

REPORT N° 001

WOKINGHAM STRATEGIC TRANSPORT MODEL 4 (WSTM4)

DATA COLLECTION REPORT



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WOKINGHAM STRATEGIC TRANSPORT MODEL 4 (WSTM4) DATA COLLECTION REPORT

Wokingham Borough Council

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TABLE OF CONTENTS

1	INTRODUCTION	5
2	KEY FEATURES OF WSTM4	7
3	HIGHWAY SURVEY DATA.....	11
4	PUBLIC TRANSPORT SURVEY DATA.....	36
5	MOBILE NETWORK DATA	37
6	SUMMARY	40

TABLES

TABLE 1	SUMMARY OF SURVEYS COMMISSIONED	11
TABLE 2	ATC DATA OBTAINED FROM LOCAL AUTHORITIES	11
TABLE 3	MCC DATA OBTAINED FROM LOCAL AUTHORITIES	12
TABLE 4	COMMISSIONED ATCS UNDERTAKEN BY TSP.....	12
TABLE 5	LIST OF ATC PERMANENT SITES OBTAINED FROM WOKINGHAM BOROUGH COUNCIL.....	16
TABLE 6	LIST OF ATC PERMANENT SITES OBTAINED FROM BRACKNELL FOREST BOROUGH COUNCIL.....	17
TABLE 7	LIST OF ATC PERMANENT SITES OBTAINED FROM HAMPSHIRE	18
TABLE 8	LIST OF ATC PERMANENT SITES OBTAINED FROM OXFORDSHIRE COUNTY COUNCIL.....	18
TABLE 9	LIST OF ATC PERMANENT SITES OBTAINED FROM READING BOROUGH COUNCIL	19
TABLE 10	LIST OF ATC PERMANENT SITES OBTAINED FROM ROYAL BOROUGH OF WINDSOR AND MAIDENHEAD	20
TABLE 11	LIST OF ATC PERMANENT SITES OBTAINED FROM WEST BERKSHIRE	21
TABLE 12	CAR, LGV AND HGV FACTORS	21
TABLE 13	LIST OF HIGHWAYS ENGLAND TRADS COUNTS	23
TABLE 14	LIST OF COMMISSIONED MCCS.....	26
TABLE 15	JUNCTION TURNING COUNTS OBTAINED FROM READING BOROUGH COUNCIL	29
TABLE 16	WOKINGHAM TOWN CENTRE JUNCTION TURNING COUNTS.....	29
TABLE 17	WBC TOWN CENTRE CAR PARK ENTRY AND EXIT COUNTS.....	31
TABLE 18	JOURNEY TIME ROUTE DESCRIPTIONS.....	33

FIGURES

FIGURE 1	WSTM DEVELOPMENT CHRONOLOGY	5
FIGURE 2	WSTM4 FULLY MODELLED AREA.....	8
FIGURE 3	WSTM4 ZONING – FULLY MODELLED AREA.....	8
FIGURE 4	WSTM4 ZONING SYSTEM: WOKINGHAM, READING AND BRACKNELL FOREST BOROUGHES	9
FIGURE 5	TSP ATC LOCATIONS.....	15
FIGURE 6	ADDITIONAL ATCS WITHIN THE WSTM4 FULLY MODELLED AREA	22
FIGURE 7	TRADS LOCATIONS WITHIN THE WSTM4 FULLY MODELLED AREA	25
FIGURE 8	TSP MCC LOCATIONS.....	28
FIGURE 9	RBC AND WBC JUNCTION TURNING COUNTS	30

FIGURE 10	ANPR SITE LOCATIONS IN WOKINGHAM TOWN CENTRE	32
FIGURE 11	JOURNEY TIME ROUTES WITHIN THE WSTM4 FULLY MODELLED AREA	34
FIGURE 12	JOURNEY TIME ROUTES IN WOKINGHAM, READING AND BRACKNELL.....	35
FIGURE 13	MOVEMENT TRACING LOCATIONS.....	39

1 INTRODUCTION

1.1 BACKGROUND

1.1.1

In 2008 WSP | Parsons Brinkerhoff was appointed as the Highways and Transport Term consultant for Wokingham Borough Council (WBC). This included the use and on-going maintenance of the Wokingham Strategic Transport Model (WSTM) and its use to support transport policies and scheme development. Since appointment WSP | Parsons Brinkerhoff have completed two model updates and progressing a third:

- **WSTM2** - update of forecast scenarios to include details of Strategic Development Locations (SDLs) and mitigation measures.
- **WSTM3** - Update to a 2010 model base year from 2005, compliance with DfT Transport Analysis Guidance, integration of a Public Transport model in VISUM and a Variable Demand Model (VDM) developed using DIADEM
- **WSTM4** - Commissioned in 2015 to update the model base year to 2015 to support strategic and local planning for the next plan period. The model software platform has been changed to VISUM.

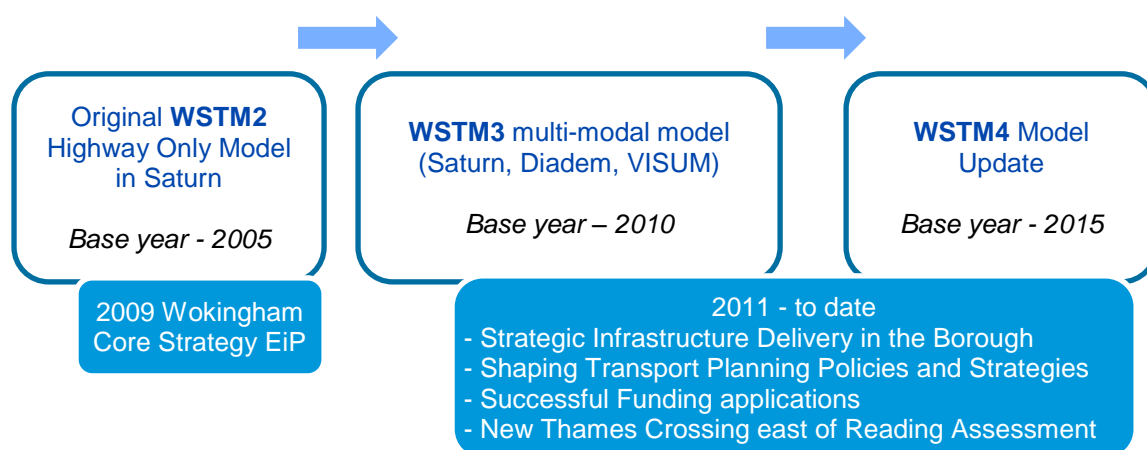


Figure 1 WSTM Development Chronology

1.1.2

The updated model will serve as a robust and up to date basis:

- for scheme and development assessments in Wokingham borough (including funding applications)
- in negotiations with the adjacent authorities, the Highways England and Network Rail
- for assessing car parks management and re-development proposals in the borough
- for the assessment of a new Thames crossing east of Reading and the development of the Strategic Outline Business Case for the scheme

- 1.1.3 This report provides a compilation of all the surveys and data collection undertaken as part of the WSTM4 update. The data collection was undertaken in accordance with the DfT's guidance and the results of this exercise are discussed in the document.
- 1.1.4 The report is set out in a further seven chapters as follows:
- Chapter 2 provides key information about the model update including descriptions of the fully modelled area and zoning system
 - Chapter 3 provides a detailed summary of the commissioned and pre-existing highway data that was obtained from Transport Survey Partners and local authorities
 - Chapter 4 describes public transport data that we were able to access from Reading, Wokingham and Bracknell Forest borough councils
 - Chapter 5 presents information about Mobile Network Data (MND) collection from Citi Logic
 - Chapter 6 concludes and summarises the report

2 KEY FEATURES OF WSTM4

2.1 MODELLED AREA

2.1.1 The WSTM4 Fully Modelled Area, formerly referred to as study area, is shown in Figure 2. As defined in the DfT's TAG, the Fully Modelled Area is the area over which proposed interventions are likely to have influence. In the WSTM4 the area is bounded by the M40 in the north, by the M25 in the east, by the M3 in the south and by the A339 and A34 in the west. The Fully Modelled Area is chosen to build a traffic model that covers a sufficient area to accurately model the reassignment and redistribution effects that are likely to be produced by new development and infrastructure schemes in Wokingham borough and by the new bridge east of Reading.

2.1.2 The fully modelled area is further subdivided into:

- Area of Detailed Modelling as shown in Figure 2. This is the area over which significant impacts of interventions are certain. Modelling detail in this area would be characterised by representation of all trip movements, small zones, very detailed networks and junction modelling, and
- Rest of the Fully Modelled Area. This is the area over which the impacts of interventions are considered to be quite likely but relatively weak in magnitude. It would be characterised by: representation of all trip movements, somewhat larger zones and less network detail than for the Area of Detailed Modelling, and speed/flow modelling (primarily link-based but possibly also including a representation of strategically important junctions).

2.1.3 The rest of the UK represents the External Area. In this area impacts of interventions are likely to be negligible. The External Area is characterised by skeletal networks and simple speed/flow relationships or fixed speed modelling and a partial representation of demand (trips to, from and across the Fully Modelled Area).

2.2 ZONING SYSTEM

2.2.1 The zone plan in the WSTM4 was devised to give a fine level of detail in the urban areas of Wokingham, Bracknell Forest, Reading and South Oxfordshire. The zones are coarser outside of the Area of Detailed Modelling and ultimately covering the whole of the UK (excluding Northern Ireland) in 643 zones. Compatibility between WSTM4 and TEMPRO 6 zone boundaries was ensured. Selected car parks and Park and Ride (P&R) sites in Wokingham, Reading and Bracknell Forest boroughs are modelled as separate zones.

2.2.2 The WSTM4 zone boundaries are shown in Figure 3 and Figure 4.

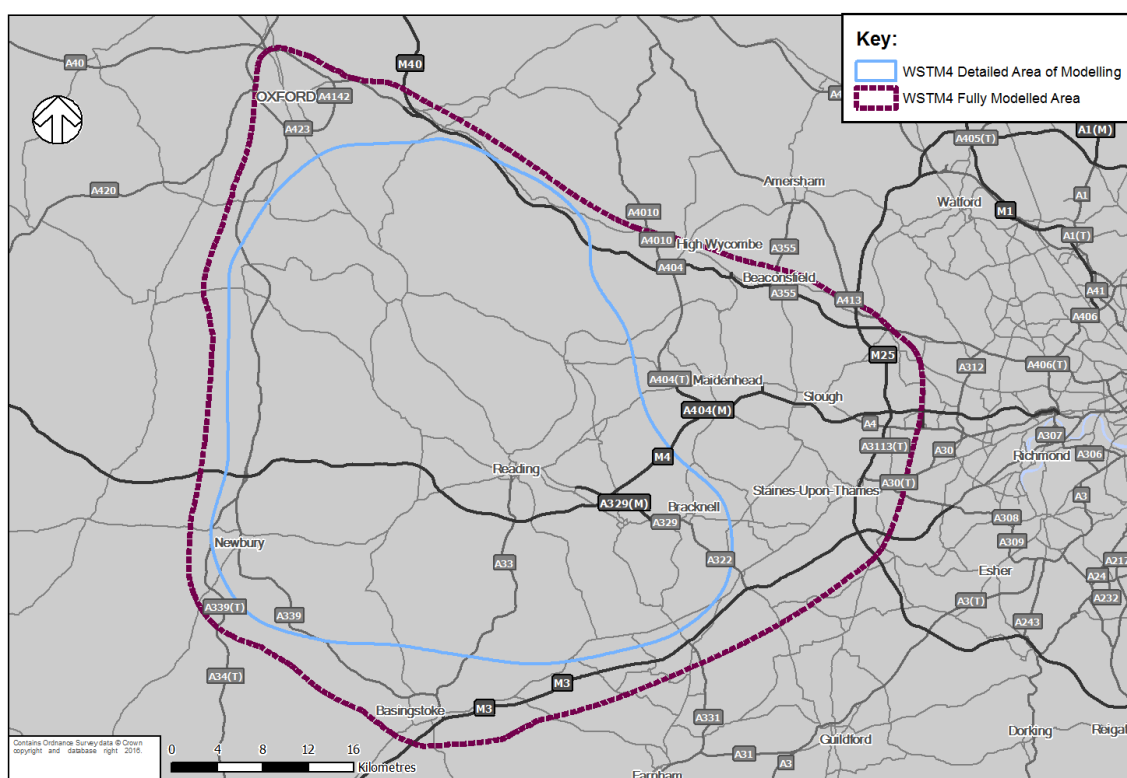


Figure 2 WSTM4 Fully Modelled Area

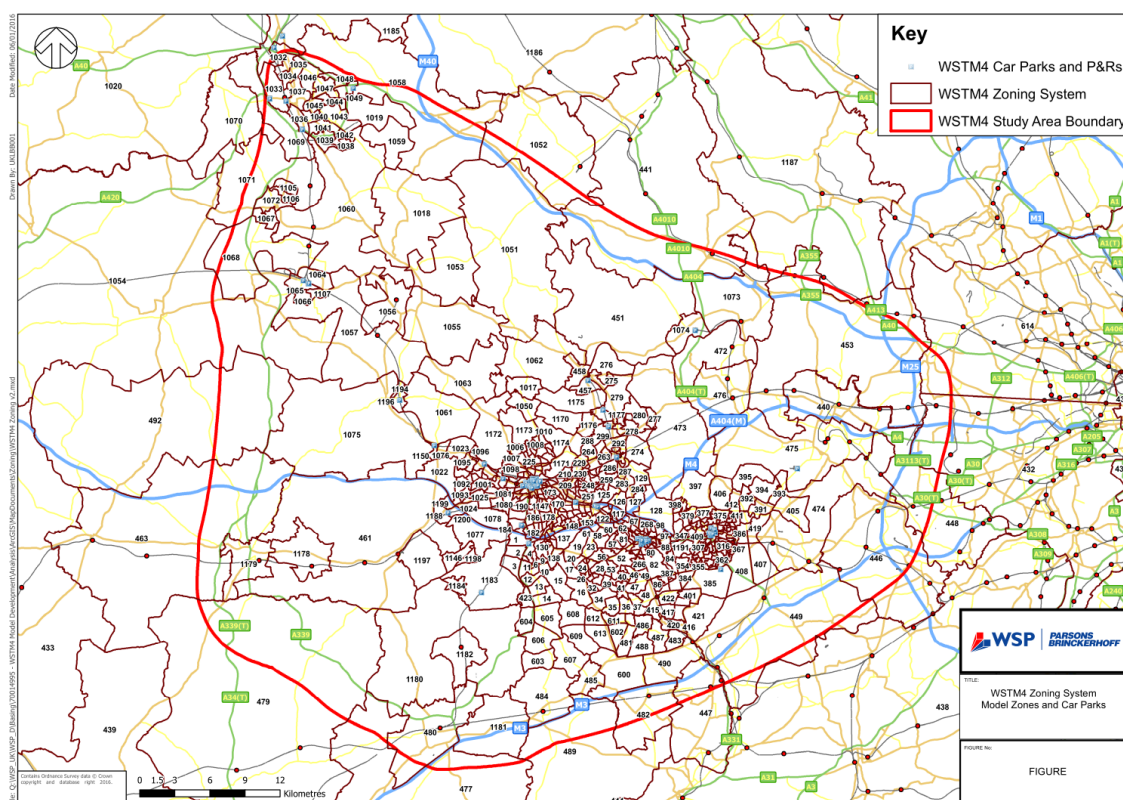


Figure 3 WSTM4 Zoning – Fully Modelled Area

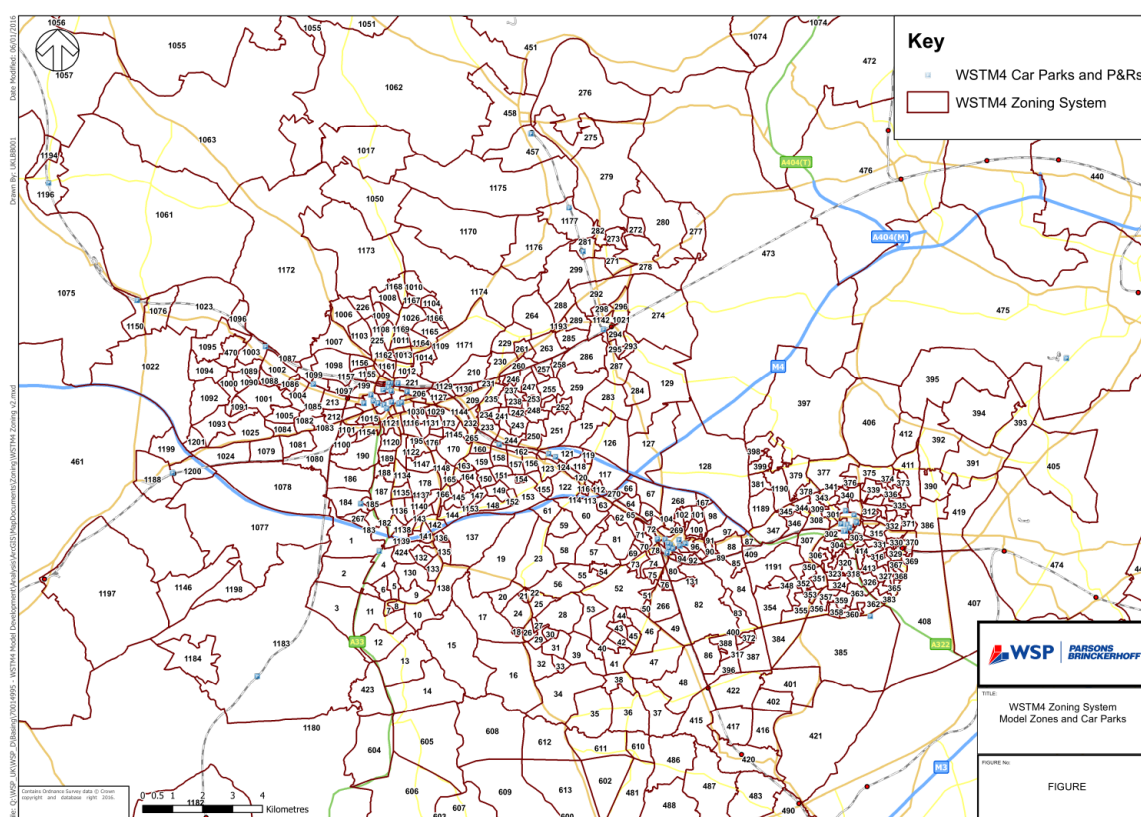


Figure 4 WSTM4 Zoning System: Wokingham, Reading and Bracknell Forest Boroughs

2.3 MODEL YEARS

2.3.1 The base year of the updated WSTM4 is 2015.

2.4 TIME PERIODS

2.4.1 The base year models are developed for the following time periods:

- average Weekday (Monday to Thursday) AM peak hour (0800-0900)
- average Weekday (Monday to Thursday) Inter peak hour (average 1000-1600)
- average Weekday (Monday to Thursday) PM peak hour (1700-1800)

2.5 MODEL STRUCTURE AND DEMAND SEGMENTATION

2.5.1 WSTM4 will inherit the WSTM3 model structure and will consist of the following sub-models:

- Highway model
- Public Transport (PT) model
- Variable Demand Model (VDM)

2.5.2 The highway model will include five user classes:

- Car Work

- Car Commuting
- Car Other
- LGV
- HGV

2.5.3 This is consistent with advice presented in Section 2.6 of TAG Unit M3.1 (January 2014)

2.5.4 PT model user classes will include:

- PT Work
- PT Commuting
- PT Other

2.5.5 All PT matrices will be split by car availability, i.e. into car available (CA) and non-car available (nCA).

2.5.6 Similarly to the highway assignment model, the PT demand will be segmented by income post the base year model calibration/validation stage.

2.5.7 To summarise, the trip matrices will be segmented as indicated below:

- Time period: AM peak hour, Inter-peak period, and PM peak period
- Mode: Private vehicle and Public transport
- Vehicle types: Light vehicles and Heavy vehicles
- Purpose: Work, Commuting and Other
- Car availability: Car available and No car available (public transport only).

3

HIGHWAY SURVEY DATA

3.1 OVERVIEW

- 3.1.1 For the purpose of updating the Wokingham model, WSP | Parsons Brinkerhoff commissioned Transport Survey Partners (TSP) to carry out traffic surveys in Wokingham, Reading and Bracknell. Table 1 summarises the surveys which were carried out.

Table 1 Summary of surveys commissioned

NUMBER OF SURVEYS	SURVEY TYPE
76	Automatic Traffic Counts (ATCs) – Links
52	Manual Classified Counts (MCCs)

- 3.1.2 Automatic traffic counts covered a two week period and will be used for model calibration and validation. Manual classified counts were carried out on a single day within this two week period and will be used for model validation only.

- 3.1.3 ATCs were laid to collect data between Monday 28th September and Sunday 11th September 2015, therefore providing two continuous weeks of data.

- 3.1.4 MCCs were carried out between 00:70 and 19:00 on Thursday 1st October 2015 and therefore overlapped with the ATC data collection.

- 3.1.5 In addition to the commissioned surveys, WSP | Parsons Brinkerhoff were able to obtain a large number of ATC data from local authorities within the fully modelled area as well as Highways England data via the HATRIS website. Where it was possible to do so, data was obtained for the same two week time period as the TSP commissioned data.

Table 2 ATC data obtained from local authorities

NUMBER OF ATCS	OBTAINED FROM
64	Wokingham Borough Council
34	Bracknell Forest Borough Council
25	Hampshire County Council
55	Oxfordshire County Council
52	Reading Borough Council
41	Royal Borough of Windsor and Maidenhead
40	West Berkshire
110	TRADS (via Highways England HATRIS website)

- 3.1.6 WSP | Parsons Brinkerhoff also received junction turning count data from Reading Borough Council and Wokingham Borough Council that was carried out within the town centres. The quantity of surveys obtained is detailed in Table 3 below.

Table 3 MCC data obtained from local authorities

NUMBER OF SURVEYS	OBTAINED FROM
16	Reading Borough Council
6	Wokingham Borough Council

- 3.1.7 Data from Reading town centre included junction turning counts covering a 12 hour period (0700-1900) however the Wokingham Town Centre data was only collected during the AM Period (0700-1000) and the PM period (1600-1900).

3.2 ATC

COMMISSIONED ATC

- 3.2.1 Table 4 describes the locations of the ATCs commissioned by WSP | Parsons Brinkerhoff carried out by TSP.

Table 4 Commissioned ATCs undertaken by TSP

ID	SURVEY LOCATION
ATC_W101	A33 Basingstoke Rd, North of Three Mile Cross
ATC_W102	Kybes Ln, North of Pingewood Rd S
ATC_W103	Burghfield Rd, North of Amners Farm Rd
ATC_W104	Hangar Rd, North of Sheffield Bottom
ATC_W105	The Straight Mile, South of M4
ATC_W106	B3018 Twyford Rd, South of M4
ATC_W107	A329 London Rd, East of Plough Ln
ATC_W108	Blagrove Ln
ATC_W109	A321 Finchampstead Rd, Eastheath
ATC_W110	B3349 Odiham Rd, North of Heckfield Heath
ATC_W111	A33 Basingstoke Rd, North of The Causeway
ATC_W112	B3034 Forest Rd, West of Foxley Ln
ATC_W113	B3430 Nine Mile Ride, East of Old Wokingham Rd
ATC_W114	B3348 Bracknell Rd, North of Brookers Row
ATC_W115	A33 North of Longwater Ave
ATC_W116	B3031 Basingstoke Rd, North of Bennet Rd
ATC_W117	Northumberland Ave, South of Stockton Rd
ATC_W118	Whiteknights Rd, South of Hamilton Rd
ATC_W119	B3349 Basingstoke Rd, North of Swallowfield St
ATC_W120	Great Lea, South of Hartley Ct Rd
ATC_W121	Bloomfield Hatch Ln, South of Grazeley
ATC_W122	Goring Ln, West of Fullers Ln
ATC_W123	Reading Rd, South of James's Ln
ATC_W124	Heathlands Rd, South of Hatch Ride
ATC_W125	B3348 Jubilee Rd, North of Finchampstead
ATC_W126	Swallowfield Rd, North of Castle Hill
ATC_W127	B3030 Sindlesham Rd, South of Church Ln
ATC_W128	B3349 School Rd, East of Wood Ln

ATC_W129	Rushey Way, East of Marefield
ATC_W130	Mill Ln, South of Wokingham Rd
ATC_W131	Meadow Rd, South of Wokingham Rd
ATC_W132	Kenton Rd, North of The Crescent
ATC_W133	Emmbrook Rd, South of Lowther Rd
ATC_W134	Holt Ln
ATC_W135	A321 Denmark St, West of Langborough Rd
ATC_W136	A329 Broad St, North of Rose St
ATC_W137	A329 Reading Rd, North of Arbor Ln
ATC_W138	Loddon Bridge Rd, South of Norton Rd
ATC_W139	Langborough Rd, West of Gipsy Ln
ATC_W140	London Rd, East of Wiltshire Rd
ATC_W141	Wiltshire Rd, South of Wiltshire Dr
ATC_R101	B4009 Wallingford Rd, North of Goring
ATC_R102	A4074 Red Ln, West of B471
ATC_R103	A4130, South of Crocker End
ATC_R104	B480, Pishill
ATC_R105	B4009 High St, West of Goring
ATC_R106	B471 Whitchurch Rd, North of Pangbourne
ATC_R107	A4155, Medmenham
ATC_R108	A4155 Span Hill, North of Spring Ln
ATC_R109	Caversham Park Rd, South of Lowfield Rd
ATC_R110	A4155 Henley Rd, East of Rossendale Rd
ATC_R111	B3345 Lower Henley Rd, East of Luscombe Cl
ATC_R112	B481 Peppard Rd, South of Newlands Ave
ATC_R113	A4074 Church Rd, East of St Anne's Rd
ATC_R114	A4155 Henley Rd, East of Caversham Park Rd
ATC_R115	Caversham Bridge, Reading
ATC_SLR101	Woosehill Ln
ATC_SLR102	Molly Millar's Ln
ATC_SLR103	Barkham Rd, West of Ormonde Rd
ATC_SLR104	Meadow Rd
ATC_SLR105	Barkham Rd, East of Latimer Rd
ATC_SLR106	Wellington Rd, North of Elms Rd
ATC_SLR108	Station Rd, E of Alderman Willey Cl
ATC_SLR109	Reading Rd, South of Station Link Rd
ATC_SLR110	Reading Rd, South of Holt Ln
ATC_SLR111	Station Link Rd, Northern section
ATC_SLR112	Oxford Rd, South of Mount Pleasant
ATC_SLR113	Reading Rd, North of Larch Ave
ATC_SLR114	Reading Rd, South of Rotherfield Ave
ATC_SLR115	Station Link Rd, Southern section
ATC_WRR101	Beech Ln, North of Hilbury Rd
ATC_WRR102	Betchworth Ave, South of Luckmore Dr
ATC_WRR103	Wokingham Rd, West of Mays Ln
ATC_WRR104	Rushey Way, East of Faygate Way
ATC_WRR105	Silverdale Rd, East of Hillside Rd
ATC_WRR106	Sutcliffe Ave

3.2.2 The ATC data was collected for 24 hours a day over a two week continuous period. Speed data was also collected for site ATC_SLR108.

3.2.3 The ATC data classified vehicles into the following seven categories:

- Pedal Cycle (PCL)
- Motor Cycle (MCL)

- Car
- LGV
- OGV1
- OGV2
- PSV

3.2.4 Figure 5 shows the locations of all the commissioned ATCs

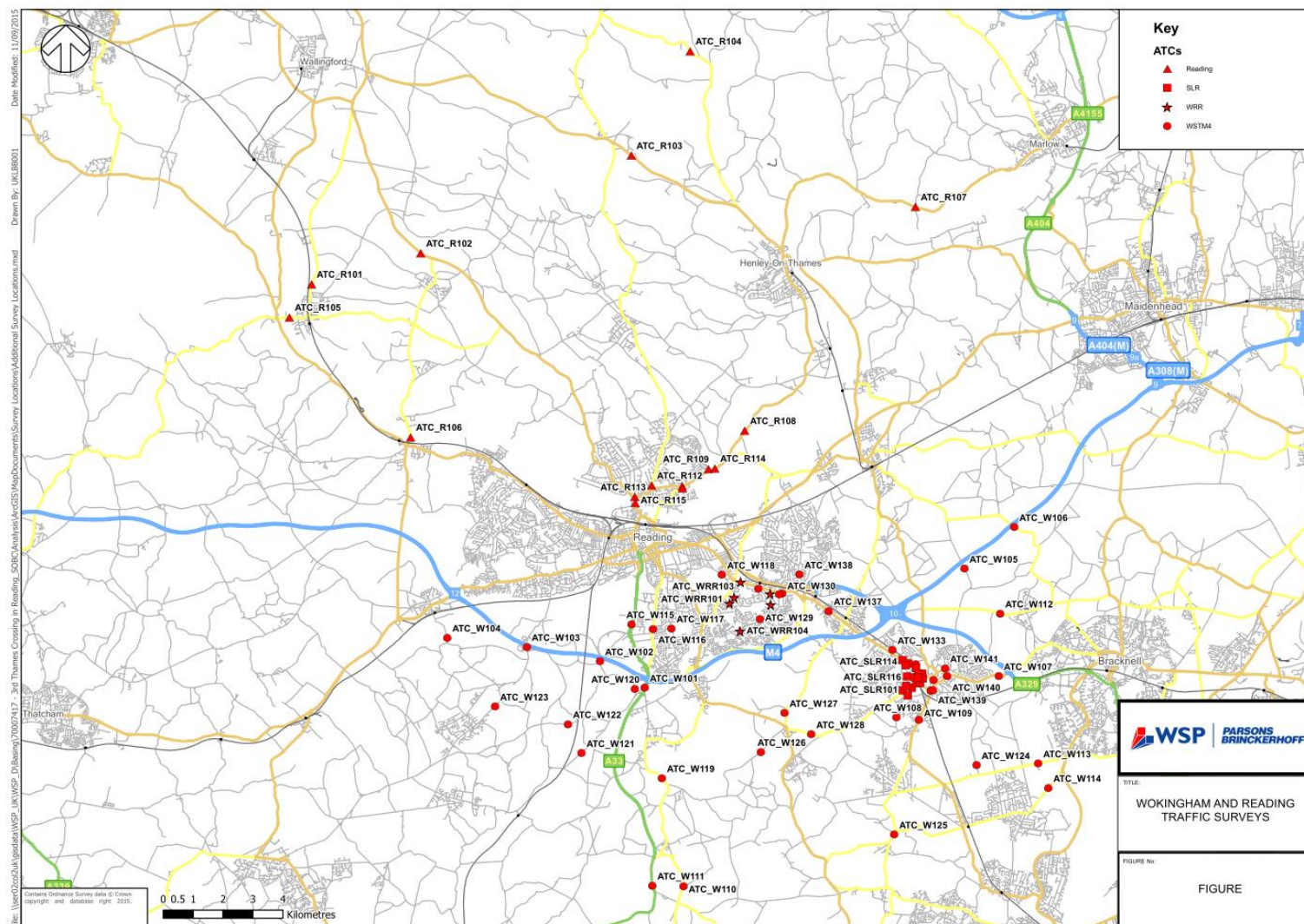


Figure 5 TSP ATC Locations

PERMANENT ATC

- 3.2.5 In addition to the above surveys that were commissioned, Wokingham Borough Council has various permanent ATC sites that continuously collect data. Data for these sites within the model could be extracted from their online database: <https://drakewell02.drakewell.com>.
- 3.2.6 Wokingham Borough Council previously carried out a number of supplementary ATCs within the town centre and to the north of the borough that WSP | Parsons Brinkerhoff were able to access. The locations of these are included within Table 5 and are represented in Figure 6.
- 3.2.7 WSP | Parsons Brinkerhoff were able to obtain similar permanent site data from other local authorities in the study area; Bracknell Forest Borough Council, Hampshire County Council, Oxford County Council, Reading Borough Council, the Royal Borough of Windsor and Maidenhead and West Berkshire Council.
- 3.2.8 To maintain consistency for the model validation and calibration, the permanent site data- where possible- was downloaded for the same two week period as the commissioned ATCs: 28th September 2015 to 11th October 2015. Table 5 to Table 11 contain the site ID, site location and source for each of the ATCs obtained from the seven local authorities within the fully modelled area.

Table 5 List of ATC permanent sites obtained from Wokingham Borough Council

ID	SOURCE	SURVEY LOCATION
WBC_002	WBC	SITE 2 - A321 FINCHAMPSTEAD RD, N OF B3016
WBC_006	WBC	SITE 6 - A321 WILTSHIRE RD, WOKINGHAM
WBC_007	WBC	SITE 7 - A327 SHINFIELD RD, READING
WBC_008	WBC	SITE 8 - A4 KNOWL HILL, KNOWL HILL
WBC_012	WBC	SITE 12 - SUTTON SEEDS WEST, READING
WBC_014	WBC	SITE 14 - A329 WOKINGHAM RD, READING
WBC_015	WBC	SITE 15 - B3350 CHURCH RD, EARLEY
WBC_027	WBC	SITE 27, A33 SWALLOWFIELD BYPASS, READING
WBC_032	WBC	SITE 32 - A4130 HENLEY ON THAMES
WBC_052	WBC	SITE 52 - B3349 BASINGSTOKE RD, RISELEY
WBC_059	WBC	SITE 59 - B3030 ROBIN HOOD LANE, READING
WBC_060	WBC	SITE 60 - B3270 LOWER EARLEY WAY SOUTH, LWR EARLEY
WBC_063	WBC	SITE 63 - A321 WARGRAVE, WARGRAVE
WBC_084	WBC	SITE 84 - A329 UNDER M4 BRIDGE, READING
WBC_090	WBC	SITE 90, NEW WOKINGHAM RD, CROWTHORNE
WBC_092	WBC	SITE 92 - B3016 EVERSLEY CROSS, EVERSLEY
WBC_093	WBC	SITE 93 - WHITLEY WOOD LANE, READING
WBC_094	WBC	SITE 94 - A327 HOLLOW LANE, SHINFIELD
WBC_095	WBC	SITE 95- A327 Lodden Bridge
WBC_096	WBC	SITE 96 - A327 READING RD, ARBORFIELD GSN
WBC_097	WBC	SITE 97 - RECTORY RD, WOKINGHAM
WBC_099	WBC	SITE 99 - A4 BATH RD, NR SONNING
WBC_100	WBC	SITE 100 - A4 BATH RD, CHARVIL
WBC_110	WBC	SITE 110 - B3349 BARKHAM RD, BARKHAM
WBC_112	WBC	SITE 112 - N33 EASTHAMPSTEAD RD, WOKINGHAM
WBC_113	WBC	SITE 113 - N60 WATERLOO RD, WOKINGHAM
WBC_118	WBC	SITE 118 - H155 BADER WAY SOUTH, WINNERSH
WBC_120	WBC	SITE 120- PLAYHATCH ROAD, SONNING
WBC_121	WBC	SITE 121 - B3348 DUKES RIDE, CROWTHORNE
WBC_169	WBC	SITE 169 - A329(M), M4 TO COPPID BEECH, WOKINGHA
WBC_170	WBC	SITE 170 - A329M COPPID BEECH TO M4
WBC_171	WBC	SITE 171 - A329(M), SOUTH OF A4 & CHURCH RD O'
WBC_174	WBC	SITE 174 - HYDE END ROAD
WBC_202	WBC	SITE 202 - C8701 WARREN HOUSE RD, WOKINGHAM
WBC_203	WBC	SITE 203 - A321 TWYFORD ROAD, WOKINGHAM
WBC_204	WBC	SITE 204 - U8269 BINFIELD RD, WOKINGHAM
WBC_205	WBC	SITE 205 - A329 SHUTE END, WOKINGHAM
WBC_206	WBC	SITE 206 - OLD WOKINGHAM ROAD NORTHERN END

WBC_207	WBC	SITE 207 - CULVER LANE
WBC_208	WBC	SITE 208 - POUND LANE
WBC_209	WBC	SITE 209 - B3350 WILDERNESS ROAD
WBC_210	WBC	SITE 210 - PEPPER LANE
WBC_212	WBC	SITE 212 - PEACH STREET, WOKINGHAM
WBC_213	WBC	SITE 213 - BUTTS HILL ROAD
WBC_217	WBC	SITE 217 - Mill Lane
WBC_218	WBC	SITE 218 - MOLLY MILLARS LANE
WBC_219	WBC	SITE 219 - WELLINGTON ROAD
NW_1	WBC (North Wokingham)	Ashton Road, South of Old Forest Road
NW_2E	WBC (North Wokingham)	Commons Road, South of Old Forest Road
NW_2W	WBC (North Wokingham)	Commons Road, South of Old Forest Road
NW_3	WBC (North Wokingham)	Lowther Road, South of Old Forest Road
NW_4	WBC (North Wokingham)	Old Forest Road, East of Lenham Close
NW_5	WBC (North Wokingham)	A329 Reading Rd, West of Green Lane
NW_6	WBC (North Wokingham)	Emmbrook Rd, North of A329 Reading Road
NW_7	WBC (North Wokingham)	Clifton Rd, South of Matthews Green RD
NW_8	WBC (North Wokingham)	Holt Ln, North of A329 A329 Reading Rd
NW_9	WBC (North Wokingham)	Jubilee Avenue, West of Holt Ln
NW_10	WBC (North Wokingham)	Bell Foundary Lane, East of A321 Twyford Road
NW_11	WBC (North Wokingham)	A321 Twyford Road, North of Bell Foundary Lane
TC_1	WBC (TC)	A329 Reading Road, Wokingham (Station SP)
TC_2	WBC (TC)	A329 London Road, Wokingham (LC 3)
TC_3	WBC (TC)	A321 Finchampstead Road, Wokingham (LC 9)
TC_4	WBC (TC)	B3349 Barkham Road, Wokingham (LC 3a)
TC_5	WBC (TC)	Paddocks Car Park, Wokingham (Hedge)

Table 6 List of ATC permanent sites obtained from Bracknell Forest Borough Council

ID	SOURCE	SURVEY LOCATION
BFBC_003	BFBC	Site 3: A329 Martins Heron, Bracknell
BFBC_010	BFBC	Site 10: Berkshire Way EB
BFBC_011	BFBC	Site 11: Berkshire Way WB
BFBC_012	BFBC	Site 12: Vigar Way NB
BFBC_013	BFBC	Site 13: Vigar Way SB
BFBC_014	BFBC	Site 14: Cain Road
BFBC_016	BFBC	Site 16: A3095 Warfield Road
BFBC_029	BFBC	Site 29: B3408 Amen Corner EB, Bracknell
BFBC_070	BFBC	Site 70: A3095 Jealotts Hill, Bracknell
BFBC_074	BFBC	Site 74: A3095 Crowthorne Bypass, Crowthorne
BFBC_086	BFBC	Site 86: A329 East of Met Office, Bracknell
BFBC_094	BFBC	Site 94: B3034 Winkfield Row
BFBC_099	BFBC	Site 99: H66 Swan Lane
BFBC_111	BFBC	Site 111: A321 Sandhurst High St
BFBC_181	BFBC	Site 181: U8471 Temple Way, NDR, Bracknell
BFBC_182	BFBC	Site 182: Harvest Ride, NDR, Bracknell
BFBC_221	BFBC	Site 221: C8662 Laundry Lane, Sandhurst
BFBC_222	BFBC	Site 222: C8633 Yateley Road, Sandhurst
BFBC_224	BFBC	Site 224: A321 Wokingham Road, Sandhurst
BFBC_226	BFBC	Site 226: D8631 Madgalene Road, Sandhurst
BFBC_227	BFBC	Site 227: C8637 Old Wokingham Rd, S of Nine Mile Ride
BFBC_229	BFBC	Site 229: A3095 Crowthorne Rd, N of B3430
BFBC_230	BFBC	Site 230: B3095 Nine Mile Ride, Crowthorne
BFBC_231	BFBC	Site 231: A322 Swinley Road, Winkfield
BFBC_232	BFBC	Site 232: D8610 Peacock Lane, Bracknell
BFBC_235	BFBC	Site 235: A322 Downshire Way, Bracknell
BFBC_236	BFBC	Site 236: D8663 Market Street (The Ring), Bracknell
BFBC_237	BFBC	Site 237: D8657 Station Way (The Ring), Bracknell
BFBC_238	BFBC	Site 238: D8663 High Street (The Ring), Bracknell
BFBC_242	BFBC	Site 242: C9601 Fernbank Road, Bracknell
BFBC_244	BFBC	Site 244: B3018 Binfield Road, Binfield
BFBC_245	BFBC	Site 245: C8639 Terrace Road South, Binfield
BFBC_247	BFBC	Site 247: B3034 Forest Road, Binfield
BFBC_248	BFBC	Site 248: B3348 Bracknell Road, N of Brookers Row

Table 7 List of ATC permanent sites obtained from Hampshire

ID	SOURCE	SURVEY LOCATION
HCC_001a	Hampshire	Site 1: A30 Winchester Rd, Basingstoke WB
HCC_001b	Hampshire	Site 1: A339 Bishops Green, S of County Boundary
HCC_002a	Hampshire	Site 2: A33 Spanish Green, SW of Petrol Station
HCC_002b	Hampshire	Site 2: B3272 Eversley Cross
HCC_002c	Hampshire	Site 2: A30 Winchester Rd, Basingstoke EB
HCC_002d	Hampshire	Site 2: A327 Minley Rd North West of M3 J4A
HCC_003a	Hampshire	Site 3: A325 Farnborough Rd, S of Empress Ave
HCC_003b	Hampshire	Site 3: B3400 Worthing Rd Basingstoke
HCC_003c	Hampshire	Site 3: B3046 Farleigh Rd, West of A339 Jct Basingstoke
HCC_005	Hampshire	Site 5: A30 Basingstoke
HCC_021	Hampshire	Site 21: A30 Hartley Wintney
HCC_032	Hampshire	Site 32: A327 North of j/w A30 Hartfordbridge
HCC_044	Hampshire	Site 44: A340 Tadley
HCC_045	Hampshire	Site 45: A30 Yateley
HCC_064	Hampshire	Site 64: B3016 Just North of Caravan Park
HCC_065a	Hampshire	Site 65: A327 North of Jct/w Coopers Hill
HCC_065b	Hampshire	Site 65: A327 Eversley
HCC_067	Hampshire	Site 67: A3013 Fleet
HCC_090	Hampshire	Site 90: B4640 Tothill
HCC_122	Hampshire	Site 122: A339 NW of Basingstoke
HCC_139	Hampshire	Site 139: B3016 Winchfield
HCC_148	Hampshire	Site 148: A 323 Reading Rd North Fleet
HCC_150	Hampshire	Site 150: A327 Summit Av Farnborough
HCC_344	Hampshire	Site 344: A30 Phoenix Green NB
HCC_494	Hampshire	Site 494: Cove Rd Fleet

Table 8 List of ATC permanent sites obtained from Oxfordshire County Council

ID	SOURCE	SURVEY LOCATION
OCC_016	Oxfordshire	Site 16: A40 OXFORD NORTHERN BYPASS
OCC_017	Oxfordshire	Site 17: A4074 SOUTH OF NUNEHAM COURTENAY
OCC_018	Oxfordshire	Site 18: A4130 CROWMARSH HILL
OCC_022	Oxfordshire	Site 22: A4074 CHAZEY HEATH
OCC_023	Oxfordshire	Site 23: A4155 SOUTH OF HENLEY
OCC_026	Oxfordshire	Site 26: A329 South-West of M40
OCC_027	Oxfordshire	Site 27: A329 NORTH-EAST OF M40
OCC_028	Oxfordshire	Site 28: A418 WEST OF M40
OCC_052	Oxfordshire	Site 52: B4027 NORTH-WEST OF NOKE JUNCTION
OCC_053	Oxfordshire	Site 53: B4044 NORTH-WEST OF SWINFORD BRIDGE
OCC_068	Oxfordshire	Site 68: B4009 SOUTH-WEST OF M40
OCC_073	Oxfordshire	Site 73: B481 SOUTH OF NETTLEBED
OCC_075	Oxfordshire	Site 75: T34 SOUTH OF OXFORD RING ROAD
OCC_091	Oxfordshire	Site 91: B4494 COUNTY BOUNDARY SOUTH OF WANTAGE
OCC_117	Oxfordshire	Site 117: A40 WHEATLEY BRIDGE
OCC_120	Oxfordshire	Site 120: A418 THAME BYPASS
OCC_122	Oxfordshire	Site 122: A4130 EAST OF A34 DMH1
OCC_127	Oxfordshire	Site 127: A4130 DIDCOT MANOR BRIDGE
OCC_131	Oxfordshire	Site 131: A4142 EAST OF A4074
OCC_133	Oxfordshire	Site 133: A34 DRAYTON
OCC_135	Oxfordshire	Site 135: A415 WEST OF MARCHAM
OCC_136	Oxfordshire	Site 136: B4017 WOOTTON
OCC_139	Oxfordshire	Site 139: A4130 WEST OF WALLINGFORD
OCC_174	Oxfordshire	Site 174: A4165 SOUTH OF KIDLINGTON
OCC_290	Oxfordshire	Site 290: A4130 WALLINGFORD BYPASS RIVER BRIDGE
OCC_318	Oxfordshire	Site 318: B4495 MARSTON FERRY ROAD
OCC_319	Oxfordshire	Site 319: B4495 DONNINGTON BRIDGE
OCC_345	Oxfordshire	Site 345: B4016 WEST OF MARSH BRIDGE DIDCOT
OCC_401	Oxfordshire	Site 401: HENLEY KINGS ROAD NORTH OF MARKET PLACE
OCC_403	Oxfordshire	Site 403: THAMES STREET WEST OF SAINT ALDATES
OCC_406	Oxfordshire	Site 406: A420 OXPENS
OCC_501	Oxfordshire	Site 501: A420 OXFORD, MAGDALEN BRIDGE

OCC_502	Oxfordshire	Site 502: A4144 OXFORD,FOLLY BRIDGE
OCC_503	Oxfordshire	Site 503: A420 OXFORD,OSNEY BRIDGE
OCC_505	Oxfordshire	Site 505: A4144 Oxford, Woodstock Rd South of Leckford Rd
OCC_506	Oxfordshire	Site 506: A4165 Oxford,Banbury Rd North of Norham Rd
OCC_507	Oxfordshire	Site 507: A4144 Oxford,Woodstock Rd S of Blandford Ave
OCC_508	Oxfordshire	Site 508: A4165 Oxford Banbury Rd South of A40
OCC_509	Oxfordshire	Site 509: B4150 Oxford Marsh Lane North of Horseman Close
OCC_510	Oxfordshire	Site 510: A420 Oxford London Rd East of Lyndworth Close
OCC_513	Oxfordshire	Site 513: B480 Oxford.Garsington Rd SE of John Smith Drive
OCC_514	Oxfordshire	Site 514: A4158 Oxford RoseHill S of Newman Road
OCC_515	Oxfordshire	Site 515: A4144 Oxford Abingdon Rd South of Weirs Lane
OCC_516	Oxfordshire	Site 516: A420 Oxford Botley Rd W of Seacourt Car Park
OCC_518	Oxfordshire	Site 518: Oxford Cowley Rd Littlemore Underneath Bypass
OCC_525	Oxfordshire	Site 525: A420 HEADINGTON RD E OF B4150
OCC_526	Oxfordshire	Site 526: B4150 MARSTON ROAD N OF A420
OCC_528	Oxfordshire	Site 528: OXFORD ST.ALDATES NORTH OF SPEEDWELL STREET
OCC_529	Oxfordshire	Site 529: A420 OXFORD HIGH STREET ALL SOULS
OCC_531	Oxfordshire	Site 531: A40 Oxford Northern Bypass East of Marston Flyover
OCC_539	Oxfordshire	Site 539: Oxford Cowley Rd East of Dawson Street
OCC_540	Oxfordshire	Site 540: Oxford, Cowley Rd East of James St
OCC_541	Oxfordshire	Site 541: Oxford Cowley Road, West of Divinity Rd
OCC_573	Oxfordshire	Site 573: Abingdon Ock Street
OCC_574	Oxfordshire	Site 574: Abingdon Bath Street

Table 9 List of ATC permanent sites obtained from Reading Borough Council

ID	SOURCE	SURVEY LOCATION
RBC_001	RBC	Site 1: Cow Lane, Portman Rd Roundabout
RBC_002	RBC	Site 2: Bath Road, East of Mill Lane
RBC_003	RBC	Site 3: The Meadway, East of St Michaels Rd
RBC_004a	RBC	Site 4: School Road, near Cowan Rd Junc
RBC_004	RBC	Site 4:Bath Road East to A4/Dorking Way Roundabout
RBC_005	RBC	Site 5: Norcut Road, West of Blundells Rd
RBC_006	RBC	Site 6: Oxford Rd, near Overdown Rd
RBC_008	RBC	Site 8: Chatham Street/A329/Friar Street
RBC_010	RBC	Site 10 :Bath Road East
RBC_013	RBC	Site 13: Bath Road/Benyon Court Junction
RBC_016	RBC	Site 16:Queens Road/Watlington Street
RBC_020	RBC	Site 20:Bath Road to A4/Pound Lane Roundabout
RBC_025	RBC	Site 25: London Road West to A4/A3290 Roundabout
RBC_029	RBC	Site 29: London Road/Fatherson Road Junction
RBC_037	RBC	Site 37:Burghfield Road near canal
RBC_038	RBC	Site 38:A33 MereOak Lane Junction
RBC_046	RBC	Site 46:A33 Northbound
RBC_047	RBC	Site 47:A33 Southbound
RBC_054	RBC	Site 54: A33 Relief Road
RBC_055	RBC	Site 55:B3031 Basingstoke Road
RBC_070	RBC	Site 70 :A327 nr Beech Road Junction
RBC_073	RBC	Site 73:Northumberland Avenue to Hartland Rd Roundabout
RBC_079	RBC	Site 79:A329 Loddon Bridge Road Junction
RBC_082	RBC	Site 82: Wokingham Road/Belle Ave Junction
RBC_089	RBC	Site 89: Peppard Road/The Ridings Junction
RBC_093	RBC	Site 93:Purley Rise nr Beech Road
RBC_096	RBC	Site 96: Oxford Road nr Ringwood Road
RBC_104	RBC	Site 104:The Meadow nr Usk Road
RBC_108	RBC	Site 108:Tilehurst Road
RBC_116	RBC	Site116: George Street
RBC_121	RBC	Site 121: Kings Road/Fatherson Road Junction
RBC_131	RBC	Site 131: A4155 to A4155/Richfield Avenue Roundabout
RBC_1160	RBC	Site1160: Hill Meadows Car Park
CC_RBC_001	RBC	Bridge Street
CC_RBC_003	RBC	Broad Street Car Park
CC_RBC_004	RBC	Oxford Road
CC_RBC_005	RBC	Castle Street
CC_RBC_006	RBC	Northern Station Entrance Access

CC_RBC_007	RBC	Duke Street
CC_RBC_008	RBC	Queens Road Car Park
CC_RBC_011	RBC	Forbury Road
CC_RBC_012	RBC	Sidmouth Street
CC_RBC_014	RBC	Stanshawe Road
CC_RBC_015	RBC	Friar Street
CC_RBC_016	RBC	Station Multi Story
CC_RBC_017	RBC	Kennet Side
CC_RBC_018	RBC	Thorn Street
CC_RBC_019	RBC	Kings Road
CC_RBC_020	RBC	Tudor Road
CC_RBC_021	RBC	Oracle Riverside car park
CC_RBC_024	RBC	Caversham Road Network Rail Northern Access
CC_RBC_025	RBC	Caversham Road Network Rail Southern Access

Table 10 List of ATC permanent sites obtained from Royal Borough of Windsor and Maidenhead

ID	SOURCE	SURVEY LOCATION
RBWM_002	RBWM	A308 Marlow road
RBWM_003	RBWM	A308 Straight Road, Old Windsor
RBWM_004	RBWM	A308 Maidenhead Road
RBWM_005	RBWM	A30 London Road
RBWM_007	RBWM	A4 East of Cannon Lane
RBWM_008	RBWM	A4 knowl Hill
RBWM_010	RBWM	A332 Windsor & Eton Northbound
RBWM_011	RBWM	A330 Winkfield Road
RBWM_013	RBWM	A4 East of River Bridge, Maidenhead
RBWM_014	RBWM	A329 London Road (West of Heatherwood Rbt)
RBWM_018	RBWM	B3021 Southlea Road Datchet
RBWM_021	RBWM	B3028 Upper Bray Road
RBWM_022	RBWM	A330 Ascot Road Holyport
RBWM_039	RBWM	B3022 St Leonards Rd, Windsor
RBWM_045	RBWM	A332 Windsor & Eton Southbound
RBWM_049	RBWM	A4 Bridge Road Maidenhead
RBWM_081	RBWM	B3175 Imperial Road, Windsor
RBWM_082	RBWM	B3024 Dedworth Road LC68
RBWM_084	RBWM	B3026 Eton Wick LC 37
RBWM_086	RBWM	B3022 Winkfield Road
RBWM_087	RBWM	Shoppenhangers Road LC 39
RBWM_088	RBWM	A4 St Clouds Way Maidenhead
RBWM_089	RBWM	Kings Road Windsor
RBWM_090	RBWM	B3024 Clarence Road Windsor
RBWM_091	RBWM	A332 Kings Ride Ascot
RBWM_092	RBWM	B3020 Bagshot Road (South of A330)
RBWM_093	RBWM	A4094 Sutton Road, Cookham
RBWM_095	RBWM	A308 Windsor Adj to M4 Bridge
RBWM_107	RBWM	B3024 WALTHAM ST.LAWRENCE
RBWM_128	RBWM	H365 Cannon Lane
RBWM_131	RBWM	A308 Braywick Road Southbound
RBWM_132	RBWM	Forlease Road
RBWM_157	RBWM	A308 Braywick Road NB
RBWM_163	RBWM	B383 Broomhall Lane, Sunningdale
RBWM_164	RBWM	A330 Devenish Road, Sunningdale
RBWM_193	RBWM	A4 Castle Hill, Maidenhead
RBWM_195	RBWM	A308 Craufurd Rise (Marlow Rd)
RBWM_196	RBWM	B4447 Cookham Road
RBWM_197	RBWM	A308 Goslar Way (Eastbound)
RBWM_198	RBWM	A308 Goslar Way (Westbound)
RBWM_199	RBWM	A308 Albert Road

Table 11 List of ATC permanent sites obtained from West Berkshire

ID	SOURCE	SURVEY LOCATION
WBerks_017	West Berkshire	A4 Halfway
WBerks_026	West Berkshire	A4 Woolhampton
WBerks_031	West Berkshire	A329 Shoters Hill, Pangbourne
WBerks_040	West Berkshire	B4009 Long Lane, Shaw
WBerks_050	West Berkshire	A338 North of Great Shefford
WBerks_051	West Berkshire	A338 South of M4
WBerks_053	West Berkshire	A4 West of Hungerford
WBerks_054	West Berkshire	A343 Andover Road
WBerks_055	West Berkshire	A340 Tidmarsh
WBerks_068	West Berkshire	A338 South of Hungerford
WBerks_069	West Berkshire	A4 Bath Road, Benham Hill
WBerks_071	West Berkshire	A329 North of Streatley
WBerks_077	West Berkshire	Burys Bank Road, Newbury
WBerks_078	West Berkshire	Lower Way, Thatcham
WBerks_079	West Berkshire	B4192 Hungerford
WBerks_087	West Berkshire	A417 North of Streatley
WBerks_090	West Berkshire	Turnpike Road, Newbury
WBerks_098	West Berkshire	B3051 Brimpton Common
WBerks_122	West Berkshire	B4009 Shaw Road, Newbury
WBerks_123	West Berkshire	Oxford Road, Donnington
WBerks_183	West Berkshire	A4 Bath Road, Thatcham
WBerks_184	West Berkshire	South of Thatcham Train Station
WBerks_186	West Berkshire	A329 Oxford Road, Purley
WBerks_251	West Berkshire	A339 North of Ret Park, Newbury
WBerks_252	West Berkshire	A339 North of Robin Hood- Southbound
WBerks_253	West Berkshire	St John's Road, Newbury
WBerks_254	West Berkshire	Monks Lane, Newbury
WBerks_255	West Berkshire	A340 Basingstoke Road, Aldermaston
WBerks_260	West Berkshire	A4 Theale, West of A34 Junction
WBerks_261	West Berkshire	A339 North of Robin Hood- Northbound
WBerks_262	West Berkshire	A339 South of Robin Hood
WBerks_263	West Berkshire	A339 East of Swan Roundabout
WBerks_R1	West Berkshire	A339 North of Vodafone Roundabout
WBerks_R3	West Berkshire	A4 London Road, east of Hambridge Road
WBerks_R4	West Berkshire	A4 Bath Road, Speen
WBerks_R5	West Berkshire	Andover Road
WBerks_R7	West Berkshire	A339 Greenham Road
WBerks_R8	West Berkshire	Greenham Road
WBerks_R9	West Berkshire	Bartholomew Road
WBerks_R10	West Berkshire	B4000 Ermin Street

3.2.9

The permanent sites we received were only classified by total vehicles; WSP | Parsons Brinkerhoff used the TSP data collected to calculate a car, LGV and HGV factor for each of the three time periods in order to further classify this data. The factors were calculated by summing the total number of cars counted in the AM peak across all TSP sites and dividing this by the total number of vehicles counted in the AM peak. This method was carried out separately for each of the classifications across each of the three time periods. The factors that we used to classify the permanent data are given in Table 12 below.

Table 12 Car, LGV and HGV factors

PROPORTION SPLIT	CAR	LGV	HGV
AM	0.8871	0.0834	0.0295
IP	0.8334	0.1166	0.0499
PM	0.9014	0.0779	0.0208

3.2.10

Figure 6 presents the ATC site locations that we were able to obtain from local authorities within the fully modelled area.

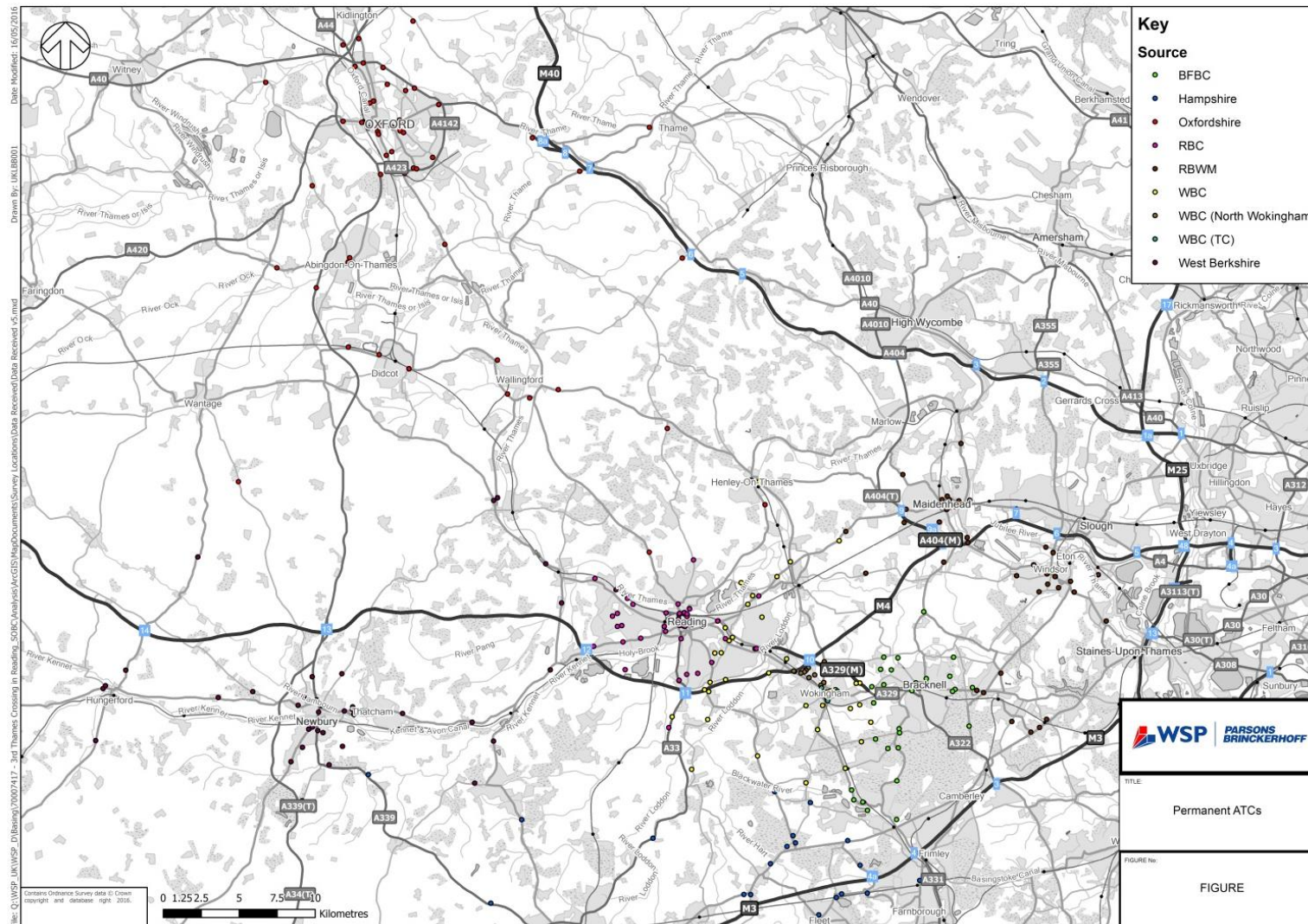


Figure 6 Additional ATCs within the WSTM4 fully modelled area

TRADS

- 3.2.11 TRADS count data was downloaded from Highways England via the HATRIS website. For the majority of TRADS sites, data was available for the same two week period as the commissioned and permanent ATCs WSP| Parsons Brinkerhoff also obtained. Where this was not possible, data was downloaded from a similar neutral time of year.
- 3.2.12 Table 13 identifies the data obtained from Highways England.

Table 13 List of Highways England TRADS counts

ID	SITE DESCRIPTION
ATC_TRADS_1608	AC, M25, M40 (EB) Offslip to M25 (AC)
ATC_TRADS_3011	NB, M3, Junction 6 - 5
ATC_TRADS_3012	SB, M3, Junction 5 - 6
ATC_TRADS_3013	NB, M3, Junction 7 - 6
ATC_TRADS_3401	NB, A34, Between A4142 - A420
ATC_TRADS_3409	SB, A34, South of M4 Junction 13
ATC_TRADS_3410	SB, A34, Onslip from M4 onto A34 S/B
ATC_TRADS_3442	SB, A34, S of Oxford (A4142 - A4183)
ATC_TRADS_3477	SB, A34, Milton Junction to Chilton
ATC_TRADS_3478	NB, A34, Chilton to Milton Junction
ATC_TRADS_3479	SB, A34, Milton Offslip
ATC_TRADS_4082	SB, A404M, North of M4 Junction 8/9
ATC_TRADS_4083	NB, A404M, North of M4 Junction 8/9
ATC_TRADS_4096	NB, A404, A4010 exit Junction 4 Handy Cross
ATC_TRADS_4098	NB, A404, exit Junction 4 Handy Cross
ATC_TRADS_4099	WB, A404, Junction 4 A404 into Handy Cross
ATC_TRADS_5207	NB, A34, Shippon (A415-A4183)
ATC_TRADS_5208	SB, A34, Shippon (A415-A4183)
ATC_TRADS_5264	SB, M4, A4 to M4 Junction 7
ATC_TRADS_9510	M25 clockwise between J11 and J12
ATC_TRADS_9511	M25 anti-clockwise between J12 and J11
ATC_TRADS_9514	M25 J12 clockwise to M3 J2
ATC_TRADS_9515	M25 J12 anti-clockwise access
ATC_TRADS_9516	M25 clockwise between J12 and J13
ATC_TRADS_9517	M25 anti-clockwise between J13 and J12
ATC_TRADS_9519	M25 anti-clockwise within J13
ATC_TRADS_9520	M25 J13 clockwise access
ATC_TRADS_9521	M25 J13 anti-clockwise exit
ATC_TRADS_9522	M25 clockwise between J13 and J14
ATC_TRADS_9523	M25 anti-clockwise between J14 and J13
ATC_TRADS_9526	M25 clockwise within J14
ATC_TRADS_9527	M25 anti-clockwise within J14
ATC_TRADS_9528	M25 J14 clockwise access
ATC_TRADS_9531	M25 anti-clockwise between J15 and J14
ATC_TRADS_9532	M25 J15 clockwise to M4 J4B
ATC_TRADS_9537	M25 J15 anti-clockwise to M4 J4B
ATC_TRADS_9539	M25 J12 anti-clockwise to M3 J2
ATC_TRADS_9547	M25 J15 anti-clockwise to M4 J4B eastbound
ATC_TRADS_9559	M4 J4B westbound to M25 J15 clockwise
ATC_TRADS_9622	M40 southbound within J2
ATC_TRADS_9630	M40 northbound between J2 and J3
ATC_TRADS_9631	M40 southbound between J3 and J2
ATC_TRADS_9641	M40/8506A, 036/7/222/211 on M40 northbound within J4
ATC_TRADS_9653	M40 J5 northbound exit
ATC_TRADS_9655	M40 J5 southbound exit
ATC_TRADS_9663	M40 J6 northbound exit
ATC_TRADS_9665	M40 J6 southbound exit
ATC_TRADS_9671	M40 southbound between J8 and J7
ATC_TRADS_9673	M40 J7 northbound exit
ATC_TRADS_9680	M40 southbound between J8A and J8
ATC_TRADS_9681	M40 northbound between J8 and J8A
ATC_TRADS_9686	M40 J8A southbound exit
ATC_TRADS_30012859	NB, A34, T northbound exit for B4640

ID	SITE DESCRIPTION
ATC_TRADS_30012867	NB, A34, northbound exit for A4
ATC_TRADS_30012869	SB, A34, southbound access from A4
ATC_TRADS_30012870	SB, A34, southbound between A339 and A4
ATC_TRADS_30012872	NB, A34, northbound between A4 and A339
ATC_TRADS_30012877	NB, A34, northbound access from A4130
ATC_TRADS_30012881	NB, A34, northbound exit for A415
ATC_TRADS_30012882	SB, A34, southbound within the A415 junction
ATC_TRADS_30012883	SB, A34, southbound exit for A415
ATC_TRADS_30012884	NB, A34, within the A4074/A4183 junction
ATC_TRADS_30012885	NB, A34, northbound exit for A4074/A4183
ATC_TRADS_30012889	NB, A34 northbound exit for A420
ATC_TRADS_30012890	SB, A34, southbound within the A420 junction
ATC_TRADS_30012891	SB, A34, southbound exit for A420
ATC_TRADS_30012902	NB, A404, within the A4130 junction
ATC_TRADS_30012904	SB, A404, within the A4130 junction
ATC_TRADS_30012905	SB, A404, southbound access from A4130
ATC_TRADS_30012906	NB, A404, between A4130 and A308
ATC_TRADS_30012907	SB, A404 between A4155 and A308
ATC_TRADS_30012910	SB, A404, within the A4155 junction
ATC_TRADS_30012912	NB, A404, between A4155 and M40
ATC_TRADS_30012917	NB, A404(M), J9A northbound exit
ATC_TRADS_30012920	SB, A404(M), southbound within J9B
ATC_TRADS_30012964	EB, M3, M3 eastbound within J6
ATC_TRADS_30012965	EB, M3, M3 J6 eastbound exit
ATC_TRADS_30012968	EB, M3, M3 eastbound within J5
ATC_TRADS_30012969	EB, M3, M3 J5 eastbound exit
ATC_TRADS_30012970	WB, M3, M3 westbound within J5
ATC_TRADS_30012974	WB, M3, M3 westbound within J4A
ATC_TRADS_30012975	WB, M3, M3 J4A westbound exit
ATC_TRADS_30013001	EB, M4, M4 J13 eastbound exit
ATC_TRADS_30013011	EB, M4, M4 J13 eastbound exit
ATC_TRADS_30013012	EB, M4, M4 eastbound within J6
ATC_TRADS_30013017	EB, M4, M4 J7 eastbound exit
ATC_TRADS_30013290	EB, M4, M4 eastbound within J5
ATC_TRADS_30013291	EB, M4, M4 J5 eastbound exit
ATC_TRADS_30015031	SB, A404, A404 between A308 and A4130
ATC_TRADS_30015033	NB, A34, A34 between A4185 and A4130
ATC_TRADS_30015431	NB, A34, A34 northbound exit for A4185
ATC_TRADS_30022464	M40 southbound between J3 and J2
ATC_TRADS_30012866	A34 northbound within the A4 junction
ATC_TRADS_30015345	A34 southbound within the A4 junction
ATC_TRADS_30027101	M4 westbound between J11 and J12
ATC_TRADS_30027102	M4 eastbound between J12 and J11
ATC_TRADS_30024566	M4 westbound between J12 and J13
ATC_TRADS_30024565	M4 eastbound between J13 and J12
ATC_TRADS_30014787	A34 northbound between M4 and A4185
ATC_TRADS_30014788	A34 southbound between A4185 and M4
ATC_TRADS_30024644	M4 eastbound between J14 and J13
ATC_TRADS_30024643	M4 westbound between J13 and J14
ATC_TRADS_30024447	M4 eastbound between J5 and J4B
ATC_TRADS_30027234	M4 westbound between J4B and J5
ATC_TRADS_30027083	M4 eastbound between J11 and J10
ATC_TRADS_30027084	M4 westbound between J10 and J11
TRADS_70471	TMU Site 7047/1 on link A34
TRADS_70472	TMU Site 7047/2 on link A34
TRADS_2502A	MIDAS site at M4/2502A Junc 9 to 10
TRADS_2501B	MIDAS site at M4/2501B Junc 10 to 9

3.2.13

Figure 7 shows the locations of all Highways England data downloaded within the WSTM4 fully modelled area.

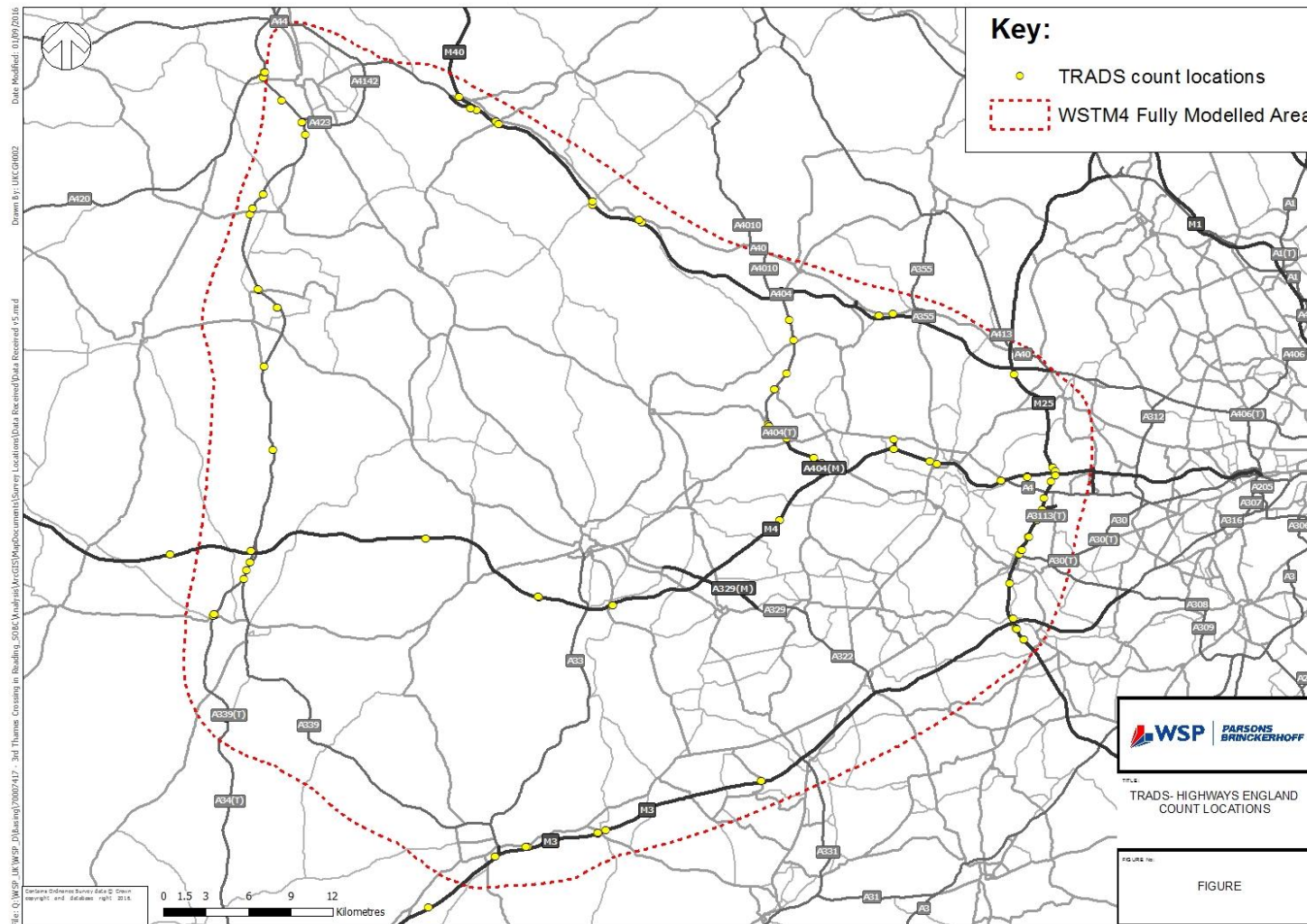


Figure 7 TRADS locations within the WSTM4 fully modelled area

3.3 JUNCTION MCC

COMMISSIONED MCC

3.3.1 Table 14 details the 52 junction Manual Classified Counts that were carried out by TSP.

Table 14 List of commissioned MCCs

ID	SURVEY LOCATION
MCC_W1	M4 Junction 11
MCC_W2	A33/ Basingstoke Rd/ Mere oak Ln
MCC_W3	A33/ Mere oak Ln
MCC_W4	Mere oak Ln roundabout
MCC_W5	Reading Rd/ Padworth Rd/ Goring Ln roundabouts
MCC_W6	A327 Arborfield Rd/ Hollow Ln/ B3349 School Green roundabout
MCC_W7	B3270 Lower Earley Way/ A327 Shinfield Rd, Blackboy roundabout
MCC_W8	A327 Hollow Ln/ Brookers Hill
MCC_W9	A327/ B3030/ B3349/ Swallowfield Rd roundabout, Arborfield Cross
MCC_W10	A329 Reading Rd/ B3270 Lower Earley Way roundabout
MCC_W11	M4 Junction 10
MCC_W12	A329(M)/ A3290/ Wharfedale Rd
MCC_W13	B3270 Lower Earley Way/ Rushey Way/ Mill Ln roundabout
MCC_W14	A329 Reading Rd/ B3030 Robinhood Ln/ King St Ln
MCC_W15	B3349 Barkham Rd/ Bearwood Rd roundabout
MCC_W16	B3349 Barkham Rd/ Barkham St roundabout
MCC_W17	Finchampstead Rd/ Nine Mile Ride, California Crossroads
MCC_W18	A321/ B3430, Queensmere roundabout
MCC_W19	A329/ A329(M)/ B3408, Coppid Beech roundabout
MCC_W20	A321 Twyford Rd/ B3034 Forest Rd
MCC_W21	B3034 Forest Rd/ Warren House Rd/ Maidenhead Rd roundabout
MCC_W22	B3034 Forest Rd/ Binfield Rd/ Green Ln
MCC_W23	A329 Rectory Rd/ Broad St/ Shute End
MCC_W24	A329 Rectory Rd/ Glebelands Rd
MCC_W25	A329 Wiltshire Rd/ Peach St/ London Rd
MCC_W26	A329 Reading Rd/ Old Forest Rd
MCC_W27	A3032 High St/ London Rd/ A321 Waltham Rd/ Wargrave Rd
MCC_W28	A4 Bath Rd/ New Bath Rd/ Charvil Ln/ Old Bath Rd roundabout
MCC_W29	A4 Bath Rd/ London Rd/ Reading Rd/ Pitts Ln roundabout
MCC_W30	A4 London Rd/ A329 Wokingham Rd/ King's Rd
MCC_W31	A329 Wokingham Rd/ B3350 Church Rd/ Wilderness Rd
MCC_W32	B3270 Lower Earley Way/ Beeston Way/ Cutbush Ln roundabouts
MCC_W33	A327 Shinfield Rd/ B3350 Elm Rd
MCC_W34	B3030 Mole Rd/ New Rd/ Mill Ln
MCC_W35	A329 Berkshire Way/ Doncastle Rd roundabout
MCC_R1	Caversham Park Rd/ A4155 Henley Rd
MCC_R2	B3345 George St/ Gosbrook Rd
MCC_R3	A4155 Bridge St/ Church St/ A4074 Church Rd
MCC_R4	B3345 George St/ A329 Vastern Rd/ King's Meadow Rd roundabout
MCC_R5	A4155 Caversham Rd/ Richfield Ave/ Waterman PI roundabout
MCC_R6	B481 Peppard Rd/ Kiln Rd
MCC_R7	A4155 Henley Rd/ B478 Playhatch Rd roundabout
MCC_R8	M4 Junction 13
MCC_R9	M4 Junction 12
MCC_SLR1	Oxford Rd/ Barkham Rd/ Station Rd/ Wellington Rd/ Station Link Rd
MCC_SLR2	Barkham Rd/ Havelock St
MCC_SLR3	Oxford Rd/ Murray Rd
MCC_SLR4	Reading Rd/ Oxford Rd
MCC_WRR1	Kilnsea Dr/ Rushey Way roundabout
MCC_WRR2	Rushey Way/ Beech Ln roundabout
MCC_WRR3	Wilderness Rd/ Beech Ln roundabout
MCC_WRR4	Elm Ln/ Elm Rd/ Rowland Way roundabout

- 3.3.2 All MCCs were located at key junctions within the model and all counts provided full origin-destination (O-D) movements within each junction. MCC_W32, MCC_W5 and MCC_W17 all contain two roundabouts but were surveyed as one junction. MCC_SLR1 was also surveyed as a single junction.
- 3.3.3 The MCC data was collected on Thursday 1st October 2015 between the hours of 07:00 and 19:00 at the junctions identified within Wokingham and Reading.
- 3.3.4 Data was captured at 15 minute intervals and fully classified into seven classes:
- Pedal Cycle (PCL)
 - Motor Cycle (MCL)
 - Car
 - LGV
 - OGV1
 - OGV2
 - PSV
- 3.3.5 Figure 8 details the locations of the MCCs carried out by TSP.

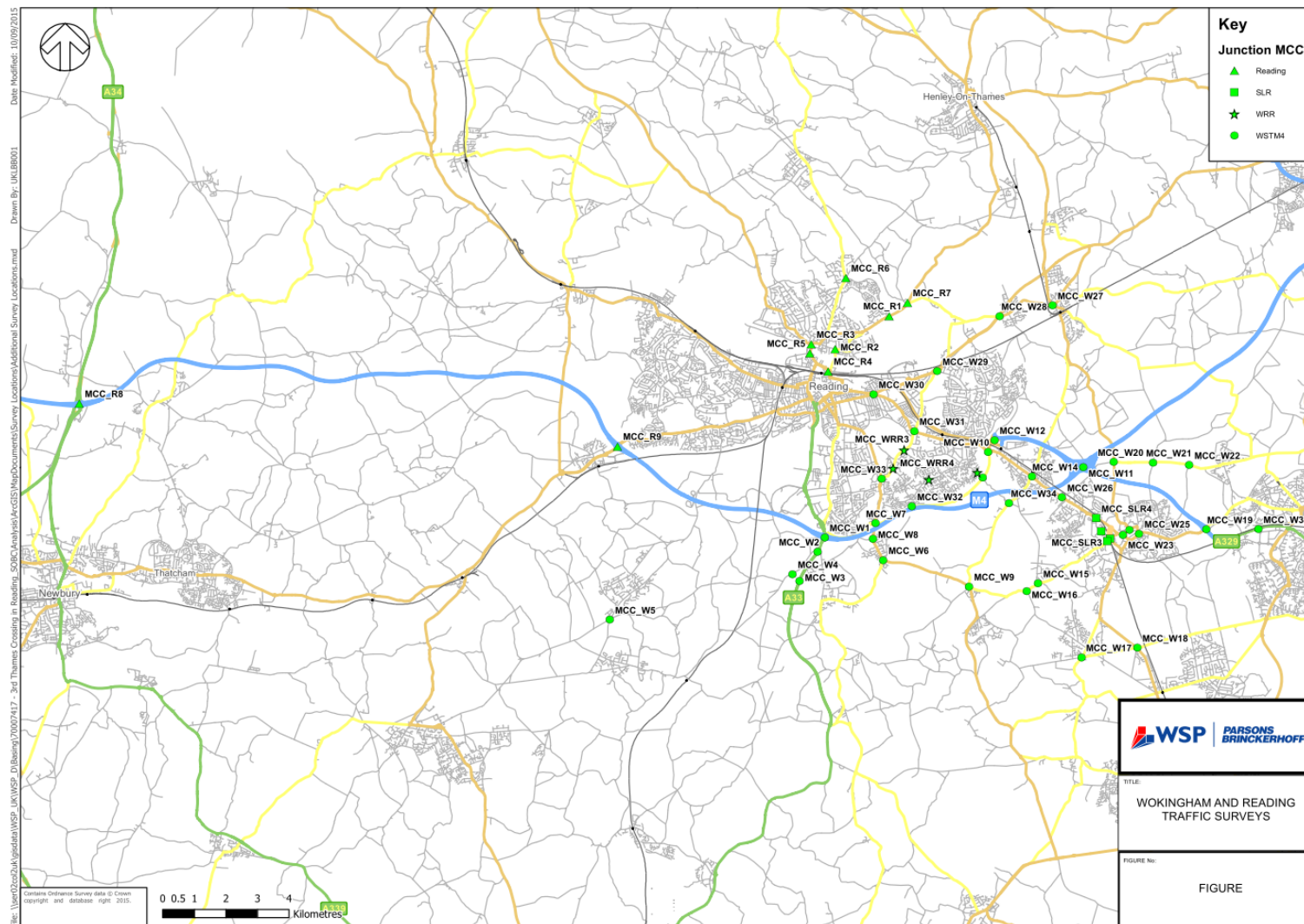


Figure 8 TSP MCC Locations

EXISTING JUNCTION MCC

- 3.3.6 In addition to the above turning count surveys that were commissioned, WSP| Parsons Brinckerhoff were able to obtain a number of existing turning counts carried out by Reading and Wokingham Borough Council within the relevant town centres.
- 3.3.7 Reading Borough Council carried out junction turning counts on key junctions within the town centre for a 12 hour period (0700-1900) on October 13th 2015. The locations are given in Table 15.
- 3.3.8 Wokingham Borough Council carried out a small number of junction turning counts on 9th June 2015. The locations detailed in Table 16 were at major junctions surrounding the town centre and data was collected for the AM period (0700-1000) and the PM period (1600-1900) only.
- 3.3.9 The locations of the junction turning counts obtained from Reading Borough Council and Wokingham Borough Council are shown in Figure 9.

Table 15 Junction turning counts obtained from Reading Borough Council

ID	SURVEY LOCATION
RBC_2	A4 Bath Road/Charrington Road/ Old Bath Road
RBC_3	Oxford Road/ Wigmore Lane/ Norcut Road
RBC_4	Oxford Road/ Overdown Road/ Rodway Road
RBC_5	Tilehurst Road/ Water Road
RBC_6	Bath Road/ Berkeley Avenue
RBC_7	Bennet Road Gyratory
RBC_8	Chatham Street/ A329/ Friar Street
RBC_9	Basingstoke Road/ Christchurch Road
RBC_10	A329/ A33
RBC_11	Park Lane/ School Lane/ Chapel Hill
RBC_12	Norcut Road/ Church End Lane
RBC_13	Peppard Road/ Henley Road/ Prospect Street
RBC_14	Burghfield Road/ Bath Road
RBC_15	South Oak Way/ A33
RBC_16	Queens Road/ Watlington Street
RBC_17	Rose Kiln Lane/ Gillette Way

Table 16 Wokingham Town Centre junction turning counts

ID	SURVEY LOCATION
WBC_1	A321/ Fitness Centre access/ Kendrick Close/ Denmark Street
WBC_2	Denmark Street/ Langborough Road
WBC_3	Station Link Road/ Barkham Road/ A321/ Station Road
WBC_4	Molly Millars Lane/ A321
WBC_5	A321/ Elms Road
WBC_6	Barkham Road/ Molly Millars Lane



Figure 9 RBC and WBC junction turning counts

3.4 P&R CAR PARK DATA

- 3.4.1 WSP | Parsons Brinckerhoff were able to obtain parking data from Wokingham Borough Council for the three Park and Ride sites within the borough: MereOak, Winnersh Triangle and Madejski.
- 3.4.2 MCC data from October 2015 was combined with average daily Park and Ride users at Winnersh Triangle to calculate entry and exit counts for AM peak, inter-peak and PM Peak hours. MCC data was also used to calculate the entry and exit numbers at MereOak Park and Ride.
- 3.4.3 Madejski Park and Ride entry and exits counts were only available for 2012 which were used in WSTM4 to provide a general overview of the cars entering and exiting the site.

3.5 AUTOMATIC NUMBER PLATE RECOGNITION DATA

- 3.5.1 WSP | Parsons Brinckerhoff commissioned Intelligent Data to undertake a number of automatic number plate recognition (ANPR) counts at town centre car parks as well as on all access roads into the town centre. The surveys were carried out on Thursday 1st October 2015, the same day as TSP turning counts and within the ATC data collection period. The car park and cordon site locations are shown in Figure 10.
- 3.5.2 The ANPR data was provided in origin-destination matrix format and WSP | Parsons Brinckerhoff were able to determine the distribution of trips to/from/through Wokingham Town Centre. Car park entry and exit counts were also provided for the twelve town centre car parks listed in Table 17 below.

Table 17 WBC town centre car park entry and exit counts

ID	SURVEY LOCATION
WBC_CP_001	The Paddocks
WBC_CP_002	Elms Road Multi-Storey
WBC_CP_003	Rose Street
WBC_CP_004	Easthampstead Road East
WBC_CP_005	Easthampstead Road West
WBC_CP_006_1	Euro Car Park
WBC_CP_006_2	Denmark Street
WBC_CP_009	Shute End Council Offices
WBC_CP_010	Cockpit Path
WBC_CP_011	Marks & Spencers
WBC_CP_014_1	Station Car Park South
WBC_CP_0014_2	Station Car Park North



Figure 10 ANPR Site Locations in Wokingham Town Centre

3.6 TRAFFICMASTER DATA

- 3.6.1 Trafficmaster data was obtained from the Department for Transport covering the year September 2014 to August 2015.
- 3.6.2 WSP | Parsons Brinckerhoff were able to attain GPS journey time data and origin-destination data across the entire road network within our fully modelled area. The data covered a 12 hour time period 7am to 7pm and was classified into car, LGV and HGV for individual days across the year obtained.
- 3.6.3 Table 18 provides a detailed description of the journey time routes for which Trafficmaster data was processed.

Table 18 Journey time route descriptions

ID	JOURNEY TIME ROUTE DESCRIPTION	LENGTH (KM)
1	Twyford-Wallingford	23.63
2	Bracknell-Wokingham-Reading	14.09
3	Bracknell-Reading	15.47
4	Spencers Wood-Wokingham	19.18
5	Riseley-Reading	26.52
6	M4 J13-J8	46.56
7	Caversham-Oxford	47.16
8	Yateley-Reading Town Centre	19.53
9	Caversham- Henley on Thames	11.67
10	Reading- M4 J12	30.27
11	Newbury- Oxford	54.32
12	Basingstoke-Staines	40.78
13	Slough-Oxford	61.53
14	Woodley-Caversham	9.08
15	Reading Town Centre- Nettlebed	15.50
16	Reading-Rowstock	30.44
17	Sandhurst-Twyford	19.03
18	Didcot-Lewknor	31.74
19	Abingdon- Milton Common	23.67
20	M4 Junction 11-Winnersh	6.82

- 3.6.4 Trafficmaster journey time data was processed covering Monday to Thursdays between September 2014 and November 2014. The 2014 October half-term was removed from the observations used to calculate the average journey time.
- 3.6.5 Travel time was based on average travel time across selected vehicle types. The following vehicle types were included in the Trafficmaster data:
- Cars
 - LGVs (up to 3500kg)
 - HGVs (up to 7500kg)
 - HGVs (over 7500kg)
- 3.6.6 The road network GIS shapefile linked to the Trafficmaster data was processed ensuring the correct direction was used for the specified journey time routes.

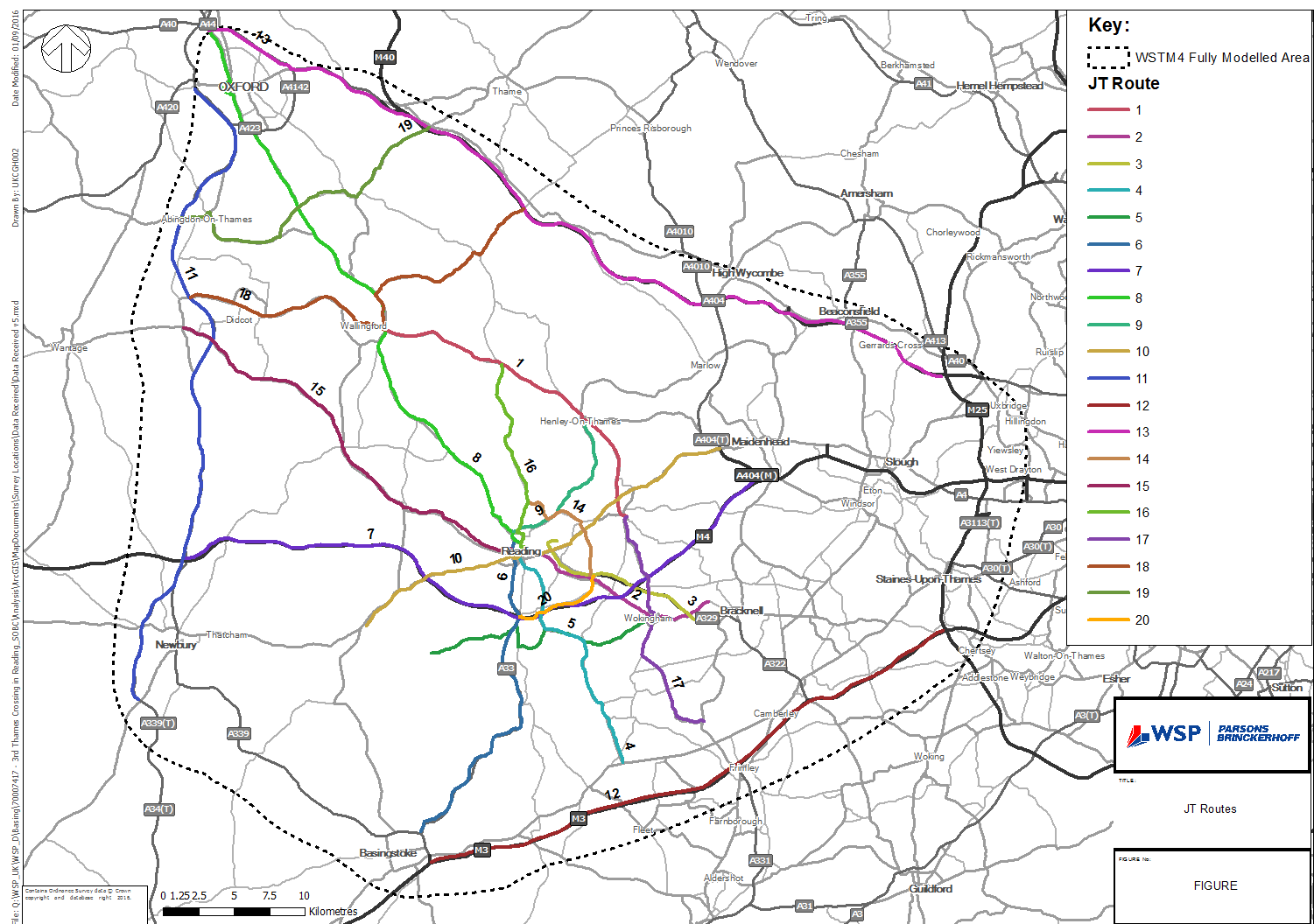


Figure 11 Journey Time Routes within the WSTM4 fully modelled area

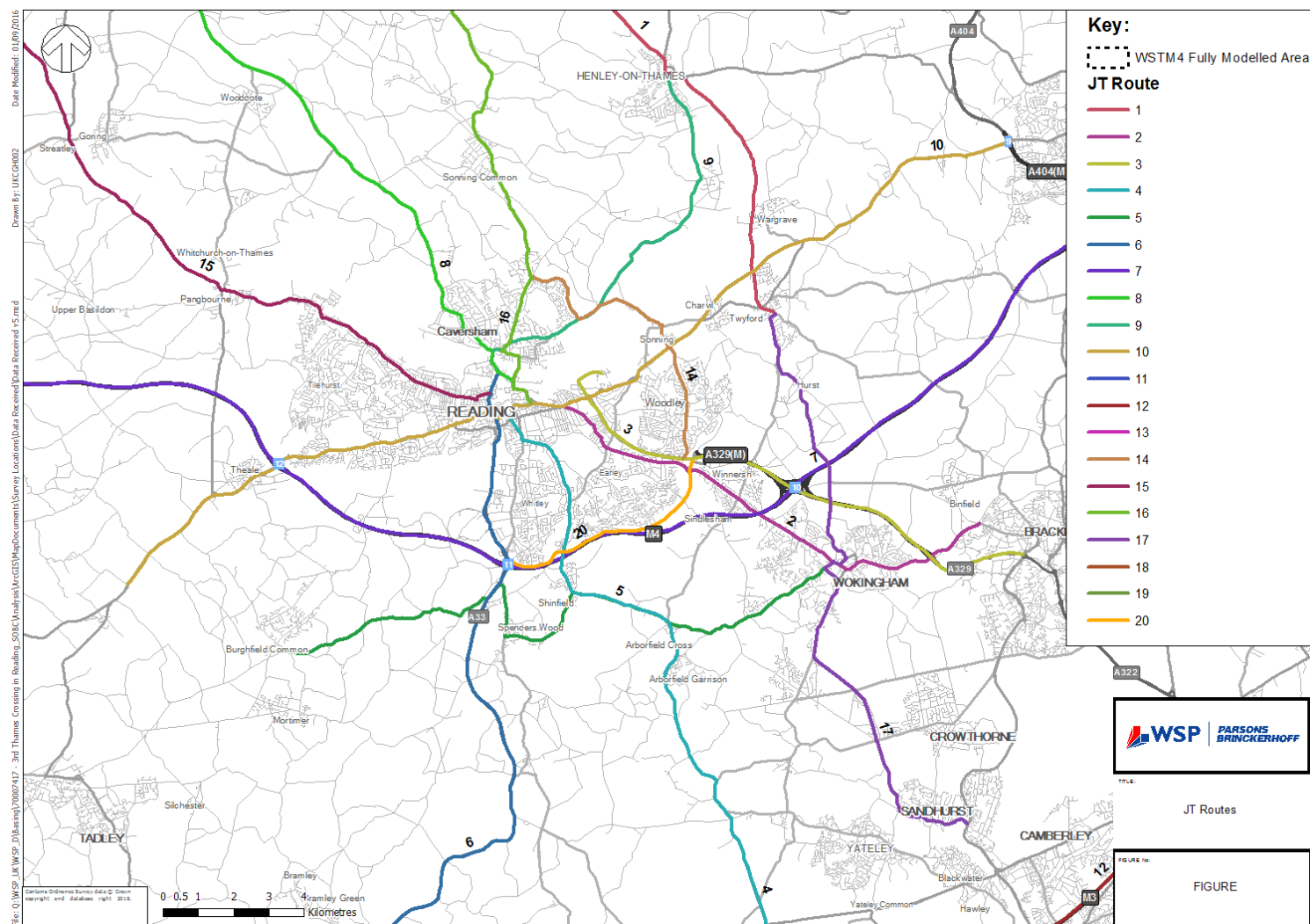


Figure 12 Journey Time Routes in Wokingham, Reading and Bracknell

4

PUBLIC TRANSPORT SURVEY DATA

4.1 OVERVIEW

- 4.1.1 WSP | Parsons Brinckerhoff were able to obtain various public transport data sets that will assist with validation and calibration of the WSTM4 model. The data collected included ticket sales data for a number of bus routes operating within Wokingham, Reading and Bracknell; this data allowed us to calculate the number of passengers boarding and alighting for AM, IP and PM time periods at stop points within the model.
- 4.1.2 The level of detail varied with each of the public transport data sets provided. Ticket sales data from bus routes 3, 4, X4, 13, 14, 19A, 19B and 19C that operate within Wokingham, Reading and Bracknell provided up with boarding and alighting counts at various bus stops within Reading. The data was averaged across the two days where surveys were carried out; Tuesday 15th September 2015 and Thursday 17th September 2015.
- 4.1.3 In addition to this, data was provided for two specific bus routes, 120 and 190. For route 120, the survey data details the number of boarders and alighters counted during inter peak hours and for route 190, the number of passengers boarding has been counted.
- 4.1.4 Reading Borough Council supplied us with entrance and exit counts at all Reading Station access points based on a survey that took place on 13th May 2015.
- 4.1.5 Similarly, Bracknell Forest Borough Council were able to supply us with boarding and alighting counts at a number of railway stations within their borough; Bracknell, Martins Heron, Crowthorne and Sandhurst. The counts took place on 28th April 2015.
- 4.1.6 In addition to this, WSP | Parsons Brinckerhoff requested MOIRA journey data from the train operating companies within the fully modelled area to support with model development. Great Western Railway and South West Trains provided access to their MOIRA models, allowing rail passenger boarding and alighting data as well as passenger loading on rail lines from and to Reading to be extracted for each of the stations within the fully modelled area. The data extracted was from a 2015 May, Wednesday timetable.

5

MOBILE NETWORK DATA

- 5.1.1 Traditionally Origin and Destination (OD) matrices are developed from a range of data sources e.g. Census data, Road Side Interviews, travel diaries and other. Getting this information in large quantities and in the context of an urban area may be disruptive to highway users. The growth of technology has led to an increase in the type and amount of data automatically created and collected about people and freight movements. The vast majority of travellers today use mobile phones, which generate vast amounts of data. Every time a traveller's mobile phone talks to the network (texts, phone calls, pings, etc.) a record with the time and approximate location of the event is generated. The continuous recording of travel behaviour allows generating OD matrices of a high resolution.
- 5.1.2 For the WSTM4 development, WSP | Parsons Brinkerhoff requested Citi Logik to capture Vodafone Mobile Network Data (MND) data and prepare initial OD matrices for the WSTM4 Fully Modelled Area. This MND supplemented with the existing data sources such as 2011 Census Data, TrafficMaster data, etc. will be used as the basis for the trip matrix development to match the WSTM4 model specification.
- 5.1.3 Citi Logik is partnered with Vodafone, which has over 19.5 million UK customers, to develop demand insights and predictive analytics derived from anonymised mobile phone network data in compliance with UK data privacy laws and future EU regulations. Citi Logik has developed a platform to collect and interpret the Vodafone data to process space and time information to inform a transport model development. Given the nature of MND, it is generally better at identifying longer trips and those where the user dwells at their destination for a longer period of time. MND also has limits on detailed information as we cannot directly learn about every individual's travel motives (trip purpose) or directly ask questions, for example, about income band. For these reason, the data will need to be combined with other data sources prior to application.
- 5.1.4 Citi Logik captures the MND and undertakes initial processing. This includes generation of travel demand matrices at the aggregated WSTM4 zone level (WSTM4 MND zones) and segmentation of trips by day of the week, time of the day, mode, purpose and direction. Through the network topology and behaviour, people's movements are accurately located in space and time, which is processed to derive OD movements. For data security and privacy reasons, the data is provided by Citi Logik to WSP | Parsons Brinkerhoff at an aggregated level so that individuals cannot be traced. Typically in dense urban and urban fringe areas Citi Logik is able to allocate mobile phone signals to areas similar to LSOAs in size, whereas in rural areas the signals can be accurately allocated to areas, which can combine a number of LSOAs.
- 5.1.5 Position information is obtained from both active and inactive phones as they switch between adjacent mobile network cells. Active phones are more likely to be used by people travelling on foot, by public transport or as car passengers. Inactive phone positions, derived as phones switch cells, are usually typical to car drivers.
- 5.1.6 Data is provided for all movements to, from, within and passing through the Fully Modelled Area.
- 5.1.7 Monday to Thursday data is provided between 10 November 2015 to 22 November 2015 for the following time periods:
- AM peak period (07:00-10:00)
 - Interpeak period (10:00-16:00)
 - PM peak period (16:00-19:00)

→ Off-peak (19:00-07:00)

5.1.8 Trips are allocated to the following modes:

→ Motorised (Cars/LGV/HGV/Bus)

→ Rail

→ Slow

→ Static. These are signals recorded totally within a single cell. These trips can be either walk or cycling trips, short-distance car trips or be associated with people who do not undertake any journeys within a defined time period.

5.1.9 Matrices are disaggregated to the following purpose segmentation:

→ HBW: Home to Work

→ HBO: Home to Other place (not Work)

→ NHB: Non home based

→ Other

5.1.10 The MND data is expanded to the total adult population.

5.1.11 The output of this stage is expanded OD matrices at MND sector level, provided in a CSV file, which includes the following information:

→ Origin MND Zone

→ Destination MND Zone

→ Mode: slow, motorised, rail, static

→ Time period: AM period (07:-10:00), Inter Peak (10:00-16:00), PM period (16:00-19:00), Off peak (19:00-07:00)

→ Day: weekday

→ Purpose: HBW, HBO, NHBW, NHBO, Other

→ Direction: From home, To home, Non home based

→ Number of person trips.

5.1.12 To facilitate MND validation through its comparison to observed data WSP | Parsons Brinkerhoff has also requested to trace trip movements passing through the following locations in Wokingham Borough shown in Figure 13:

→ Roadside Interviews (RSI) 2 (A327 Shinfield Road)

→ RSI 4 (A321 Finchamstead Road)

→ RSI 8 (A329 Reading Road).

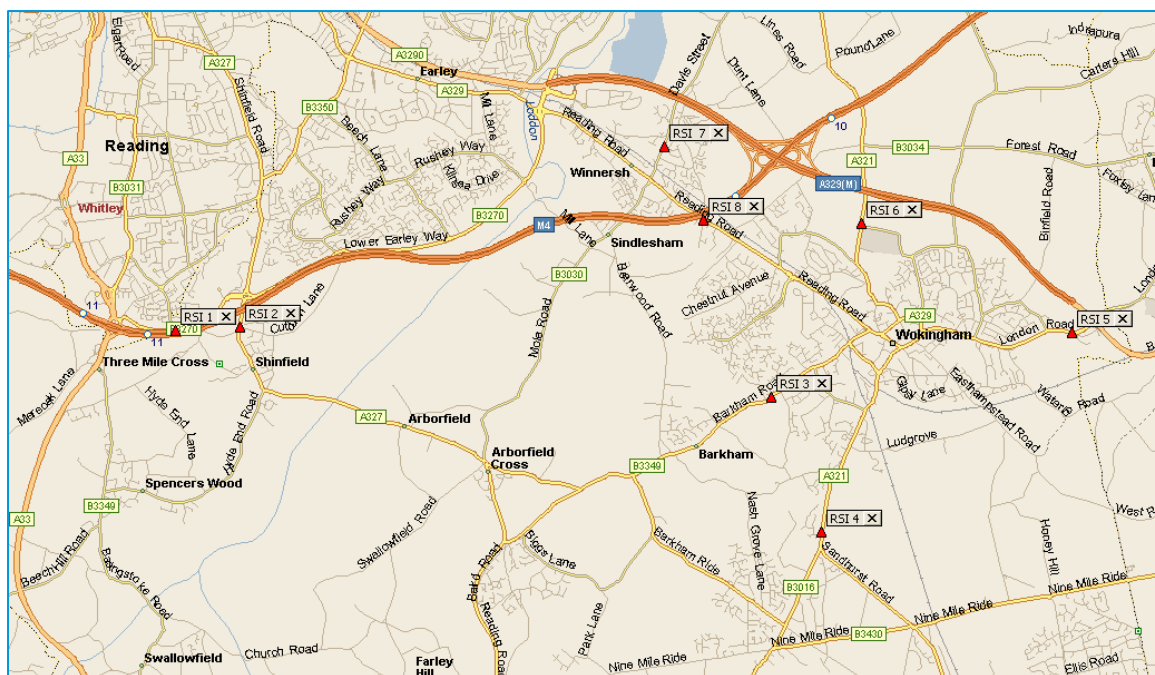


Figure 13 Movement tracing locations

- 5.1.13** To capture the up-to-date distribution of trips across the Thames in Reading area, WSP | Parsons Brinkerhoff has also requested to trace trip movements passing through each bridge in Reading (Caversham Bridge, Reading Bridge and Sonning Bridge) as well as the bridge in Henley-on-Thames.
- 5.1.14** There is also a perception that there is a significant proportion of travellers travelling between Oxfordshire and Reading via the A34 and the M4, which may choose to go through rural areas of South Oxfordshire to get to their destination in Reading if additional capacity by the new bridge is provided. To confirm existing movements, WSP | Parsons Brinkerhoff requested to identify the distribution of the highway trips passing through the M4 between J12 and J11 and the A34 based on mobile phone records.

6

SUMMARY

- 6.1.1 WSP | Parsons Brinckerhoff have been commissioned by Wokingham Borough Council to carry out an update of the Wokingham Strategic Transport Model. This data collection report has detailed the data sources and data obtained which will be used for model calibration and validation.
- 6.1.2 Transport Survey Partners were commissioned by WSP | Parsons Brinckerhoff to carry out 76 ATCs and 52 junction MCCs at key locations identified within the modelled area.
- 6.1.3 Additional ATC data was also obtained from Wokingham Borough Council, Bracknell Forest Borough Council, Reading Borough Council, Oxfordshire County Council, Hampshire County Council, West Berkshire and the Royal Borough of Windsor and Maidenhead. A factor that was derived from the TSP counts was applied to the local authority data in order to classify total vehicles into cars, LGVs and HGVs.
- 6.1.4 ATC data was also obtained from Highways England for junctions within the fully modelled area.
- 6.1.5 Additional junction turning count data was obtained from Reading Borough Council and Wokingham Borough Council at major junctions within the respective town centres.
- 6.1.6 Trafficmaster data was obtained from the Department for Transport and average travel time for selected routes within the study area was calculated. Journey time data was processed for an average Monday to Thursday between September 2014 and August 2015.
- 6.1.7 Park and Ride count data was provided by Wokingham Borough Council which when combined with MCC data allowed calculation of entry and exit counts at each of the three sites.
- 6.1.8 The ANPR data collected by Intelligent Data provided information about the distribution of trips in Wokingham town centre and hourly car park entry and exit counts.
- 6.1.9 Public transport data was attained from Reading, Wokingham and Bracknell Forest Borough Councils. WSP | Parsons Brinckerhoff were able to access ticket sales data from various bus routes, boarding and alighting counts at bus stops, rail station entry/exit counts for Reading Station and rail boarding and alighting counts at stations within Bracknell Forest.
- 6.1.10 MOIRA data was obtained from Great Western Railway and South West Trains in order to determine boarding and alighting counts at rail stations within the fully modelled area as well as passenger loading on rail services from and to Reading.
- 6.1.11 To inform demand matrix development Vodafone Mobile Network Data was captured by Citi Logik and used as a basis for preparing initial OD matrices for the WSTM4 Modelled Area.
- 6.1.12 The combination of commissioned and additional surveys obtained provides a suitable basis for the update, validation and calibration of the Wokingham Strategic Transport Model.