Proposed Employment Site, Land to the North of A4 Bath Road, Theale, Berkshire

Transport Assessment

DTA

Transport Planning Consultants

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Transport Assessment

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SJT/RT 20168-08a Transport Assessment

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1.0 INTRODUCTION

1.1 David Tucker Associates (DTA) has been commissioned by CP Logistics UK Reading Propco Limited to review the transport and highway implications of the construction in relation to the proposals for the development of an employment site. The site plan is attached as **Appendix A**.

1.2 The proposed description of development is as follows:

"Full planning application for the construction of 2 employment units for flexible uses within Class E (light industrial), B2 and/or B8 of the Use Classes Order (including ancillary office provision) with associated enabling works, access, parking and landscaping".

1.3 This Transport Assessment (TA) has been prepared in accordance with the National Planning Policy Framework (NPPF) and National Planning Practice Guidance issued in March 2014.

1.4 This report considers the transport and highways implications associated with the proposals and is structured as follows:

- Chapter 2: Policy;
- Chapter 3: Existing Conditions;
- Chapter 4: Development Proposals;
- Chapter 5: Traffic Generation, Distribution and Impact Assessment;
- Chapter 6: Junction Capacity Assessment; and,
- Chapter 7: Conclusions.

1.5 This TA considers the potential transport and highways impacts of the proposals including the impact of development generated traffic on the capacity and safety of the surrounding road network.

1.6 The Highway Authority previously provided comments in respect of two similar applications (for higher floor areas) (ref: 21/02029/COMIND and 20/00476/OUYTMAJ) on the same site.

Matters raised in respect of access arrangements and modelling in these previous responses are addressed in this report at Sections 4 and 5.

1.7 The current scheme is for less development (9,644.74 sqm) whereas the previous applications were for up to approximately 15,000 sqm and 20,000 sqm respectively. The previous comments in response to the application are included in **Appendix B**.

2.0 NATIONAL AND LOCAL POLICY

2.1 National Planning Policy Framework (NPPF)

2.1.1 In July 2021, the Government published a revised National Planning Policy Framework (NPPF). This report should therefore be read in the context of the new NPPF.

2.1.2 Paragraph 111 of the NPPF is clear that: "*Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe*".

2.1.3 Within this context, the NPPF identifies in Paragraph 112 that applications for development should:

"*a) give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;*

b) address the needs of people with disabilities and reduced mobility in relation to all modes of transport;

c) create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards;

d) allow for the efficient delivery of goods, and access by service and emergency vehicles; and

e) be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations."

2.1.4 Paragraph 113 of the NPPF goes on to state that: *"All developments that will generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed"*.

2.1.5 In reinforcing the principle of supporting sustainable development, paragraph 10 stipulates that at the heart of the Framework is *"...a presumption in favour of sustainable development"*.

2.2 DfT Circular 01/2022

2.2.1 Circular 01/2022 was published by the Department for Transport on 23rd December 2022 and replaced the policies in Circular 02/2013.

2.2.2 Paragraph 47 of the Circular discusses engaging with NH at the pre-application stage on the scope of the Transport Assessment/ Statements and Travel Plans.

2.2.3 In terms of assessing development proposals, paragraph 49 identifies that a Transport Assessment must consider existing and forecast levels of traffic on the Strategic Road Network, alongside any additional trips from committed developments that would impact the same sections.

2.2.4 Paragraph 50 of Circular 01/2022 states that an opening year assessment to include trips generated by the proposed development, forecasted growth and committed development shall be carried out to establish the residual transport impacts of the proposed development.

2.2.5 Paragraph 51 goes onto to discuss that where a Transport Assessment indicates that a development would have an unacceptable impact or the residual cumulative impacts on the SRN would be severe, the need for improvements and when they need to be implemented should be identified.

2.3 West Berkshire Core Strategy (2006 - 2026) Development Plan Document

2.3.1 The West Berkshire Core Strategy (2006 - 2026) was adopted in July 2012.

2.3.2 The Core Strategy sets out nine strategic objectives of which the seventh objective is Transport. With regard to transport it states that 'to put in place a sustainable transport network which supports the growth in West Berkshire, links existing and new development, prioritises walking, cycling and public transport and provides a genuine choice of modes.

Traffic management measures will minimise the impact of new development on the existing network.'

2.3.3 The Area Delivery Plan Policy 4 has been prepared for the Eastern Area which includes Theale. With regard to Transport it states the following measures can be provided:

- Cycle and pedestrian accessibility between Theale and Calcot will be enhanced by the construction of a new bridge over the M4 in partnership with the Highways Agency;
- Better cycle provision between Pangbourne and Tilehurst, through Purley on Thames; as well as safe and attractive cycle links between Pangbourne and Theale will be delivered in accordance with the Transport Vision;
- Facilities at Theale railway station will be improved in partnership with First Great Western; including additional parking where possible, and greater accessibility to facilitate interchange between modes.

2.3.4 Existing and new businesses, particularly around junction 12 of the M4 at Pincents Lane Retail Park and Arlington Business Park will engage with the Council in travel planning.

2.3.5 Highways infrastructure will be upgraded to reduce congestion along the A4 corridor, including improvements to the Langley Hill / A4 junction and potentially dualling the A4 from Langley Hill to the M4. Upgrades are identified and prioritised in the Infrastructure Delivery Plan with details of any critical infrastructure set out in Appendix D.

2.3.6 Policy CS 13 of the Core Strategy identifies the impact and objectives of Transport within the county. The Core Strategy states that development that generates a transport impact will be required to:

- 'Reduce the need to travel.
- Improve and promote opportunities for healthy and safe travel.
- Improve travel choice and facilitate sustainable travel particularly within, between and to main urban areas and rural service centres.
- Demonstrate good access to key services and facilities.

- Minimise the impact of all forms of travel on the environment and help tackle climate change.
- Mitigate the impact on the local transport network and the strategic road network.
- Take into account the West Berkshire Freight Route Network (FRN).
- Prepare Transport Assessments/Statements and Travel Plans to support planning proposals in accordance with national guidance.'

2.4 Local Transport Plan for West Berkshire 2011-2026 (LTP)

2.4.1 The LTP has been prepared to deliver 'a number of West Berkshire's strategies and plans, in particular the Sustainable Community Strategy and the Local Development Framework.'

2.4.2 Policy LTP AT1 of the LTP identifies the need for walking. The LTP states that the 'Council will work towards increasing the use of walking as a mode of travel for local journeys and as a means of accessing other sustainable travel modes for longer journeys. To achieve this, the Council will focus on the following:

i. *Maintaining and, where possible, improving the condition of footways and pedestrian crossings.*
ii. *Facilitating safe and prioritised pedestrian access to key destination*
iii. *Delivering the Rights of Way Improvement Plan and improving the links between public rights of way and local networks of footways*
iv. *Promoting the benefits of walking for health and well being.'*

2.4.3 Policy LTP AT2 of the LTP sets out the targets and objectives for cycling. The LTP states that the 'Council, in partnership with West Berkshire Cycle Forum, will work towards increasing cycling in West Berkshire. To achieve this, the Council will focus on the following:

i. *Establishing, improving and promoting a network of routes (strategic, local and recreational) for cycling.*

ii. *Ensuring that all new developments make cycling at least as desirable as any other transport mode choice by connecting with the local network where possible and following the West Berkshire Council Cycling Guidance.*

iii. *Ensuring that Children, Young People and Adults are equipped with the knowledge, skills and training to cycle more often.*

iv. *Promoting the benefits of cycling for health and well being.*

v. *Delivering the Rights of Way Improvement Plan and improving the links between public rights of way and local networks of cycleways.'*

2.4.4 Policy LTP K9 of the LTP sets out Passenger Transport. It states that in 'partnership with local transport operators, the Council will facilitate and support passenger transport services operating in West Berkshire to help deliver the transport vision for the District.'

3.0 EXISTING CONDITIONS

3.1 Site Location

3.1.1 The site is located to the north of the A4 Bath Road in Theale, approximately 400m north-east of the village centre. The M4 westbound on slip from the roundabout at junction 12 runs along the north-east boundary of the site with the A4 running along the south-east of the site. Hoad Way runs along the south-west boundary of the site and a combination of residential dwellings, commercial premises and High Street are on the north-west boundary of the site. The location of the site is shown on **Figure 1**.

3.2 Local Highway Network

3.2.1 The proposed site will be accessed from Hoad Way. Hoad Way links Theale High Street to the A4. It is subject to a 30mph speed limit and is street lit. A footway runs along the eastern side of the carriageway.

3.2.2 The A4 is a long-distance route from the centre of London to Junction 18 of the M5 at Avonmouth near Bristol. Within the vicinity of the site, it forms the Theale southern bypass from the M4 Junction 12 to the A340 roundabout. It runs on an east / west alignment and is a dual carriageway in the vicinity of the site. To the north-east it provides access to the M4 at Junction 12 and Reading. To the south-west it provides access to Thatcham and Newbury. It is street lit and is subject to the national speed limit.

3.2.3 The M4 runs on an east – west alignment to the north of the site. To the east is provides access to London and to the west it provides access to South Wales and the South West. Additionally, a junction 13, the A34 runs on a north south alignment between Oxford and the M40 to Winchester and the M3. The M4 currently has a smart motorways scheme being undertaken between junctions 3 to 12. This will increase the capacity of the motorway from three to four lane running.

3.3 Road Safety

3.3.1 Personal Injury Collision (PIC) data has previously been obtained from West Berkshire Council for the five-year period of 01/05/2014 to 30/04/2019 for roads within the vicinity of the site. The area requested is for Hoad Way and approximately 100m along the High Street to the west of the Hoad Way / High Street mini roundabout, A4 Bath Road approximately 100m south of the A4 / Hoad Way / Waterside Drive Roundabout, the A4 between A4 / Hoad Way / Waterside Drive Roundabout and M4 junction 12. The M4 junction 12 roundabout and approximately 10m north of the A4 north of the M4 Junction 12 Roundabout.

3.3.2 This showed 13 recorded collisions on the roads within the vicinity of the site. None of which were fatal, two of which collisions were recorded as serious collision with the remaining collisions recorded as slight.

3.3.3 The collision data showed that there were no collisions on Hoad Way within the vicinity of the site. The collisions occurred on the A4 Bath Road / Waterside Drive / Hoad Way Roundabout or the M4 junction 13 roundabout. The collisions were the result of poor driver awareness and not in a deficiency in the highway design or layout.

3.3.4 Updated PICs are on order but still awaited.

3.4 Walking and Cycling Provision

3.4.1 Footways are provided along the northern side of Hoad Way which runs along the site frontage. This provides access to the High Street which has footways running alongside both sides of the carriageway. The footways on the High Street provides access to the shops and facilities within Theale which include a convenience store, pharmacy, a small supermarket, cafes, takeaways, opticians and post office. They also provide access to the High Street bus stops.

3.4.2 To the west, the High Street becomes a private road approximately 180m north east of the High Street / Hoad Way Roundabout. This becomes a pedestrian route and a footbridge is provided across the M4 which provides access to Ikea and the footways on Pincents Lane provided access to the footways on the A4 towards Reading and Calcot.

3.4.3 Hoad Way is subject to a 30mph speed limit and therefore vehicle speeds are unlikely to present a significant deterrent to cycling. Consequently, it is considered that cycling would be a viable option of travel for some staff and visitors, with the whole of Theale and Theale Railway Station is situated within 2km of the site.

3.4.4 National Cycle Route (NCR) 4 passes to the south of Theale and provides access to Reading Town Centre and Reading Railway Station as well as the suburban areas of Calcot and Horncastle. A spur from NCR 4 at Sheffield Mill provides access to Theale Railway Station. Access to this spur from the site would be via Hoad Way, High Street and Station Road.

3.5 Public Transport

Bus

3.5.1 The closest bus stops to the site are located on the High Street within Theale. The westbound stop is located approximately 150m from the site and the eastbound stop is approximately 200m from the site. Both stops have a post and flag arrangement and the northbound stop has post and flag with a shelter and bus bay also provided.

3.5.2 The stops are served by the 1, 15 and 44 bus services. The bus service 1 provides a service between Reading and Newbury, the 15 provides a service between Reading and Calcot, and the 44 provides a service between Beenham and Thatcham. A summary of these services is provided in **Table 1**.

Table 1 - Summary of Local Bus Services

No.	Operator	Route	Maximum Frequency & First and Last Service		
			Days of Operation	First / Last service	Frequency
1	Reading Buses	Reading town centre - Newbury	Mon - Fri	05:27 / 22:53	Every half an hour
			Sat	06:41 / 22:53	Every half an hour
			Sun	07:44 / 19:09	Hourly
		Newbury - Reading Town Centre	Mon - Fri	05:35 / 23:04	Every half an hour
			Sat	07:01 / 23:05	Every half an hour
			Sun	08:22 / 19:47	Hourly
15	Reading Buses	Reading – Calcot	Mon - Fri	07:50 / 14:09	Hourly
			Sat	07:42 / 18:06	Hourly
		Calcot – Reading	Mon - Fri	09:31 / 15:11	Hourly
			Sat	07:53 / 18:18	Hourly
44	West Berkshire Council Transport Services	Calcot - Thatcham	Mon - Fri	13:43	One service per day
		Thatcham - Calcot	Mon - Fri	12:12	One service per day

Rail

3.5.3 The closest railway station to the site is Theale approximately 900m to the south-west of the site. The station is on the Reading and Taunton Line and is operated by Great Western Railway (GWR). There are 15 bicycle storage spaces which are covered by CCTV and 215 car parking spaces with 11 accessible spaces available. The typical off-peak service at the station is:

- 1 tph to London Paddington
- 1 tph to Reading
- 1 tph to Newbury
- 1 tph to Bedwyn

3.5.4 Reading Railway Station is a larger station which is served by trains from Theale. It is served by GWR, Cross Country, TfL Rail and South Western Railway. There is a multi-storey car park located at Reading Railway Station. The station can also be accessed using the number 1 bus service.

3.5.5 Reading Railway Station is on the Great Western Main Line which runs from London Paddington to Reading. To the west of Reading it serves a variety of communities in the west and southwest of England and onward into South Wales. Some services on the Great Western Main Line terminate at Bristol, while others continue on the Bristol to Exeter line towards the West Country. Reading is also on the Reading to Taunton line, which serves communities in Berkshire and Wiltshire. Nearly all services are timetabled to stop at Reading.

3.5.6 Other main lines connect Reading with Birmingham New Street, Birmingham International, northern England and Scotland, and with Basingstoke, Winchester, Southampton Central and Bournemouth to the south. Through services from north to south on these lines are operated by CrossCountry, and all services stop in Reading. There are extensions to Edinburgh Waverley and Guildford once daily in each direction.

3.5.7 The secondary North Downs line connects Reading with Guildford, Reigate and Gatwick Airport. South Western Railway trains serve Reading to Wokingham, Bracknell, Ascot, Staines, Richmond, Clapham Junction and London Waterloo.

3.6 Summary

3.6.1 The site is well connected in terms of the highway network and the walking and cycling facilities. The A4 provides access to the strategic road network with access to the M4 motorway at Junction 12 and Reading. Additionally, Hoad Way provides access to Theale village centre and Theale Railway Station, both of these via the High Street. Theale Town Centre provides a number of services and facilities including a convenience store, a small supermarket and cafes which could all be used during a break in the workplace. Theale Railway Station provides services to Reading, Newbury, London Paddington and Bedwyn. Additionally, Reading provides services to national destinations including Birmingham and Manchester.

3.6.2 There are bus stops on the High Street which provide frequent services to Reading and Newbury. Additionally, during weekdays, there are daily services to Calcot and Thatcham.

4.0 DEVELOPMENT PROPOSALS

4.1 Overview

4.1.1 The proposals are for the development of Class E (Light Industrial)/ B2 / B8 employment units on land to the north of the A4 in Theale.

4.1.2 The development will provide two units as follows:

- Unit 1: 4,893sqm; and
- Unit 2: 4,700sqm.

4.1.3 The site plan is attached as **Appendix A**.

4.2 Site Access

4.2.1 The proposed access will take the form of a priority junction from Hoad Way located approximately 115m north of the A4 Bath Road / Waterside Drive / Hoad Way Roundabout. The access plan, including the visibility splays of 2.4m x 50m to the south and 2.4m x 48m to the north is shown on **Drawing 20168-01c**.

4.2.2 The highway officer previously raised whether a turn right lane would be required. Junction modelling is included in section 5 of this report which demonstrates the access design is appropriate and that there is adequate capacity in the junction to accommodate demand without the need for a right turn lane.

4.2.3 Swept path analyses using a large car and an articulated vehicle have been undertaken around the site and at the site access. These can be seen in **Drawing 20168-06-1a** and **Drawing 20168-06-2a**.

4.2.4 There will be two pedestrian access points onto the site. The first is off Hoad Way via the main site access. The second is from High Street via a pedestrian footway.

4.3 Car Parking

4.3.1 Car parking on site will be set in respect to the parking standards set out in the West Berkshire District Local Plan, Saved Policies Amended September 2007 Appendix 5: Parking provision. This document provides the parking standards for B1c/B2 and B8 land uses as set out in **Table 2** below.

Table 2 - Car Parking Standards

Land Use	Maximum provision	
General and Special Industrial B2 – B7	1 per 25m2 up to 235m2	1 per 50m2 over 235m2
Storage and Distribution B8	1 per 25m2 up to 235m2	1 per 200m2 over 235m2

4.3.2 This results in a consequential range of parking provision maxima for each of the units depending on whether they are occupied by a Class E (Light Industrial)/B2 and/or B8 occupier. The range of car parking provision for each of the units in accordance with the standards are set out in the following tables.

Unit 1

4.3.3 The parking standard for each type of Land Use is provided in **Table 3**.

Table 3 - Unit 1 Car Parking Provision

Land Use	Maximum provision				
	Standards		Provision		Total
General and Special Industrial B2 – B7	1 per 25m2 up to 235m2	1 per 50m2 over 235m2	9	86	95
Storage and Distribution B8	1 per 25m2 up to 235m2	1 per 200m2 over 235m2	9	22	31

4.3.4 In total the site proposes 60 car parking spaces and 4 disabled parking bays to serve the unit.

Unit 2

4.3.5 The parking standard for each type of Land Use is provided in **Table 4**.

Table 4 - Unit 2 Car Parking Provision

Land Use	Maximum provision				
	Standards		Provision		Total
General and Special Industrial B2 – B7	1 per 25m2 up to 235m2	1 per 50m2 over 235m2	9	97	106
Storage and Distribution B8	1 per 25m2 up to 235m2	1 per 200m2 over 235m2	9	24	33

4.3.6 In total the site proposes 60 car parking spaces and 4 disabled parking bays to serve the unit.

Overall Car Parking Provision

4.3.7 The car parking provision for each of the units sits within the identified range and this therefore achieves sufficient parking to serve a Class E (light industrial) /B2 and/or B8 occupier.

4.3.8 A total of 8 electric vehicle charging points will be provided at both units, two of which will be located within the disabled parking provision.

4.4 Cycle and Motorcycle Parking Standards

4.4.1 The cycle and motorcycle parking on site will be set in respect to the parking standards set out in Table 2 of the Cycle and Motorcycle Advice and Standards for New Development November 2014. This document provides the parking standards for B1 an B2 land uses as set out in **Table 5** below.

Table 5 - Cycle and Motorcycle Parking Standards

Development Type	Recommended standards (no. spaces)			
	Bicycle Parking		Motorcycle Parking	
	Staff/Long Stay	Visitor/Short Stay	Staff/Long Stay	Visitor/Short Stay
B2 General Industrial	1 per 500m2	Min 2	1 / 2800m2 (min of 2)	

4.4.2 The cycle and motorway parking for each development are provided in the table below in line with the standards set out in **Table 5**.

Unit 1

4.4.3 The cycle and motorcycle standard for unit 1 is provided in **Table 6**.

Table 6 - Unit 1 Cycle and Motorcycle Provision

Development Type	Recommended standards (no. spaces)			
	Bicycle Parking		Motorcycle Parking	
	Staff/Long Stay	Visitor/Short Stay	Staff/Long Stay	Visitor/Short Stay
B2 General Industrial	9	2	2	

4.4.4 In total Unit 1 proposes 20 cycle parking spaces and 5 motorcycle spaces.

Unit 2

4.4.5 The cycle and motorcycle standard for unit 2 is provided in **Table 7**.

Table 7 - Unit 2 Cycle and Motorcycle Provision

Development Type	Recommended standards (no. spaces)			
	Bicycle Parking		Motorcycle Parking	
	Staff/Long Stay	Visitor/Short Stay	Staff/Long Stay	Visitor/Short Stay
B2 General Industrial	10	2	2	

4.4.6 In total Unit 2 proposes 20 cycle parking spaces and 5 motorcycle spaces.

Overall Cycle and Motorcycle Parking Provision

4.4.7 On this basis, cycle and motorcycle parking provision is in excess of parking standards for each unit.

5.0 FORECAST TRAFFIC IMPACT

5.1 Traffic Generation

5.1.1 The TRICS database has been utilised to forecast the number of trips the development will likely generate. Flexible Class E (Light Industrial)/ B2 / B8 use is being applied for, therefore, the worst-case traffic generation for B2 use has been considered. Sites were selected on 02 Employment / D Industrial estate against the following criteria:

- Site in London, Northern Ireland and Ireland were removed;
- Floor Area selected was: 708 to 167416 (units: sqm);
- Date Range: 01/01/15 to 18/11/22;
- Weekday only;
- Selected location: Edge of Town; and,
- Sites next / near to dual carriageways or motorways selected.

5.1.2 The trip rates are summarised in **Table 8**, with the traffic generation shown in **Table 9**, and the site selection is included in **Appendix C**.

Table 8 - TRICS Industrial Estate Trip Rates per 100sqm

Time Range	Total Vehicle Trip Rates per 100 sqm			HGV Vehicle Trip Rates per 100sqm		
	Arrivals	Departures	Totals	Arrivals	Departures	Totals
08:00 - 09:00	0.414	0.159	0.573	0.025	0.020	0.045
17:00 - 18:00	0.116	0.368	0.484	0.014	0.010	0.024
Daily	3.18	3.102	6.282	0.286	0.275	0.561

Table 9 - Traffic Generation for 9,644sqm of Industrial Estate

Time Range	Total Vehicle Generation			HGV Generation		
	Arrivals	Departures	Totals	Arrivals	Departures	Totals
08:00 - 09:00	40	15	55	2	2	4
17:00 - 18:00	11	35	47	1	1	2
Daily	307	299	606	28	27	54

5.2 Traffic Distribution

5.2.1 The Journey to Work Census 2011 data will be used to determine the likely distribution of these trips. The data for the site ward has been obtained and an approximate distribution of trips has been determined.

5.2.2 The site is located within West Berkshire 009 and the proposed distribution of employment traffic is shown in **Table 10**. The details of the journey to work assessment with route distribution is included in **Appendix D**.

Table 10 - Traffic Distribution

Road Link	Proportion
M4 West	18%
A4 East	7%
M4 East	37%
A4 West	27%
Royal Avenue	1%
Charrington Road (South)	1%
Old Bath Road	7%
Charrington Road (North)	1%

5.2.3 Based on the trip generation and distribution assumptions above, the traffic assignment flows are shown on **Figure 2**. This shows the majority of traffic will route to/from the M4 with a further split of traffic on the A4 to the west and into Reading to the east.

5.2.4 The AM and PM proposed development flows are provided in **Figure 3**, with the HGV flows provided in **Figure 4**.

5.2.5 Flow diagrams for 2023 Base Flows, 2033 with TEMPro and 2033 plus the proposed development in Passenger Car Units (PCUs) can be seen in **Appendix E**.

5.3 Parcel Distribution Centre Sensitivity

5.3.1 Previously NH have requested that parcel distribution trip rates should also be considered given that B8 use would allow a parcel distribution occupier. The TRICS database has therefore also been utilised to forecast the number of trips the development could generate

if it were 100% Parcel Distribution. Sites were selected on 02 Employment / G Parcel Distribution Centres against the following criteria:

- Site in London, Northern Ireland and Ireland were removed;
- Floor Area selected was: 763 to 24154 (units: sqm);
- Date Range: 01/01/15 to 11/05/21;
- Weekday only;
- Selected location: Edge of Town; and,
- Sites next / near to dual carriageways or motorways selected.

5.3.2 The trip rates are summarised in **Table 11**, with the traffic generation shown in **Table 12**, and the site selection is included in **Appendix F**.

Table 11 - TRICS Parcel Distribution Trip Rates per 100sqm

Time Range	Total Vehicle Trip Rates per 100 sqm			HGV Vehicle Trip Rates per 100sqm		
	Arrivals	Departures	Totals	Arrivals	Departures	Totals
08:00 - 09:00	0.067	0.378	0.445	0.022	0.111	0.133
17:00 - 18:00	0.378	0.378	0.756	0.044	0.000	0.044
Daily	5.856	4.54	10.396	1.957	1.378	3.335

Table 12 - Traffic Generation for 9,593sqm of Parcel Distribution

Time Range	Total Vehicle Generation			HGV Generation		
	Arrivals	Departures	Totals	Arrivals	Departures	Totals
08:00 - 09:00	6	36	43	2	11	13
17:00 - 18:00	36	36	73	4	0	4
Daily	565	438	1003	189	133	322

5.3.3 The above shows that the AM peak will generate less traffic (12 movements) than that shown in the B2 trip rates, and the PM peak will generate slightly more traffic (26 movements). The traffic generation above has been converted to PCU and distributed on the network which can be seen in **Appendix G**.

5.3.4 At the M4 junction specifically, the PCU values are not materially different to those shown in **Appendix E** from the industrial estate rates and so the industrial estate rates have been used to assess the capacity of the junctions.

5.4 Traffic Growth

Background Traffic Growth

5.4.1 To determine the forecast traffic growth on the network, base traffic forecasts have been uplifted using TEMPRO growth factors. TEMPRO takes account of local planning data including increases in households and jobs specific to local areas. On this basis, it is considered any additional traffic at the above sites would be included in the projected traffic increases in the local TEMPRO growth factors.

5.4.2 The TEMPro growth factors which will be used to calculate the future year traffic flows can be seen in **Table 13** below.

Table 13 - TEMPro Growth Factors

Road Type	Time Period	Local Growth Figure
Minor	AM	1.0578
	PM	1.0598

6.0 JUNCTION OPERATION ASSESSMENTS

6.1 Overview

6.1.1 The modelling software Junctions 10 has been utilised to assess the following junctions:

- Hoad Way / Proposed Site Access Priority Junction; and
- A4 / Hoad Way / Waterside Drive Roundabout.

6.1.2 The following years have been assessed:

- 2023 base year;
- 2033 forecast year;
- 2033 forecast year including committed development; and
- 2033 forecast year including committed development and proposed development.

6.1.3 A percentage increase assessment has been undertaken at the M4 Junction 12 Roundabout as the VISSIM model for the area is currently being updated by Pell Frishmann.

6.2 Hoad Way/ Proposed Site Access

6.2.1 The Hoad Way / Proposed Site Access Priority Junction has been modelled using the PICADY module within Junctions 10. The results are summarised in **Table 14** and the full results are attached at **Appendix H**.

Table 14 - Hoad Way/ Proposed Site Access Priority Junction Assessment Summary

	AM			PM		
	Q (PCU)	Delay (s)	RFC	Q (PCU)	Delay (s)	RFC
2033 Forecast Year + Development						
Stream B-C	0.0	6.28	0.03	0.1	5.99	0.06
Stream B-A	0.0	0.00	0.00	0.0	0.00	0.00
Stream C-AB	0.3	5.50	0.12	0.0	5.86	0.03
NB: Stream A – Hoad Way N; Stream B – Site Access; Stream C – Hoad Way S						

6.2.2 The results in Table 14 show that the junction will operate well within its theoretical capacity with a maximum RFC of 0.12 in the AM peak of 2033 forecast year with development traffic present of the network.

6.2.3 The junction has been modelled in PICADY without a right turn lane. The results in **Table 14** demonstrate that the junction operates well within capacity without the right turn lane and therefore, it considered for this development that a right turn lane is not necessary for the operation of the junction.

6.3 A4/ Hoad Way/ Waterside Drive Roundabout

6.3.1 The A4 / Hoad Way / Waterside Drive Roundabout has been modelled using the ARCADY module within Junctions 10. The results are summarised in **Table 15** and the full results are attached at **Appendix I**.

Table 15 - A4/ Hoad Way/ Waterside Drive Roundabout Junction Assessment

	AM			PM		
	Q (PCU)	Delay (s)	RFC	Q (PCU)	Delay (s)	RFC
2023 Baseline						
A4 East	3.7	4.91	0.78	1.0	2.02	0.50
Waterside Drive	0.2	3.12	0.18	0.9	3.56	0.45
A4 West	1.6	3.50	0.59	1.1	3.54	0.52
Hoad Way	0.8	8.94	0.45	1.5	14.09	0.60
2033 Forecast						
A4 East	5.0	6.28	0.83	1.2	2.15	0.53
Waterside Drive	0.3	3.50	0.21	1.2	4.23	0.54
A4 West	1.9	3.95	0.63	1.4	4.07	0.57
Hoad Way	1.1	11.50	0.53	2.6	23.05	0.72
2033 Forecast Year + Development						
A4 East	5.4	6.70	0.84	1.2	2.18	0.53
Waterside Drive	0.3	3.62	0.21	1.2	4.34	0.55
A4 West	2.0	4.13	0.64	1.4	4.12	0.57
Hoad Way	1.3	12.38	0.56	3.6	30.14	0.79

6.3.2 The results in **Table 15** show that the junction operates within capacity with a maximum RFC of 0.84 in the AM peak of 2033 forecast year with development traffic present on the network.

6.4 M4 Junction 12 Roundabout

6.4.1 To assess the impact of the proposed development on the M4 Junction 12 roundabout, a percentage impact assessment has been undertaken. **Table 16** identifies the proposed percentage increase on each arm of the roundabout.

Table 16 - M4 Junction 12 Roundabout Percentage Impact Assessment

	A4 Bath Road North	M4 East	A4 Bath Road South	M4 West
AM (08:00-09:00)				
A4 Bath Road North	0 / 0%	0 / 0%	6 / 1%	0 / 0%
M4 East	0 / 0%	0 / 0%	16 / 1%	0 / 0%
M4 Bath Road South	3 / 0%	7 / 1%	0 / 0%	3 / 1%
M4 West	0 / 0%	0 / 0%	8 / 2%	0 / 0%
PM (17:00-18:00)				
A4 Bath Road North	0 / 0%	0 / 0%	2 / 0%	0 / 0%
M4 East	0 / 0%	0 / 0%	5 / 1%	0 / 0%
M4 Bath Road South	5 / 1%	14 / 1%	0 / 0%	7 /2%
M4 West	0 / 0%	0 / 0%	2 / 2%	0 / 0%

6.4.2 The results in **Table 16** show that the percentage increase on any single movement will be a maximum of 2% during peak periods. This level of traffic is well within daily variation of background flow.

6.5 VISSIM Modelling

6.5.1 In support of applications 21/02029/COMIND and 20/00476/OUTMAJ, a VISSIM model was completed. These applications both proposed a greater quantum of floorspace that that is now proposed. Despite this greater quantum the VISSIM model in support of applications 21/02029/COMIND and 20/00476/OUTMAJ showed no problems at any of the junctions tested. Given that conclusion a re-run of the model is not considered necessary. In any event, the VISSIM model is currently being updated by Pell Frishmann and is therefore unavailable for assessment purposes.

7.0 CONCLUSIONS

7.1 David Tucker Associates (DTA) has been commissioned by CP Logistics UK Reading Propco Limited to review the transport and highway implications of the construction in relation to the proposals for the development of an employment site.

7.2 This Transport Assessment (TA) has been prepared in accordance with the National Planning Policy Framework (NPPF, 2021) and National Planning Practice Guidance issued in March 2014.

7.3 The proposed site is well connected in terms of the highway network and the walking and cycling facilities. The A4 provides access to the strategic road network with access to the M4 motorway at Junction 12 and Reading. Additionally, Hoad Way provides access to Theale village centre and Theale Railway Station, both of these via the High Street. Theale Town Centre provides a number of services and facilities including a convenience store, a small supermarket and cafes which could all be used during a break in the workplace. Theale Railway Station provides services to Reading, Newbury, London Paddington and Bedwyn. Additionally, Reading provides services to national destinations including Birmingham and Manchester.

7.4 There are bus stops on the High Street which provide frequent services to Reading and Newbury. Additionally, during weekdays, there are daily services to Calcot and Thatcham.

7.5 The collision data shows that there are no collisions on Hoad Way within the vicinity of the site. The collisions occurred on the A4 Bath Road / Waterside Drive / Hoad Way Roundabout or the M4 Junction 12 roundabout. The collisions were the result of poor driver awareness and not in a deficiency in the highway design or layout.

7.6 The results of the PICADY assessment identified that the junction operates well within its theoretical capacity with a maximum RFC of 0.12 in the AM peak of 2033 forecast flows with development traffic present on the network.

7.7 The results of the ARCADY assessment identified that the junction operates well within its theoretical capacity with a maximum RFC of 0.84 in the AM peak of 2033 forecast flows with development traffic present on the network.

7.8 A VISSIM model is being run for the wider area which includes the M4 Junction 12 and nearby A4 junctions. The output of the modelling will follow in a separate Technical Note.

7.9 The development traffic can be accommodated on the local network and the proposals are in accordance with local and national planning policy. They are in full accordance with paragraph 109 of the NPPF and there are no reasons for refusing planning permission.

Figures

David Tucker Associates
Transport Planning Consultancy
Forester House, Doctors Lane, Henley-in-Arden
Warwickshire, B95 5AW
Tel: +44(0) 1564 793598 Fax: +44(0) 1564 793983
www.dtatransportation.co.uk

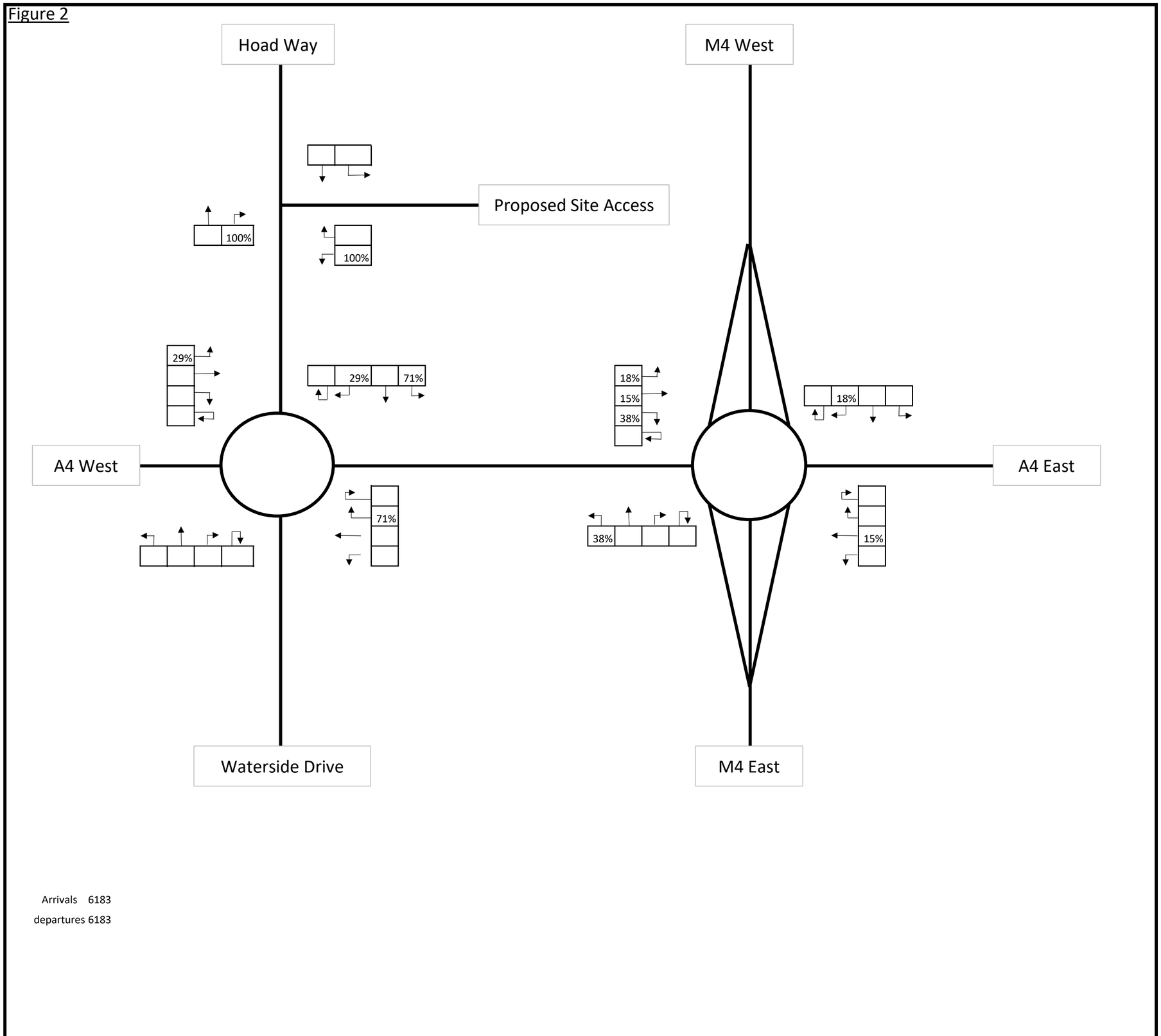
Notes:

Figure 1
Drawing Title: Site Location Plan
Job Title: Bath Road, Theale, Berkshire
Client: CP Logistics

Scale : NTS

NORTH

Figure 2



Arrivals 6183

departures 6183

Figure 3 - Total Traffic Assignment

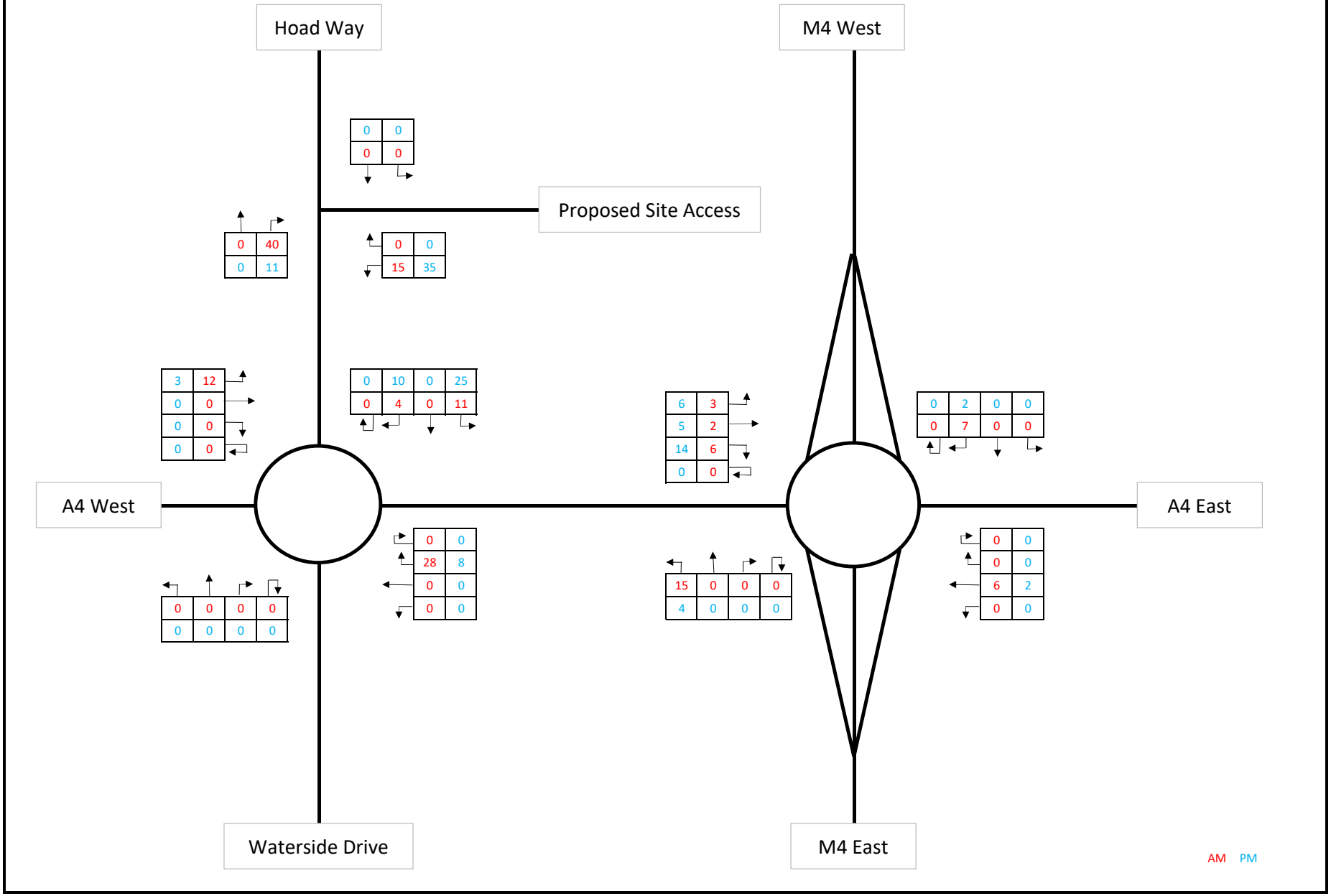
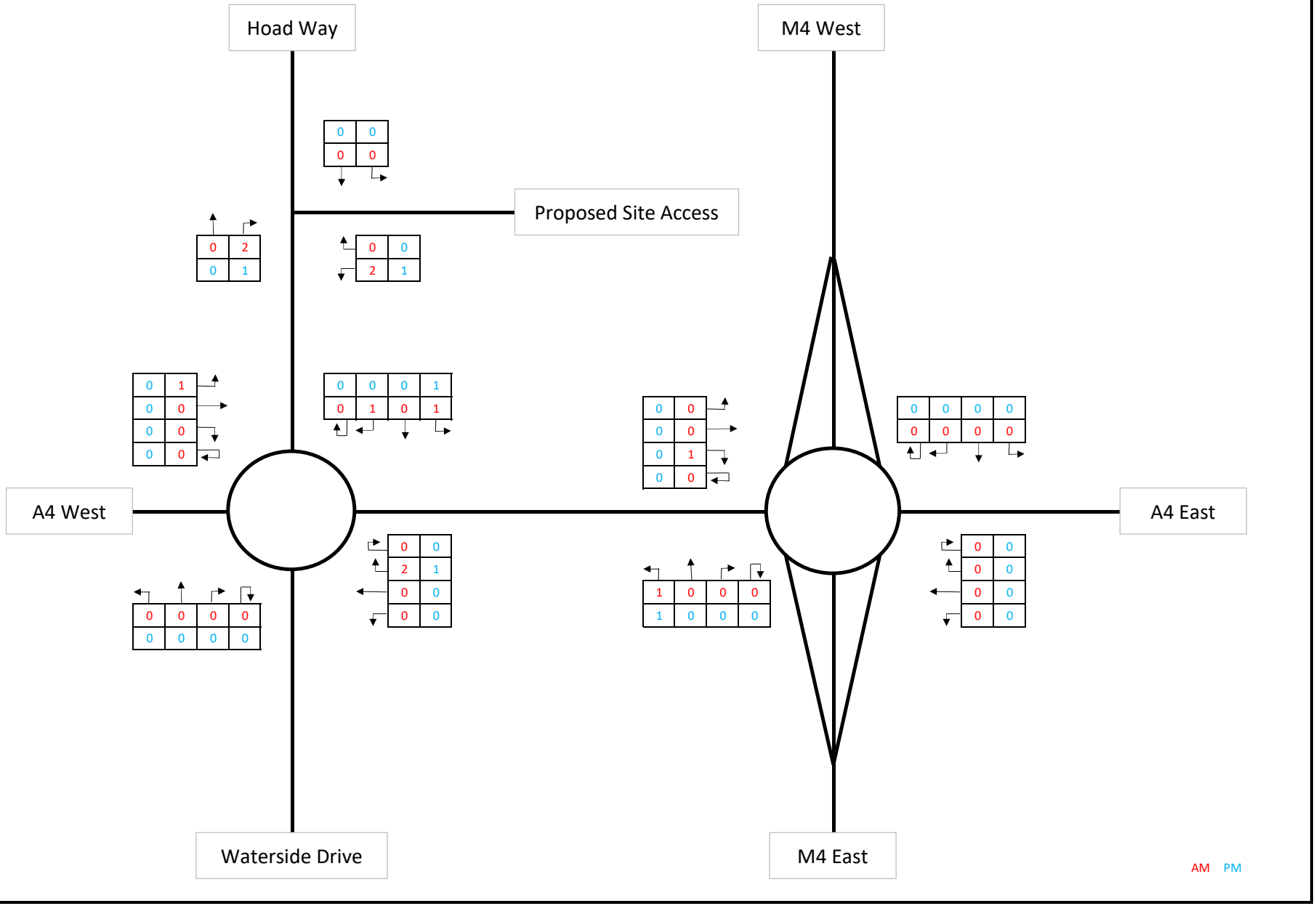
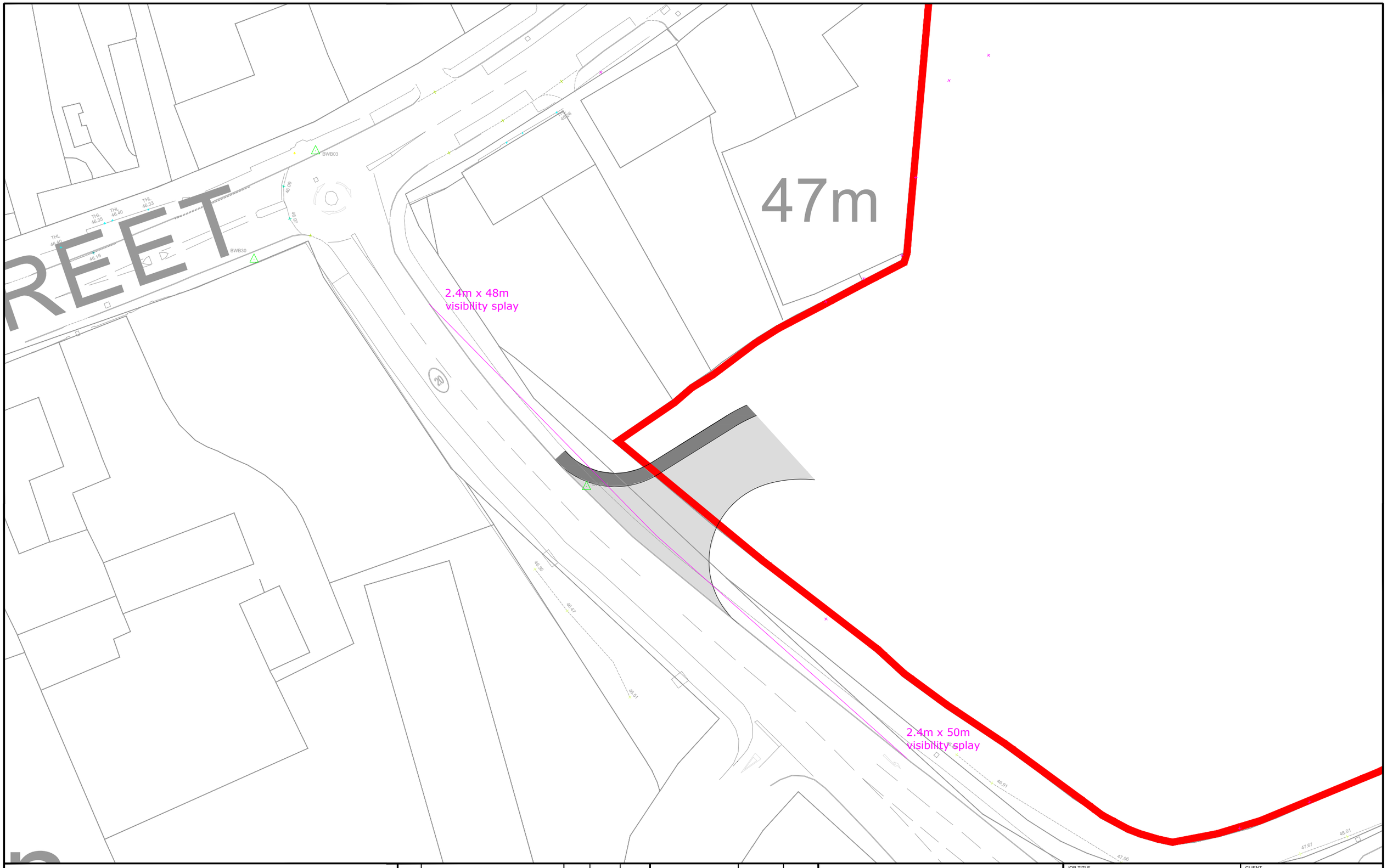


Figure 4 - HGV Assignment



Drawings



REV	DESCRIPTION	DRAWN	INITIALS	DATE

DRAWING STATUS	CHECKED BY	DATE

david tucker associates
transport planning consultants

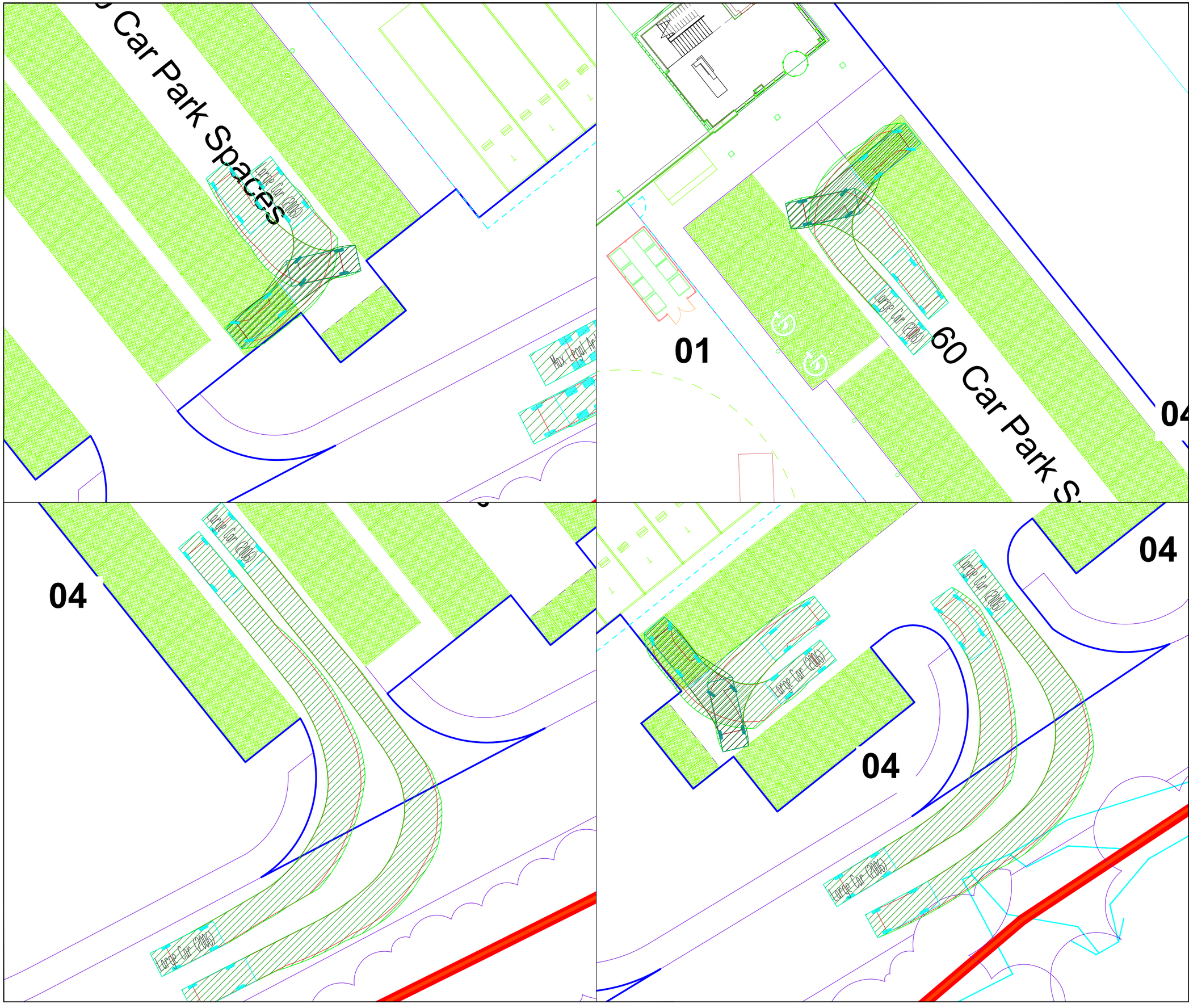
Forester House, Doctors Lane,
Henley in Arden,
Warwickshire B95 5AW
Tel: +44(0)1564 793598
Fax: +44(0)1564 793983
www.dtatransportation.co.uk

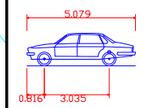
JOB TITLE	CLIENT
Theale	CP Logistics

DRAWING TITLE

Proposed Site Access

SCALE	DRAWN BY	DATE	DRAWING No	REVISION
1/500@A3	BP	March2020	20168–01	C





Large Car (2006)

Overall Length	5.079m
Overall Width	1.872m
Overall Body Height	1.525m
Min Body Ground Clearance	0.310m
Max Track Width	1.831m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	5.900m

REV	DATE	DESCRIPTION	INITIALS

DTA
Transport Planning Consultants

Forester House, Doctors Lane
Henley-in-Arden
Warwickshire B95 5AW
Tel: +44(0)1564 793598
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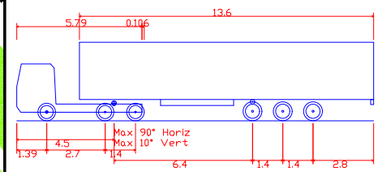
www.dtatransportation.co.uk

JOB TITLE: Land to the North of A4 Bath Road
CLIENT: CP Logistics
DRAWING TITLE: Swept Path Analyis – Large Car

SCALE AT A0	DRAWN BY	DATE	DRAWING No	REVISION
1/250 @A3	RT	August '23	20168-06-1	a



Max Legal Articulated Vehicle (16.5m)

Overall Length	16.500m
Overall Width	2.500m
Overall Body Height	3.632m
Min Body Ground Clearance	0.396m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.870m

Landscaping as per Landscape Architects Layout

Substation

Hoad W

60 Ca

04

2 Level Access D

01

06

02

03

50000

Service Yard

07

60 Car Park Spaces

5 Dock Access

05

03

03

07

REV	DATE	DESCRIPTION	INITIALS

DTA
Transport Planning Consultants

Forester House, Doctors Lane
Henley-in-Arden
Warwickshire B95 5AW
Tel: +44(0)1564 792598
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JOB TITLE	CLIENT
Land to the North of A4 Bath Road	CP Logistics

DRAWING TITLE

Swept Path Analysis – Max Legal Articulated Vehicle

SCALE AT A0	DRAWN BY	DATE	DRAWING No	REVISION
1/500 @A3	RT	August '23	20168-06-1	a

Appendix A

Boundaries

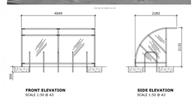
Red Line Boundary

NDA

Security Fence

01 WASTE MANAGEMENT STORE
Concrete base with 2.4m high timber palisade fencing with galvanized structure.

02 BICYCLE STORE
Urban Engineering 'Series A' or similar and approved Polycarbonate transparent sheets with polyester powder coated steel frame.
Colour: White (BS00E55) Sheffield steel cycle racks or similar and approved to accommodate 10 cycles per shelter.



Arrangement and quantity of Cycle Stands within the Cycle Store area in accordance with planning requirements

Refer to site plan for location and positioning.

03 BOUNDARY SECURITY FENCE

Typical Paladin Fencing:
The perimeter of the service yards will be provided with 2.4m high paladin fencing. Post and panels to be black finish. Fences to be suitably set back from vehicular areas to reduce risk of accidental impact. Fencing / landscaping to be co-ordinated such that a maximum gap beneath fence is 100mm.

04 KNEE RAIL FENCING
Made from softwood guaranteed for 25 years.
Galvanised strap for longer life
5 year treatment guarantee
Height 1.20m with planed finish.

05 DOCK APRON RETAINING WALL
External retaining walls to the sides of the dock access will be also of fair faced concrete. Armco barrier galvanised mild steel and handrailing is to be provided adjacent to the retaining wall to level access ramps. The barrier uprights are to be surface fixed to the concrete.

06-07 VEHICLE AND PEDESTRIAN GATES:

To security sensitive areas near the main access road, vehicle gate is to be black steel paladin, 2.4m high to BS 1722-12:2006 (including concrete foundations). Gates to hinge open and be able to be held in the open position by providing bolt sleeves. Posts to be square section powder coated black steel with capped tops, cast in concrete bases.

07 AUTO CANTILEVERED SLIDING GATE

2.4m high Paladin automated sliding Gates.

Rev	Date	Iss. By	App. By	Description
P1	26/07/23		ELF	Revised Layout.
P2	03/08/23		ELF	Access to Unit 1 moved.
P3	04/08/23		ELF	Car Park layout updated.
P4	08/08/23		ELF	Update site layout as per latest comments from Panatoni.
P5	09/08/23		ELF	Issued for Planning.
P6	11/09/23		ELF	Updated layout according to the latest landscape and drainage strategy.

Red Line Boundary

Name	Area (Hectares)	Area (Acres)
Site Gross Area	5.43 hectare	13.41 acres
Total Area	5.43 hectare	13.41 acres

Planning Site Area Schedule

Name	Area (Hectares)	Area (Acres)
Net Dev Area Unit 1	0.98 hectare	2.42 acres
Net Dev Area Unit 2	1.04 hectare	2.58 acres
Total Area	2.02 hectare	4.99 acres

UNIT 1 GIA Area Schedule

Name	Area (m²)	Area (ft²)
Unit 1 Escape Stair	24.29 m²	261.48 ft²
Unit 1 GF Core	86.68 m²	933.06 ft²
Unit 1 Mezzanine Office	415.76 m²	4,475.16 ft²
Unit 1 Warehouse	4,029.72 m²	43,375.58 ft²
	4,556.45 m²	49,045.27 ft²

UNIT 2 GIA Area Schedule

Name	Area (m²)	Area (ft²)
Unit 2 Escape Stair	24.29 m²	261.48 ft²
Unit 2 GF Core	86.68 m²	933.06 ft²
Unit 2 Mezzanine Office	415.76 m²	4,475.16 ft²
Unit 2 Warehouse	4,561.56 m²	49,100.20 ft²
	5,088.29 m²	54,769.90 ft²

TOTAL GIA

Name	Area (m²)	Area (ft²)
<varies>	9,644.74 m²	103,815.17 ft²
	9,644.74 m²	103,815.17 ft²

GEA Schedule

Name	Area (m²)	Area (ft²)
<varies>	9,889.97 m²	106,454.73 ft²
Total GEA:	9,889.97 m²	106,454.73 ft²

SCALE 1:1000

0m 50m 100m

PANATTONI

SGP

Architects + Masterplanners

Waterfront House
2a Smith Way
Grove Park
Enderby
Leicester LE19 1SX

t: +44 (0)116 247 0557

www.stephengeorge.co.uk

Theale, Reading

Drawing Name:
Site Plan

Drawing Stage: **Planning**

Status: **S0**

SGP File Ref: 18-095-SGP-ZZ-ZZ-M3-A-00000

SGP Project No	Date	Drawn	Team	Scale	Rev
18-095	26/07/23	ELF	MMS	As indicated @ A1	P6

Drawing Number:
18-095-SGP-ZZ-ZZ-DR-A- 131001
Project Code Originator Volume Level Type Role Number

Appendix B

From: [redacted]
Sent: 04 January 2022 14:09
To: [redacted]
CC: [redacted]
Subject: FW: 21/02029 - Land bounded by Hoad Way and M4, Theale

Hi [redacted], please find the email below from WSP. The original comments are in black, the comments from the applicants consultants are in blue italics, with a further response from WSP in bold green.

I concur with the comments. It would seem that there is still an issue with no fronting or access onto the High Street. It would also seem that there is still some information missing that would enable us to check the VISSIM modelling.

We look forward to further responses,

Best wishes

[redacted] (he/him)
Highways Development Control Team Leader
Environment Department, West Berkshire Council, Market Street, Newbury RG14 5LD
[redacted]
www.westberks.gov.uk

From: [redacted]
Sent: 14 December 2021 09:41
To: [redacted]
Cc: [redacted]
Subject: 21/02029 - Land bounded by Hoad Way and M4, Theale

Hi [redacted],

Further to your discussion with [redacted] on Thursday please find below our comments (in blue) to the applicants response (in green) to our outstanding queries/concerns (in black).

Hopefully this is ok and can be sent on to the planning officer.

1. The proposals need to show pedestrian/cycle access onto the High Street. Overlooking will make it more of an attractive route and encourage more walking and cycling. *- A pedestrian/ cycle access will not be offered onto the High Street as the proposed footway along the site access is on the desire line –* **This is**

unacceptable, a new link would encourage trips to/from Calcot via the existing footpath across the M4 leading to Pincetts Lane, therefore this still needs to be provided.

2. Consider a footway on the south and eastern internal boundary of the site access to improve safety. *- A footway on the south and eastern internal boundary of the site access will not be provided as it is a private access road, and the proposed footway is on the desire line.* **– The suggested footway would be within the site boundary (as highlighted below in blue). The current layout would increase conflicts between vehicles (cars and HGVs) and pedestrians.**

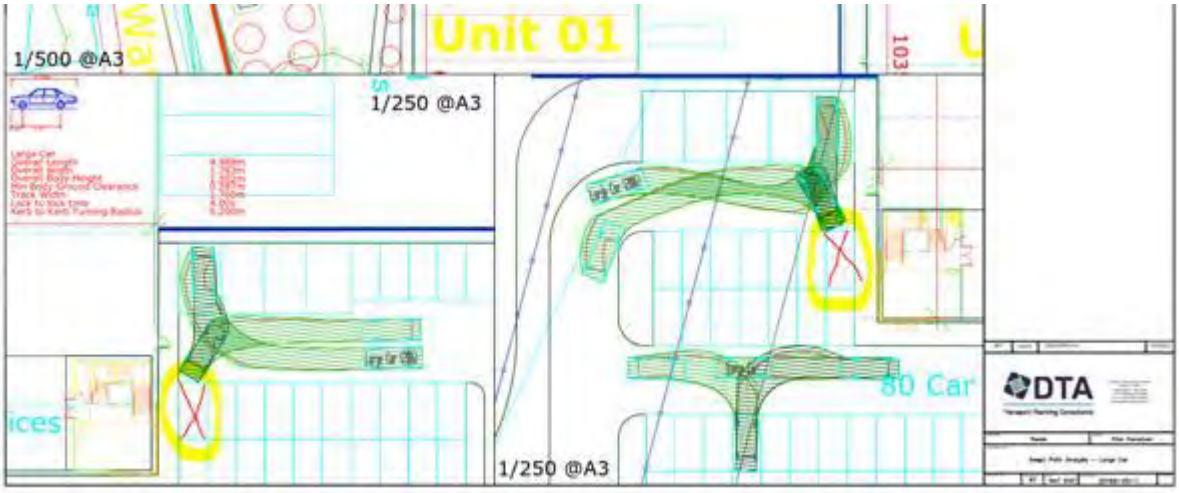
3. Clarification is required as to whether the land use is B1 (office) or B2-B7 (General and Special Industrial) in addition to the proposed B8 use. *-The offices referred to on the proposals plan are for ancillary uses within the buildings and the land use is as summarised in the planning application summary. No standalone B1 office is proposed or will be consented. The sites adopted in the TRICS assessment will all have ancillary office spaces and therefore there is no need to separately analysis any office element* **– The LHA is satisfied with the B2 ancillary uses.**

4. The proposed level of car parking exceeds the maximum parking standards, and these therefore need to be reviewed. *– The applicant states that the scheme needs to provide flexibility for either B8 or B2 uses and that the overall level (188 spaces) falls within the maximum allowed for B2.* **– This is acceptable as the trip generation is based on the worst case (B2 use).**

5. A provision of electric vehicle charging points are required. *- A provision will be provided and will be secured by condition.* **- This is acceptable.**

6. Swept path analysis should be provided for a large car for the parking spaces in the far corners of all parking areas, site access and the internal access road. This should also be undertaken for an articulated vehicle for the site access, internal access road and service yards for all units. *– The swept path analysis for a large car shows a different car park layout to that shown in drawing 8-095-SGP-ZZ-ZZ-*

DR-A-131001 – proposals plan. - **Therefore the applicant needs to provide the updated proposals plan in which the swept path analysis was based on and also show swept path analysis for the parking spaces highlighted below. The swept path analysis for the articulated vehicle at the service yards is acceptable. However the swept path analysis does not show an articulated vehicle entering and exiting the site access and this is required.**



7. Clarification as to why the AM and PM development trips in Figures 3 and 4 differ to those in Table 10 are required. - *Figures 3 and 4 of the Transport Assessment are in Passenger Car Units (PCUs), whereas those in Table 10 of the Transport Assessment are total vehicles.* **This is therefore acceptable.**

8. The TEMPRO growth factors used in calculation of future year traffic flows needs to be provided. **– The applicant has provided the following growth factors: -**

Table 1 - TEMPRO Local Growth Figures

	Time	Local Growth Figure
2019-2029	AM	1.0931
	PM	1.0627

These figures have been reviewed and the LHA agree with the AM growth figure used however the PM peak is too low and should be 1.0924. This is also in line with the growth factors used in the VISSIM model. Therefore the growth factor for PM peak needs to be amended and all flow diagrams and modelling updated.

9. Flow diagrams for 2019 base, 2029 with TEMPRO, 2029 with TEMPRO and Committed Developments, 2029 plus development (including TEMPRO and committed development) must be provided in order for the LHA to review the junction modelling.
– All the above have been provided except for 2029 with TEMPRO and committed development and this is therefore still required.

10. The flow diagrams for the committed developments should also be provided and the modelling must include these flows and not just based on TEMPRO. **– The provision of these flow diagrams is still outstanding.**

11. The TA needs to include geometry plans showing the measurements for the junctions assessed. **– these have been provided. The LHA has reviewed the geometry and for the A4/Hoad Way / Waterside Drive roundabout the flare length for Hoad Way is 57m in the model however it should be 12m. Therefore the model for A4/Hoad Way / Waterside Drive roundabout needs to be re-run with the correct geometry on Hoad Way.**

12. Provide both average and maximum queue data from the 10 random seeds of the VISSIM model. **– This has been provided, LHA to review and provide comments.**

13. Provide detailed delay data for the Hoad Way junction. **– This has been provided, LHA to review and provide comments.**

Kind Regards,

[redacted]

[redacted]
Principal Transport Planner
BSc (Hons) MCIHT CMILT

[redacted]

3rd Floor
2 London Square
Cross Lanes
Guildford
Surrey
GU1 1UN

wsp.com

From: [redacted]
Sent: 04 January 2022 15:35
To: [redacted]
CC: [redacted]
Subject: 92428 21/ 02029/ COMI ND L and Bou nded by Hoad W ay and M 4 and, H igh St reet, Theale, R eading
Attachments: 040122 N HPR Con dition ed R ec 21 _02029_ COMI ND_ 040122 (003). pdf

This is an EXTERNAL EMAIL. STOP. THINK before you CLICK links or OPEN attachments.

For the attention of: [redacted] West Berkshire District Council

Site: Land Bounded by Hoad Way and M4 and, High Street, Theale, Reading, Grid Reference 464750 171453

Proposal: Full planning application for the construction of 3 employment units for flexible uses within Class E (light industrial), B2 and B8 of the Use Classes Order (including ancillary office provision) with associated enabling works, access, parking and landscaping

Planning Application: 21/02029/COMIND

Our Reference: 92428

Dear [redacted],

Please note that the below pre-commencement condition is yet to be agreed with the Applicant however in the interest of time we are providing you with our response to meet your 5th January deadline.

National Highways has been appointed by the Secretary of State for Transport as Strategic Highway Company under the provisions of the Infrastructure Act 2015 and is the Highway Authority, Traffic Authority and Street Authority for the Strategic Road Network (SRN). The SRN is a critical national asset and as such National Highways works to ensure that it operates and is managed in the public interest, both in respect of current activities and needs as well as in providing effective stewardship of its long-term operation and integrity.

In this case, our interest is in the M4, specifically Junction 12.

National Highways has no objection to the planning application subject to the following condition.

1. *Prior to occupation of any part of development hereby permitted, an Operational Management Plan will be submitted to and agreed in writing by the Local Planning*

Authority (in consultation with National Highways). The Operational Management Plan will include but not limited to the following:

- *Details of HGV routing;*
- *Measures to manage down demand for HGV movements during peak periods (Monday-Friday AM Peak (0800-0900) and PM Peak (1630-1800); and*
- *Framework Travel Plan for staff on site.*

REASON: To mitigate any adverse impact from the development on the M4, to ensure that the M4 continues to be an effective part of the national system of routes for through traffic in accordance with section 10 of the Highways Act 1980 and to satisfy the reasonable requirements of road safety.

Please find attached our NHPR form in this respect.

Kind Regards

[redacted] **Area 3 Spatial Planning Manager**
National Highways | Bridge House | 1 Walnut Tree Close | [redacted]
Web: http://www.highways.gov.uk
GTN: 0300 470 1043

National Highways Planning Response (NHPR 21-09)
Formal Recommendation to an Application for Planning Permission

From: [redacted]
Operations Directorate
Southeast Region
National Highways
PlanningSE@highwaysengland.co.uk

To: [redacted] West Berkshire District Council

CC: transportplanning@dft.gov.uk
spatialplanning@highwaysengland.co.uk

Council's Reference: 21/02029/COMIND

Location: Land Bounded by Hoad Way and M4 and, High Street, Theale, Reading, Grid Reference 464750,171453

Proposal: Full planning application for the construction of 3 employment units for flexible uses within Class E (light industrial), B2 and B8 of the Use Classes Order (including ancillary office provision) with associated enabling works, access, parking and landscaping

National Highways Ref: 92428

Referring to the consultation on the planning application referenced above, in the vicinity of the M4 that forms part of the Strategic Road Network, notice is hereby given that National Highways' formal recommendation is that we:

~~a) offer no objection (see reasons at Annex A);~~

b) recommend that conditions should be attached to any planning permission that may be granted (see Annex A – National Highways recommended Planning Conditions & reasons);

~~c) recommend that planning permission not be granted for a specified period (see reasons at Annex A);~~

~~d) recommend that the application be refused (see reasons at Annex A)~~

Highways Act 1980 Section 175B is not relevant to this application.[1]

This represents National Highways' formal recommendation and is copied to the Department for Transport as per the terms of our Licence.

Should the Local Planning Authority not propose to determine the application in accordance with this recommendation they are required to consult the Secretary of State for Transport, as set out in the Town and Country Planning (Development Affecting Trunk Roads) Direction 2018, via transportplanning@dft.gov.uk and may not determine the application until the consultation process is complete.

Signature: [redacted]	**Date: 04/01/2022**
Name: [redacted]	**Position:** Area 3 Spatial Planning Manager National Highways planningSE@highwaysengland.co.uk
National Highways **Bridge House, 1 Walnut Tree Close, Guildford, Surrey, GU1 4LZ** [redacted]	

[1] Where relevant, further information will be provided within Annex A.

Annex A National Highway's assessment of the proposed development

National Highways has been appointed by the Secretary of State for Transport as a strategic highway company under the provisions of the Infrastructure Act 2015 and is the highway authority, traffic authority and street authority for the Strategic Road Network (SRN). The SRN is a critical national asset and as such we work to ensure that it operates and is managed in the public interest, both in respect of current activities and needs as well as in providing effective stewardship of its long-term operation and integrity.

National Highways are concerned with proposals that have the potential to impact on the safe and efficient operation of the SRN, in this case the M4.

Recommendation

National Highways has no objection to the planning application subject to the following condition.

Condition

1. *Prior to occupation of any part of development hereby permitted, an Operational Management Plan will be submitted to and agreed in writing by the Local Planning Authority (in consultation with National Highways). The Operational Management Plan will include but not limited to the following:*

- *Details of HGV routing;*
- *Measures to manage down demand for HGV movements during peak periods (Monday-Friday AM Peak (0800-0900) and PM Peak (1630-1800); and*
- *Framework Travel Plan for staff on site.*

REASON: To mitigate any adverse impact from the development on the M4, to ensure that the M4 continues to be an effective part of the national system of routes for through traffic in accordance with section 10 of the Highways Act 1980 and to satisfy the reasonable requirements of road safety.

HIGHWAYS RESPONSE

To:	[redacted] Planning Consultant	**Our Ref**:	21/02029
From:	[redacted] Principal Transport Planner, WSP	**Your Ref**:	21/02029/COMIND
Extn:		**Date**:	12th October 2021

Land off Hoad Way and South of M4 J12, Theale

Full planning application for the construction of 3 employment units for flexible uses within Class E (light industrial), B2 and B8 of the Use Classes Order (including ancillary office provision) with associated enabling works, access, parking and landscaping.

Documents Reviewed:

- David, Tucker Associates, Transport Assessment (TA), 29th July 2021;
- SGP, Proposals Plan - drawing 8-095-SGP-ZZ-ZZ-DR-A-131001;
- SGP, Design and Access Statement, July 2021;
- Pell Frischmann, Land North of A4 Bath Road Modelling Report, 3rd August 2021; and
- David, Tucker Associates, Technical Note – VISSIM Model Outputs, 7th September 2021.

Background

Pre-application comments were provided from the Local Highway Authority (LHA) in October 2019 following the submission of a scoping note. It was considered that the site layout, access, use of TRICS for trip generation and Census data for distribution of traffic was acceptable. However, the following issues would need to be addressed in the Transport Assessment: -

- Consider a right turn lane and ghost island at the new site access;
- Provide pedestrian and cycle access onto the High Street;
- Provide electric car charging points;
- A Travel Plan will be required;
- Committed Developments should be included for future years (Residential development in Calcot, residential development at Lakeside, office development at Brunel Road and possibly residential development at Pincents Lane); and
- The area wide VISSIM model should be used.

An outline planning application (20/00476/OUYMAJ) was previously submitted in February 2020. At that time, the LHA recommended refusal for the application as further trip rate and VISSIM traffic modelling data was required and also overlooking onto the High Street was also required. This application was withdrawn in July 2020.

REVIEW OF TRANSPORT ASSESSMENT

Accidents (page 8 of the TA)

1. Five year accident data has been obtained for Hoad Way, the High Street, A4 Bath Road and M4 J12 roundabout. The analysis shows that there have been no personal injury collisions on Hoad Way. There were 13 accidents recorded in the remaining vicinity of the site which were as a result of driver error and not related to highway layout. **There is therefore no concern with highway safety.**

Accessibility (pages 10-13 of the TA)

Walking and Cycling

2. There are good pedestrian links from the site into Theale, to the west of the site with footways on the northern side of Hoad Way along the frontage of the site providing access to the High Street.
3. There are no formal cycle facilities within the vicinity of the site. However, Hoad Way is subject to a 30mph speed limit.
4. To encourage walking and cycling to the site and improve safety for pedestrians and cyclists it was requested in the pre-application response that access onto the High Street from the development would be expected. The Design and Access Statement (section 2.5 and Figure 7) describes and shows two existing access points into the north of the site from the High Street. **However, the proposals plan (shown in Appendix A – drawing 8-095-SGP-ZZ-ZZ-DR-A-131001) does not show any pedestrian/cycle access onto the High Street and this is required.**
5. As previously mentioned, the LHA remains keen to have overlooking from the site onto Theale High Street. It is considered that the development should not be screened and turned away from this route, which is an important pedestrian and cycle route from Theale to Calcot. Overlooking will make it more of an attractive route and encourage more walking and cycling.
6. The internal provision for pedestrians and cyclists shows that there are potential safety conflicts with vehicles accessing trailer spaces and car parks for Units 2 and 3. **A footway on the south and eastern internal boundary of the site access should be provided to reduce these conflicts and improve the safety of the site.**

Public Transport

7. There are frequent bus services within 200m of the site on the High Street. These provide services to Reading, Newbury, Calcot and Thatcham.
8. Theale railway station is located approximately 900m to the south west of the site providing links to Reading, Newbury, Bedwyn and London Paddington.
9. **It can be concluded that the site is within a sustainably accessible location**.

Vehicle Access (page 14 of the TA)

10. The proposed access will form a priority junction with Hoad Way. **The indicative site access plan (drawing 20168-01) shows the access will achieve the required visibility splays of 50m to the east and 48m to the west.**

11. At the pre-application stage, the LHA requested that a right turn lane and ghost island at the new site access should be considered. The applicant considers that this will not be necessary as demonstrated by the junction capacity assessment for the new access. **However, as discussed below, further information is requested for the junction capacity assessment. Therefore, this arrangement may still be necessary once the LHA have undertaken a full review of the assessments.**

Car Parking (pages 15-16 of the TA)

12. The car parking standards set out in the West Berkshire District Local Plan, Saved Policies Amended September 2007 Appendix 5: Parking provision have been used which is acceptable. The applicant assessed the level of car parking based on land uses General and Special Industrial B2 – B7 and storage and distribution B8. However, the proposals plan shows a breakdown of the area schedule for each unit showing the following: -

- Unit 1: Warehouse 2500sq.m;
  Offices 358sq.m.
- Unit 2: Warehouse 6531sq.m;
  Offices 584sq/m.
- Unit 3: Warehouse 5211sq.m;
  Offices 493sq.m.

13. Therefore, clarification is required as to whether the land use is B1 (office) or B2-B7 (General and Special Industrial). As the proposal plan (drawing 8-095-SGP-ZZ-ZZ-DR-A-131001) refers to offices, **therefore it would be useful to clarify if these are for ancillary use.**
14. Furthermore, the LHA have undertaken an assessment of parking based on the area schedule above which confirms based on B2-B7 and B8 land uses, the maximum permitted parking level would be 100 spaces. Based on B1 office and B8 land uses the maximum permitted parking level would be 129 parking spaces. The TA shows that in total 188 parking spaces are proposed which exceeds the maximum permitted parking standards for the site.
15. **Therefore, a review of car parking needs to be undertaken with both the TA and proposals plan updated to show a level of parking within West Berkshire Parking standards**.
16. **There is no mention of the provision for electric vehicle charging points and this is required**.
17. **As part of the full planning application, swept path analysis should be provided for a large car for the parking spaces in the far corners of all parking areas, site access and the internal access road. This should also be undertaken for an articulated vehicle for the site access, internal access road and service yards for all units**.

Cycle and Motorcycle Parking (Pages 16-18 of the TA)

18. The provision of cycle and motorcycle parking has been considered based on the Cycle and Motorcycle Advice and Standards for New Development (November 2014). This has been assessed based on the standards for B1/B2 land uses which have the same recommended standards. The level of

cycle/motorcycle parking has also been calculated based on the total floor area for each unit.

19. The proposed cycle provision for Unit 1 will be 10 cycle spaces and 2 motorcycle spaces, Unit 2 proposes 20 cycle spaces and 2 motorcycle spaces and Unit 4 proposes 20 cycle spaces and 2 motorcycle spaces. **This provision exceeds the cycle parking standards, and this is considered acceptable due to the sustainable location of the site.**
20. There is no mention in the TA of the type of cycle parking to be provided. Cycle parking should be provided in the form of Sheffield stands and should be secure and covered. **The proposals plan shows that the cycle parking for each unit will be located within the car parking area and close to the pedestrian entrance of each Unit which is acceptable.**

Traffic Impact (Pages 19-20 of the TA)

Traffic Generation

21. The trip generation has been calculated using TRICS and based on a selection criteria of Employment / Industrial Unit for the total floor area, therefore the worst case scenario. However further to the LHA's previous comment with regards to car parking, **clarification is required as to whether the land use (in addition to the B8 use) is for office's or B2-B7 (General and Special Industrial) as this is unclear from the Proposals plan. If for offices, then it is considered that selection criteria in TRICS should be based on Employment/Offices. Clarification on the land uses should be provided.**
22. Table 10 shows that there would be 63 arrivals and 37 departures in the AM peak period (08.00-09.00) and 21 arrivals and 58 departures in the PM peak period (17.00-18.00).

Traffic Distribution

23. **The distribution of development trips has been assessed based on Journey to Work Census 2011 data and this methodology is acceptable**.
24. Figures 3 and 4 in the TA show the distribution of development trips for the AM and PM peaks. The arrival and departure trips shown in these figures vary to those in Table 10 of the TA, however they exceed the trips calculated in Table 10 and therefore represent a worst case scenario. **Notwithstanding this, clarification as to why these figures differ is required.**

Junction Assessments (Pages 21-24 of the TA)

25. The site access priority junction and A4/Hoad Way / Waterside Drive roundabout have been assessed using Junctions 10. These have been assessed for the 2019 base year, 2029 forecast year and 2029 forecast year including committed development.
26. **Paragraph 6.1.2 in the TA stated assessment are provided for 2024. This appears to be typo and should be updated to 2029**.
27. TEMPRO has been used to uplift the base traffic with growth factors which is an acceptable approach. **However, in order to review this process, the LHA need to see the growth factors used for calculation of future year traffic flows. This should be provided.**

28. Flow diagrams for the years assessed have not been provided and **in order for the LHA to review the junction modelling these are required for all the scenarios assessed in the TA.**
29. It was requested at the pre- application stage that the junction capacity assessments included the following committed developments: -
    - Proposed 200 dwellings at Dorking Way in Calcot with planning application 19/01544/FULEXT;
    - Housing developments at Lakeside in Theale with planning application 15/02842/OUTMAJ;
    - Office development at Brunel Road in Theale under planning applications 17/01588/COMIND and 17/01589/COMIND; and
    - Proposed 265 dwellings at Pincents Lane with planning application 19/00113/OUTMAJ.
30. However, the TA considers that any additional traffic from the committed developments would be included in the projected traffic increases in the local TEMPRO growth factors. **This is unacceptable and the modelling must include committed developments in addition to the TEMPRO factors**. **However, it is noted in the VISSIM model committed developments are included separately and this is acceptable and growth factors used for VISSIM model are acceptable. See later in this note. However, confirmation is required if these factors are also utilised in the assessment of the TA. This will be reviewed in support of the traffic flow diagrams to be provided as requested above.**
31. **The TA needs to include geometry plans showing the measurements for the junctions assessed in Junction 10**.
32. The LHA had also requested in response to the Scoping note that the area wide VISSIM model should be used. Section 6.5 of the TA states that the VISSIM model is currently being updated and the output will follow as a separate Technical Note. This technical note has also been submitted and has been reviewed as part of this response.

Mitigation

33. A Framework Travel Plan has been submitted as part of the application which will promote sustainable travel. **This will be reviewed by the Travel Planning team at West Berkshire Council and comments will be provided separately.**

VISSIM Technical Note Review

34. The VISSIM model includes all the agreed committed developments: -

- Proposed 200 dwellings at Dorking Way in Calcot with planning application 19/01544/FULEXT;
- Housing developments at Lakeside (The Green) in Theale approved with planning application 15/02842/OUTMAJ ;
- Office development at Brunel Road in Theale under planning applications 17/01588/COMIND and 17/01589/COMIND; and
- Proposed 265 dwellings at Pincents Lane with planning application 19/00113/OUTMAJ.

35. The following scenarios have been included within the VISSIM modelling and is described as below:

- a. 2019 Base Year – observed traffic flows;
- b. 2023 Forecast Future Year 'without proposed development' – 2019 Base + TEMPro background traffic growth + Committed Developments + 'Land East of Pincents Lane' + 'Land West of Dorking Way';
- c. 2023 Forecast Future Year 'with proposed development' – 2019 Base + TEMPro background traffic growth + Committed Developments + 'Land East of Pincents Lane' + 'Land West of Dorking Way' + Land to the North of A4 Bath Road;
- d. 2029 Forecast Future Year 'without proposed development' – 2019 Base + TEMPro background traffic growth + Committed Developments + 'Land East of Pincents Lane' + 'Land West of Dorking Way'; and
- e. 2029 Forecast Future Year 'with proposed development' – 2019 Base + TEMPro background traffic growth + Committed Developments + 'Land East of Pincents Lane' + 'Land West of Dorking Way' + Land North of A4 Bath Road.

36. The following peak hours (as determined by traffic surveys carried out in March 2019) are modelled:

- Weekday AM peak – 07:15 to 08:15 hours;
- Weekday PM peak – 16:15 to 17:15 hours;

37. The TEMPRO factors used for 2023 were previously agreed by WBC Highways Development Control. **These are therefore acceptable.** The same parameters were used for the growth factors used to uplift the 2023 flows to the agreed 2029 future assessment year. **These factors are also acceptable.**

38. The VISSIM model has been validated for each scenario and should be appropriate for use in testing for proposed developments such as this. **This is therefore acceptable.**

39. In the LHA's previous response it was requested that scenarios are provided un-optimised alongside optimised. Paragraph 5.11 in the VISSIM note states that all future forecast year scenarios are run with traffic signal optimisation and MOVA, which represents the continued use of MOVA in the future. Scenarios without MOVA have not been run as it is noted that MOVA already exists within the modelling study area. **This is considered acceptable.**

40. The development trips used in the VISSIM model correlates with Table 10 of the TA. However as stated above, clarification is required in support of the land uses.

41. The VISSIM model note stated that the impact of the development traffic on the surrounding road network is not detrimental to the highway network. LHA review of the results is detailed below.

42. VISSIM modelling results for the journey time are provided on page 27 of the technical note as shown below:

AM Peak journey time in seconds

To / from	2019 base (JT in sec)	2029 growth (without development) (JT in sec)	2029 growth (with development) (JT in sec)
Pincents Lane from Ikea to A4	90	74	72
Pincents Lane from A4 to Ikea	40	41	41
A4 from Waterside Drive to Langley Hill	249	271	270
A4 from Langley Hill to Waterside Drive	218	280	333

PM Peak journey time in seconds

To / from	2019 base (JT in sec)	2029 growth (without development) (JT in sec)	2029 growth (with development) (JT in sec)
Pincents Lane from Ikea to A4	114	140	144
Pincents Lane from A4 to Ikea	41	41	42
A4 from Waterside Drive to Langley Hill	309	331	327
A4 from Langley Hill to Waterside Drive	219	255	268

43. The results show no change or slight reduction in journey times due to the optimisation of the traffic signals in 2029 except on the A4 from Langley Hill to Waterside Drive (westbound) where there is an increase in the AM peak of +53 and in the PM peak of +13. The average queue data shows that in the AM peak there is an increase in queue length at the Bath Road (WB) arm of the Hoad Way roundabout of 73m and an increase of 12 vehicles queuing between the 2029 scenario (without development) and 2029 with the proposed development at Hoad Way. The queue data for the AM peak also shows an increase on one of the slip roads at the M4 J12 with an increase in queue length of 28m (from 29m to 57m). However this is not expected to impact the operation of the junction and the increase in queue is minimal (4 vehicles).

44. To further review the impact of the proposals the LHA request that the applicant provides both average and maximum queue data from the 10 random seeds of the VISSIM model.

45. The Level of Service (LOS) analysis shown on pages 28 and 29 of the technical note indicates that the Hoad Way/Waterside Drive roundabout in the AM peak period does not operate at the same LOS between 2029 without development and 2029 with development, therefore indicating an increase in delay at this junction. Without development the junction operates with a LOS of LOS_E (35s-50s) delay and with development operates with an LOS of LOS_F which means a delay of greater than 50s. As the results show an increase in delay at the Hoad Way roundabout, it would be useful for the applicant to provide detailed delay data at this junction so that LHA would be able to understand how much delay is caused on the network as a result of the development traffic.

46. It is noted that there is latent demand in the future year models both without and with development, therefore it will be useful to understand how much delay is caused at the junction as a result of development traffic.

47. Prior to LHA consider that the impact of the development traffic is not detrimental, further information is requested as stated above.

RECOMMENDATION: -

48. Until the LHA can consider the proposal acceptable, the following information is required: -
    - The proposals need to show pedestrian/cycle access onto the High Street. Overlooking will make it more of an attractive route and encourage more walking and cycling.
    - Consider a footway on the south and eastern internal boundary of the site access to improve safety.
    - Clarification is required as to whether the land use is B1 (office) or B2-B7 (General and Special Industrial) in addition to the proposed B8 use.
    - The proposed level of car parking exceeds the maximum parking standards, and these therefore need to be reviewed.
    - A provision of electric vehicle charging points are required.
    - Swept path analysis should be provided for a large car for the parking spaces in the far corners of all parking areas, site access and the internal access road. This should also be undertaken for an articulated vehicle for the site access, internal access road and service yards for all units.
    - Clarification as to why the AM and PM development trips in Figures 3 and 4 differ to those in Table 10 are required.
    - The TEMPRO growth factors used in calculation of future year traffic flows needs to be clarified if same factors are utilised as per VISSIM note.
    - Flow diagrams for 2019 base, 2029 with TEMPRO, 2029 with TEMPRO and Committed Developments, 2029 plus development (including TEMPRO and committed development) must to be provided in order for the LHA to review the junction modelling.
    - The TA needs to include geometry plans showing the measurements for the junctions assessed.
    - Provide both average and maximum queue data from the 10 random seeds of the VISSIM model.
    - Provide detailed delay data for the Hoad Way junction.

From: [redacted]
Sent: 14 Oct obe r 2021 0 9:15
To: [redacted]
Subject: FW : # 14909 F W : 92428 Pl anning A ppl ica tion 2102029COMI N D

From: [redacted]
Sent: 12 October 2021 16:00
To: [redacted]
Cc: [redacted]
Subject: FW: #14909 FW: 92428 Planning Application 2102029COMIND Land Bounded by Hoad Way and M4 and High Street Theale Reading West Berkshire

This is an EXTERNAL EMAIL. STOP. THINK before you CLICK links or OPEN attachments.

Dear [redacted],

Thanks for sending through the modelling output and report via Turley. We have reviewed the information within in regard to impact on the Strategic Road Network (SRN) and in relation to our initial feedback provided in a Holding recommendation dated 15/09/21.

The LINSIG modelling shows that at the SRN, specifically junction 12 of the M4, saturation reaches above 90% on a number of lanes even after optimisation in the PM peak, section 4.21 of the Pell Frischmann modelling report. There is limited to no practical reserve capacity.

The trip rates used to model are derived from the submitted Transport Assessment (TA). However our initial feedback indicated that TRICS evidence provided for the proposed flexi B2 / B8 use units is derived from an 02/D EMPLOYMENT/INDUSTRIAL ESTATE land use (TA-Appendix C), this does not constitute a worst case. We requested that the applicant changes the Industrial Estate trip rates to a land use with the greatest trip generating potential (i.e B8 parcel distribution) as per the description of land use actually being applied for.

Until such time we see a worst case trip generation exercise and subsequent update to the modelling at the SRN, Junction 12 of the M4, we cannot confirm the traffic impact on the SRN and suggest the Holding recommendation stays in place.

Kind Regards

[redacted], Area 3 Spatial Planning Manager
National Highways | Bridge House | 1 Walnut Tree Close | Guildford | Surrey | GU1 4LZ
[redacted]
Web: http://www.highways.gov.uk
GTN: 0300 470 1043

From: [redacted]
Sent: 22 September 2021 09:44

To: [redacted]
Subject: RE: 92428 Planning Application 2102029COMIND Land Bounded by Hoad Way and M4 and High Street Theale Reading West Berkshire

Dear [redacted]

I am the new case officer for this application. I have received the attached Vissim modelling from the applicant which has been submitted in response to your e-mail below. I will formerly consult Highways England via the Planning Registration team however as this relates to your comments I am also sending this direct to yourself. Should you have any questions please let me know.

Kind regards
[redacted]

[redacted] | Principal Planning Officer

West Berkshire Council
Planning & Countryside, Council Offices, Market Street, Newbury, RG14 5LD
[redacted]

Please note that I work part time and my usual working days are Tuesday-Thursday. My normal working hours are 8am - 2:30pm.

From: [redacted]
Sent: 15 September 2021 13:51
To: Planapps <Planapps@westberks.gov.uk>
Cc: [redacted]
Subject: 92428 Planning Application 2102029COMIND Land Bounded by Hoad Way and M4 and High Street Theale Reading West Berkshire

This is an EXTERNAL EMAIL. STOP. THINK before you CLICK links or OPEN attachments.

For the attention of: [redacted] West Berkshire District Council

Site: Land Bounded by Hoad Way and M4 and, High Street, Theale, Reading, Grid Reference 464750 171453

Proposal: Full planning application for the construction of 3 employment units for flexible uses within Class E (light industrial), B2 and B8 of the Use Classes Order (including ancillary office provision) with associated enabling works, access, parking and landscaping

Planning Application: 21/02029/COMIND

Our Reference: 92428

Dear [redacted],

HIGHWAYS ENGLAND has been appointed by the Secretary of State for Transport as strategic highway company under the provisions of the Infrastructure Act 2015 and is the highway authority, traffic authority and street authority for the Strategic Road Network (SRN). The SRN is a critical national asset and as such we work to ensure that it operates and is managed in the public interest, both in respect of current activities and needs as well as in providing effective stewardship of its long-term operation and integrity.

In the case of this development proposal, our interest is in the M4, in particular Junction 12.

We have reviewed the available information supporting the proposal. We request additional information from the Applicant to allow us to fully consider the application and address the concerns outlined in the attached HEPR.

In the interim we ask that the application is not determined for a period of 56 days until such time as we have resolved the outstanding technical matters.

Kind Regards

[redacted], **Area 3 Spatial Planning Manager**
Highways England | Bridge House | 1 Walnut Tree Close | Guildford | Surrey | GU1 4LZ
[redacted]
Web: http://www.highways.gov.uk
GTN: 0300 470 1043

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Highways England Company Limited | General enquiries: 0300 123 5000 |National Traffic Operations Centre, 3 Ridgeway, Quinton Business Park, Birmingham B32 1AF | https://www.gov.uk/government/organisations/highways-england | info@highwaysengland.co.uk

Registered in England and Wales no 9346363 | Registered Office: Bridge House, 1 Walnut Tree Close, Guildford, Surrey GU1 4LZ

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Appendix C

Calculation Reference: AUDIT-623801-230724-0732

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : D - INDUSTRIAL ESTATE
TOTAL VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	EX	ESSEX	3 days
03	SOUTH WEST		
	DV	DEVON	1 days
	NS	NORTH SOMERSET	1 days
06	WEST MIDLANDS		
	WK	WARWICKSHIRE	4 days
	WO	WORCESTERSHIRE	1 days
07	YORKSHIRE & NORTH LINCOLNSHIRE		
	AK	WAKEFIELD	3 days
	KS	KIRKLEES	1 days
	NY	NORTH YORKSHIRE	1 days
08	NORTH WEST		
	LC	LANCASHIRE	2 days
09	NORTH		
	TW	TYNE & WEAR	2 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
Actual Range: 1776 to 150564 (units: sqm)
Range Selected by User: 708 to 167416 (units: sqm)

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/15 to 18/11/22

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	3 days
Tuesday	3 days
Wednesday	4 days
Thursday	5 days
Friday	4 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	19 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town	19

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Industrial Zone	12
Development Zone	1
Out of Town	2
No Sub Category	4

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Inclusion of Servicing Vehicles Counts:

Servicing vehicles Included	8 days - Selected
Servicing vehicles Excluded	17 days - Selected

Secondary Filtering selection:

Use Class:

n/a	1 days
Not Known	18 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order (England) 2020 has been used for this purpose, which can be found within the Library module of TRICS®.

Filter by Site Operations Breakdown:
All Surveys Included

Population within 500m Range:
All Surveys Included

Population within 1 mile:

1,001 to 5,000	1 days
5,001 to 10,000	4 days
10,001 to 15,000	7 days
15,001 to 20,000	4 days
20,001 to 25,000	1 days
25,001 to 50,000	2 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	2 days
50,001 to 75,000	2 days
75,001 to 100,000	3 days
100,001 to 125,000	1 days
125,001 to 250,000	8 days
250,001 to 500,000	3 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	8 days
1.1 to 1.5	10 days
1.6 to 2.0	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	19 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	19 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 AK-02-D-01 INDUSTRIAL ESTATE WAKEFIELD
CARR WOOD ROAD
CASTLEFORD

Edge of Town
Development Zone
Total Gross floor area: 1776 sqm
Survey date: MONDAY 22/05/17 Survey Type: MANUAL

2 AK-02-D-02 INDUSTRIAL ESTATE (PART) WAKEFIELD
PIONEER WAY
CASTLEFORD

Edge of Town
Industrial Zone
Total Gross floor area: 4328 sqm
Survey date: TUESDAY 23/05/17 Survey Type: MANUAL

3 AK-02-D-03 INDUSTRIAL ESTATE WAKEFIELD
THUNDERHEAD RIDGE RD
CASTLEFORD
GLASSHOUGHTON
Edge of Town
No Sub Category
Total Gross floor area: 3191 sqm
Survey date: MONDAY 15/05/17 Survey Type: MANUAL

4 DV-02-D-07 INDUSTRIAL ESTATE DEVON
BITTERN ROAD
EXETER
SOWTON IND. ESTATE
Edge of Town
Industrial Zone
Total Gross floor area: 3600 sqm
Survey date: MONDAY 03/07/17 Survey Type: MANUAL

5 EX-02-D-03 INDUSTRIAL ESTATE ESSEX
WYNCOLLS ROAD
COLCHESTER
SEVERALLS INDUSTRIAL PK
Edge of Town
Industrial Zone
Total Gross floor area: 4876 sqm
Survey date: FRIDAY 18/05/18 Survey Type: MANUAL

6 EX-02-D-04 INDUSTRIAL ESTATE ESSEX
PASTURE ROAD
WITHAM

Edge of Town
Industrial Zone
Total Gross floor area: 37130 sqm
Survey date: THURSDAY 10/05/18 Survey Type: MANUAL

7 EX-02-D-05 INDUSTRIAL ESTATE ESSEX
HECKWORTH CLOSE
COLCHESTER
SEVERALLS INDUSTRIAL PK
Edge of Town
Industrial Zone
Total Gross floor area: 7280 sqm
Survey date: FRIDAY 18/05/18 Survey Type: MANUAL

8 KS-02-D-02 INDUSTRIAL ESTATE KIRKLEES
LAW STREET
CLECKHEATON

Edge of Town
Industrial Zone
Total Gross floor area: 23226 sqm
Survey date: THURSDAY 15/09/16 Survey Type: MANUAL

LIST OF SITES relevant to selection parameters (Cont.)

9 LC-02-D-07 INDUSTRIAL ESTATE LANCASHIRE
CHAIN CAUL WAY
PRESTON
ASHTON-ON-RIBBLE
Edge of Town
Industrial Zone
Total Gross floor area: 4700 sqm
Survey date: FRIDAY *17/11/17* *Survey Type: MANUAL*

10 LC-02-D-08 INDUSTRIAL ESTATE LANCASHIRE
NOOK LANE
BAMBER BRIDGE

Edge of Town
Industrial Zone
Total Gross floor area: 4000 sqm
Survey date: TUESDAY *06/11/18* *Survey Type: MANUAL*

11 NS-02-D-01 INDUSTRIAL ESTATE NORTH SOMERSET
WINTERSTOKE ROAD
WESTON-SUPER-MARE
OLDMIXON
Edge of Town
Industrial Zone
Total Gross floor area: 27000 sqm
Survey date: THURSDAY *15/09/22* *Survey Type: MANUAL*

12 NY-02-D-03 INDUSTRIAL ESTATE NORTH YORKSHIRE
RACECOURSE ROAD
RICHMOND

Edge of Town
Out of Town
Total Gross floor area: 35183 sqm
Survey date: THURSDAY *05/05/22* *Survey Type: MANUAL*

13 TW-02-D-09 INDUSTRIAL ESTATE TYNE & WEAR
ELEVENTH AVENUE
GATESHEAD
TEAM VALLEY
Edge of Town
No Sub Category
Total Gross floor area: 6200 sqm
Survey date: WEDNESDAY *18/05/22* *Survey Type: MANUAL*

14 TW-02-D-10 INDUSTRIAL ESTATE TYNE & WEAR
ELEVENTH AVENUE
GATESHEAD
TEAM VALLEY
Edge of Town
No Sub Category
Total Gross floor area: 21500 sqm
Survey date: WEDNESDAY *18/05/22* *Survey Type: MANUAL*

15 WK-02-D-01 INDUSTRIAL ESTATE WARWICKSHIRE
CASTLE MOUND WAY
RUGBY

Edge of Town
Industrial Zone
Total Gross floor area: 150564 sqm
Survey date: WEDNESDAY *27/06/18* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

16 WK-02-D-02 INDUSTRIAL ESTATE WARWICKSHIRE
OVERVIEW WAY
RUGBY

Edge of Town
Industrial Zone
Total Gross floor area: 90535 sqm
Survey date: WEDNESDAY 27/06/18 Survey Type: MANUAL

17 WK-02-D-03 INDUSTRIAL ESTATE WARWICKSHIRE
EASTBORO WAY
NUNEATON

Edge of Town
Industrial Zone
Total Gross floor area: 20860 sqm
Survey date: THURSDAY 26/09/19 Survey Type: MANUAL

18 WK-02-D-04 INDUSTRIAL ESTATE WARWICKSHIRE
ABELES WAY
ATHERSTONE

Edge of Town
No Sub Category
Total Gross floor area: 17500 sqm
Survey date: FRIDAY 27/09/19 Survey Type: MANUAL

19 WO-02-D-03 INDUSTRIAL ESTATE WORCESTERSHIRE
MILLENNIUM WAY
EVESHAM

Edge of Town
Out of Town
Total Gross floor area: 84575 sqm
Survey date: TUESDAY 26/06/18 Survey Type: MANUAL

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

MANUALLY DESELECTED SITES

Site Ref	Reason for Deselection
AL-02-D-01	Site location not comparable
NF-02-D-04	Site location not comparable
NM-02-D-01	Site location not comparable
WO-02-D-02	Site location not comparable
WO-02-D-03	Site location not comparable

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
TOTAL VEHICLES
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	6	21374	0.060	6	21374	0.026	6	21374	0.086
06:00 - 07:00	6	21374	0.141	6	21374	0.054	6	21374	0.195
07:00 - 08:00	19	28843	0.311	19	28843	0.088	19	28843	0.399
08:00 - 09:00	19	28843	0.414	19	28843	0.159	19	28843	0.573
09:00 - 10:00	19	28843	0.305	19	28843	0.199	19	28843	0.504
10:00 - 11:00	19	28843	0.253	19	28843	0.207	19	28843	0.460
11:00 - 12:00	19	28843	0.243	19	28843	0.234	19	28843	0.477
12:00 - 13:00	19	28843	0.249	19	28843	0.290	19	28843	0.539
13:00 - 14:00	19	28843	0.289	19	28843	0.267	19	28843	0.556
14:00 - 15:00	19	28843	0.215	19	28843	0.289	19	28843	0.504
15:00 - 16:00	19	28843	0.185	19	28843	0.259	19	28843	0.444
16:00 - 17:00	19	28843	0.178	19	28843	0.328	19	28843	0.506
17:00 - 18:00	19	28843	0.116	19	28843	0.368	19	28843	0.484
18:00 - 19:00	19	28843	0.083	19	28843	0.154	19	28843	0.237
19:00 - 20:00	6	21374	0.104	6	21374	0.122	6	21374	0.226
20:00 - 21:00	6	21374	0.034	6	21374	0.058	6	21374	0.092
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			3.180			3.102			6.282

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	1776 - 150564 (units: sqm)
Survey date date range:	01/01/15 - 18/11/22
Number of weekdays (Monday-Friday):	19
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	5

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
OGVS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	6	21374	0.006	6	21374	0.006	6	21374	0.012
06:00 - 07:00	6	21374	0.008	6	21374	0.014	6	21374	0.022
07:00 - 08:00	19	28843	0.016	19	28843	0.012	19	28843	0.028
08:00 - 09:00	19	28843	0.025	19	28843	0.020	19	28843	0.045
09:00 - 10:00	19	28843	0.032	19	28843	0.025	19	28843	0.057
10:00 - 11:00	19	28843	0.028	19	28843	0.025	19	28843	0.053
11:00 - 12:00	19	28843	0.026	19	28843	0.025	19	28843	0.051
12:00 - 13:00	19	28843	0.028	19	28843	0.026	19	28843	0.054
13:00 - 14:00	19	28843	0.023	19	28843	0.026	19	28843	0.049
14:00 - 15:00	19	28843	0.025	19	28843	0.023	19	28843	0.048
15:00 - 16:00	19	28843	0.022	19	28843	0.026	19	28843	0.048
16:00 - 17:00	19	28843	0.017	19	28843	0.020	19	28843	0.037
17:00 - 18:00	19	28843	0.014	19	28843	0.010	19	28843	0.024
18:00 - 19:00	19	28843	0.010	19	28843	0.012	19	28843	0.022
19:00 - 20:00	6	21374	0.004	6	21374	0.003	6	21374	0.007
20:00 - 21:00	6	21374	0.002	6	21374	0.002	6	21374	0.004
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.286			0.275			0.561

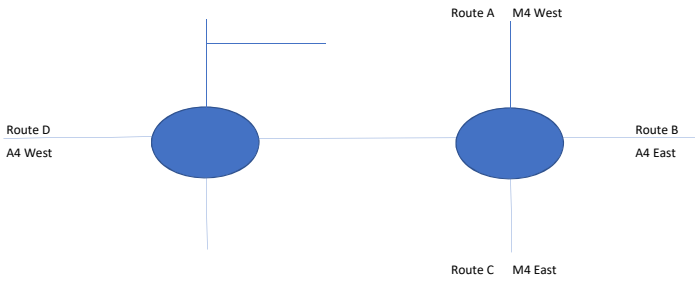
This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Appendix D

Residence	Driving a car or van	Route
Barnet	4	C
Bexley	2	C
Brent	1	C
Camden	1	C
Croydon	3	C
Ealing	18	C
Enfield	6	C
Greenwich	1	C
Hackney	0	C
Hammersmith and Fulham	14	C
Haringey	3	C
Harrow	7	C
Hillongdon	29	C
Hounslow	19	C
Islington	1	C
Kensington and Chelsea	3	C
Kingston upon Thames	8	C
Lambeth	4	C
Lewisham	1	C
Merton	5	C
Newham	1	C

Route	Driving car or van	
A	1130	18%
B	915	15%
C	2357	38%
D	1781	29%
Grand Total	**6183**	



Richmond upon Thames	22	C
Sutton	2	C
Tower Hamlets	0	C
Waltham Forest	1	C
Wandsworth	14	C
Westminster	11	C
Bolton	3	A
Bury	2	A
Tameside	1	A
Trafford	1	A
Wigan	1	A
Knowsley	2	A
St Helens	1	A
Sefton	2	A
Barnsley	1	A
Doncaster	3	A
Rotherham	2	A
Sheffield	9	A
Gateshead	2	A
Newcastle upon Tyne	1	A
Birmingham	3	A
Coventry	4	A
Solihull	3	A
Walsall	2	A
Wolverhampton	2	A
Bradford	2	A
Kirkless	3	A
Leeds	7	A
Wakefield	4	A
Hartlepool	2	A
Middlesborough	0	A
Redcar and Cleveland	2	A
Darlington	3	A
Halton	1	A
Warrington	1	A
Blackpool	1	A
Derby	2	A
Leicester	4	A
Rutland	2	A
Herefordshire	4	A
Telford and Wrekin	1	A
Bath and North East Somerset	7	A
Bristol	5	A
North Somerset	1	A
South Gloucestershire	9	A
Plymouth	2	A
Torbay	2	A
Bournemouth	9	A
Poole	4	A
Swindon	98	A
Luton	3	C
Thurrock	1	C
Medway	4	C
Bracknell Forest	220	C
Slough	68	C
Windsor and Maidenhead	160	C
Wokingham	695	C
Milton Keynes	10	A
Brighton and Hove	3	C
Portsmouth	9	A
Southampton	10	A
Isle of Wight	3	A
Central Bedfordshire	3	C
Aylesbury Vale	32	A
Chiltern	19	C
South Bucks	35	C
Wycombe	73	C
Cambridge	1	C
Cheshire East	2	A
Cheshire West and Chester	1	A
Cornwall	1	A
Amber Valley	1	A
North East Derbyshire	1	A
South Derbyshire	2	A
East Devon	0	A
Exeter	3	A
North Devon	2	A
South Hams	1	A
Teignbridge	3	A
Torridge	0	A
West Devon	1	A
Christchurch	1	A
East Dorset	3	A

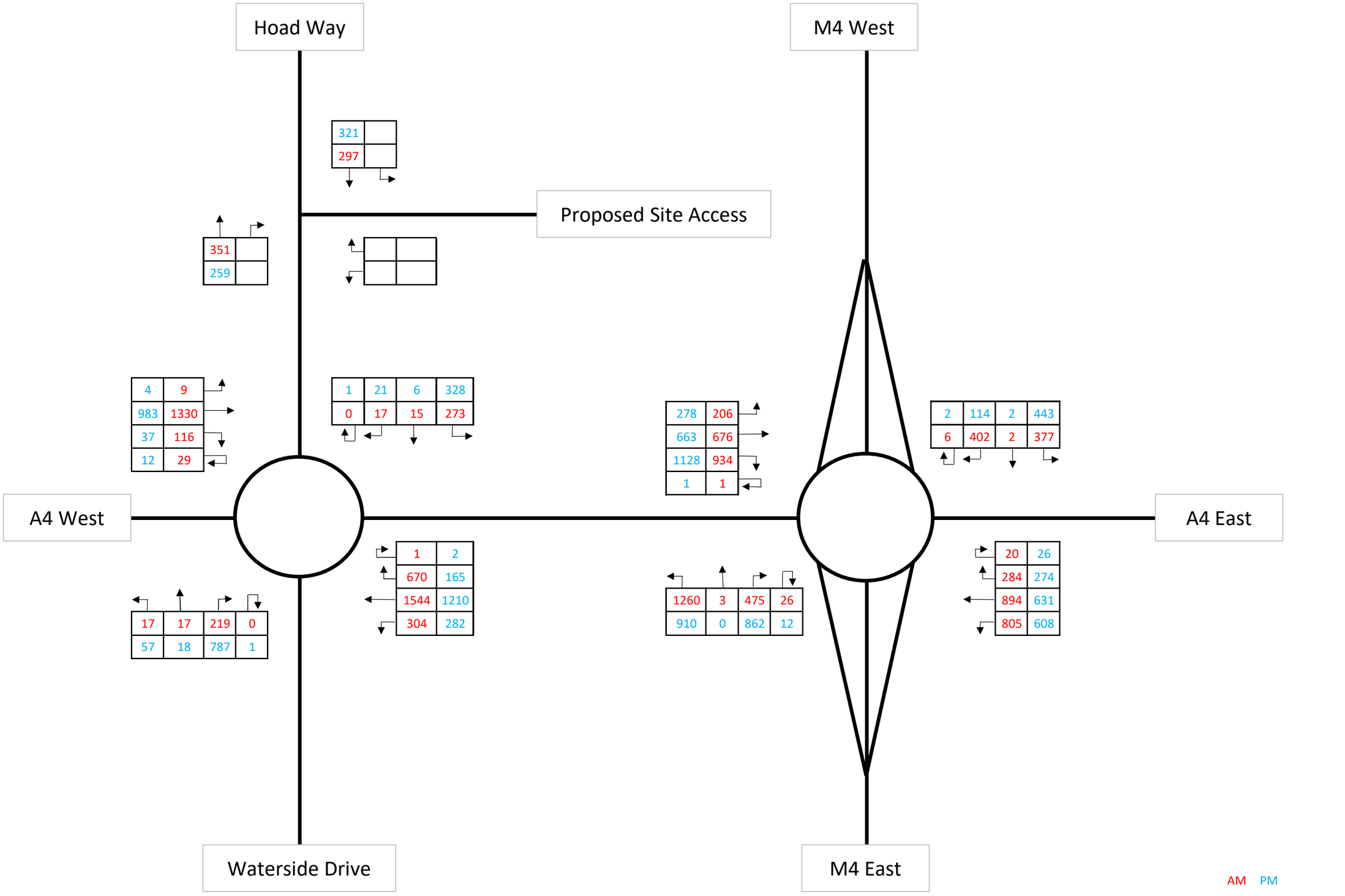
North Dorset	2	A
West Dorset	4	A
Weymouth and Portland	2	A
County Durham	4	A
Eastbourne	1	C
Lewes	2	C
Wealden	5	C
Basildon	1	C
Braintree	1	C
Brentwood	2	C
Harlow	1	C
Maldon	2	C
Rochford	0	C
Tendring	2	C
Uttlesford	1	C
Cheltenahm	8	A
Cotswold	10	A
Forest of Dean	3	A
Gloucester	11	A
Stroud	1	A
Tewkesbury	2	A
Basingstoke and Dean	434	D
East Hampshire	15	C
Eastleigh	19	A
Fareham	5	A
Gosport	2	A
Hart	81	C
Havant	6	C
New Forest	15	C
Rushmoor	43	C
Test Valley	30	A
Winchester	25	A
Dacorum	11	C
East Hertfordshire	4	C
Hertsmere	3	C
North Hertfordshire	6	C
St Albans	3	C
Stevenage	2	C
Three Rivers	5	C
Watford	3	C
Welwyn Hatfield	3	C
Canterbury	1	C
Dover	1	C
Gravesham	1	C
Maidstone	3	C
Sevenoaks	1	C
Shepway	1	C
Swale	2	C
Thanet	1	C
Lancester	1	A
Rossendale	1	A
West Lancashire	1	A
Blaby	1	A
Charnwood	3	A
Harborough	3	A
Hinckley and Bosworth	1	A
Melton	1	A
North West Leicestershire	5	A
Lincoln	3	A
North Kesteven	1	A
West Lindsey	2	C
Breckland	2	C
Broadland	6	C
Great Yarmouth	2	C
Kings Lynn and West Norfolk	1	C
Daventry	2	A
East Northamptonshire	2	A
Northampton	4	A
South Northamptonshire	7	A
Craven	1	A
Hambleton	1	A
Harrogate	3	A
Richmondshire	1	A
Ashfield	1	A
Bassetlaw	1	A
Rushcliffe	3	A
Cherwell	17	A
Oxford	21	A
South Oxfordshire	241	D
Vale of White Horse	83	A
West Oxfordshire	21	A
Shropshire	1	A
Mendip	1	A

Sedgemoor	1	A
South Somerset	2	A
Taunton Dean	2	A
Lichfield	0	A
Babergh	1	C
Ipswich	0	C
St Edmundsbury	3	C
Waveney	1	C
Elmbridge	15	C
Epsom and Ewell	1	C
Guildford	17	c
Mole Valley	5	A
Reigate and Banstead	2	C
Runnymede	22	C
Spelthorne	13	C
Surrey Heath	41	C
Tandridge	6	C
Waverley	22	C
Woking	13	C
Nuneaton and Bedworth	1	A
Stratford-on-Avon	2	A
Warwick	4	A
Adur	1	C
Arun	2	C
Chichester	5	A
Horsham	6	C
Worthing	3	C
Wiltshire	95	A
Bromsgrove	3	A
Malvern Hills	1	A
Worcester	3	A
Wychavon	4	A
Wyre Forest	8	A
Ealing	1	C
Hounslow	3	C
Chiltern	3	C
Wycombe	1	C
Havant	1	C
Sutton	2	C
Waverley	2	C
Sheffield	0	A
North Somerset	2	A
swindon	33	A
Leeds	0	A
Tower Hamlets	0	C
High Peak	1	A
Vale of White Horse	7	A
Bristol	1	A
Greenwich	0	C
Conway	0	A
Ceredigion	1	A
Pembrokeshire	1	A
Swansea	1	A
Neath Port Talbot	3	A
Bridgend	1	A
Rhondda Cynon Taf	1	A
Merthyr Tydfil	2	A
Torfaen	3	A
Monmouthshire	2	A
Newport	3	A
Cardiff	7	A
Ceredigion	1	A
Cardiff	0	A
West Berkshire 001	44	A
West Berkshire 002	26	A
West Berkshire 003	75	A
West Berkshire 004	82	D
West Berkshire 005	111	D
West Berkshire 006	140	B
West Berkshire 007	45	A
West Berkshire 008	149	B
West Berkshire 009	178	D
West Berkshire 011	127	D
West Berkshire 012	36	A
West Berkshire 013	58	D
West Berkshire 014	79	D
West Berkshire 015	100	D
West Berkshire 016	88	D
West Berkshire 017	92	D
West Berkshire 018	27	A
West Berkshire 019	57	D
West Berkshire 020	45	D
West Berkshire 021	45	A

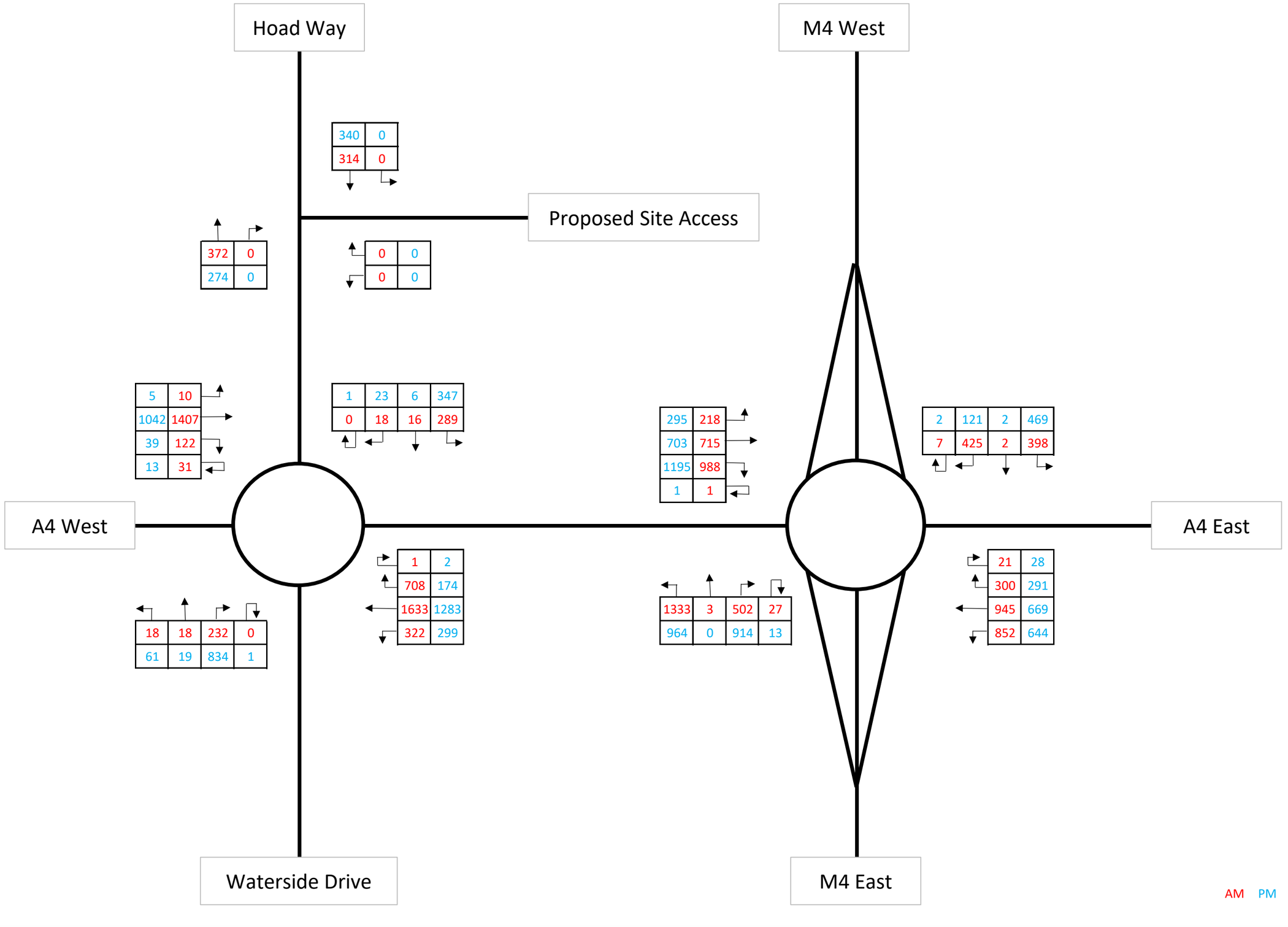
West Berkshire 022	89	D	
Reading 001	44	C	
Reading 002	39	B	
Reading 003	35	B	B/C
Reading 004	37	B	B/C
Reading 005	103	B	
Reading 006	58	C	
Reading 007	72	C	
Reading 008	97	B	
Reading 009	89	B	
Reading 010	47	B	
Reading 011	73	C	
Reading 012	21	C	
Reading 013	78	B	B/C
Reading 014	61	C	
Reading 015	101	B	
Reading 016	23	C	
Reading 017	63	C	
Reading 018	56	C	

Appendix E

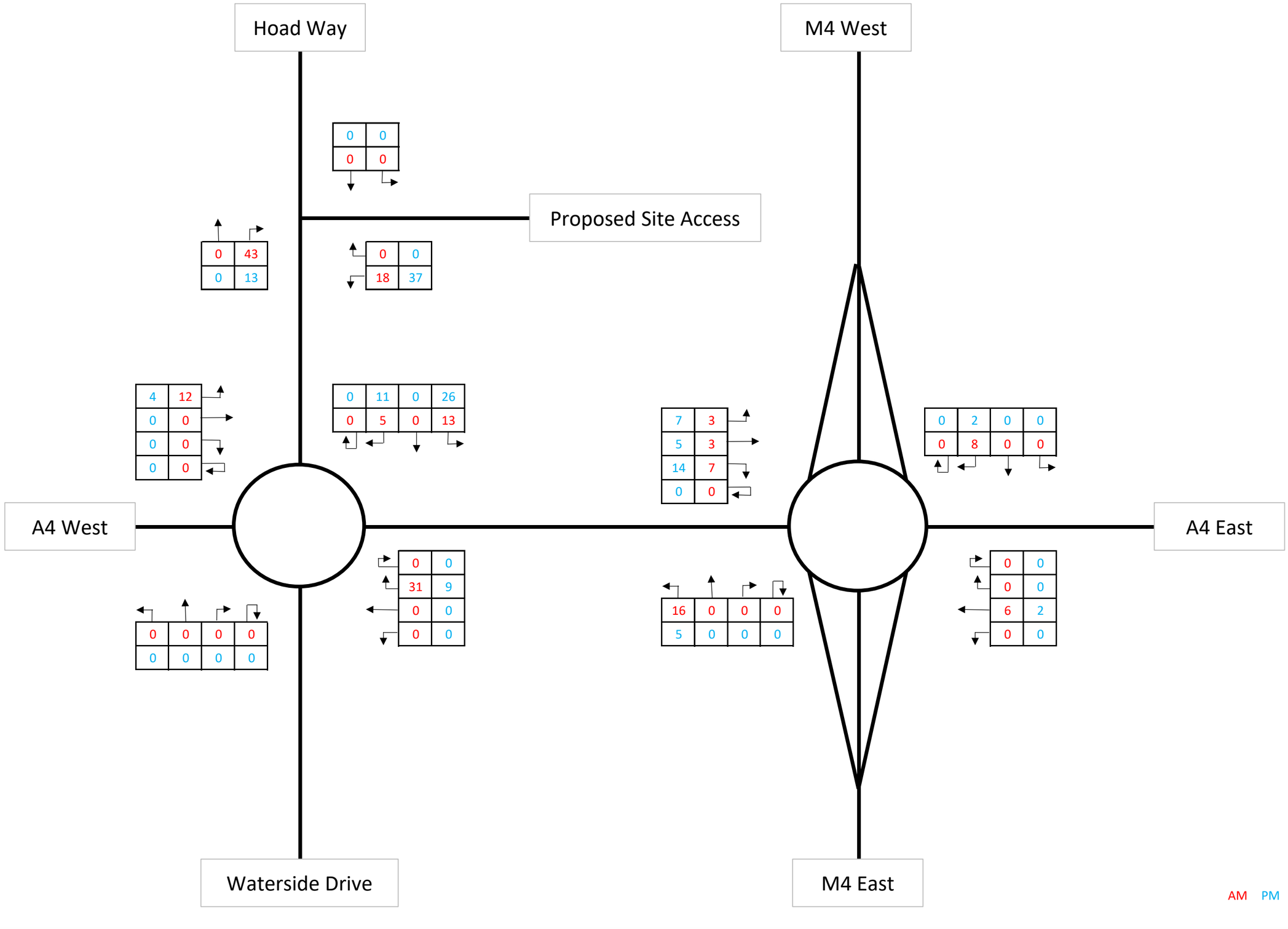
2023 Base Flows (PCUs)



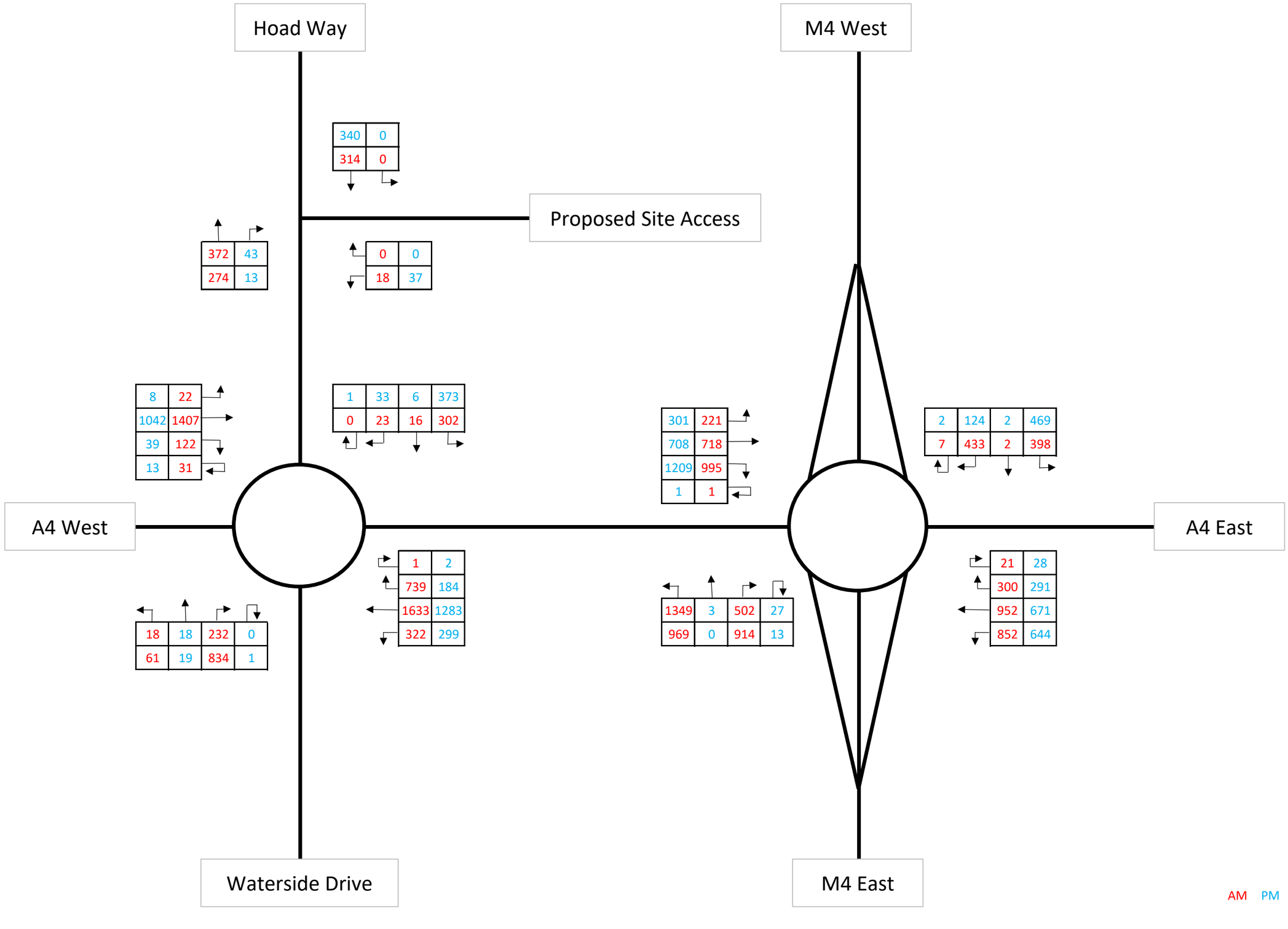
2033 Forecast Flows (PCUs)



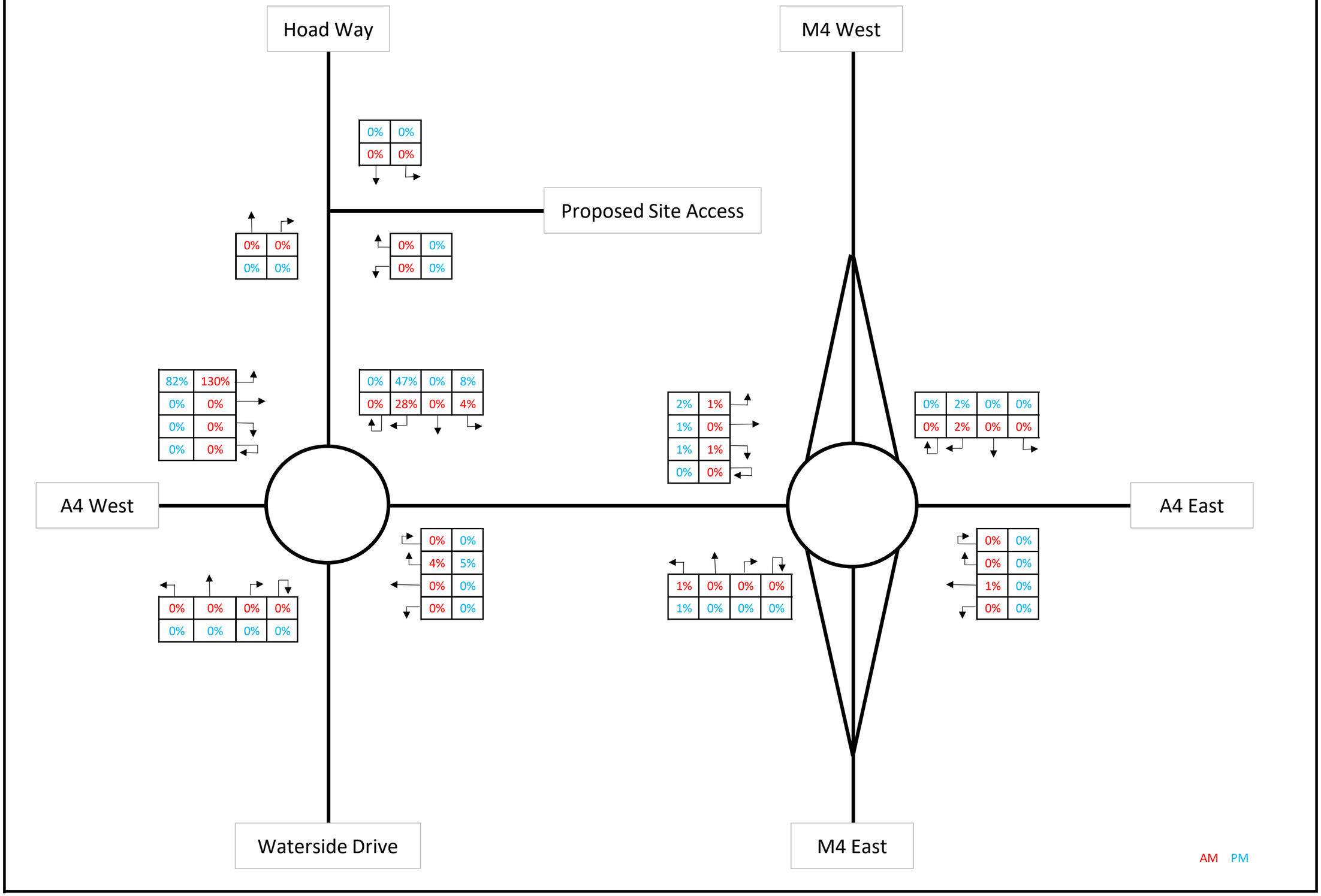
Development Flows



2033 + Development Flows (PCUs)



Percentage Increase



Appendix F

Calculation Reference: AUDIT-623801-230802-0828

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : G - PARCEL DISTRIBUTION CENTRES
TOTAL VEHICLES

Selected regions and areas:

05	EAST MIDLANDS		
	LN	LINCOLNSHIRE	1 days
	NG	NOTTINGHAM	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter:	Gross floor area
Actual Range:	1496 to 3000 (units: sqm)
Range Selected by User:	763 to 24154 (units: sqm)

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/13 to 11/05/21

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	1 days
Friday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	2 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town	2

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Industrial Zone	1
Commercial Zone	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Inclusion of Servicing Vehicles Counts:

Servicing vehicles Included	2 days - Selected
Servicing vehicles Excluded	2 days - Selected

Secondary Filtering selection:

Use Class:

B8	2 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order (England) 2020 has been used for this purpose, which can be found within the Library module of TRICS®.

Filter by Site Operations Breakdown:

All Surveys Included

Population within 500m Range:

All Surveys Included

Population within 1 mile:

10,001 to 15,000	1 days
25,001 to 50,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

125,001 to 250,000	1 days
500,001 or More	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

1.1 to 1.5	2 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	2 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	2 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 LN-02-G-01 PARCELFORCE WORLDWIDE LINCOLNSHIRE
WHISBY WAY
LINCOLN
BIRCHWOOD
Edge of Town
Industrial Zone
Total Gross floor area: 1496 sqm
Survey date: FRIDAY *28/06/19* *Survey Type: MANUAL*

2 NG-02-G-02 CITY LINK NOTTINGHAM
MILLENIUM WAY
NOTTINGHAM
PHOENIX CENTRE
Edge of Town
Commercial Zone
Total Gross floor area: 3000 sqm
Survey date: MONDAY *17/06/13* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

MANUALLY DESELECTED SITES

Site Ref	Reason for Deselection
SO-02-G-02	Too large

TRIP RATE for Land Use 02 - EMPLOYMENT/G - PARCEL DISTRIBUTION CENTRES
TOTAL VEHICLES
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	1496	1.003	1	1496	0.134	1	1496	1.137
06:00 - 07:00	1	1496	1.671	1	1496	0.201	1	1496	1.872
07:00 - 08:00	2	2248	0.334	2	2248	0.712	2	2248	1.046
08:00 - 09:00	2	2248	0.067	2	2248	0.378	2	2248	0.445
09:00 - 10:00	2	2248	0.156	2	2248	0.156	2	2248	0.312
10:00 - 11:00	2	2248	0.156	2	2248	0.067	2	2248	0.223
11:00 - 12:00	2	2248	0.089	2	2248	0.067	2	2248	0.156
12:00 - 13:00	2	2248	0.178	2	2248	0.378	2	2248	0.556
13:00 - 14:00	2	2248	0.423	2	2248	0.178	2	2248	0.601
14:00 - 15:00	2	2248	0.200	2	2248	0.267	2	2248	0.467
15:00 - 16:00	2	2248	0.245	2	2248	0.356	2	2248	0.601
16:00 - 17:00	2	2248	0.356	2	2248	0.445	2	2248	0.801
17:00 - 18:00	2	2248	0.378	2	2248	0.378	2	2248	0.756
18:00 - 19:00	2	2248	0.400	2	2248	0.423	2	2248	0.823
19:00 - 20:00	2	2248	0.089	2	2248	0.222	2	2248	0.311
20:00 - 21:00	2	2248	0.111	2	2248	0.178	2	2248	0.289
21:00 - 22:00	1	3000	0.000	1	3000	0.000	1	3000	0.000
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			5.856			4.540			10.396

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	1496 - 3000 (units: sqm)
Survey date date range:	01/01/13 - 11/05/21
Number of weekdays (Monday-Friday):	2
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	1

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/G - PARCEL DISTRIBUTION CENTRES
OGVS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

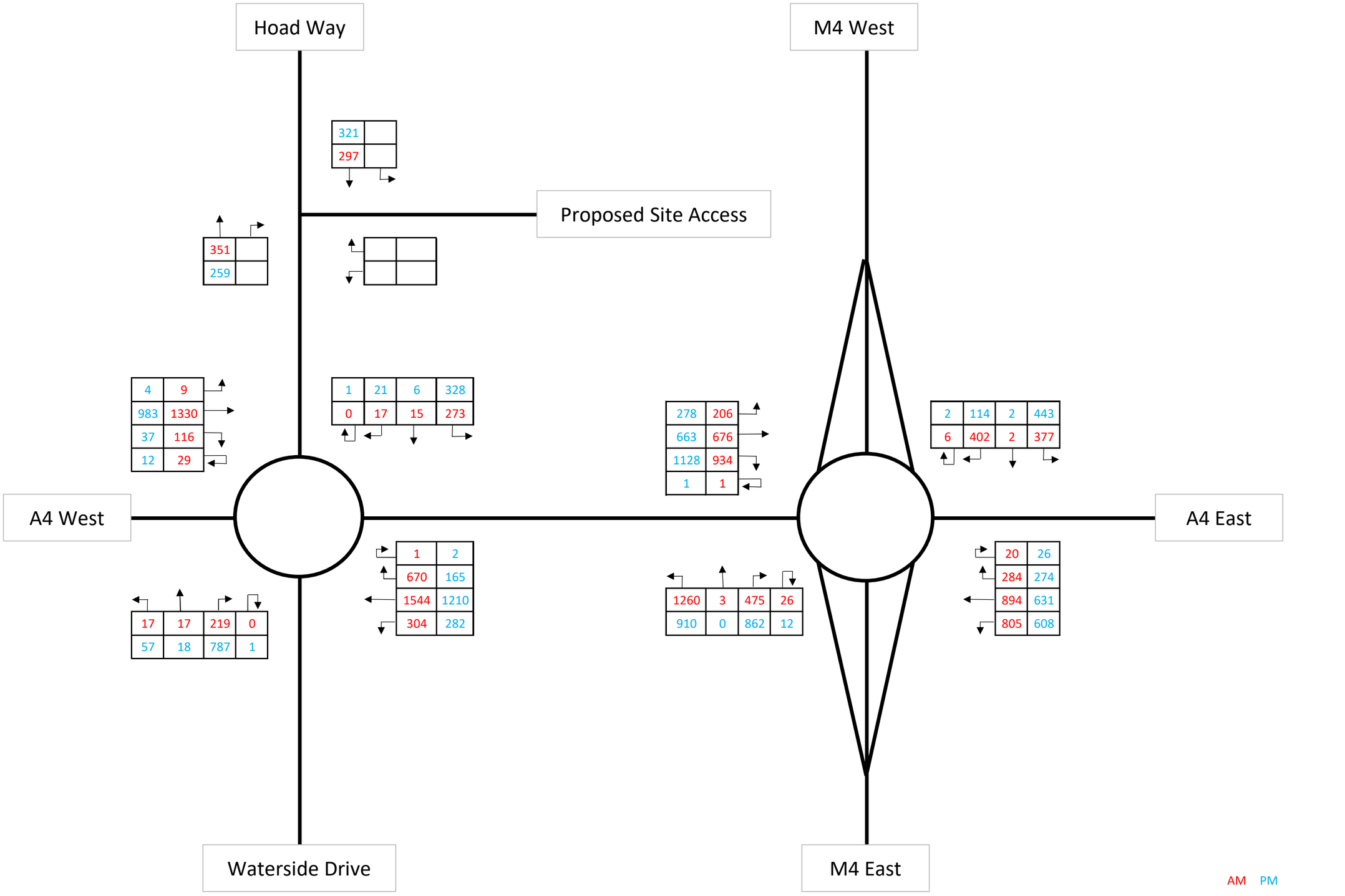
	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	1496	0.668	1	1496	0.134	1	1496	0.802
06:00 - 07:00	1	1496	0.535	1	1496	0.201	1	1496	0.736
07:00 - 08:00	2	2248	0.044	2	2248	0.423	2	2248	0.467
08:00 - 09:00	2	2248	0.022	2	2248	0.111	2	2248	0.133
09:00 - 10:00	2	2248	0.022	2	2248	0.022	2	2248	0.044
10:00 - 11:00	2	2248	0.044	2	2248	0.000	2	2248	0.044
11:00 - 12:00	2	2248	0.000	2	2248	0.022	2	2248	0.022
12:00 - 13:00	2	2248	0.067	2	2248	0.089	2	2248	0.156
13:00 - 14:00	2	2248	0.067	2	2248	0.067	2	2248	0.134
14:00 - 15:00	2	2248	0.067	2	2248	0.044	2	2248	0.111
15:00 - 16:00	2	2248	0.156	2	2248	0.044	2	2248	0.200
16:00 - 17:00	2	2248	0.044	2	2248	0.044	2	2248	0.088
17:00 - 18:00	2	2248	0.044	2	2248	0.000	2	2248	0.044
18:00 - 19:00	2	2248	0.111	2	2248	0.089	2	2248	0.200
19:00 - 20:00	2	2248	0.022	2	2248	0.044	2	2248	0.066
20:00 - 21:00	2	2248	0.044	2	2248	0.044	2	2248	0.088
21:00 - 22:00	1	3000	0.000	1	3000	0.000	1	3000	0.000
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			1.957			1.378			3.335

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

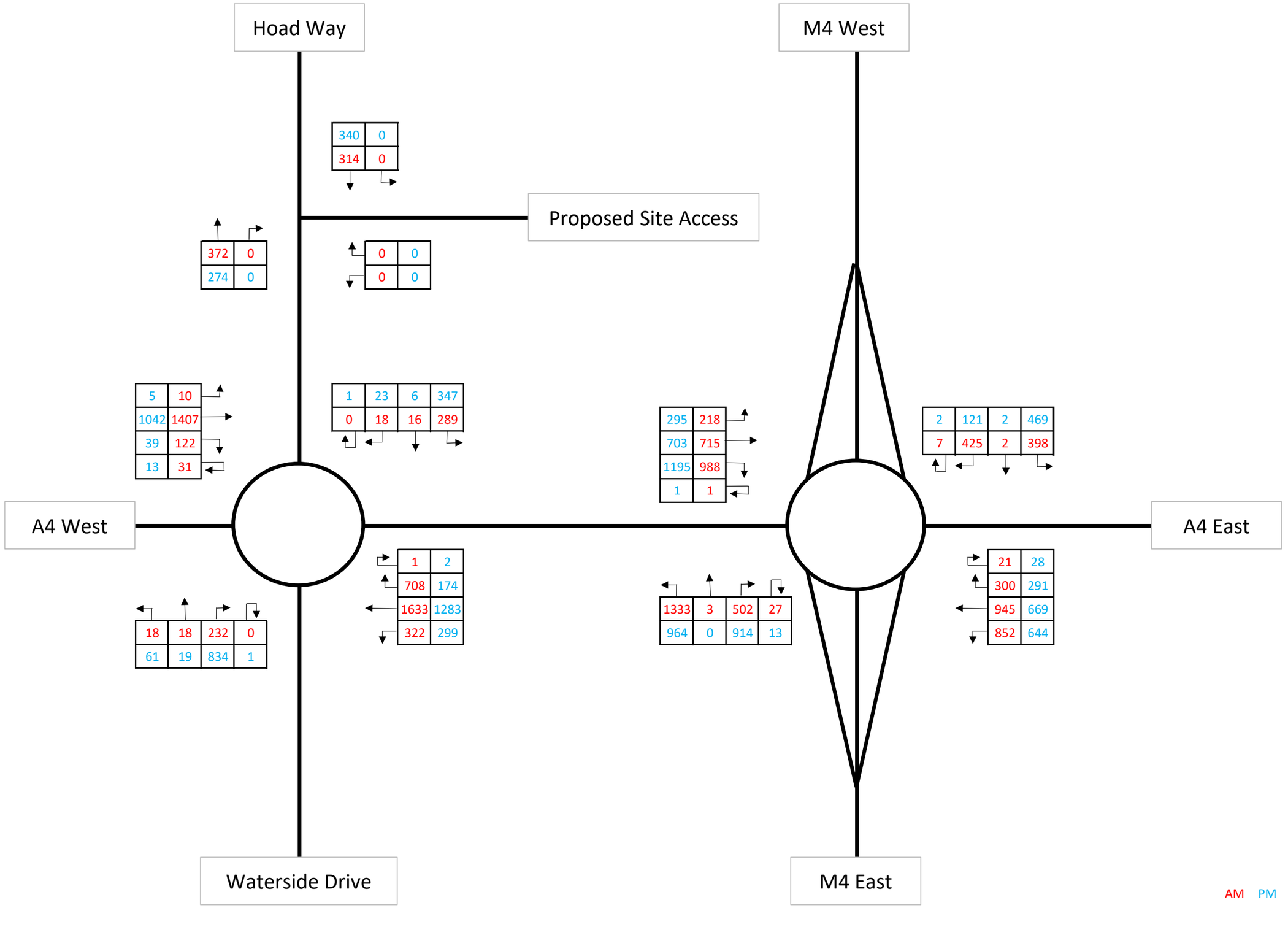
*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Appendix G

2023 Base Flows (PCUs)



2033 Forecast Flows (PCUs)



Development Flows

Hoad Way

M4 West

Proposed Site Access

A4 West

A4 East

Waterside Drive

M4 East

0	0
0	0

0	9
0	42

0	0
50	36

12	3		
0	0		
0	0		
0	0		

0	11	0	26
0	15	0	36

7	9
5	7
14	19
0	0

0	8	0	0
0	2	0	0

0	0	0	0
0	0	0	0

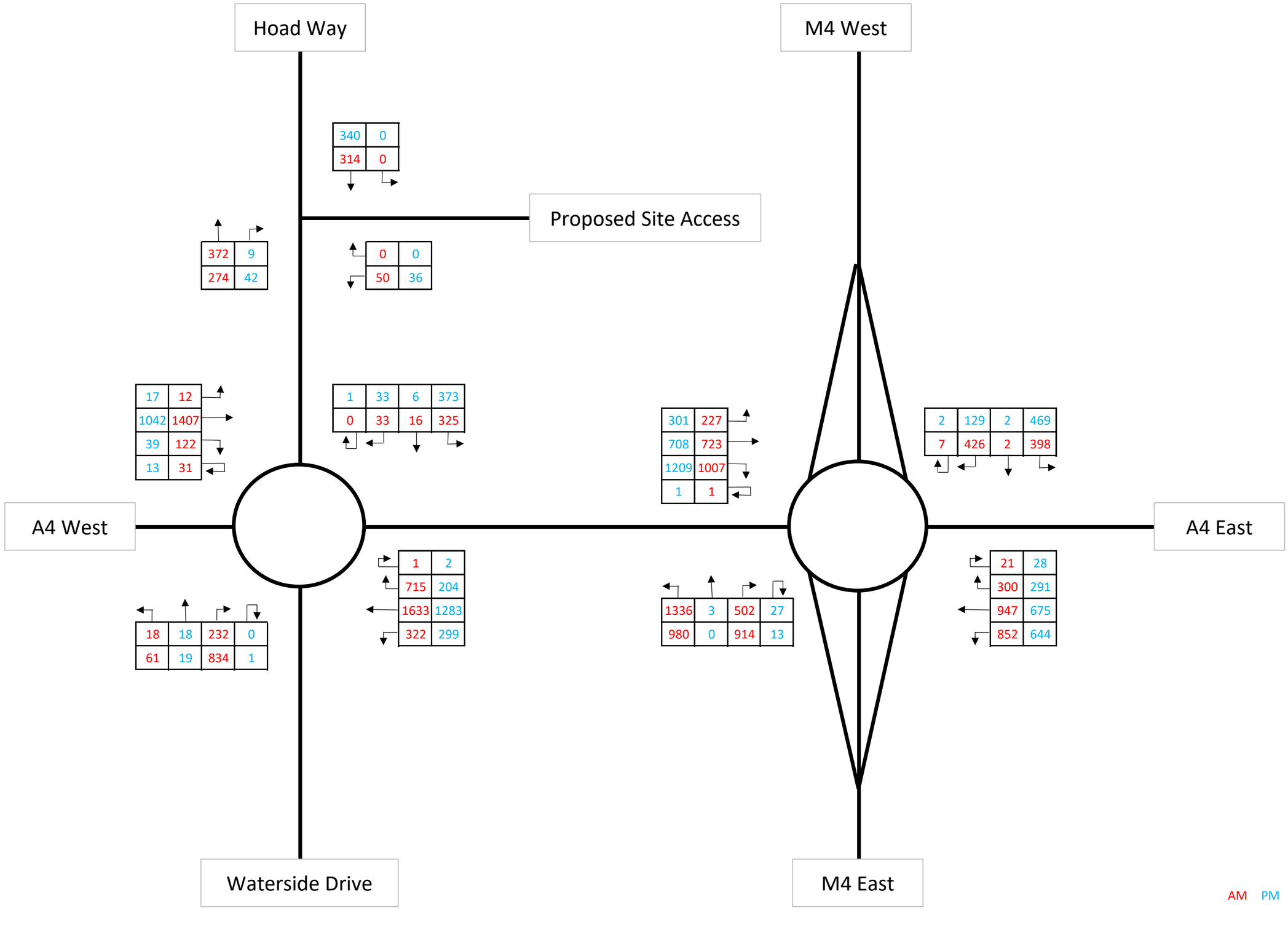
0	0
7	30
0	0
0	0

4	0	0	0
16	0	0	0

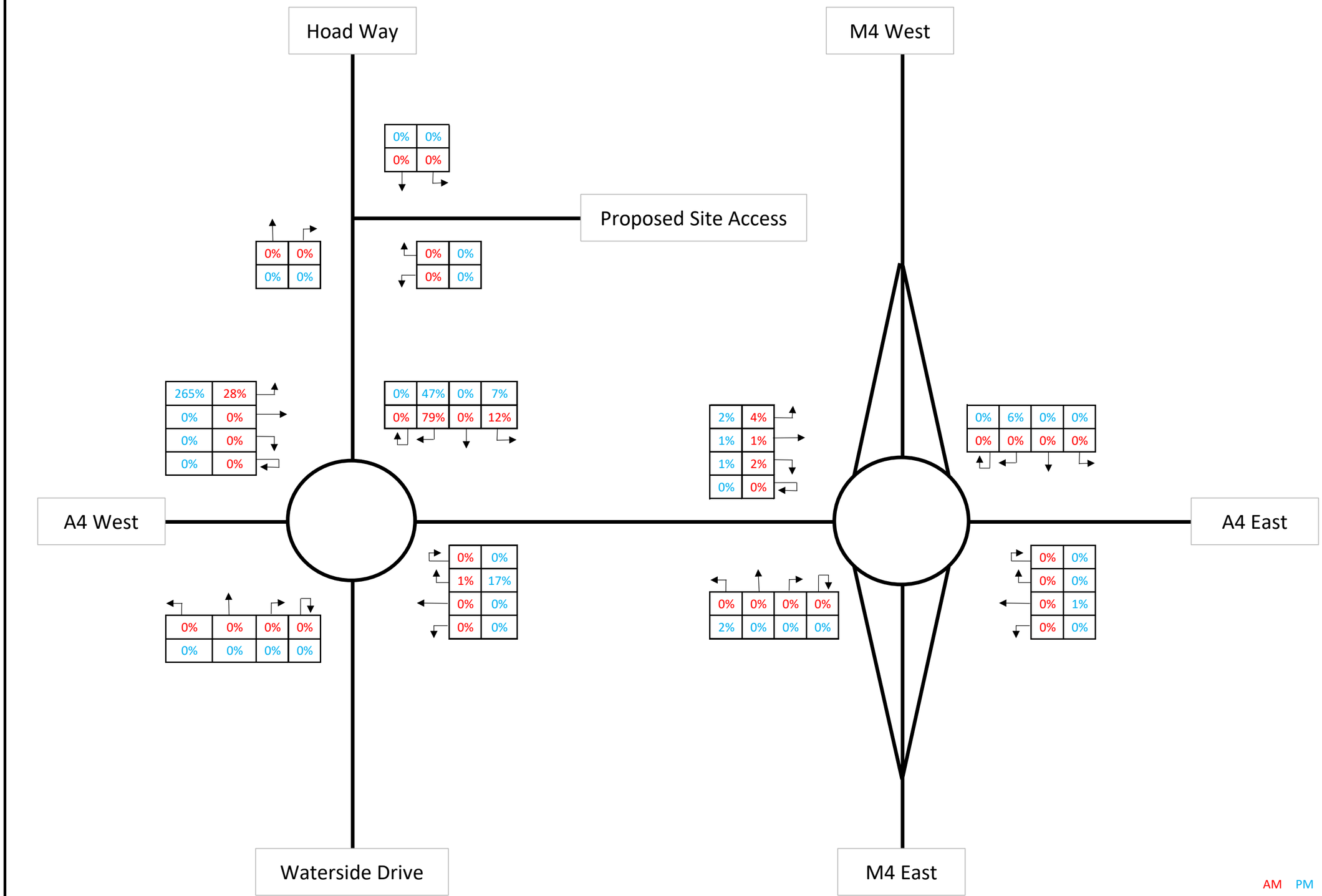
0	0
0	0
1	6
0	0

AM PM

2033 + Development Flows (PCUs)



Percentage Increase



Appendix H

Junctions 10

PICADY 10 - Priority Intersection Module

Filename: Hoad Way - Proposed Site Access Priority Junction RevA.j10
Path: P:\20000's\20168\Junction Assessment\2023 Assessment
Report generation date: 16/08/2023 15:04:14

Summary of junction performance

	AM			PM		
	Q (PCU)	Delay (s)	RFC	Q (PCU)	Delay (s)	RFC
	2023 Baseline Flows					
Stream B-C	0.0	0.00	0.00	0.0	0.00	0.00
Stream B-A	0.0	0.00	0.00	0.0	0.00	0.00
Stream C-AB	0.0	0.00	0.00	0.0	0.00	0.00
	2033 Forecast Flows					
Stream B-C	0.0	0.00	0.00	0.0	0.00	0.00
Stream B-A	0.0	0.00	0.00	0.0	0.00	0.00
Stream C-AB	0.0	0.00	0.00	0.0	0.00	0.00
	2033 Forecast Flows + Development					
Stream B-C	0.0	6.28	0.03	0.1	5.99	0.06
Stream B-A	0.0	0.00	0.00	0.0	0.00	0.00
Stream C-AB	0.3	5.50	0.12	0.0	5.86	0.03

Values shown are the highest values encountered over all time segments. Delay is the maximum value of Av. delay per arriving vehicle.

File summary

File Description

Title	Hoad Way / Site Access Priority Junction
Location	Theale
Site number	
Date	08/10/2019
Version	
Status	
Identifier	
Client	
Jobnumber	
Enumerator	DTA\Arcady
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Av. delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Q Percentiles	Calculate detailed queueing delay	Show lane queues in feet / metres	Show all PICADY stream intercepts	Calculate residual capacity	RFC Threshold	Av. Delay threshold (s)	Q threshold (PCU)	Use iterations with HCM roundabouts	Max number of iterations for roundabouts
5.75						0.85	36.00	20.00		500

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2023 Baseline Flows	AM	ONE HOUR	07:45	09:15	15	✓
D2	2023 Baseline Flows	PM	ONE HOUR	16:45	18:15	15	✓
D3	2033 Forecast Flows	AM	ONE HOUR	07:45	09:15	15	✓
D4	2033 Forecast Flows	PM	ONE HOUR	16:45	18:15	15	✓
D5	2033 Forecast Flows + Development	AM	ONE HOUR	07:45	09:15	15	✓
D6	2033 Forecast Flows + Development	PM	ONE HOUR	16:45	18:15	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

2023 Baseline Flows, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Hoad Way / Proposed Site Access Prioirty Junction	T-Junction	Two-way	Two-way	Two-way		0.00	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	0.00	A

Arms

Arms

Arm	Name	Description	Arm type
A	Hoad Way N		Major
B	Site Access		Minor
C	Hoad Way S		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right-turn storage	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C - Hoad Way S	7.70			25.7	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate flare length	Flare length (PCU)	Visibility to left (m)	Visibility to right (m)
B - Site Access	One lane plus flare	10.00	7.90	5.50	4.70	4.00	✓	2.00	92	40

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	554	0.093	0.236	0.149	0.338
B-C	682	0.097	0.245	-	-
C-B	589	0.211	0.211	-	-

The slopes and intercepts shown above include custom intercept adjustments only.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2023 Baseline Flows	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
A - Hoad Way N		ONE HOUR	✓	297	100.000
B - Site Access		ONE HOUR	✓	0	100.000
C - Hoad Way S		ONE HOUR	✓	351	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A - Hoad Way N	B - Site Access	C - Hoad Way S
From	A - Hoad Way N	0	0	297
	B - Site Access	0	0	0
	C - Hoad Way S	351	0	0

Vehicle Mix

HV %s

		To		
		A - Hoad Way N	B - Site Access	C - Hoad Way S
From	A - Hoad Way N	0	0	1
	B - Site Access	0	0	0
	C - Hoad Way S	2	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Q (PCU)	Max LOS	Av. Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-C	0.00	0.00	0.0	A	0	0
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.00	0.00	0.0	A	0	0
C-A					322	483
A-B					0	0
A-C					273	409

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	628	0.000	0	0.0	0.0	0.000	A
B-A	0	0	462	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	542	0.000	0	0.0	0.0	0.000	A
C-A	264	66			264				
A-B	0	0			0				
A-C	224	56			224				

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	617	0.000	0	0.0	0.0	0.000	A
B-A	0	0	444	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	532	0.000	0	0.0	0.0	0.000	A
C-A	316	79			316				
A-B	0	0			0				
A-C	267	67			267				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	602	0.000	0	0.0	0.0	0.000	A
B-A	0	0	420	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	520	0.000	0	0.0	0.0	0.000	A
C-A	386	97			386				
A-B	0	0			0				
A-C	327	82			327				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	602	0.000	0	0.0	0.0	0.000	A
B-A	0	0	420	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	520	0.000	0	0.0	0.0	0.000	A
C-A	386	97			386				
A-B	0	0			0				
A-C	327	82			327				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	617	0.000	0	0.0	0.0	0.000	A
B-A	0	0	444	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	532	0.000	0	0.0	0.0	0.000	A
C-A	316	79			316				
A-B	0	0			0				
A-C	267	67			267				

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	628	0.000	0	0.0	0.0	0.000	A
B-A	0	0	462	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	542	0.000	0	0.0	0.0	0.000	A
C-A	264	66			264				
A-B	0	0			0				
A-C	224	56			224				

2023 Baseline Flows, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Hoad Way / Proposed Site Access Prioirty Junction	T-Junction	Two-way	Two-way	Two-way		0.00	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	0.00	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	2023 Baseline Flows	PM	ONE HOUR	16:45	18:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
A - Hoad Way N		ONE HOUR	✓	321	100.000
B - Site Access		ONE HOUR	✓	0	100.000
C - Hoad Way S		ONE HOUR	✓	259	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A - Hoad Way N	B - Site Access	C - Hoad Way S
From	A - Hoad Way N	0	0	321
	B - Site Access	0	0	0
	C - Hoad Way S	259	0	0

Vehicle Mix

HV %s

		To		
		A - Hoad Way N	B - Site Access	C - Hoad Way S
From	A - Hoad Way N	0	0	1
	B - Site Access	0	0	0
	C - Hoad Way S	1	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Q (PCU)	Max LOS	Av. Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-C	0.00	0.00	0.0	A	0	0
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.00	0.00	0.0	A	0	0
C-A					238	356
A-B					0	0
A-C					295	442

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	623	0.000	0	0.0	0.0	0.000	A
B-A	0	0	468	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	538	0.000	0	0.0	0.0	0.000	A
C-A	195	49			195				
A-B	0	0			0				
A-C	242	60			242				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	612	0.000	0	0.0	0.0	0.000	A
B-A	0	0	452	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	528	0.000	0	0.0	0.0	0.000	A
C-A	233	58			233				
A-B	0	0			0				
A-C	289	72			289				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	596	0.000	0	0.0	0.0	0.000	A
B-A	0	0	428	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	514	0.000	0	0.0	0.0	0.000	A
C-A	285	71			285				
A-B	0	0			0				
A-C	353	88			353				

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	596	0.000	0	0.0	0.0	0.000	A
B-A	0	0	428	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	514	0.000	0	0.0	0.0	0.000	A
C-A	285	71			285				
A-B	0	0			0				
A-C	353	88			353				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	612	0.000	0	0.0	0.0	0.000	A
B-A	0	0	452	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	528	0.000	0	0.0	0.0	0.000	A
C-A	233	58			233				
A-B	0	0			0				
A-C	289	72			289				

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	623	0.000	0	0.0	0.0	0.000	A
B-A	0	0	468	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	538	0.000	0	0.0	0.0	0.000	A
C-A	195	49			195				
A-B	0	0			0				
A-C	242	60			242				

2033 Forecast Flows, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Hoad Way / Proposed Site Access Prioirty Junction	T-Junction	Two-way	Two-way	Two-way		0.00	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	0.00	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D3	2033 Forecast Flows	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
A - Hoad Way N		ONE HOUR	✓	314	100.000
B - Site Access		ONE HOUR	✓	0	100.000
C - Hoad Way S		ONE HOUR	✓	372	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A - Hoad Way N	B - Site Access	C - Hoad Way S
From	A - Hoad Way N	0	0	314
	B - Site Access	0	0	0
	C - Hoad Way S	372	0	0

Vehicle Mix

HV %s

		To		
		A - Hoad Way N	B - Site Access	C - Hoad Way S
From	A - Hoad Way N	0	0	1
	B - Site Access	0	0	0
	C - Hoad Way S	2	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Q (PCU)	Max LOS	Av. Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-C	0.00	0.00	0.0	A	0	0
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.00	0.00	0.0	A	0	0
C-A					341	512
A-B					0	0
A-C					288	432

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	625	0.000	0	0.0	0.0	0.000	A
B-A	0	0	457	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	539	0.000	0	0.0	0.0	0.000	A
C-A	280	70			280				
A-B	0	0			0				
A-C	236	59			236				

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	613	0.000	0	0.0	0.0	0.000	A
B-A	0	0	438	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	529	0.000	0	0.0	0.0	0.000	A
C-A	334	84			334				
A-B	0	0			0				
A-C	282	71			282				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	598	0.000	0	0.0	0.0	0.000	A
B-A	0	0	412	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	516	0.000	0	0.0	0.0	0.000	A
C-A	410	102			410				
A-B	0	0			0				
A-C	346	86			346				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	598	0.000	0	0.0	0.0	0.000	A
B-A	0	0	412	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	516	0.000	0	0.0	0.0	0.000	A
C-A	410	102			410				
A-B	0	0			0				
A-C	346	86			346				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	613	0.000	0	0.0	0.0	0.000	A
B-A	0	0	438	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	529	0.000	0	0.0	0.0	0.000	A
C-A	334	84			334				
A-B	0	0			0				
A-C	282	71			282				

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	625	0.000	0	0.0	0.0	0.000	A
B-A	0	0	457	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	539	0.000	0	0.0	0.0	0.000	A
C-A	280	70			280				
A-B	0	0			0				
A-C	236	59			236				

2033 Forecast Flows, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Hoad Way / Proposed Site Access Prioirty Junction	T-Junction	Two-way	Two-way	Two-way		0.00	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	0.00	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D4	2033 Forecast Flows	PM	ONE HOUR	16:45	18:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
A - Hoad Way N		ONE HOUR	✓	340	100.000
B - Site Access		ONE HOUR	✓	0	100.000
C - Hoad Way S		ONE HOUR	✓	274	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A - Hoad Way N	B - Site Access	C - Hoad Way S
From	A - Hoad Way N	0	0	340
	B - Site Access	0	0	0
	C - Hoad Way S	274	0	0

Vehicle Mix

HV %s

		To		
		A - Hoad Way N	B - Site Access	C - Hoad Way S
From	A - Hoad Way N	0	0	1
	B - Site Access	0	0	0
	C - Hoad Way S	1	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Q (PCU)	Max LOS	Av. Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-C	0.00	0.00	0.0	A	0	0
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.00	0.00	0.0	A	0	0
C-A					251	377
A-B					0	0
A-C					312	468

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	620	0.000	0	0.0	0.0	0.000	A
B-A	0	0	463	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	535	0.000	0	0.0	0.0	0.000	A
C-A	206	52			206				
A-B	0	0			0				
A-C	256	64			256				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	608	0.000	0	0.0	0.0	0.000	A
B-A	0	0	445	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	524	0.000	0	0.0	0.0	0.000	A
C-A	246	62			246				
A-B	0	0			0				
A-C	306	76			306				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	591	0.000	0	0.0	0.0	0.000	A
B-A	0	0	421	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	510	0.000	0	0.0	0.0	0.000	A
C-A	302	75			302				
A-B	0	0			0				
A-C	374	94			374				

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	591	0.000	0	0.0	0.0	0.000	A
B-A	0	0	421	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	510	0.000	0	0.0	0.0	0.000	A
C-A	302	75			302				
A-B	0	0			0				
A-C	374	94			374				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	608	0.000	0	0.0	0.0	0.000	A
B-A	0	0	445	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	524	0.000	0	0.0	0.0	0.000	A
C-A	246	62			246				
A-B	0	0			0				
A-C	306	76			306				

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	0	0	620	0.000	0	0.0	0.0	0.000	A
B-A	0	0	463	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	535	0.000	0	0.0	0.0	0.000	A
C-A	206	52			206				
A-B	0	0			0				
A-C	256	64			256				

2033 Forecast Flows + Development, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Hoad Way / Proposed Site Access Prioirty Junction	T-Junction	Two-way	Two-way	Two-way		0.73	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	0.73	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D5	2033 Forecast Flows + Development	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
A - Hoad Way N		ONE HOUR	✓	314	100.000
B - Site Access		ONE HOUR	✓	18	100.000
C - Hoad Way S		ONE HOUR	✓	415	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A - Hoad Way N	B - Site Access	C - Hoad Way S
From	A - Hoad Way N	0	0	314
	B - Site Access	0	0	18
	C - Hoad Way S	372	43	0

Vehicle Mix

HV %s

		To		
		A - Hoad Way N	B - Site Access	C - Hoad Way S
From	A - Hoad Way N	0	0	1
	B - Site Access	0	0	13
	C - Hoad Way S	2	6	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Q (PCU)	Max LOS	Av. Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-C	0.03	6.28	0.0	A	17	25
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.12	5.50	0.3	A	73	109
C-A					308	462
A-B					0	0
A-C					288	432

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	14	3	698	0.019	13	0.0	0.0	5.946	A
B-A	0	0	386	0.000	0	0.0	0.0	0.000	A
C-AB	52	13	735	0.071	52	0.0	0.1	5.501	A
C-A	260	65			260				
A-B	0	0			0				
A-C	236	59			236				

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	16	4	685	0.024	16	0.0	0.0	6.081	A
B-A	0	0	368	0.000	0	0.0	0.0	0.000	A
C-AB	69	17	765	0.090	69	0.1	0.2	5.392	A
C-A	304	76			304				
A-B	0	0			0				
A-C	282	71			282				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	20	5	668	0.030	20	0.0	0.0	6.278	A
B-A	0	0	342	0.000	0	0.0	0.0	0.000	A
C-AB	96	24	808	0.119	96	0.2	0.3	5.266	A
C-A	360	90			360				
A-B	0	0			0				
A-C	346	86			346				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	20	5	668	0.030	20	0.0	0.0	6.278	A
B-A	0	0	342	0.000	0	0.0	0.0	0.000	A
C-AB	97	24	808	0.119	97	0.3	0.3	5.263	A
C-A	360	90			360				
A-B	0	0			0				
A-C	346	86			346				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	16	4	685	0.024	16	0.0	0.0	6.082	A
B-A	0	0	367	0.000	0	0.0	0.0	0.000	A
C-AB	69	17	766	0.090	69	0.3	0.2	5.385	A
C-A	304	76			304				
A-B	0	0			0				
A-C	282	71			282				

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	14	3	698	0.019	14	0.0	0.0	5.947	A
B-A	0	0	386	0.000	0	0.0	0.0	0.000	A
C-AB	53	13	735	0.071	53	0.2	0.1	5.505	A
C-A	260	65			260				
A-B	0	0			0				
A-C	236	59			236				

2033 Forecast Flows + Development, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Hoad Way / Proposed Site Access Prioirty Junction	T-Junction	Two-way	Two-way	Two-way		0.52	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	0.52	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D6	2033 Forecast Flows + Development	PM	ONE HOUR	16:45	18:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
A - Hoad Way N		ONE HOUR	✓	340	100.000
B - Site Access		ONE HOUR	✓	37	100.000
C - Hoad Way S		ONE HOUR	✓	287	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A - Hoad Way N	B - Site Access	C - Hoad Way S
From	A - Hoad Way N	0	0	340
	B - Site Access	0	0	37
	C - Hoad Way S	274	13	0

Vehicle Mix

HV %s

		To		
		A - Hoad Way N	B - Site Access	C - Hoad Way S
From	A - Hoad Way N	0	0	1
	B - Site Access	0	0	3
	C - Hoad Way S	1	12	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Q (PCU)	Max LOS	Av. Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-C	0.06	5.99	0.1	A	34	51
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.03	5.86	0.0	A	19	28
C-A					244	367
A-B					0	0
A-C					312	468

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	28	7	692	0.040	28	0.0	0.0	5.578	A
B-A	0	0	398	0.000	0	0.0	0.0	0.000	A
C-AB	14	4	680	0.021	14	0.0	0.0	5.862	A
C-A	202	51			202				
A-B	0	0			0				
A-C	256	64			256				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	33	8	679	0.049	33	0.0	0.1	5.745	A
B-A	0	0	382	0.000	0	0.0	0.0	0.000	A
C-AB	18	5	699	0.026	18	0.0	0.0	5.715	A
C-A	240	60			240				
A-B	0	0			0				
A-C	306	76			306				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	41	10	660	0.062	41	0.1	0.1	5.988	A
B-A	0	0	360	0.000	0	0.0	0.0	0.000	A
C-AB	25	6	726	0.034	24	0.0	0.0	5.513	A
C-A	291	73			291				
A-B	0	0			0				
A-C	374	94			374				

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	41	10	660	0.062	41	0.1	0.1	5.988	A
B-A	0	0	360	0.000	0	0.0	0.0	0.000	A
C-AB	25	6	726	0.034	25	0.0	0.0	5.500	A
C-A	291	73			291				
A-B	0	0			0				
A-C	374	94			374				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	33	8	679	0.049	33	0.1	0.1	5.746	A
B-A	0	0	382	0.000	0	0.0	0.0	0.000	A
C-AB	18	5	699	0.026	18	0.0	0.0	5.683	A
C-A	240	60			240				
A-B	0	0			0				
A-C	306	76			306				

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	28	7	692	0.040	28	0.1	0.0	5.583	A
B-A	0	0	398	0.000	0	0.0	0.0	0.000	A
C-AB	14	4	680	0.021	14	0.0	0.0	5.844	A
C-A	202	50			202				
A-B	0	0			0				
A-C	256	64			256				

Appendix I

Junctions 10

ARCADY 10 - Roundabout Module

Filename: A4 - Hoad Way - Waterside Drive Roundabout RevA.j10
Path: P:\20000's\20168\Junction Assessment\2023 Assessment
Report generation date: 16/08/2023 15:06:36

Summary of junction performance

	AM			PM		
	Q (PCU)	Delay (s)	RFC	Q (PCU)	Delay (s)	RFC
	2023 Baseline Flows					
1 - A4 East	3.7	4.91	0.78	1.0	2.02	0.50
2 - Waterside Drive	0.2	3.12	0.18	0.9	3.56	0.48
3 - A4 West	1.6	3.50	0.59	1.1	3.54	0.52
4 - Hoad Way	0.8	8.94	0.45	1.5	14.09	0.60
	2033 Forecast Flows					
1 - A4 East	5.0	6.28	0.83	1.2	2.15	0.53
2 - Waterside Drive	0.3	3.50	0.21	1.2	4.23	0.54
3 - A4 West	1.9	3.95	0.63	1.4	4.07	0.57
4 - Hoad Way	1.1	11.50	0.53	2.6	23.05	0.72
	2033 Forecast Flows + Development					
1 - A4 East	5.4	6.70	0.84	1.2	2.18	0.53
2 - Waterside Drive	0.3	3.62	0.21	1.2	4.34	0.55
3 - A4 West	2.0	4.13	0.64	1.4	4.12	0.57
4 - Hoad Way	1.3	12.38	0.56	3.6	30.14	0.79

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of Av. delay per arriving vehicle.

File summary

File Description

Title	A4 - Hoad Way - Waterside Drive Roundabout
Location	Theale
Site number	
Date	07/10/2019
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	DTA\Arcady
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Av. delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Q Percentiles	Calculate detailed queueing delay	Show lane queues in feet / metres	Show all PICADY stream intercepts	Calculate residual capacity	RFC Threshold	Av. Delay threshold (s)	Q threshold (PCU)	Use iterations with HCM roundabouts	Max number of iterations for roundabouts
5.75						0.85	36.00	20.00		500

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2023 Baseline Flows	AM	ONE HOUR	07:45	09:15	15	✓
D2	2023 Baseline Flows	PM	ONE HOUR	16:45	18:15	15	✓
D3	2033 Forecast Flows	AM	ONE HOUR	07:45	09:15	15	✓
D4	2033 Forecast Flows	PM	ONE HOUR	16:45	18:15	15	✓
D5	2033 Forecast Flows + Development	AM	ONE HOUR	07:45	09:15	15	✓
D6	2033 Forecast Flows + Development	PM	ONE HOUR	16:45	18:15	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

2023 Baseline Flows, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	2 - Waterside Drive - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Hoad Way - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4	4.62	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	4.62	A

Arms

Arms

Arm	Name	Description	No give-way line
1	A4 East		
2	Waterside Drive		
3	A4 West		
4	Hoad Way		

Roundabout Geometry

Arm	V (m)	E (m)	l' (m)	R (m)	D (m)	PHI (deg)	Entry only	Exit only
1 - A4 East	12.00	16.00	27.0	30.0	28.0	80.0		
2 - Waterside Drive	12.00	15.00	39.0	32.0	28.0	80.0		
3 - A4 West	12.00	16.00	7.0	17.0	28.0	80.0		
4 - Hoad Way	4.00	9.00	57.0	23.0	28.0	80.0		

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - A4 East	1.033	3757
2 - Waterside Drive	1.019	3688
3 - A4 West	0.936	3324
4 - Hoad Way	0.668	1995

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2023 Baseline Flows	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1 - A4 East		ONE HOUR	✓	2519	100.000
2 - Waterside Drive		ONE HOUR	✓	253	100.000
3 - A4 West		ONE HOUR	✓	1484	100.000
4 - Hoad Way		ONE HOUR	✓	305	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - A4 East	2 - Waterside Drive	3 - A4 West	4 - Hoad Way
From	1 - A4 East	1	670	1544	304
	2 - Waterside Drive	219	0	17	17
	3 - A4 West	1330	116	29	9
	4 - Hoad Way	273	15	17	0

Vehicle Mix

HV %s

		To			
		1 - A4 East	2 - Waterside Drive	3 - A4 West	4 - Hoad Way
From	1 - A4 East	0	2	10	3
	2 - Waterside Drive	10	0	14	23
	3 - A4 West	11	2	17	0
	4 - Hoad Way	1	27	6	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Q (PCU)	Max LOS	Av. Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - A4 East	0.78	4.91	3.7	A	2311	3467
2 - Waterside Drive	0.18	3.12	0.2	A	232	348
3 - A4 West	0.59	3.50	1.6	A	1362	2043
4 - Hoad Way	0.45	8.94	0.8	A	280	420

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1896	474	133	3620	0.524	1892	1369	0.0	1.2	2.221	A
2 - Waterside Drive	190	48	1423	2237	0.085	190	602	0.0	0.1	1.952	A
3 - A4 West	1117	279	406	2944	0.380	1115	1207	0.0	0.7	2.168	A
4 - Hoad Way	230	57	1273	1144	0.201	229	248	0.0	0.3	4.019	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	2265	566	159	3593	0.630	2262	1637	1.2	1.8	2.886	A
2 - Waterside Drive	227	57	1702	1953	0.116	227	719	0.1	0.1	2.316	A
3 - A4 West	1334	334	486	2869	0.465	1333	1443	0.7	1.0	2.583	A
4 - Hoad Way	274	69	1523	977	0.281	274	296	0.3	0.4	5.229	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	2773	693	194	3556	0.780	2766	2003	1.8	3.7	4.821	A
2 - Waterside Drive	279	70	2081	1567	0.178	278	880	0.1	0.2	3.102	A
3 - A4 West	1634	408	594	2768	0.590	1631	1765	1.0	1.6	3.487	A
4 - Hoad Way	336	84	1863	749	0.448	334	362	0.4	0.8	8.831	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	2773	693	195	3556	0.780	2773	2007	3.7	3.7	4.912	A
2 - Waterside Drive	279	70	2086	1561	0.178	279	882	0.2	0.2	3.116	A
3 - A4 West	1634	408	596	2766	0.591	1634	1769	1.6	1.6	3.504	A
4 - Hoad Way	336	84	1866	748	0.449	336	363	0.8	0.8	8.941	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	2265	566	160	3593	0.630	2272	1643	3.7	1.8	2.930	A
2 - Waterside Drive	227	57	1709	1946	0.117	228	722	0.2	0.1	2.327	A
3 - A4 West	1334	334	488	2868	0.465	1337	1449	1.6	1.0	2.596	A
4 - Hoad Way	274	69	1527	975	0.281	276	298	0.8	0.4	5.285	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1896	474	133	3620	0.524	1899	1374	1.8	1.2	2.239	A
2 - Waterside Drive	190	48	1429	2232	0.085	191	604	0.1	0.1	1.960	A
3 - A4 West	1117	279	408	2942	0.380	1118	1212	1.0	0.7	2.179	A
4 - Hoad Way	230	57	1277	1141	0.201	230	249	0.4	0.3	4.045	A

2023 Baseline Flows, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	2 - Waterside Drive - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Hoad Way - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4	3.86	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	3.86	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	2023 Baseline Flows	PM	ONE HOUR	16:45	18:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1 - A4 East		ONE HOUR	✓	1659	100.000
2 - Waterside Drive		ONE HOUR	✓	863	100.000
3 - A4 West		ONE HOUR	✓	1036	100.000
4 - Hoad Way		ONE HOUR	✓	356	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - A4 East	2 - Waterside Drive	3 - A4 West	4 - Hoad Way
From	1 - A4 East	2	165	1210	282
	2 - Waterside Drive	787	1	57	18
	3 - A4 West	983	37	12	4
	4 - Hoad Way	328	6	21	1

Vehicle Mix

HV %s

		To			
		1 - A4 East	2 - Waterside Drive	3 - A4 West	4 - Hoad Way
From	1 - A4 East	0	3	4	1
	2 - Waterside Drive	1	0	2	13
	3 - A4 West	4	6	9	33
	4 - Hoad Way	2	67	5	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Q (PCU)	Max LOS	Av. Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - A4 East	0.50	2.02	1.0	A	1522	2283
2 - Waterside Drive	0.48	3.56	0.9	A	792	1188
3 - A4 West	0.52	3.54	1.1	A	951	1426
4 - Hoad Way	0.60	14.09	1.5	B	327	490

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1249	312	59	3697	0.338	1247	1577	0.0	0.5	1.517	A
2 - Waterside Drive	650	162	1148	2517	0.258	648	157	0.0	0.4	1.950	A
3 - A4 West	780	195	820	2557	0.305	778	977	0.0	0.5	2.107	A
4 - Hoad Way	268	67	1369	1080	0.248	267	229	0.0	0.3	4.544	A

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1491	373	70	3685	0.405	1491	1886	0.5	0.7	1.695	A
2 - Waterside Drive	776	194	1373	2288	0.339	775	188	0.4	0.5	2.408	A
3 - A4 West	931	233	980	2406	0.387	931	1168	0.5	0.7	2.540	A
4 - Hoad Way	320	80	1637	901	0.355	319	274	0.3	0.6	6.353	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1827	457	86	3669	0.498	1825	2306	0.7	1.0	2.017	A
2 - Waterside Drive	950	238	1681	1974	0.481	949	230	0.5	0.9	3.548	A
3 - A4 West	1141	285	1199	2201	0.518	1139	1430	0.7	1.1	3.526	A
4 - Hoad Way	392	98	2003	656	0.597	388	336	0.6	1.5	13.632	B

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1827	457	86	3669	0.498	1827	2312	1.0	1.0	2.019	A
2 - Waterside Drive	950	238	1682	1973	0.482	950	230	0.9	0.9	3.564	A
3 - A4 West	1141	285	1201	2199	0.519	1141	1431	1.1	1.1	3.542	A
4 - Hoad Way	392	98	2006	654	0.599	392	336	1.5	1.5	14.094	B

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1491	373	71	3685	0.405	1493	1895	1.0	0.7	1.697	A
2 - Waterside Drive	776	194	1375	2286	0.339	777	188	0.9	0.5	2.418	A
3 - A4 West	931	233	983	2404	0.387	933	1170	1.1	0.7	2.553	A
4 - Hoad Way	320	80	1641	898	0.356	324	274	1.5	0.6	6.488	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1249	312	59	3697	0.338	1250	1583	0.7	0.5	1.523	A
2 - Waterside Drive	650	162	1151	2515	0.258	650	157	0.5	0.4	1.956	A
3 - A4 West	780	195	822	2554	0.305	781	979	0.7	0.5	2.117	A
4 - Hoad Way	268	67	1373	1077	0.249	269	230	0.6	0.3	4.587	A

2033 Forecast Flows, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	2 - Waterside Drive - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Hoad Way - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4	5.71	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	5.71	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D3	2033 Forecast Flows	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1 - A4 East		ONE HOUR	✓	2664	100.000
2 - Waterside Drive		ONE HOUR	✓	268	100.000
3 - A4 West		ONE HOUR	✓	1570	100.000
4 - Hoad Way		ONE HOUR	✓	323	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - A4 East	2 - Waterside Drive	3 - A4 West	4 - Hoad Way
From	1 - A4 East	1	708	1633	322
	2 - Waterside Drive	232	0	18	18
	3 - A4 West	1407	122	31	10
	4 - Hoad Way	289	16	18	0

Vehicle Mix

HV %s

		To			
		1 - A4 East	2 - Waterside Drive	3 - A4 West	4 - Hoad Way
From	1 - A4 East	0	2	10	3
	2 - Waterside Drive	10	0	14	23
	3 - A4 West	11	2	17	0
	4 - Hoad Way	1	27	6	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Q (PCU)	Max LOS	Av. Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - A4 East	0.83	6.28	5.0	A	2445	3667
2 - Waterside Drive	0.21	3.50	0.3	A	246	369
3 - A4 West	0.63	3.95	1.9	A	1441	2161
4 - Hoad Way	0.53	11.50	1.1	B	296	445

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	2006	501	140	3612	0.555	2000	1448	0.0	1.3	2.379	A
2 - Waterside Drive	202	50	1505	2153	0.094	201	635	0.0	0.1	2.048	A
3 - A4 West	1182	295	430	2921	0.405	1179	1276	0.0	0.7	2.275	A
4 - Hoad Way	243	61	1346	1095	0.222	242	263	0.0	0.3	4.313	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	2395	599	168	3584	0.668	2392	1732	1.3	2.1	3.220	A
2 - Waterside Drive	241	60	1800	1853	0.130	241	760	0.1	0.2	2.479	A
3 - A4 West	1411	353	515	2842	0.497	1410	1526	0.7	1.1	2.769	A
4 - Hoad Way	290	73	1610	919	0.316	290	314	0.3	0.5	5.850	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	2933	733	205	3545	0.827	2922	2118	2.1	4.9	6.066	A
2 - Waterside Drive	295	74	2199	1446	0.204	295	928	0.2	0.3	3.469	A
3 - A4 West	1729	432	629	2735	0.632	1725	1865	1.1	1.9	3.919	A
4 - Hoad Way	356	89	1971	678	0.525	353	384	0.5	1.1	11.255	B

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	2933	733	206	3545	0.827	2933	2124	4.9	5.0	6.276	A
2 - Waterside Drive	295	74	2207	1438	0.205	295	931	0.3	0.3	3.497	A
3 - A4 West	1729	432	631	2734	0.632	1729	1871	1.9	1.9	3.950	A
4 - Hoad Way	356	89	1974	676	0.526	356	385	1.1	1.1	11.504	B

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	2395	599	169	3583	0.668	2406	1740	5.0	2.2	3.300	A
2 - Waterside Drive	241	60	1811	1842	0.131	241	764	0.3	0.2	2.500	A
3 - A4 West	1411	353	517	2840	0.497	1415	1535	1.9	1.1	2.790	A
4 - Hoad Way	290	73	1615	915	0.317	293	316	1.1	0.5	5.942	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	2006	501	141	3612	0.555	2009	1454	2.2	1.3	2.407	A
2 - Waterside Drive	202	50	1512	2147	0.094	202	638	0.2	0.1	2.055	A
3 - A4 West	1182	295	432	2920	0.405	1183	1282	1.1	0.8	2.287	A
4 - Hoad Way	243	61	1351	1092	0.223	244	264	0.5	0.3	4.348	A

2033 Forecast Flows, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	2 - Waterside Drive - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Hoad Way - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4	5.02	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	5.02	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D4	2033 Forecast Flows	PM	ONE HOUR	16:45	18:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1 - A4 East		ONE HOUR	✓	1758	100.000
2 - Waterside Drive		ONE HOUR	✓	915	100.000
3 - A4 West		ONE HOUR	✓	1099	100.000
4 - Hoad Way		ONE HOUR	✓	377	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - A4 East	2 - Waterside Drive	3 - A4 West	4 - Hoad Way
From	1 - A4 East	2	174	1283	299
	2 - Waterside Drive	834	1	61	19
	3 - A4 West	1042	39	13	5
	4 - Hoad Way	347	6	23	1

Vehicle Mix

HV %s

		To			
		1 - A4 East	2 - Waterside Drive	3 - A4 West	4 - Hoad Way
From	1 - A4 East	0	3	4	1
	2 - Waterside Drive	1	0	2	13
	3 - A4 West	4	6	9	33
	4 - Hoad Way	2	67	5	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Q (PCU)	Max LOS	Av. Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - A4 East	0.53	2.15	1.2	A	1613	2420
2 - Waterside Drive	0.54	4.23	1.2	A	840	1259
3 - A4 West	0.57	4.07	1.4	A	1008	1513
4 - Hoad Way	0.72	23.05	2.6	C	346	519

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1324	331	62	3693	0.358	1321	1670	0.0	0.6	1.567	A
2 - Waterside Drive	689	172	1218	2446	0.282	687	165	0.0	0.4	2.071	A
3 - A4 West	827	207	868	2511	0.330	825	1037	0.0	0.5	2.223	A
4 - Hoad Way	284	71	1450	1026	0.277	282	243	0.0	0.4	4.970	A

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1580	395	74	3680	0.429	1580	1997	0.6	0.8	1.771	A
2 - Waterside Drive	823	206	1456	2203	0.373	822	198	0.4	0.6	2.638	A
3 - A4 West	988	247	1038	2352	0.420	987	1240	0.5	0.8	2.748	A
4 - Hoad Way	339	85	1734	836	0.406	338	291	0.4	0.7	7.413	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1936	484	91	3664	0.528	1934	2439	0.8	1.2	2.149	A
2 - Waterside Drive	1007	252	1783	1870	0.539	1005	242	0.6	1.2	4.203	A
3 - A4 West	1210	303	1270	2135	0.567	1208	1518	0.8	1.4	4.037	A
4 - Hoad Way	415	104	2122	577	0.719	408	356	0.7	2.4	21.130	C

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1936	484	91	3663	0.528	1936	2449	1.2	1.2	2.153	A
2 - Waterside Drive	1007	252	1785	1869	0.539	1007	242	1.2	1.2	4.233	A
3 - A4 West	1210	303	1273	2132	0.567	1210	1519	1.4	1.4	4.067	A
4 - Hoad Way	415	104	2126	574	0.723	415	357	2.4	2.6	23.045	C

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1580	395	75	3680	0.430	1582	2011	1.2	0.8	1.777	A
2 - Waterside Drive	823	206	1459	2201	0.374	825	198	1.2	0.6	2.654	A
3 - A4 West	988	247	1042	2349	0.421	990	1242	1.4	0.8	2.766	A
4 - Hoad Way	339	85	1740	832	0.408	346	292	2.6	0.7	7.738	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1324	331	63	3693	0.358	1324	1678	0.8	0.6	1.571	A
2 - Waterside Drive	689	172	1221	2443	0.282	690	166	0.6	0.4	2.081	A
3 - A4 West	827	207	871	2508	0.330	828	1040	0.8	0.5	2.236	A
4 - Hoad Way	284	71	1455	1022	0.278	285	244	0.7	0.4	5.032	A

2033 Forecast Flows + Development, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	2 - Waterside Drive - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Hoad Way - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4	6.10	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	6.10	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D5	2033 Forecast Flows + Development	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1 - A4 East		ONE HOUR	✓	2694	100.000
2 - Waterside Drive		ONE HOUR	✓	268	100.000
3 - A4 West		ONE HOUR	✓	1582	100.000
4 - Hoad Way		ONE HOUR	✓	341	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - A4 East	2 - Waterside Drive	3 - A4 West	4 - Hoad Way
From	1 - A4 East	1	708	1633	352
	2 - Waterside Drive	232	0	18	18
	3 - A4 West	1407	122	31	22
	4 - Hoad Way	302	16	23	0

Vehicle Mix

HV %s

		To			
		1 - A4 East	2 - Waterside Drive	3 - A4 West	4 - Hoad Way
From	1 - A4 East	0	2	10	4
	2 - Waterside Drive	10	0	14	23
	3 - A4 West	11	2	17	3
	4 - Hoad Way	2	27	8	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Q (PCU)	Max LOS	Av. Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - A4 East	0.84	6.70	5.4	A	2472	3708
2 - Waterside Drive	0.21	3.62	0.3	A	246	369
3 - A4 West	0.64	4.13	2.0	A	1452	2178
4 - Hoad Way	0.56	12.38	1.3	B	313	469

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	2028	507	144	3609	0.562	2023	1458	0.0	1.4	2.421	A
2 - Waterside Drive	202	50	1532	2127	0.095	201	635	0.0	0.1	2.076	A
3 - A4 West	1191	298	453	2900	0.411	1188	1280	0.0	0.8	2.314	A
4 - Hoad Way	257	64	1346	1095	0.234	255	294	0.0	0.3	4.425	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	2422	605	172	3579	0.677	2418	1744	1.4	2.2	3.308	A
2 - Waterside Drive	241	60	1831	1821	0.132	241	759	0.1	0.2	2.529	A
3 - A4 West	1422	356	541	2817	0.505	1421	1531	0.8	1.1	2.839	A
4 - Hoad Way	307	77	1610	919	0.334	306	352	0.3	0.5	6.063	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	2966	742	211	3540	0.838	2954	2132	2.2	5.3	6.441	A
2 - Waterside Drive	295	74	2237	1408	0.210	295	928	0.2	0.3	3.588	A
3 - A4 West	1742	435	662	2704	0.644	1738	1869	1.1	2.0	4.093	A
4 - Hoad Way	375	94	1970	678	0.554	373	430	0.5	1.2	12.064	B

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	2966	742	211	3539	0.838	2966	2138	5.3	5.4	6.703	A
2 - Waterside Drive	295	74	2246	1399	0.211	295	931	0.3	0.3	3.621	A
3 - A4 West	1742	435	664	2703	0.645	1742	1877	2.0	2.0	4.130	A
4 - Hoad Way	375	94	1974	676	0.556	375	432	1.2	1.3	12.383	B

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	2422	605	173	3578	0.677	2434	1752	5.4	2.3	3.402	A
2 - Waterside Drive	241	60	1843	1809	0.133	241	764	0.3	0.2	2.553	A
3 - A4 West	1422	356	544	2815	0.505	1426	1541	2.0	1.1	2.865	A
4 - Hoad Way	307	77	1616	915	0.335	310	354	1.3	0.5	6.175	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	2028	507	145	3608	0.562	2032	1464	2.3	1.4	2.450	A
2 - Waterside Drive	202	50	1539	2120	0.095	202	638	0.2	0.1	2.084	A
3 - A4 West	1191	298	455	2898	0.411	1192	1286	1.1	0.8	2.329	A
4 - Hoad Way	257	64	1351	1092	0.235	258	296	0.5	0.3	4.464	A

2033 Forecast Flows + Development, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	2 - Waterside Drive - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Hoad Way - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4	5.91	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	5.91	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D6	2033 Forecast Flows + Development	PM	ONE HOUR	16:45	18:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1 - A4 East		ONE HOUR	✓	1767	100.000
2 - Waterside Drive		ONE HOUR	✓	915	100.000
3 - A4 West		ONE HOUR	✓	1102	100.000
4 - Hoad Way		ONE HOUR	✓	413	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - A4 East	2 - Waterside Drive	3 - A4 West	4 - Hoad Way
From	1 - A4 East	2	174	1283	308
	2 - Waterside Drive	834	1	61	19
	3 - A4 West	1042	39	13	8
	4 - Hoad Way	373	6	33	1

Vehicle Mix

HV %s

		To			
		1 - A4 East	2 - Waterside Drive	3 - A4 West	4 - Hoad Way
From	1 - A4 East	0	3	4	2
	2 - Waterside Drive	1	0	2	13
	3 - A4 West	4	6	9	23
	4 - Hoad Way	2	67	4	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Q (PCU)	Max LOS	Av. Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - A4 East	0.53	2.18	1.2	A	1621	2432
2 - Waterside Drive	0.55	4.34	1.2	A	840	1259
3 - A4 West	0.57	4.12	1.4	A	1011	1517
4 - Hoad Way	0.79	30.14	3.6	D	379	568

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1330	333	70	3685	0.361	1328	1690	0.0	0.6	1.579	A
2 - Waterside Drive	689	172	1232	2432	0.283	687	165	0.0	0.4	2.088	A
3 - A4 West	830	207	875	2505	0.331	828	1044	0.0	0.5	2.234	A
4 - Hoad Way	311	78	1450	1026	0.303	309	252	0.0	0.4	5.150	A

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1588	397	83	3671	0.433	1588	2021	0.6	0.8	1.788	A
2 - Waterside Drive	823	206	1473	2186	0.376	822	198	0.4	0.6	2.671	A
3 - A4 West	991	248	1046	2344	0.423	990	1249	0.5	0.8	2.769	A
4 - Hoad Way	371	93	1734	836	0.444	370	302	0.4	0.8	7.911	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1946	486	101	3653	0.533	1944	2465	0.8	1.2	2.179	A
2 - Waterside Drive	1007	252	1803	1850	0.545	1005	242	0.6	1.2	4.305	A
3 - A4 West	1213	303	1280	2125	0.571	1211	1528	0.8	1.4	4.093	A
4 - Hoad Way	455	114	2121	577	0.788	445	370	0.8	3.3	26.195	D

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1946	486	102	3652	0.533	1945	2477	1.2	1.2	2.184	A
2 - Waterside Drive	1007	252	1806	1847	0.545	1007	242	1.2	1.2	4.340	A
3 - A4 West	1213	303	1283	2123	0.571	1213	1530	1.4	1.4	4.124	A
4 - Hoad Way	455	114	2126	574	0.792	454	370	3.3	3.6	30.143	D

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1588	397	85	3670	0.433	1590	2038	1.2	0.8	1.795	A
2 - Waterside Drive	823	206	1477	2183	0.377	825	198	1.2	0.6	2.689	A
3 - A4 West	991	248	1050	2341	0.423	993	1252	1.4	0.8	2.790	A
4 - Hoad Way	371	93	1741	832	0.446	382	302	3.6	0.8	8.429	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A4 East	1330	333	70	3685	0.361	1331	1698	0.8	0.6	1.583	A
2 - Waterside Drive	689	172	1236	2428	0.284	690	166	0.6	0.4	2.099	A
3 - A4 West	830	207	878	2502	0.332	831	1047	0.8	0.5	2.248	A
4 - Hoad Way	311	78	1456	1022	0.304	312	253	0.8	0.5	5.225	A

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