

TECHNICAL NOTE

Job Name: Wokingham Local and M4 Modelling Assessment

Job No: 332110634

Note No: 001

Subject: Peak Hour Analysis

DOCUMENT ISSUE RECORD

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1. Introduction

- 1.1. Stantec has been commissioned by Wokingham Borough Council (WBC) and Homes England (HE) to undertake an assessment to support delivery of a major development option known as Hall Farm / Loddon Valley (Hall Farm, Hatch Farm and Four Valleys Development), located just to the south of the M4 motorway, in Wokingham Borough.
- 1.2. The assessment will be supported by a series of transport models, including a strategic highway model, developed in PTV-VISUM and an M4 corridor microsimulation model, developed in PTV-VISSIM.
- 1.3. This note sets out the analysis of traffic data and evidence in selecting the proposed morning and evening peak hours to be used within the strategic VISUM model and microsimulation VISSIM model.
- 1.4. The strategic highway model is subject to a local study area update, with the existing WSTM4 VISUM model being the starting point. This model has peak hours of 0800-0900 and 1700-1800. It would be the proportionate approach to maintain these peak hours if the analysis does not show any significant difference between the actual peak hour and the current model peak hour. It would also be pragmatic to develop the microsimulation model with the same peak hours, as this does not overcomplicate the process for transferring flows in future scenario tests between the two models.

2. Overview

- 2.1. The analysis undertaken has followed the process as set out in DfT's TAG unit M3.1 Highway Assignment Modelling. This states in Section 2.5 that:

'Traffic patterns, trip purpose and vehicle type proportions, traffic flows and congestion vary by time of day. Highway assignment models should therefore normally represent the morning and evening peaks and the inter-peak period separately as a minimum.

The peak periods should be identified by analysis of Automatic Traffic Counts (ATCs) at as many points as are available throughout the Fully Modelled Area. The aim should be to designate those periods where traffic flows are markedly higher as the peak periods with the inter-peak period being a period between the two peaks during which flows are approximately constant. It is conventional to define peak periods, and inter-peak periods, as multiples of hours rather than as hours plus fractions of hours.

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In the inter-peak period, it is usually appropriate to model an average hour. In the peaks, however, models could represent one of the following: • each individual hour within each peak period • the actual peak hour within each peak period • the average hour within the peak periods'

- 2.2. For the purposes of this study, only AM and PM models are being developed and the models are developed to represent a single peak hour and not peak period.

3. Observed Data Selection

- 3.1. In order to agree upon an appropriate hour to be used within the strategic and microsimulation models, 2021 observed ATC data within and in proximity to the study area has been analysed, taking available neutral weekday rolling hourly averages for each observed 15-minute data section. The data sets can be broken down into the two following categories:
- Highway England permanent count data (Source: [Highways England - WebTRIS - Map View](#))
 - Wokingham permanent count data (Source: Drakewell)
- 3.2. Data was selected within the month of November 2021 for WebTRIS and the Wokingham permanent sites, using data from Tuesday to Thursday across a period of two last weeks.
- 3.3. Both sets of data have been analysed for outliers. The outliers have been identified and removed in accordance with guidance provided in TAG UNIT M1.2 'Data Sources and Surveys', May 2020. Section 'Data Accuracy' recommends adopting a 95% confidence interval with the variation of the mean plus/minus 5%.

4. WebTRIS Peak Hour Analysis

- 4.1. WebTRIS sites have been collated across the study area, along the M4 from east of Junction 10 to west of Junction 11, for all sites on the mainline and slip roads where data was available.
- 4.2. The rolling hourly averages have been tallied across all WebTRIS sites. The data available is split into 15-minute periods and data has been extracted for each hour from the start of a 15-minute period, e.g. 07:00 to produce a 07:00 to 08:00 hourly flow.
- 4.3. In total, 15 sites have been analysed, which are listed in Table 4-1 and graphically presented in Figure 4-1.

Table 4-1: WebTRIS Sites

Name	Description
M4/2559A	J10 Westbound
M4/2559B	J10 Eastbound
M4/2570A	Within J10 Westbound Mainline
M4/2570B	Within J10 Eastbound Mainline
M4/2570K	J10 Westbound OnSlip
M4/2573K	J10 WB On slip (from A329M NB)
M4/2573M	J10 EB On slip
M4/2575A	J10 WB Mainline
M4/2575B	Junction 10 Mainline Eastbound
M4/2576L	Junction 10 Off Slip Eastbound A329M North
M4/2602A	Mainline b/n J10 and J11 Westbound
M4/2602B	Mainline b/n J10 and J11 Eastbound
M4/2656M	J11 On Slip Eastbound
M4/2672B	Mainline b/n J11 and J12 Eastbound
M4/2688A	Mainline b/n J11 and J12 Westbound

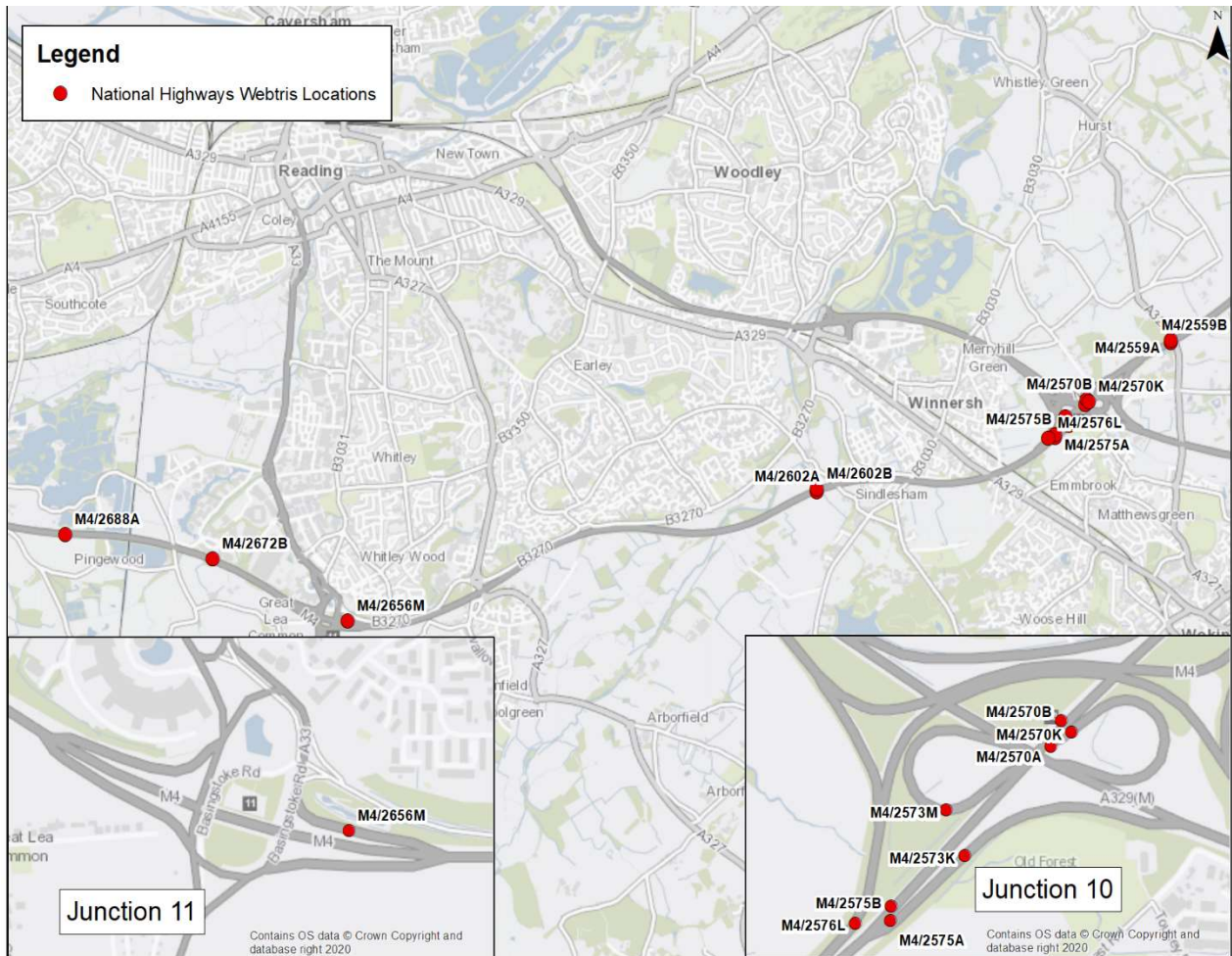


Figure 4-1: Locations of WebTRIS Sites

- 4.4. The analysis of tallying the WSTM4 historically allotted peak hour periods of 0800-0900 and 1700-1800 and comparing this against November 2021 rolling hourly average time periods can be found within [Appendix A1](#).
- 4.5. The analysis of WebTRIS data shows that the AM peak hour might be slightly earlier than the current modelled peak hour of 0800-0900 and occur between 0745 and 0845. However, across the area of interest the peak hour flows may only be 2% higher than the modelled 0800-0900 peak flows.
- 4.6. The PM peak hour analysis shows a similar pattern and suggests that the evening peak hours may fall between 1645 and 1745. However, like in the AM, the peak hour flows are only 1% higher than the modelled 1700-1800 peak hour flows.

5. Wokingham Permanent Count Site Peak Hour Analysis

- 5.1. Similarly, Wokingham permanent count sites have been analysed to verify the selected peak hour.
- 5.2. In total, 19 sites (listed in Table 5-1 and graphically shown in Figure 5-1) have been analysed with detailed results presented in [Appendix A2](#).

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Table 5-1: Wokingham Permanent Sites

Name	Description
015_North	B3350 Church Lane, Earley
015_South	B3350 Church Lane, Earley
03A_NorthWest	A329 Reading Road/Old Forest Rd
03A_Southeast	A329 Reading Road/Old Forest Rd
05A_Eastbound	Barkham Road
05A_Westbound	Barkham Road
098_NorthWest	A329 Reading Road, Winnersh
098_SouthEast	A329 Reading Road, Winnersh
12A_Northeast	A329 Kings Rd
12A_Southwest	A329 Peach Street
12A_Southwest	A321 Denmark Street
207_East	Culver Lane, Earley
207_West	Culver Lane, Earley
209_NorthEast	B3350 Wilderness Road, Earley
209_SouthWest	B3350 Wilderness Road, Earley
211_North	Loddon Bridge Road, Earley
211_South	Loddon Bridge Road, Earley
220_North	A327 Eastern Relief Road, Shinfield
220_South	A327 Eastern Relief Road, Shinfield

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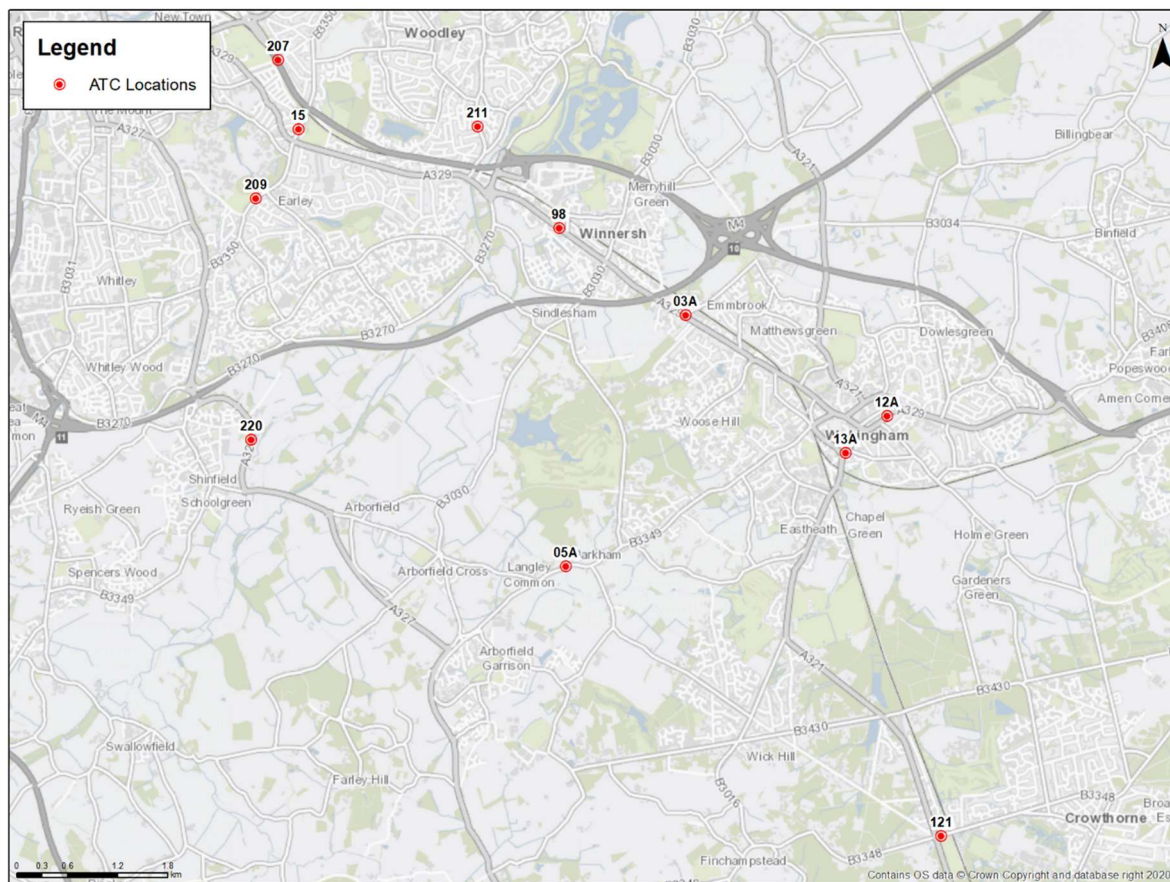


Figure 5-1: Locations of Selected Wokingham Permanent Sites

5.3. From the analysis of the peak period maximums, the AM peak hour is shown to be 0745-0845 with the 0800-0900 flows being only 1% lower. The PM peak hour tally of the hours is shown to be generally dispersed across the peak period, with the flows being highest between 1600 and 1745. However, the data in the 1700-1800 peak hour is not seen to be significantly different and is only 1% lower.

6. Conclusion

- 6.1. Both WebTRIS (M4) data and traffic data collected on local roads in Wokingham show slightly earlier AM and PM peak hours. However, the variance between peak hours observed in the last two weeks of November and WSTM4 peak hours (0800-0900 and 1700-1800) is minor with differences being within 1-2%.
- 6.2. As such, it can be deemed that using a proportionate approach of retaining the current WSTM4 modelled peak hours is acceptable.

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Appendix A1 – WebTRIS Rolling Hourly Average Percentage Variance

Table 1: WebTRIS Sites. AM Total Flow, Vehicles.

AM Period	2559A	2559B	2570A	2570B	2570K	2573K	2573M	2575A	2575B	2576L	2602A	2602B	2656M	2672B	2688A	TOTAL
7:00 - 8:00	2898	4017	1864	2737	211	1253	681	2059	2354	1311	3121	3894	1170	7941	2665	38174
7:15 - 8:15	3108	4199	1975	2871	248	1340	738	2214	2457	1452	3346	4103	1271	8437	2829	40588
7:30 - 8:30	3190	4273	2043	2945	282	1417	782	2316	2510	1593	3520	4285	1332	8701	2966	42155
7:45 - 8:45	3215	4182	2084	2889	312	1441	766	2385	2462	1687	3617	4285	1355	8643	3074	42396
8:00 - 9:00	3151	4006	2054	2800	308	1395	718	2353	2407	1708	3569	4225	1341	8399	3077	41511
8:15 - 9:15	3010	3835	1975	2678	298	1308	661	2260	2318	1660	3410	4099	1279	7950	3043	39783
8:30 - 9:30	2906	3593	1919	2499	281	1196	581	2178	2183	1529	3257	3828	1171	7451	2926	37496
8:45 - 9:45	2751	3305	1822	2318	249	1083	496	2052	2051	1376	3059	3560	1040	6995	2787	34943
9:00 - 10:00	2638	3049	1771	2149	211	999	425	1960	1912	1241	2888	3283	922	6531	2682	32658

Table 2: WebTRIS Sites. Flow comparison to 08:00-09:00 peak hour flow.

AM Period	2559A	2559B	2570A	2570B	2570K	2573K	2573M	2575A	2575B	2576L	2602A	2602B	2656M	2672B	2688A	TOTAL
7:00 - 8:00	-8%	0%	-9%	-2%	-32%	-10%	-5%	-13%	-2%	-23%	-13%	-8%	-13%	-5%	-13%	-8%
7:15 - 8:15	-1%	5%	-4%	3%	-20%	-4%	3%	-6%	2%	-15%	-6%	-3%	-5%	0%	-8%	-2%
7:30 - 8:30	1%	7%	-1%	5%	-8%	2%	9%	-2%	4%	-7%	-1%	1%	-1%	4%	-4%	2%
7:45 - 8:45	2%	4%	1%	3%	1%	3%	7%	1%	2%	-1%	1%	1%	1%	3%	0%	2%
8:00 - 9:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8:15 - 9:15	-4%	-4%	-4%	-4%	-3%	-6%	-8%	-4%	-4%	-3%	-4%	-3%	-5%	-5%	-1%	-4%
8:30 - 9:30	-8%	-10%	-7%	-11%	-9%	-14%	-19%	-7%	-9%	-10%	-9%	-9%	-13%	-11%	-5%	-10%
8:45 - 9:45	-13%	-18%	-11%	-17%	-19%	-22%	-31%	-13%	-15%	-19%	-14%	-16%	-22%	-17%	-9%	-16%
9:00 - 10:00	-16%	-24%	-14%	-23%	-32%	-28%	-41%	-17%	-21%	-27%	-19%	-22%	-31%	-22%	-13%	-21%



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Table 3: WebTRIS Sites. PM Total Flow, Vehicles.

PM Period	2559A	2559B	2570A	2570B	2570K	2573K	2573M	2575A	2575B	2576L	2602A	2602B	2656M	2672B	2688A	TOTAL
16:00 - 17:00	3335	3606	2302	2556	331	1324	530	2608	2326	1461	3718	3905	1291	7532	3572	40397
16:15 - 17:15	3483	3725	2349	2594	345	1344	580	2685	2356	1514	3854	3958	1334	7682	3668	41469
16:30 - 17:30	3603	3751	2395	2590	353	1339	588	2742	2363	1544	3897	3990	1380	7739	3671	41943
16:45 - 17:45	3597	3749	2369	2580	361	1346	588	2722	2360	1573	3909	4023	1385	7797	3587	41944
17:00 - 18:00	3654	3703	2389	2539	349	1345	565	2729	2334	1578	3870	3972	1370	7741	3480	41618
17:15 - 18:15	3613	3604	2377	2472	345	1287	515	2703	2279	1562	3769	3890	1342	7652	3377	40786
17:30 - 18:30	3521	3491	2305	2386	312	1200	488	2595	2201	1520	3623	3776	1266	7468	3293	39443
17:45 - 18:45	3383	3294	2223	2241	262	1092	436	2471	2071	1417	3415	3531	1189	6991	3174	37189
18:00 - 19:00	3129	2982	2041	2029	217	1001	370	2254	1884	1304	3142	3254	1046	6527	2999	34177

Table 4: WebTRIS Sites. Flow comparison to 17:00-18:00 peak hour flow.

PM Period	2559A	2559B	2570A	2570B	2570K	2573K	2573M	2575A	2575B	2576L	2602A	2602B	2656M	2672B	2688A	TOTAL
16:00 - 17:00	-9%	-3%	-4%	1%	-5%	-2%	-6%	-4%	0%	-7%	-4%	-2%	-6%	-3%	3%	-3%
16:15 - 17:15	-5%	1%	-2%	2%	-1%	0%	3%	-2%	1%	-4%	0%	0%	-3%	-1%	5%	0%
16:30 - 17:30	-1%	1%	0%	2%	1%	0%	4%	0%	1%	-2%	1%	0%	1%	0%	5%	1%
16:45 - 17:45	-2%	1%	-1%	2%	3%	0%	4%	0%	1%	0%	1%	1%	1%	1%	3%	1%
17:00 - 18:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17:15 - 18:15	-1%	-3%	0%	-3%	-1%	-4%	-9%	-1%	-2%	-1%	-3%	-2%	-2%	-1%	-3%	-2%
17:30 - 18:30	-4%	-6%	-4%	-6%	-11%	-11%	-14%	-5%	-6%	-4%	-6%	-5%	-8%	-4%	-5%	-5%
17:45 - 18:45	-7%	-11%	-7%	-12%	-25%	-19%	-23%	-9%	-11%	-10%	-12%	-11%	-13%	-10%	-9%	-11%
18:00 - 19:00	-14%	-19%	-15%	-20%	-38%	-26%	-34%	-17%	-19%	-17%	-19%	-18%	-24%	-16%	-14%	-18%

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Appendix A2 – Wokingham Permanent ATCs Rolling Hourly Average Percentage Variance

Table 1: Wokingham Permanent ATC Sites. AM Total Flow, Vehicles.

AM Period	015_NB	03A_NW	03A_SE	05A_EB	05A_WB	098_NW	098_SE	121_EB	12A_SW	13A_SW	207_EB	207_WB	209_NE	209_SW	211_NB	211_SB	220_NB	220_SB	Total
7:00 - 8:00	437	623	516	344	335	571	507	423	1094	573	149	245	510	677	354	385	521	407	8670
7:15 - 8:15	498	722	630	456	394	643	554	523	1284	640	183	340	518	772	460	412	591	451	10070
7:30 - 8:30	548	791	690	552	460	680	588	617	1388	660	215	415	547	809	547	437	618	463	11024
7:45 - 8:45	567	828	716	586	467	693	611	658	1510	677	234	445	529	834	588	421	585	449	11399
8:00 - 9:00	552	838	678	594	461	701	603	633	1527	684	240	426	520	831	578	436	575	412	11289
8:15 - 9:15	514	800	633	531	420	663	604	572	1446	672	216	377	531	848	515	434	515	359	10649
8:30 - 9:30	471	741	598	450	351	634	582	511	1380	654	186	308	511	848	457	406	459	327	9874
8:45 - 9:45	434	675	569	382	322	585	543	447	1240	619	151	243	505	780	417	401	409	301	9022
9:00 - 10:00	409	605	565	312	291	531	533	403	1115	553	116	202	495	710	390	378	346	289	8240

Table 2: Wokingham Permanent ATC Sites. Flow comparison to 08:00-09:00 peak hour flow.

AM Period	015_NB	03A_NW	03A_SE	05A_EB	05A_WB	098_NW	098_SE	121_EB	12A_SW	13A_SW	207_EB	207_WB	209_NE	209_SW	211_NB	211_SB	220_NB	220_SB	Total
7:00 - 8:00	-21%	-26%	-24%	-42%	-27%	-19%	-16%	-33%	-28%	-16%	-38%	-43%	-2%	-18%	-39%	-12%	-9%	-1%	-23%
7:15 - 8:15	-10%	-14%	-7%	-23%	-14%	-8%	-8%	-17%	-16%	-6%	-24%	-20%	-1%	-7%	-20%	-6%	3%	9%	-11%
7:30 - 8:30	-1%	-6%	2%	-7%	0%	-3%	-2%	-2%	-9%	-3%	-10%	-3%	5%	-3%	-5%	0%	7%	12%	-2%
7:45 - 8:45	3%	-1%	6%	-1%	1%	-1%	1%	4%	-1%	-1%	-2%	4%	2%	0%	2%	-3%	2%	9%	1%
8:00 - 9:00	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8:15 - 9:15	-7%	-5%	-7%	-11%	-9%	-6%	0%	-10%	-5%	-2%	-10%	-12%	2%	2%	-11%	0%	-11%	-13%	-6%
8:30 - 9:30	-15%	-12%	-12%	-24%	-24%	-10%	-3%	-19%	-10%	-4%	-23%	-28%	-2%	2%	-21%	-7%	-20%	-21%	-13%
8:45 - 9:45	-21%	-20%	-16%	-36%	-30%	-17%	-10%	-29%	-19%	-9%	-37%	-43%	-3%	-6%	-28%	-8%	-29%	-27%	-20%
9:00 - 10:00	-26%	-28%	-17%	-47%	-37%	-24%	-12%	-36%	-27%	-19%	-52%	-53%	-5%	-15%	-33%	-13%	-40%	-30%	-27%

Table 3: Wokingham Permanent ATC Sites. PM Total Flow, Vehicles.

PM Period	015_NB	03A_NW	03A_SE	05A_EB	05A_WB	098_NW	098_SE	121_EB	12A_SW	13A_SW	207_EB	207_WB	209_NE	209_SW	211_NB	211_SB	220_NB	220_SB	Total
16:00 - 17:00	649	691	666	394	474	628	695	460	1126	455	332	240	676	800	531	449	452	470	10185
16:15 - 17:15	650	663	651	390	464	625	693	469	1137	441	335	245	692	776	541	467	461	471	10171
16:30 - 17:30	675	666	634	383	471	597	699	478	1150	432	349	252	701	775	554	466	452	481	10216
16:45 - 17:45	666	646	610	375	474	574	709	473	1152	415	350	259	698	777	560	463	436	485	10120
17:00 - 18:00	643	613	599	372	459	558	705	511	1190	410	350	262	694	767	561	457	439	491	10076
17:15 - 18:15	637	585	576	362	431	536	694	500	1184	404	330	250	686	754	563	446	410	491	9836
17:30 - 18:30	618	546	548	339	388	516	675	472	1205	419	309	249	680	712	534	430	377	472	9489
17:45 - 18:45	596	518	504	319	354	507	639	439	1207	431	279	233	670	677	512	418	343	437	9079
18:00 - 19:00	569	491	461	291	326	505	611	377	1161	418	239	219	643	657	493	418	299	392	8568

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Table 4: Wokingham Permanent ATC Sites. Flow comparison to 17:00-18:00 peak hour flow.

PM Period	015_NB	03A_NW	03A_SE	05A_EB	05A_WB	098_NW	098_SE	121_EB	12A_SW	13A_SW	207_EB	207_WB	209_NE	209_SW	211_NB	211_SB	220_NB	220_SB	Total
16:00 - 17:00	1%	13%	11%	6%	3%	13%	-1%	-10%	-5%	11%	-5%	-8%	-3%	4%	-5%	-2%	3%	-4%	1%
16:15 - 17:15	1%	8%	9%	5%	1%	12%	-2%	-8%	-4%	8%	-4%	-6%	0%	1%	-4%	2%	5%	-4%	1%
16:30 - 17:30	5%	9%	6%	3%	3%	7%	-1%	-6%	-3%	5%	0%	-4%	1%	1%	-1%	2%	3%	-2%	1%
16:45 - 17:45	4%	5%	2%	1%	3%	3%	1%	-7%	-3%	1%	0%	-1%	1%	1%	0%	1%	-1%	-1%	0%
17:00 - 18:00	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
17:15 - 18:15	-1%	-5%	-4%	-3%	-6%	-4%	-2%	-2%	0%	-2%	-6%	-4%	-1%	-2%	0%	-2%	-6%	0%	-2%
17:30 - 18:30	-4%	-11%	-8%	-9%	-15%	-7%	-4%	-8%	1%	2%	-12%	-5%	-2%	-7%	-5%	-6%	-14%	-4%	-6%
17:45 - 18:45	-7%	-16%	-16%	-14%	-23%	-9%	-9%	-14%	1%	5%	-20%	-11%	-3%	-12%	-9%	-9%	-22%	-11%	-10%
18:00 - 19:00	-12%	-20%	-23%	-22%	-29%	-9%	-13%	-26%	-2%	2%	-32%	-16%	-7%	-14%	-12%	-8%	-32%	-20%	-15%