bonehurst Road/Balcombe Road – One day manual classified count**
- **A23 Bonehurst Road (Department for Transport Surveys) – One day manual classified counts**
- **A23 Brighton Road – ACC Cycle counts (Site 719)**
- **A23 Brighton Road/Honeycrook Road – One day manual classified count**
- **A23 Brighton Road/Woodhatch Road – One day manual classified count**
- **A23 Brighton Road/Maple Road/Three Arch Road – One day manual classified counts**

The locations of these survey and count sites are shown in Figure 2 below.



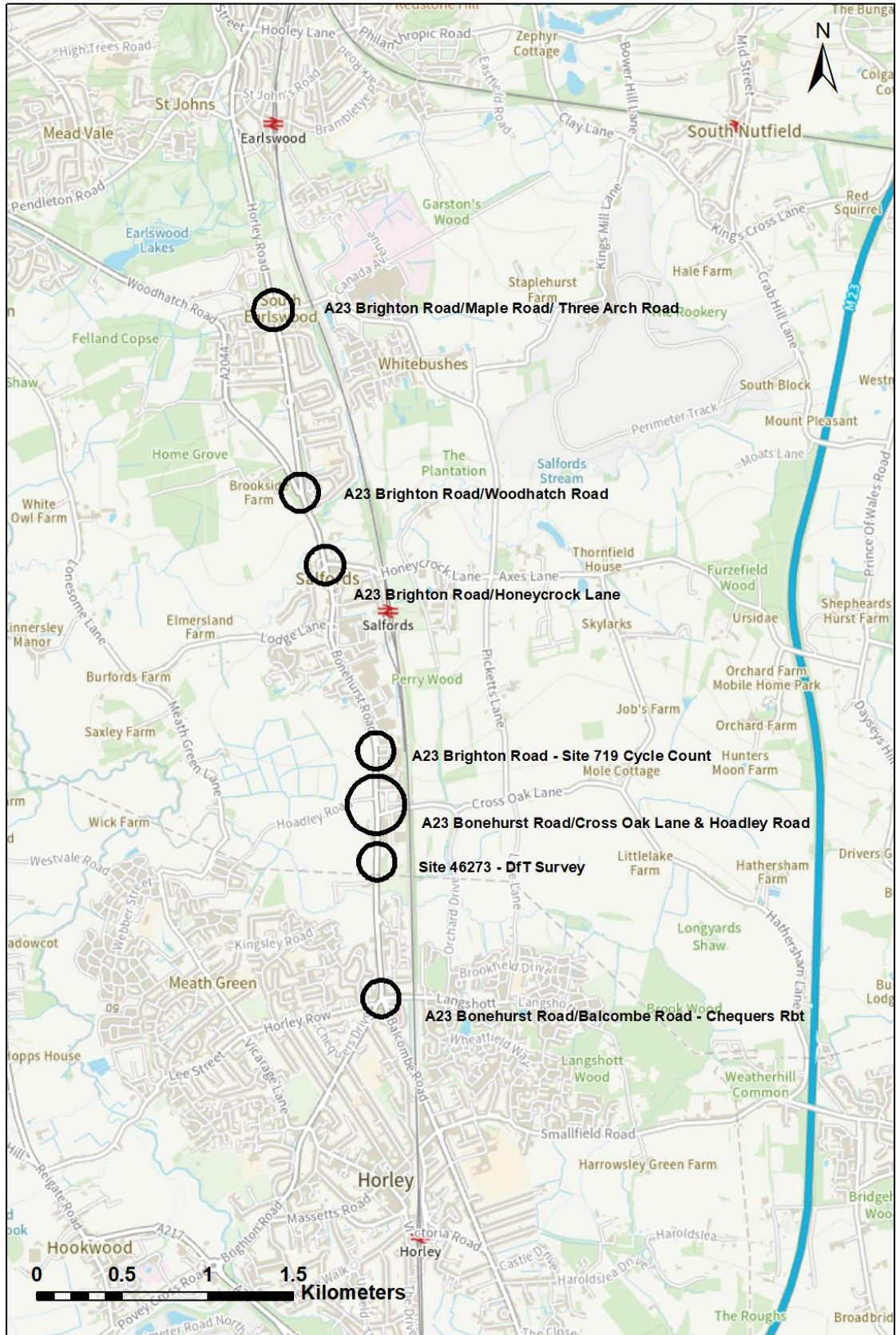


Figure 2: locations of the survey sites used to inform this report.

# A23 Bonehurst Road/Cross Oak Lane

## Motor Vehicle Flows

Approximately 1.1km north of Chequers roundabout in Horley, Cross Oak Lane joins the A23 from the east. During peak periods, this junction experiences a relatively high volume of flow attempting to join the A23, in addition to vehicles turning off the A23 into Cross Oak Lane. One day classified manual count surveys were taken at this junction in both February and September of 2022, allowing us to compare turning movement data over the 7-month period between when the surveys were carried out.

Total vehicle flows through this junction remained very similar between February and September, with an increase of 440 (1.9%) vehicles in September (22,968 in February and 23,408 in September): this is unremarkable as in general traffic flows are higher in September compared with February. As can be seen in Figure 3a below, the volume/time profile for this junction remained very similar between these two months. The graph shows a peak in the AM period, focussed around 08:00, followed by a decrease in flow, only for the rate of flow to increase steadily throughout the afternoon before reaching a peak around 16:00. In both months, it appears the PM peak has flow rates as high as the AM peak, but these high flow rates are also spread over a longer period.

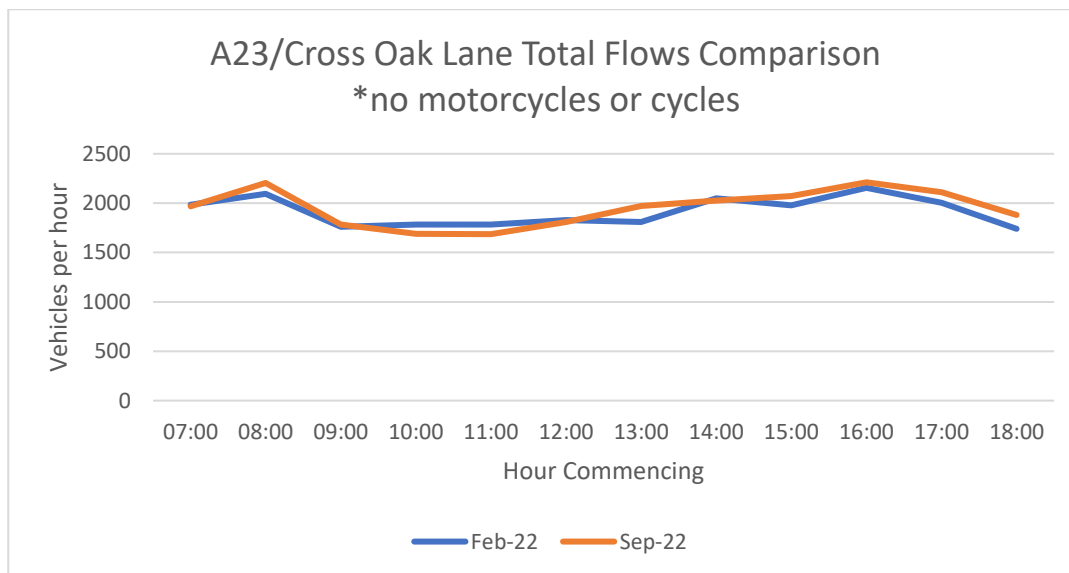


Figure 3a: the flow/time profile for motor vehicle flows at the A23/Cross Oak Lane junction.

By contrast, Figure 3b shows the approach to the junction from Cross Oak Lane experiences approximately 33% more flow in the morning peak than the evening peak period, with Figure 4 indicating that the majority of vehicles in the in the morning peak period exiting onto the A23 turn right

towards Redhill. In a similar manner to total flows for the whole junction, the PM peak flow appears to be spread over a far longer period than the AM peak, with a more gradual increase before, and decrease after, the peak.

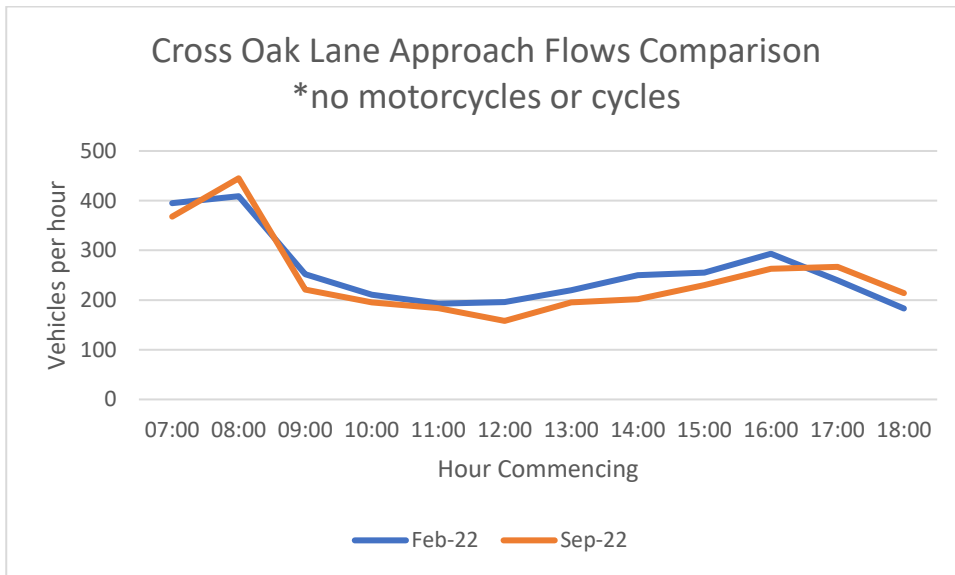


Figure 3b: vehicle/time profile for motor vehicles using the Cross Oak Lane approach of the A23/Cross Oak Lane junction.

Figure 4 shows the turning movements for this junction recorded in September 2022.



Figure 4: A23/Cross Oak Lane turning counts for the AM and PM peak periods and over 12 hours (September 2022).

Figure shows OGVs (medium and large goods vehicles) as a proportion of total traffic flow for the entire A23/Cross Oak Lane junction in February and September. It can be seen that the highest proportion of OGVs occurs between approximately 10:00 and 12:00, reaching over 5% in February.



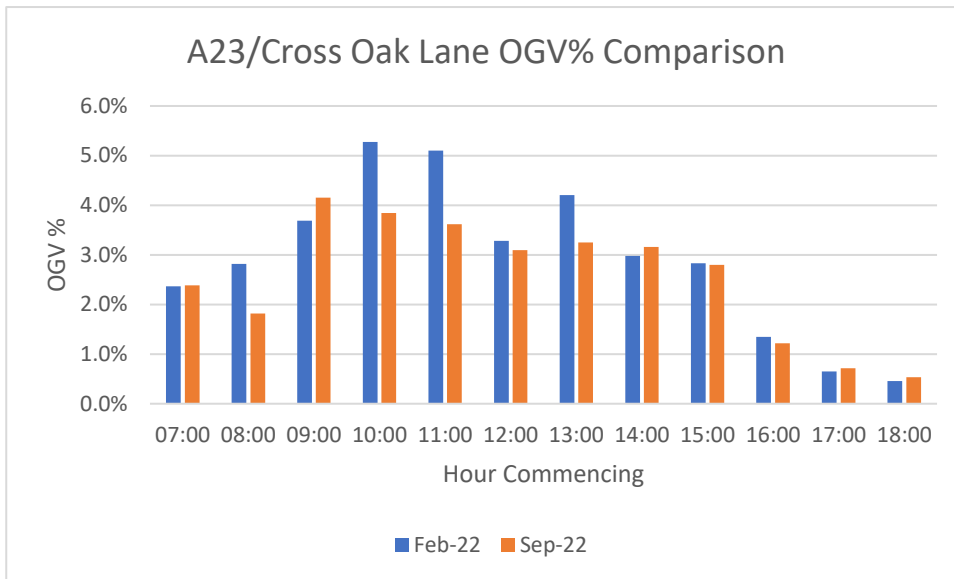


Figure 5: OGV percentages of total vehicle volume in February and September for all approaches at the A23/Cross Oak Lane junction.

Table 1a shows the number of OGVs travelling through the junction for each hour of the day, together with the corresponding percentage of the total vehicle flow, and Table 1b provides a summary. The overall figure of between 2.5% and 2.9% of total flow is comparable to similar A roads of this nature in Surrey.

Hour commencing	February 2022		September 2022	
	No. of OGVs	OGV %	No. of OGVs	OGV %
07:00	47	2.4%	47	2.4%
08:00	59	2.8%	40	1.8%
09:00	65	3.7%	74	4.2%
10:00	94	5.3%	65	3.8%
11:00	91	5.1%	61	3.6%
12:00	60	3.3%	56	3.1%
13:00	76	4.2%	64	3.2%
14:00	61	3.0%	64	3.2%
15:00	56	2.8%	58	2.8%
16:00	29	1.3%	27	1.2%
17:00	14	0.6%	16	0.7%
18:00	8	0.5%	10	0.5%

Table 1a: number of OGVs and corresponding percentage of the total flow travelling through the A23/Cross Oak Lane junction.

	February 2022	September 2022
Total Vehicle Flow 07.00-19.00	23,122	23,533
Total OGV Count	660	582
Total OGV %	2.9%	2.5%

Table 2b: summary of the number and corresponding percentage of OGVs using the A23/Cross Oak Lane junction, February and September 2022.

Queue surveys were conducted in September for the A23/Cross Oak Lane junction. These surveys recorded the maximum queue distance in a 5-minute period, from 07:00 – 19:00. Both lanes of the A23 southbound approach usually experienced maximum queues in any 5-minute period of over 40m, which remained relatively constant throughout the day, with increased queues between 08:00 – 09:00 and 16:00 – 18:00. Cross Oak Lane experienced relatively stable queue lengths throughout the day, at approximately 25m as a typical maximum queue length. The southern approach of the A23 experienced differing queue lengths depending on the lane, with right turn lane experiencing maximum queues of only around 20m during the AM and PM peaks, reducing down to 15m in the interpeak period.

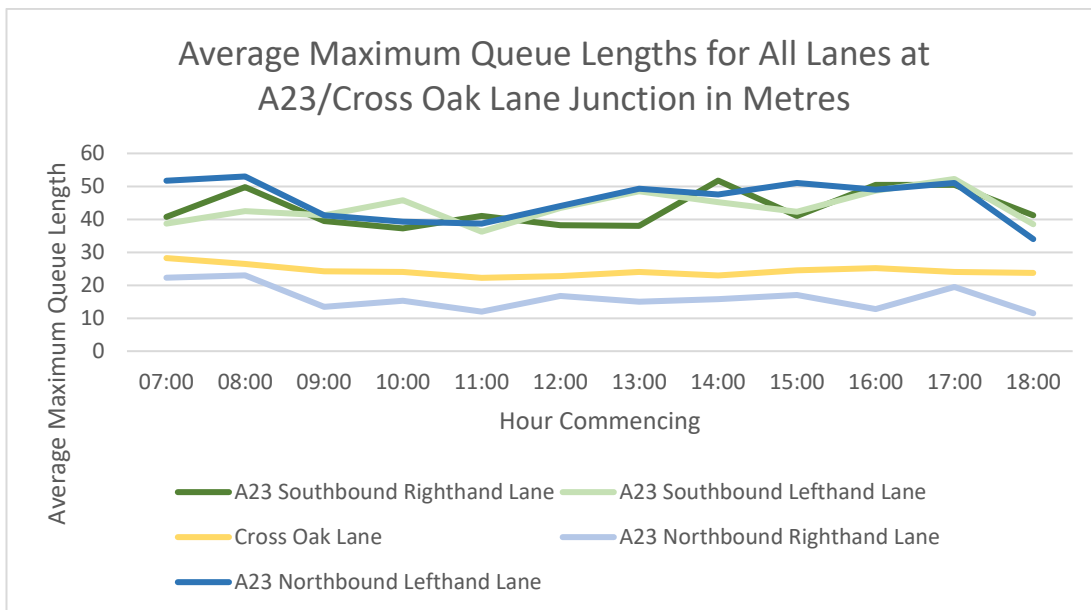


Figure 6: average maximum queue lengths per 5-minute period, for all approach lanes of the A23/Cross Oak Lane junction.

It is worth noting that the distance from the stop line back to the entrance of the timber merchant’s access just to the south of the junction is only 45m. Although there is a Keep Clear marking, the graph above shows there are times when the queue extends beyond the access, making it more difficult for drivers to exit the facility. Figure 7 below gives context to the queue lengths, showing how queues can impact access to local businesses.



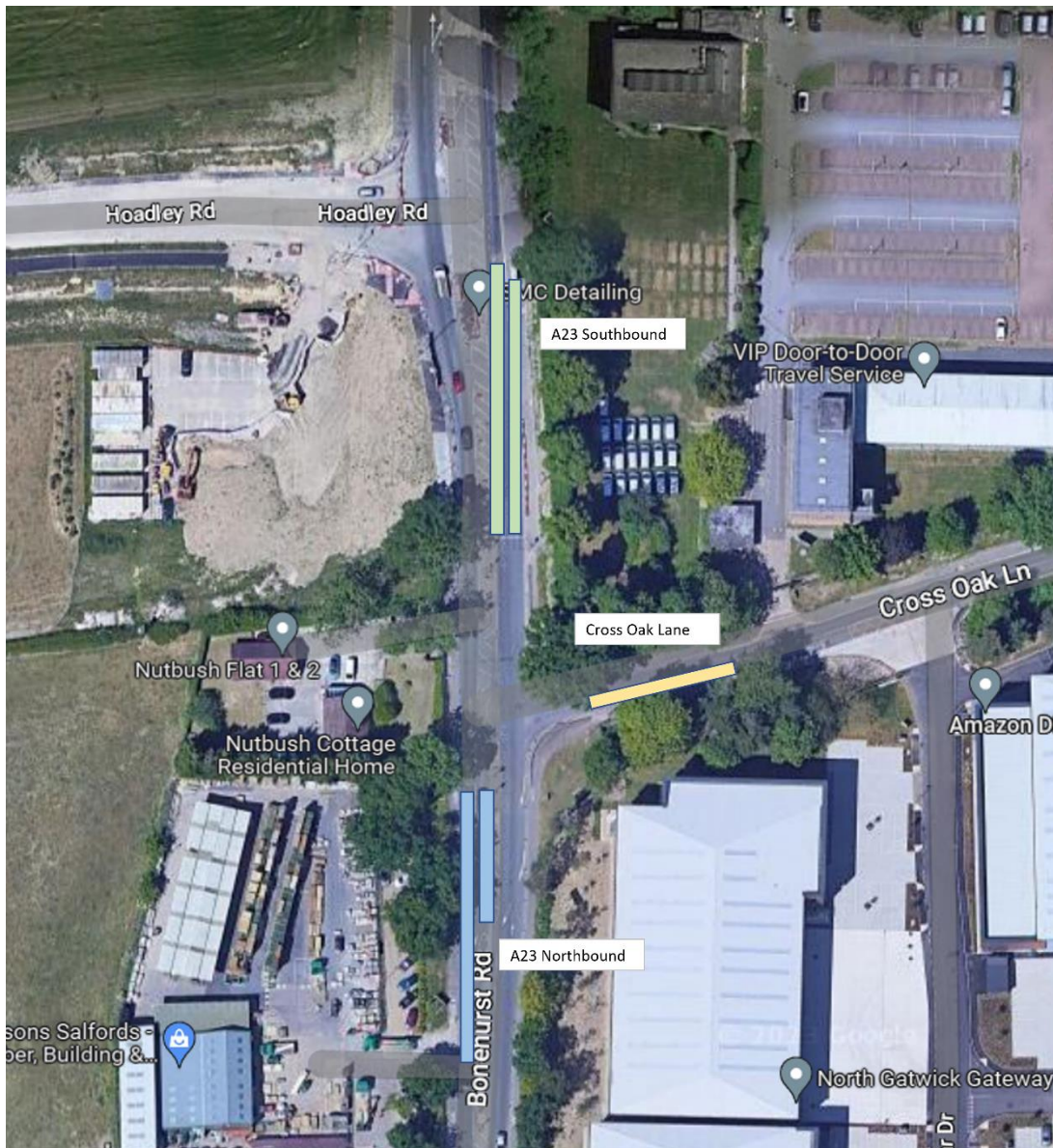


Figure 7: maximum recorded queue lengths at junction between A23 and Cross Oak Lane.

## Cyclists and Pedestrians

Counts of cyclists and pedestrians crossing at the junction were taken in February and September 2022. With regard to pedestrians, it appears that there was a base level of crossings (across the mouth of Cross Oak Lane and across the A23 opposite Cross Oak Lane) throughout the day of approximately 3 to 5 pedestrians per hour. In both surveys, there was a slight increase in pedestrians between 13:00 and 14:00, peaking at 5 or 6 pedestrians. There is some discrepancy between the February and September surveys. The February survey records a very pronounced peak during the hour of 07:00 to 08:00, of 15 pedestrians, quickly reducing down to base levels in the next hour. The September survey notices a similar peak, but instead in the PM period, from approximately 16:00 to 18:00. Despite the difference, both indicate that there are more pedestrians crossing during the AM and PM peak periods, from 07:00 – 09:00 and 16:00 – 18:00.

The majority of hours at this junction saw no cycles crossing at this junction. The only cycles recorded crossing the junction did so either between 07:00 – 09:00 or 14:00 – 19:00. Numbers were very limited, with only 13 cycles crossing on the day of the February survey.

## A23 Bonehurst Road/Hoadley Road

### Motor Vehicle Flows

The A23 Bonehurst Road/Hoadley Road junction is situated approximately 80m north of the A23 Bonehurst Road junction with Cross Oak Lane. Hoadley Road provides access from the A23 to the newly built Westvale Park development, and vice versa. One-day classified manual count surveys were conducted at this junction in both February and September of 2022.

As can be seen in Figure 8, the volume/time profile recorded in the February and September surveys are analogous. Unsurprisingly given their proximity to each other, this junction has a similar flow profile to that of the Cross Oak Lane junction: the flow rate in the AM peak period is very similar to that of the PM peak period, but the AM peak is sharper, while PM peak is flatter lasting a longer period.

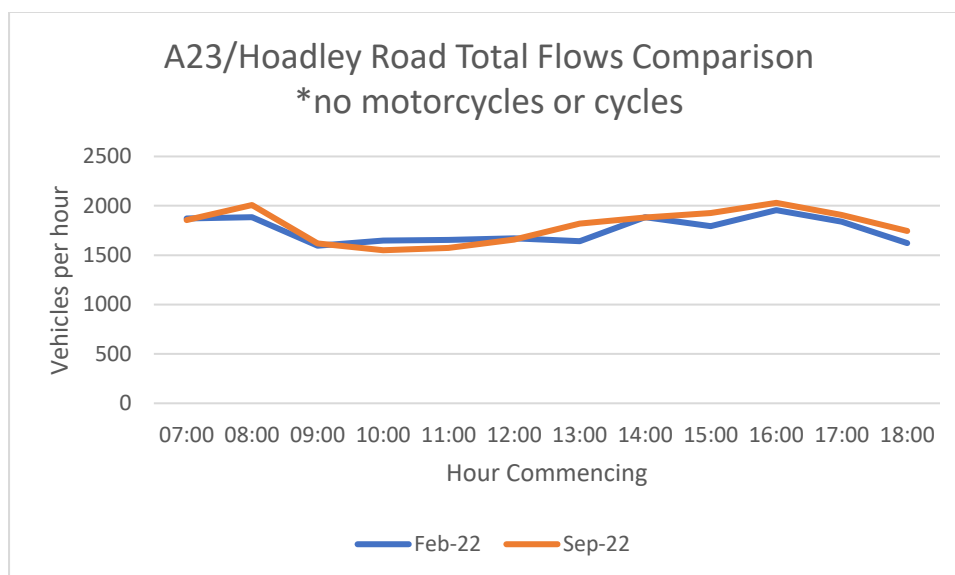


Figure 8: the flow/time profile for motor vehicle flows at the A23/Hoadley Road junction.

The volume of vehicles approaching from Hoadley Road is generally very low, at approximately 40 vehicles per hour during the interpeak period and reaching 100 vehicles per hour during the busiest hours. The volume and profile of this junction is likely to change as the development is completed

and more residents continue to occupy the site. OGV proportions are also likely to change for the same reason.

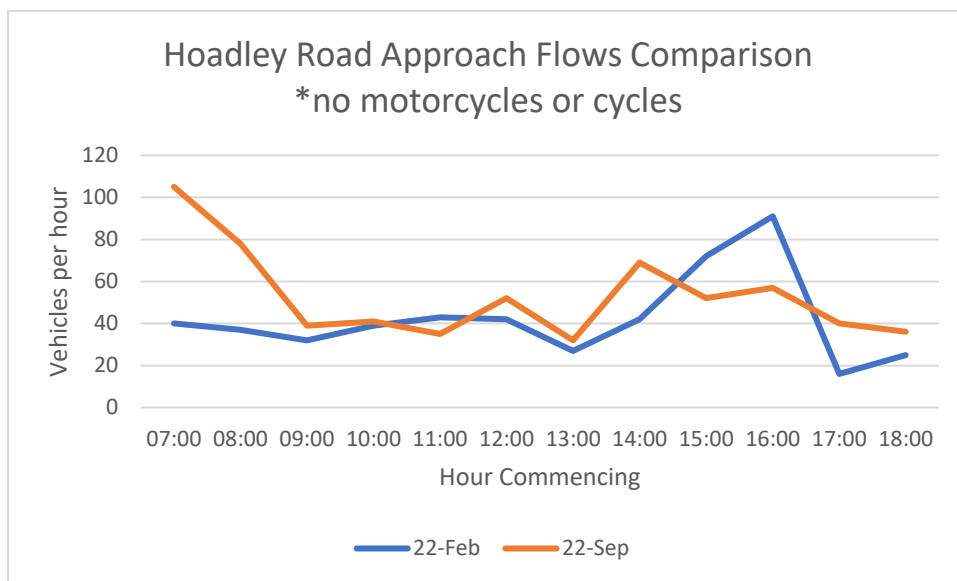


Figure 9: the vehicle/time profile for motor vehicles using the Hoadley Road approach of the A23/Hoadley Road junction.

Queue surveys were taken as part of the surveys conducted in September 2022. As shown in Figure 10, queue lengths vary depending on the lane. Due to the low levels of vehicles using Hoadley Road at the moment, this approach experiences low levels of queuing. This also explains the short queue lengths observed in the A23 southbound right-turn lane.

Both the central and left-hand lanes of the A23 southbound approach typically experience moderate queues. Modest queues during the AM period drop, but from 10:00 steadily increase in length throughout the day before being at their longest between 16:00 – 18:00.

The northbound approach shows very unequal use of the two available lanes, with queues in the left hand lane extending back by nearly 50m in the morning peak and over 40m in the early afternoon. The unequal use is because there is only a single northbound lane at the A23/Cross Oak Lane junction just to the south, and because any drivers using right turn lane have to merge back into a single lane once passed Hoadley Road.

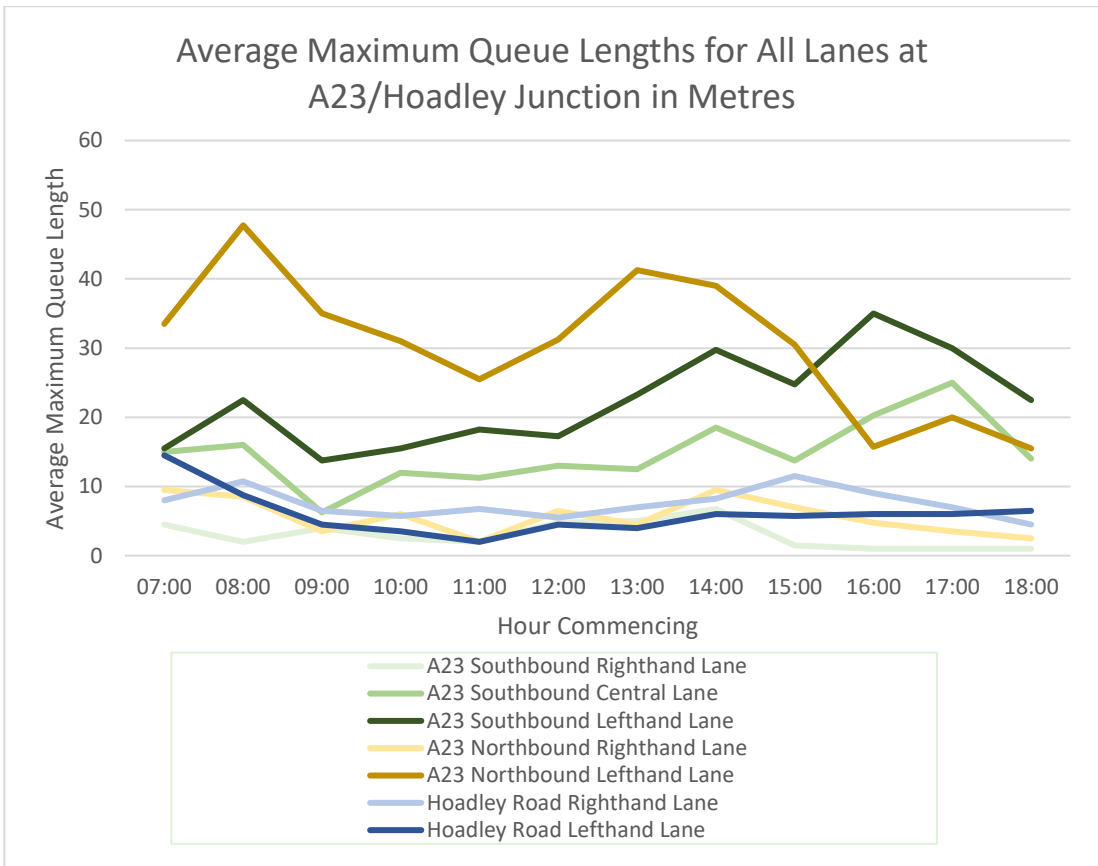


Figure 10: average maximum queue lengths per 5-minute period, for all approach lanes of the A23/Hoadley Road junction.

## Cyclists and Pedestrians

Pedestrian and cycle counts were obtained in February 2022, which captured the number of pedestrians and cyclists crossing the A23/Hoadley Road junction per hour. As seen in Figure 11, during the peak periods, both AM and PM, the number of pedestrians crossing the junction was relatively high. The number of pedestrians crossing peaks at 11 per hour. During the inter peak period, only a few pedestrians crossed each hour.

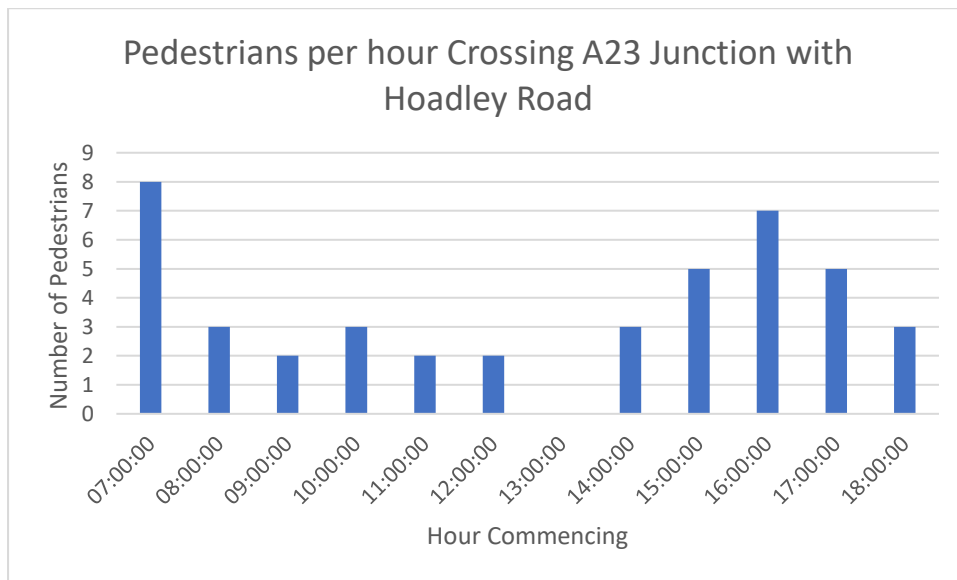


Figure 11: the number of pedestrians crossing the A23/Hoadley Road junction per hour.

As can be seen in Table 2, there are three main periods where cyclists crossed. These periods were from 07:00 – 10:00, with 8 crossings, 13:00 – 16:00 with 12 crossings, then 17:00 – 18:00 with 7 crossings. Between these periods, there was a minimal number of crossings. The survey clearly records AM and PM peaks, with relatively few cycles passing through in the interpeak period. The February survey has a maximum flow rate of 24 cycles per hour, between 17:00 and 18:00.

Time	Cycles
07:00	14
08:00	11
09:00	5
10:00	2
11:00	11
12:00	7
13:00	8
14:00	6
15:00	7
16:00	8
17:00	24
18:00	4
Total	107

Table 2 shows the number of cyclists per hour recorded in the February survey, 2022 from 07:00 – 19:00.



# A23 Bonehurst Road/Balcombe Road – Chequers Roundabout

The junction between the A23 Bonehurst Road, Balcombe Road and Ladbroke Road at Chequers roundabout is situated in north Horley and is positioned slightly more than 1km south of Cross Oak Lane. A one-day manual classified count was undertaken here in May 2022. The junction layout is shown in Figure 12 below.

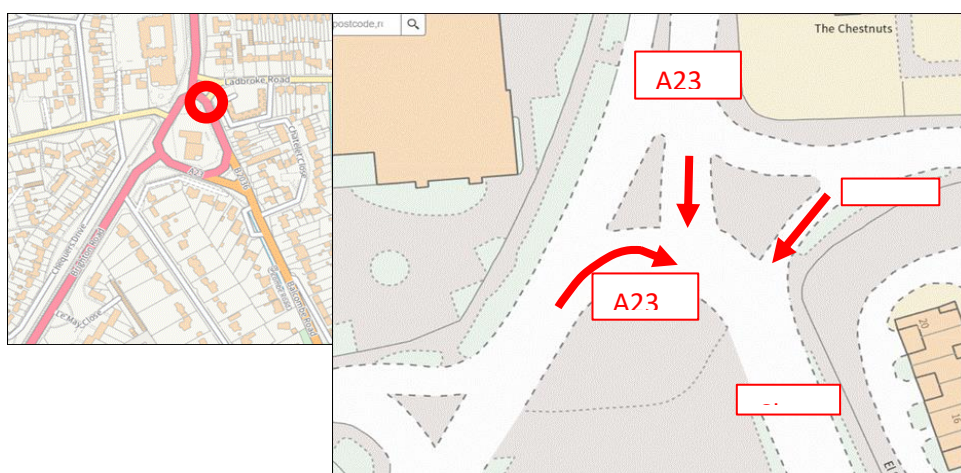


Figure 12: the location of the survey of A23 Bonehurst Road/Balcombe Road.

## Motor Vehicle Flows

On the day of the manual count, this junction experienced two distinct periods of peak flow, one in the AM period between 08:00 – 09:00 and one in the PM period between 15:00 – 18:00. The PM peak flow rate was slightly higher than the AM peak flow rate, at 1442 vehicles between 17:00 – 18:00, however this was not significantly higher than the hour between 08:00 – 09:00, which had 1366 vehicles recorded. What should be noted from studying Figure 13 is how extended the PM peak period is for this junction. Flow rates were nearly equal to or above 1400 vehicles per hour for three hours in the PM period, whereas this only occurred for one hour in the AM period. This implies that although the peak flow rates are very similar, a higher volume of flow uses the junction over the entire PM period compared with the AM.

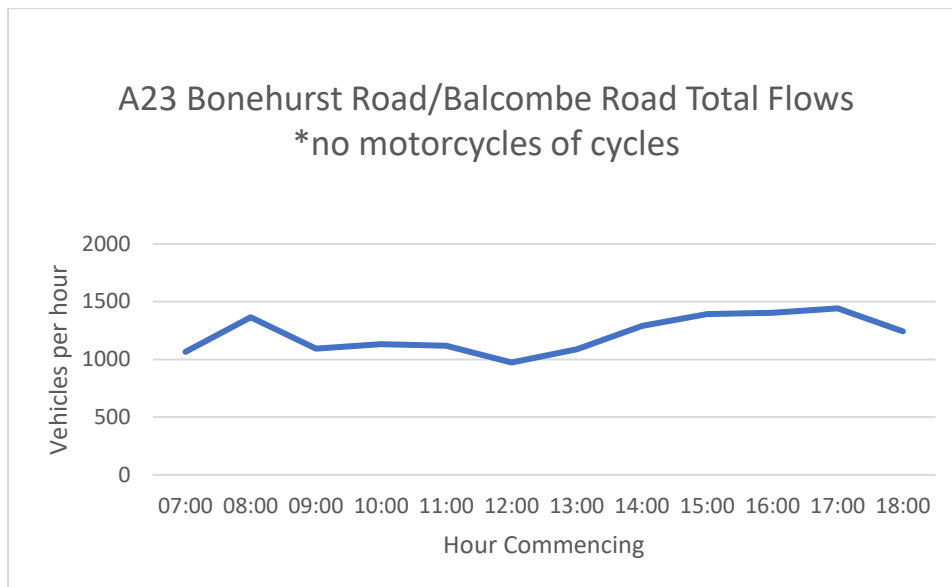


Figure 13: total flow per hour at the A23 Bonehurst Road/Balcombe Road junction, as part of Chequers roundabout in Horley.

The one-day classified count recorded the number of OGVs (medium and large goods vehicles) using the junction, allowing an OGV percentage of total vehicle volume to be calculated. Figure 14 indicates the number of OGVs peaked in the hour between 08:00 – 09:00, at 61, equating to 4% of vehicle flows being made up of OGVs. This percentage remains high until approximately midday, when it begins to decrease, reaching only slightly more than 1% in the evening. This is accompanied by a decrease in the nominal number of OGVs after 16:00.

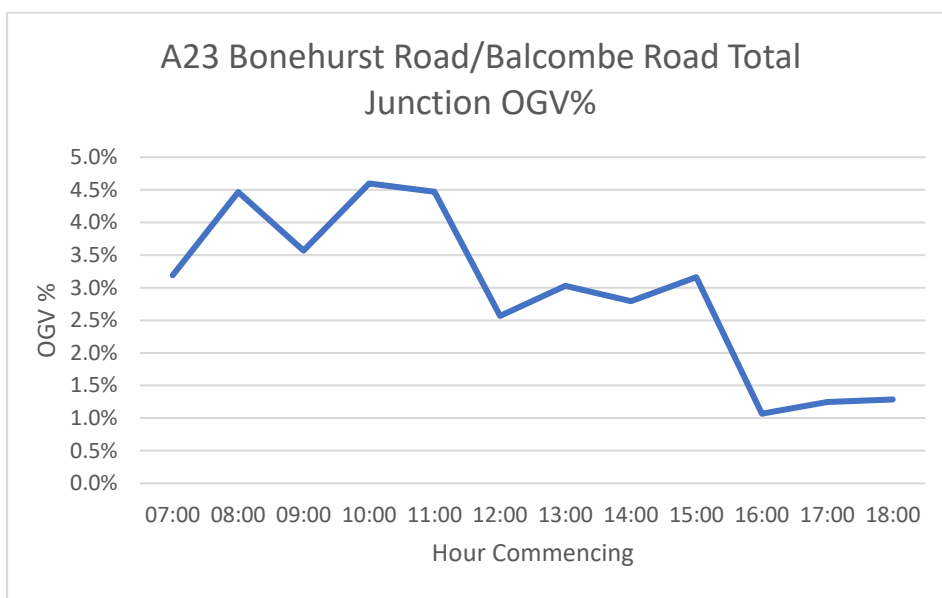


Figure 14: OGV percentages per hour as a proportion of total vehicle flow, at the A23 Bonehurst Road/Balcombe Road junction, as part of Chequers roundabout in Horley.

# A23 Bonehurst Road Surveys

One-day counts on the A23 Bonehurst Road have been conducted by the Department for Transport (DfT) as far back as the year 2000 (site 46273, shown in Figure 2). By comparing counts over time, trends and differences in the road's volume/time profile can be identified.

## Motor Vehicle Flows – Daily Counts

One-day surveys taken since the year 2000 show a general decrease of vehicles using the A23 per day between 07:00 – 19:00. Of the years 2000 to 2003, the average number of vehicles recorded in each survey was 24817, whereas the average number of vehicles recorded in surveys in 2012 and 2019 was 18829, approximately 24% less than the average between 2000 to 2003. Although data was not collected between 2013 – 2018, Figure 15 indicates there is confidence that the number of vehicles using the A23 in both directions has decreased since 2000. This reduction up until 2012 may be explained partly by the continuing effects of the recession following the 2008 financial crisis. OGV% values have remained consistent, ranging between 2.5% and 4% of total flow.

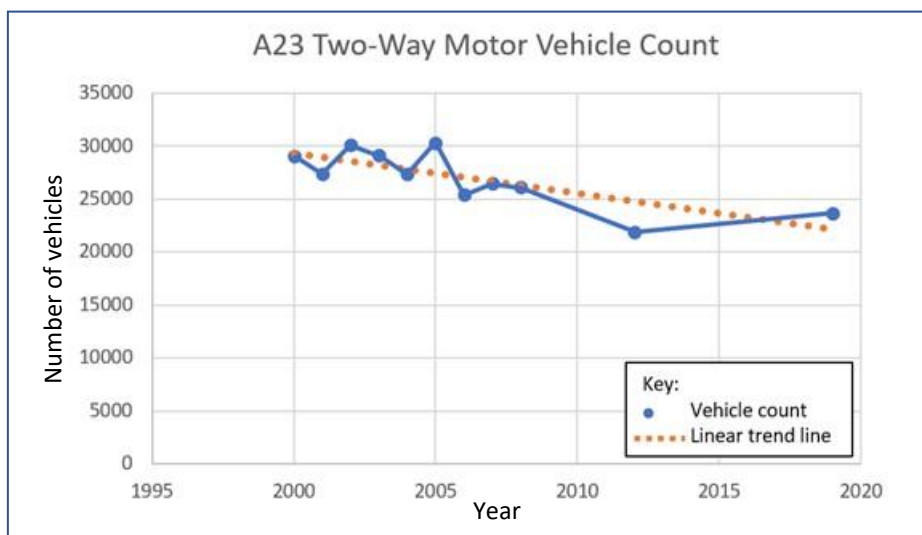


Figure 15: the total number of vehicles passing the survey point in both directions between 07:00 - 19:00, over multiple years. No survey was conducted during the years without data on this graph. The survey site is situated between Chequers roundabout and Cross Oak Lane on the A23.

## Motor Vehicle Flows – Hourly Counts

As one can see in Figure 15 above and Figure 16 below, the total vehicle flow in both directions was higher in 2000 and 2005 than in both 2012 and 2019. The profiles for 2005 and 2012 show similar trends in the AM period, even though flows in 2005 are greater. Both have a reasonably distinct AM peak period, with 2005 and 2012 flows peaking at 2,408 and 1,748 respectively. There was then a fall in volumes before a steady increase throughout the early afternoon. In the evening, flows in 2005

continued to increase, peaking at 2,694 vehicles per hour, whereas 2012 recorded flow rates plateauing at approximately 1,850 vehicles per hour. There is no distinct morning peak in the 2019 data, with flow rates remaining between 1,750 and 1,600 until 14:00. Flow rates do somewhat increase for the PM period, peaking at just below 2,000 vehicles per hour between 17:00 – 18:00. Overall, flow rates are very similar in 2012 and 2019, however the 2019 survey recorded a far more consistent flow rate throughout the day, with flow rates in 2012 varying significantly more. Flows in 2000 are similar to flows in 2005, but slightly greater in the morning and slightly lower in the inter peak period and evening. Every hour recorded in 2000 had higher flow rates than the same hour in 2012 and 2019.

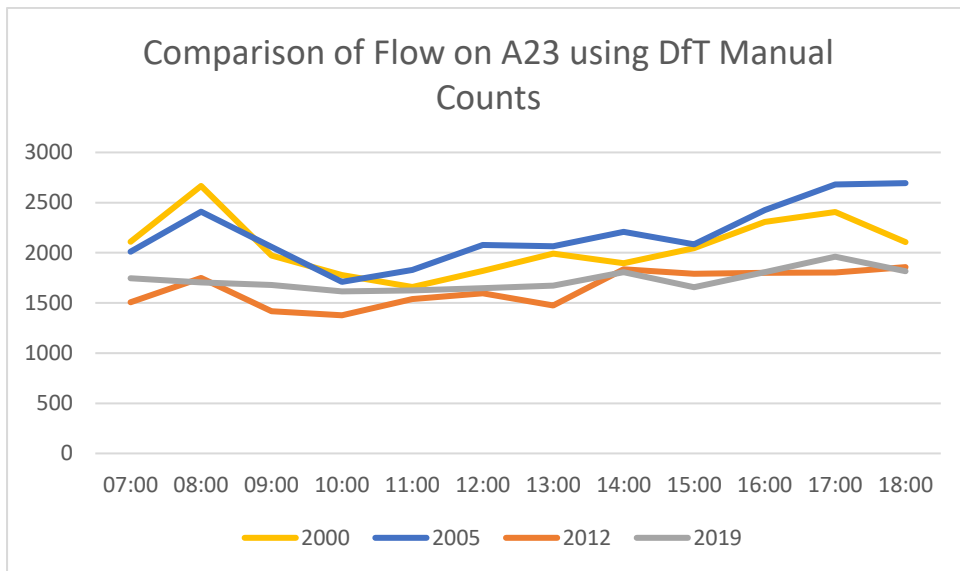


Figure 16: comparison of flows in vehicles per hour in both directions over four different years on the A23 between Chequers roundabout and Cross Oak Lane junction. These four years give a good summary of changes to flow volume over time.

What is noticeable, and is also somewhat evident in relation to the A23 junctions with Cross Oak Land and Hoadley Road, is that the profile throughout the day is relatively flat. This is in contrast to many roads in Surrey which experience distinct peaks in the morning and evening, with lower flows during the interpeak period although typically gradually building from late morning to school pick-up time and the late afternoon. This flatter profile shows that once flows build in the morning, the A23 remains busy throughout the day until the drop in volumes in the evening. As noted at the beginning of this report, the A23 is an important corridor linking Redhill and Reigate with Gatwick and the southern part of the M23, and serving not just local communities, including Horley, along its route but also a number of business parks, industrial estate and other commercial enterprises as well as the East Surrey Hospital.

# A23 Brighton Road – Automatic Cycle Counts

Weekday (5-day) average cycle counts were calculated using cycle data captured by the Automatic Cycle Count (ACC) site on the shared path and adjacent carriageway of the A23 close to the junction of the A23 with Hoadley Road.

Figure 17 shows average values for the month of September plotted on a flow per hour/time graph, only using data from Monday to Friday.

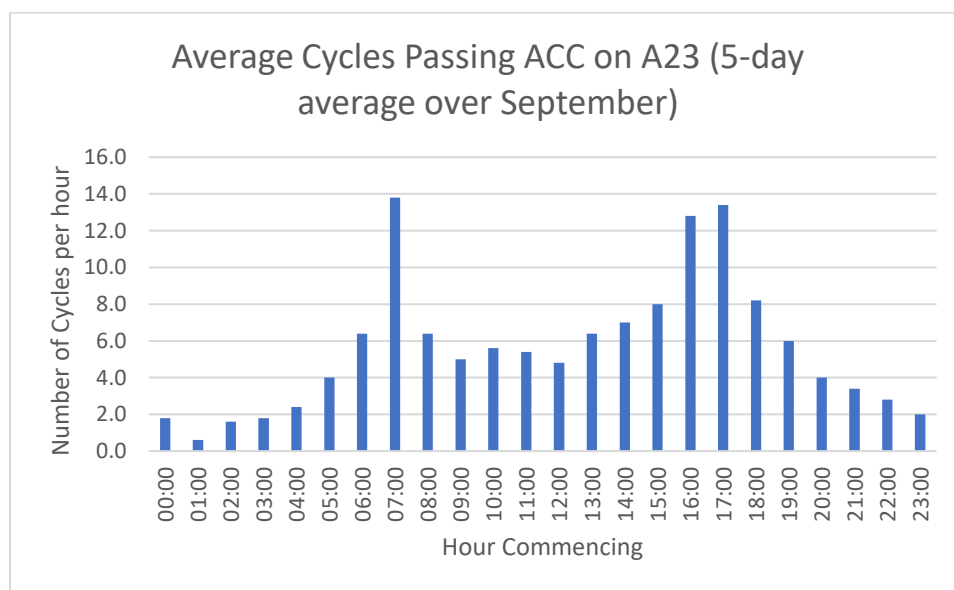


Figure 17: weekday averages of cycles per hour for September 2022.

As can be seen in Figure 17, the cycle per hour profile shows two distinct peaks, the morning one occurring in the hour 07:00 – 08:00, and the afternoon one spread over two hours, 16:00 - 18:00. During the distinct interpeak period, approximately 5 cycles per hour pass the ACC between 09:00 – 13:00.

## A23 Brighton Road/Honeycrock Road

### Motor Vehicle Flows

The junction at which the A23 meets Honeycrock Road experiences two moderately distinct peak periods regarding total flow, the first between 08:00 – 09:00 and the second between 15:00 – 18:00. Similar to other junctions nearby on the A23, the peak flow rates of both peaks are very similar, however the difference between the two peaks is the length of time



that volume is high. Figure 18 shows, for example, in the AM peak the volume is only above 2000 vehicles per hour in the 08:00 – 09:00 period, whereas in the PM peak, volume remains above 2000 vehicles per hour for three hours. In between the peak periods, from 09:00 – 15:00, there is an apparent interpeak period, which usually sees flow rates of less than 1800 vehicles per hour.

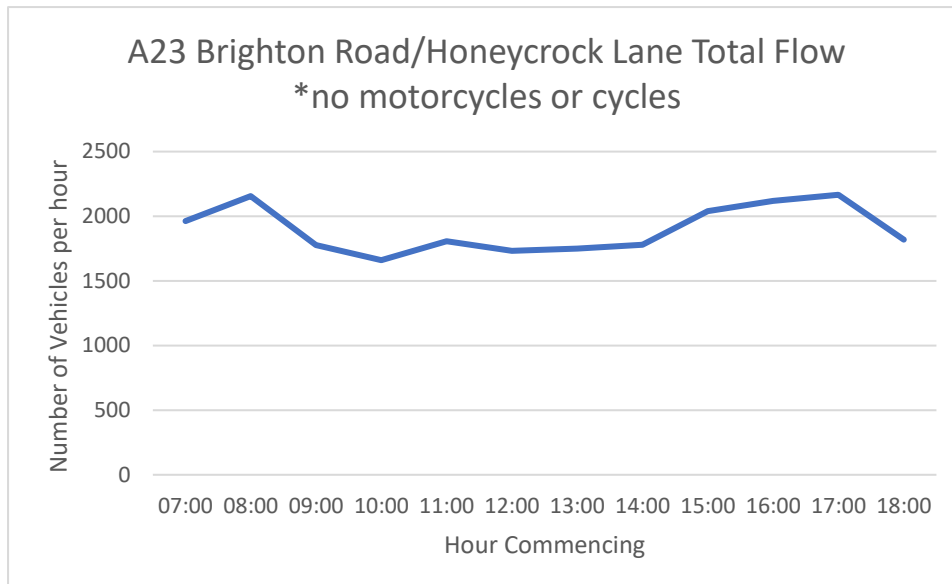


Figure 18: total motor vehicle flows per hour at the A23 Brighton Road/Honeycrock Road junction.

The period with the highest proportion of OGV movements is from 09:00 – 11:00, with values of approximately 5-6%, as shown in Figure 19. This peak is very distinctive after a relatively low value in the hours before. After the peak period named above, proportion of OGVs generally decreases steadily throughout the day, reaching less than 1% by 18:00. Until 16:00, the number of OGVs using the junction doesn't decrease substantially, however by 16:00, a combination of decreasing OGV counts and increasing total flow results in a decreased OGV percentage.

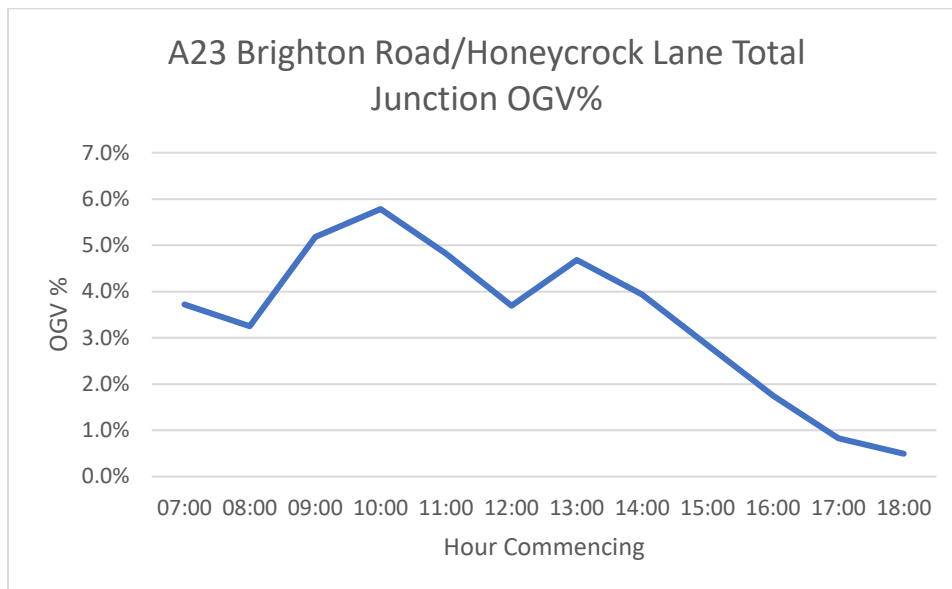


Figure 19: OGVs as a proportion (%) of total vehicle flow hour passing through the A23 Brighton Road/Honeycrook Lane junction.

## Cycle Flows

There are two distinctive peaks periods when the number of cycles passing through the junction is at its highest. From 07:00 – 08:00 there was 12 cycles, and from 17:00 – 18:00 there was 13. In the prominent interpeak period between, there was typically 5 to 7 cycles per hour.

# A23 Brighton Road/Woodhatch Road

## Motor Vehicle Flows

This is a popular junction for drivers either heading towards or coming from the Woodhatch and Reigate areas. Over the day (7am to 7pm) about 40% of the vehicles heading towards Redhill peel off at this junction to travel towards Woodhatch and Reigate. Nearly all the vehicles using the A2044 Woodhatch Road and approaching the junction turn right onto the southbound A23.

However it is worth noting that the number of vehicles exiting the A2044 on to the A23 is considerably less than those turning left off the A23 on to Woodhatch Road: over the 12 hour period nearly 2,900 vehicles turn left off the A23, whereas less than 1,900 vehicles turn right out of the junction. Presumably this is partly due to the difficulty drivers find making the manoeuvre especially with the A23 being a busy road, and partly because the adjacent A217 Reigate Road also heads south toward Horley, Gatwick and the M23. Each vehicle queueing to turn right from Woodhatch Road takes on average about 1 minute to do so.

# A23 Brighton Road/Maple Road/Three Arch Road

## Motor Vehicle Flows

At this junction, there are two distinct peak periods, one in the AM and one in the PM. Figure 20 indicates that for the junction as a whole the AM peak occurs in the hour 08:00 – 09:00 and has a flow rate of 2343 vehicles per hour for the period. The PM peak period also occurs for approximately one hour, from 17:00 – 18:00, with a flow rate of 2441 vehicles per hour. The steepness of the peaks are similar, unlike most other A23 junctions in the area. The interpeak period runs from approximately 10:00 - 15:00, with an average flow rate of 1947 vehicles per minute.

Figure 20 also shows how different approaches experience peak flow rates at different times of the day. The A23 southbound approach experiences the highest volume of flow in the PM peak period, between 16:00 – 18:00, whereas the A23 northbound approach experiences the greatest volume of flow in the AM period, between 09:00 – 10:00. Demand on the Three Arch Road approach is greatest throughout the afternoon, from 14:00 to 18:00.

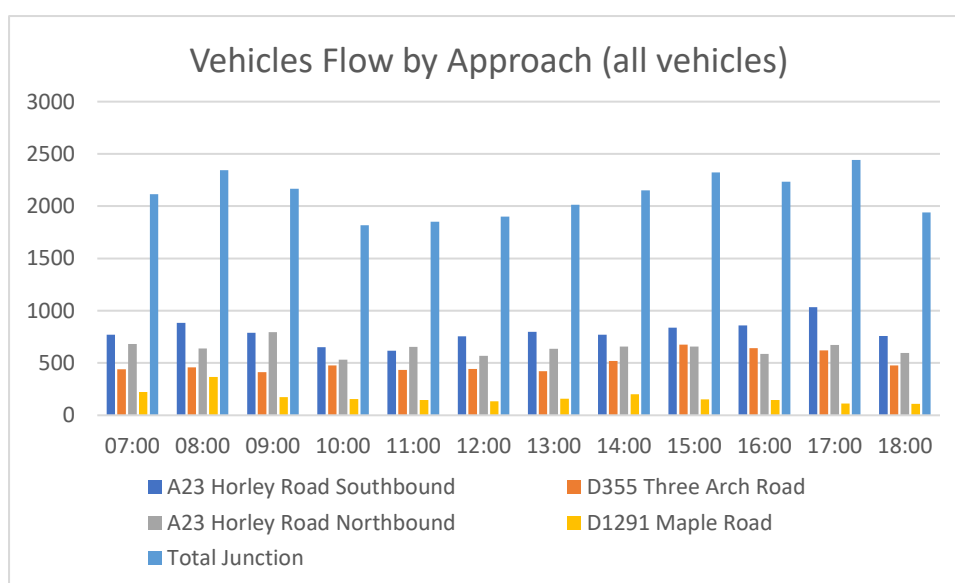


Figure 20: total motor vehicles per hour for all approaches individually and for the junction as a whole, A23 Brighton Road / Maple Road / Three Arch Road

The trends identified in the 2021 survey at this junction are broadly similar to those from surveys conducted in previous years. The AM peak at the same junction was slightly higher in 2005 (2437 vehicles per hour) than in 2015 (2404 vehicles per hour) and 2021 (2343 vehicles per hour). The AM peak occurs at the same hour, from 08:00 – 09:00, however, the increase in flows before the peak in 2005 was significantly sharper, and the

decrease after the peak was significantly shallower than in 2015 and 2021. The slow increase in flow throughout the afternoon is relatively equal over all three years, but the PM peak, which occurs between 17:00 – 18:00 is significantly greater in the 2005 survey (2687 vehicles per hour) than in 2015 (2552 vehicles per hour) and 2021 (2441 vehicles per hour). These differences can be seen in Figure .

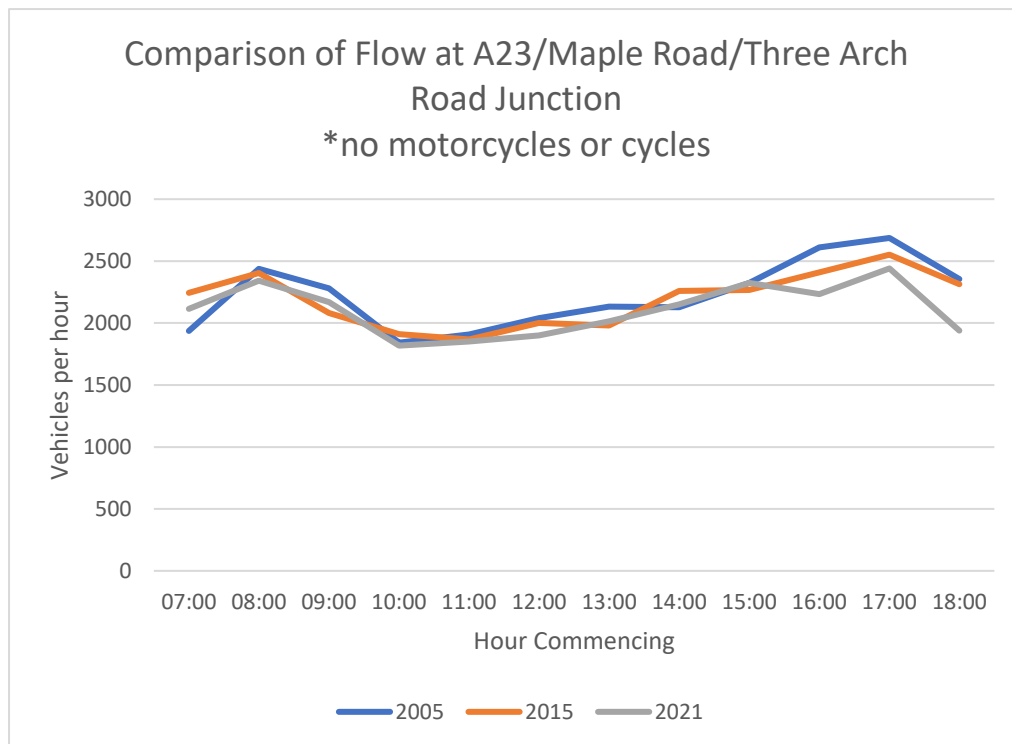


Figure 21: comparison of motor vehicles per hour at the A23/Maple Road/Three Arch Road junction from one day surveys in three separate years.

This junction experiences a different trend on OGV proportions to most other A23 junctions nearby. Figure 22 shows there is a relatively steady increase in the proportion of OGVs over the morning period, peaking between 12:00 – 13:00 at just over 4%, before experiencing a sharp decrease over the afternoon and the early evening. These trends are mostly mirrored by the number of OGVs, peaking at 77 OGVs between 12:00 – 13:00.

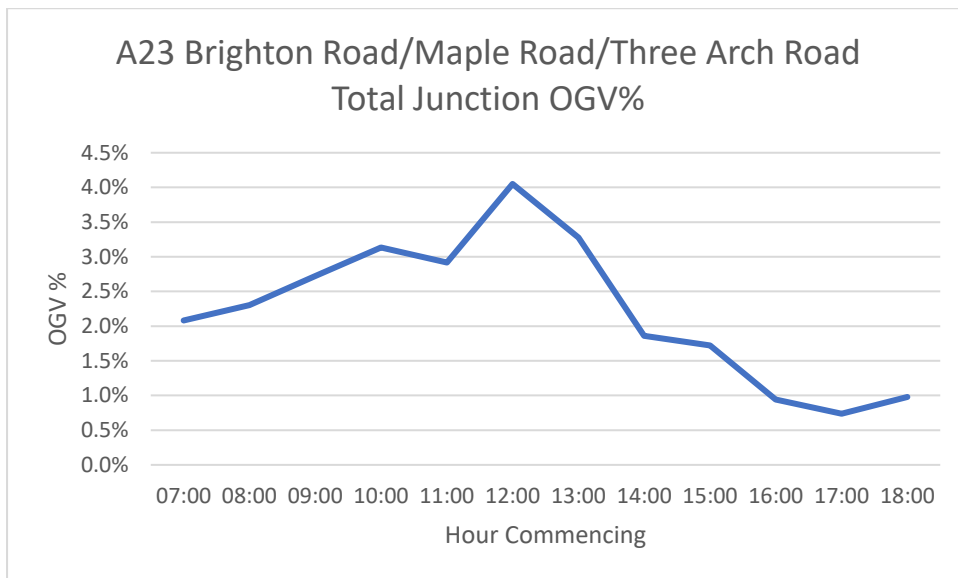


Figure 22: OGVs as proportion (%) of total vehicle flow per hour at the A23/Maple Road/Three Arch Road junction.

## Cycle Flows

The number of cycles passing through the junction peaks in the morning period, with 13 cycles passing per hour between 07:00 – 09:00. This then sharply declines in the interpeak period, when from 09:00 – 14:00, an average of 5.4 cycles passed through the junction per hour. This then steadily increased into the evening, reaching 9 cycles per hour between 16:00 – 18:00.

# A23 Corridor Journey Time Profile

## Overview

Graphs showing typical time/distance profiles for vehicles moving northbound and southbound along the A23 corridor from just north of Chequers roundabout to Earlswood are shown in Figures 23a and 24a. This GPS data is from Teletrac-Navman supplied by the Department for Transport and is for the period September to November 2019. In these graphs, the steeper the gradient, the slower vehicles are moving. Accompanying these are graphs 23b and 24b which show a profile of average speed at each stage of the corridor, compared with the free flow speed of the same location (free flow speed is the speed a vehicle would theoretically move with no other vehicles on the road and is obtained from vehicle speeds recorded during the night). A significant difference between average and free flow speed indicates congestion experienced in the relevant peak hour time period.



## Northbound Vehicles

Figure 23a shows that in the AM peak period it takes on average over 15 minutes to travel between the Chequers roundabout and Earlswood, and notes the location of junctions along the route.

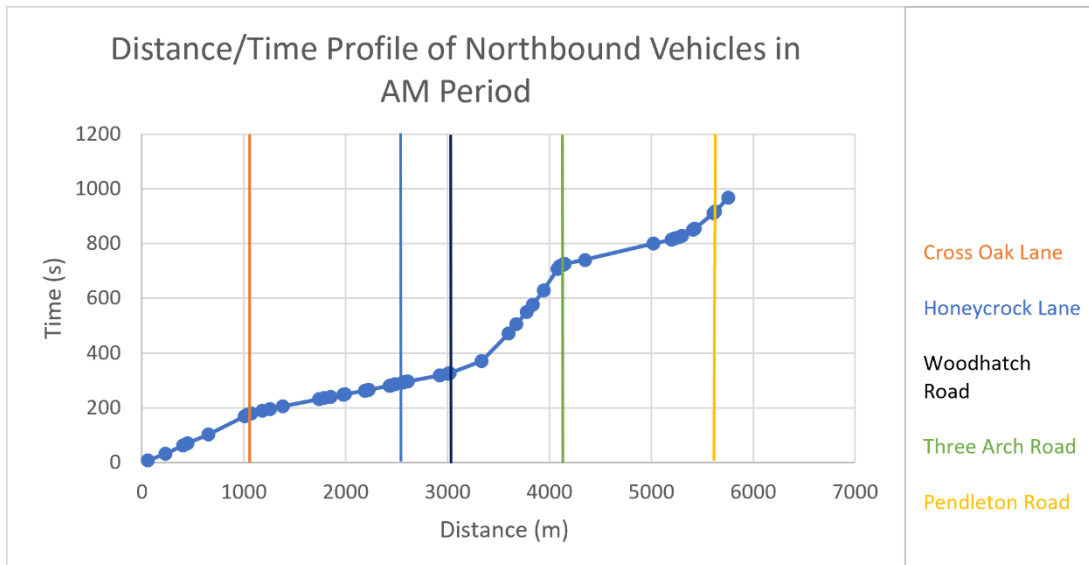


Figure 23a: journey time profile northbound on the A23 between the Chequers roundabout and Earlswood, AM Peak hour.

Source: Teletrac-Navman GPS data, supplied under licence by the Department for Transport

Figure 23b provides additional detail by showing the difference between vehicle speeds in the AM peak hour and typical night-time (free-flow) speeds. Figure 6 on page 12 indicates that northbound vehicle queues on the approach to the Cross Oak Lane junction in the AM peak are only just over 50 metres. But the speed data shows that the traffic heading north is slow moving, indicating that although traffic is only stationary for a relatively short length on the immediate approach to Cross Oak Lane, the junction results in an approaching line of slow moving vehicles. The section of the A23 through Salfords appears to accommodate the weight of vehicle flow relatively well, but the approaches to the Three Arch Road junction and Redhill are particularly slow.

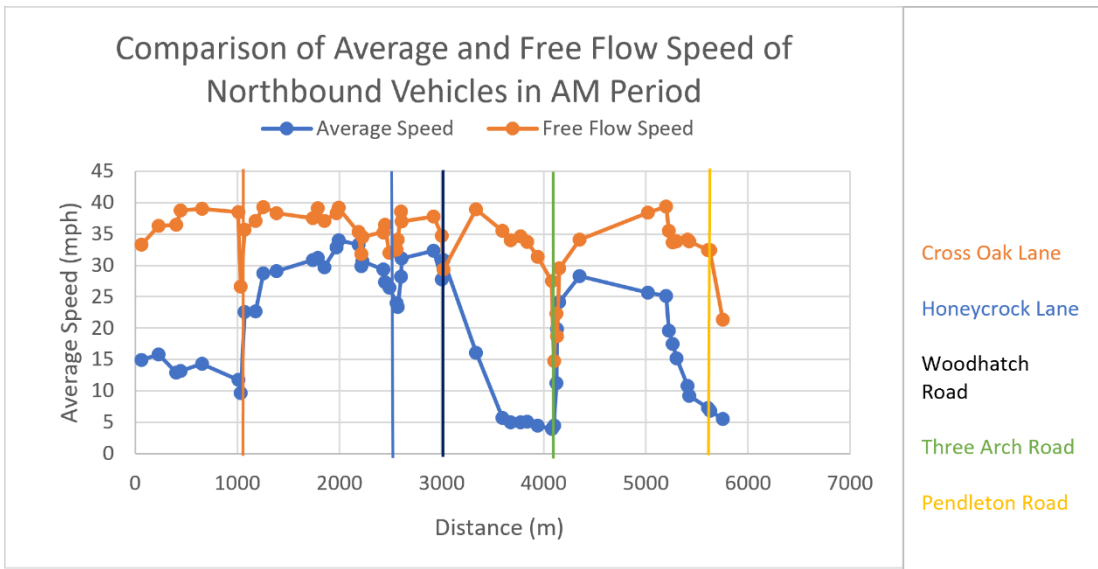


Figure 23b: average vehicle speeds northbound on the A23 between the Chequers roundabout and Earlswood, AM Peak hour.

Source: Teletrac-Navman GPS data, supplied under licence by the Department for Transport

## Southbound Vehicles

Figures 24a and 24b show that there is only a relatively short stretch of the route south from Redhill, after where the A2044 Woodhatch Road joins the A23, when traffic flow is comparable to uncongested conditions. Both graphs show that the approach to the Three Arch Road junction is slow, and the route through Salfords including the approach to the Hoadley Road and Cross Oak Lane junction. It is unsurprising that the route through Salfords south of the junction with Lodge Lane is slower when the road is busy: it changes from dual carriageway to a single carriageway road with multiple accesses on both sides of the road.

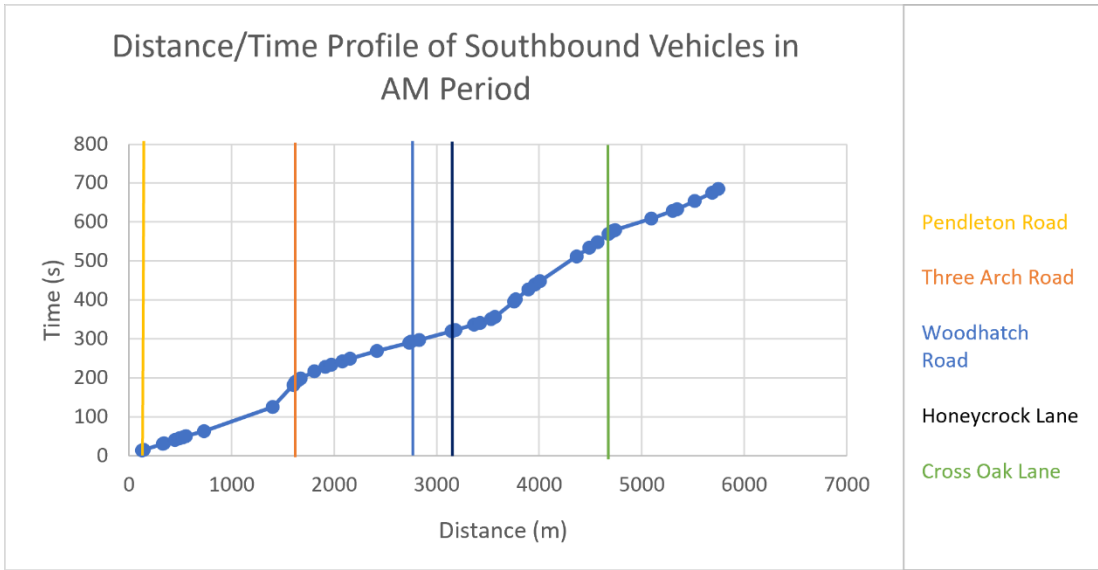


Figure 24a: journey time profile southbound on the A23 between Earlswood and the Chequers roundabout, AM Peak hour.

Source: Teletrac-Navman GPS data, supplied under licence by the Department for Transport

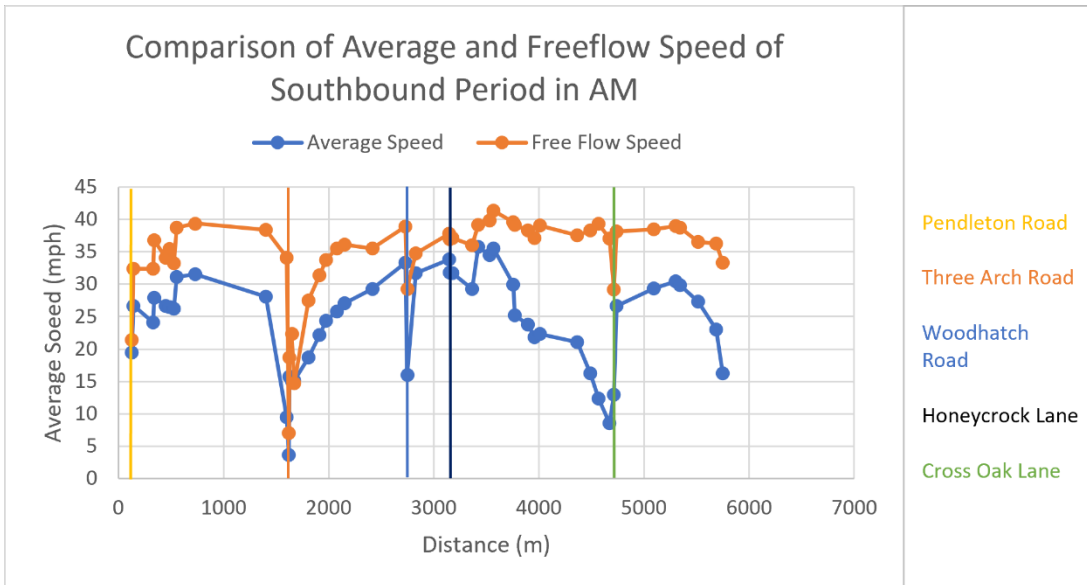


Figure 24b: average vehicle speeds southbound on the A23 between Earlswood and the Chequers roundabout, AM Peak hour.

Source: Teletrac-Navman GPS data, supplied under licence by the Department for Transport

Figure 24b indicates that vehicle speeds also reduce in busy periods on the approach to the Chequers roundabout.

Only the profiles for the morning peak hour are shown as those for PM peak are similar.

## Origin & Destination Analysis

### Introduction

Using Surrey County Council’s strategic County Transport Model, it is possible to estimate the origins and destinations of vehicles passing through a certain point on the road network. All approaches to the A23 Bonehurst Road/Cross Oak Lane junction were analysed for both the AM and PM peak hours. At this level of analysis (by using the whole county model rather than a more local sub-area model), flow proportions can be estimated only, which is why vehicle counts are not reported on in this section of the report.

### AM Peak Hour

Of the vehicles approaching the Cross Oak Lane junction along the A23 from the south, the vast majority also pass through Chequers roundabout. Approximately one quarter approach Chequers roundabout from Horley Row to the west. Another quarter approach from B2036 Balcombe Road, while around half use the A23 Brighton Road, to the south of Chequers

roundabout. Of those using Brighton Road and travelling north on the A23, about 20% originate in Horley, with the majority of the remainder from Crawley and the M23 as well as Gatwick.

15% of these northbound vehicles turn right into Cross Oak Lane, with some of these accessing the local business parks. About 40% have destinations in Salfords and South Earlswood, including the East Surrey Hospital, although some of this proportion do travel further east towards Outwood and South Nutfield. The remaining 45% travel towards Reigate and Redhill.

60% of the vehicles approaching the junction on Cross Oak Lane come from north-east Horley.

Southbound drivers approaching the junction on the A23 from the north are mostly relatively local, with approximately a quarter from the South Earlswood, Woodhatch and Reigate areas, half from the Redhill & Merstham areas, and another quarter from Whitebushes and Salfords.

Of the vehicles travelling south from the junction, approximately one third head down Balcombe Road, with the remainder using the A23 to head towards Horley, Gatwick, the M23 and Crawley, particularly the business parks and industrial estates in the area.

## PM Peak Hour

The most notable difference in the PM peak period (16:00 19:00) is the reduced number of trips exiting onto the A23 from Cross Oak Lane. Of these nearly 60% turn right out of the junction and head towards Horley and Crawley.

About 40% of the vehicles heading south into the junction come from Salfords and South Earlswood areas, including East Surrey Hospital.

## Summary

The A23 is a busy road and does experience congestion in some places, especially where it meets Cross Oak Lane. Typically this junction experiences over 2,000 vehicles passing through it during peak hours, and journey times are affected as a result.

When comparing flows on the A23 with past years, there has been a downward trend since the period 2000-2005. Although the number of vehicles using the A23 did increase slightly in 2019, it is too early to say whether this continues: the expectation, though, is that local development may result in more traffic.