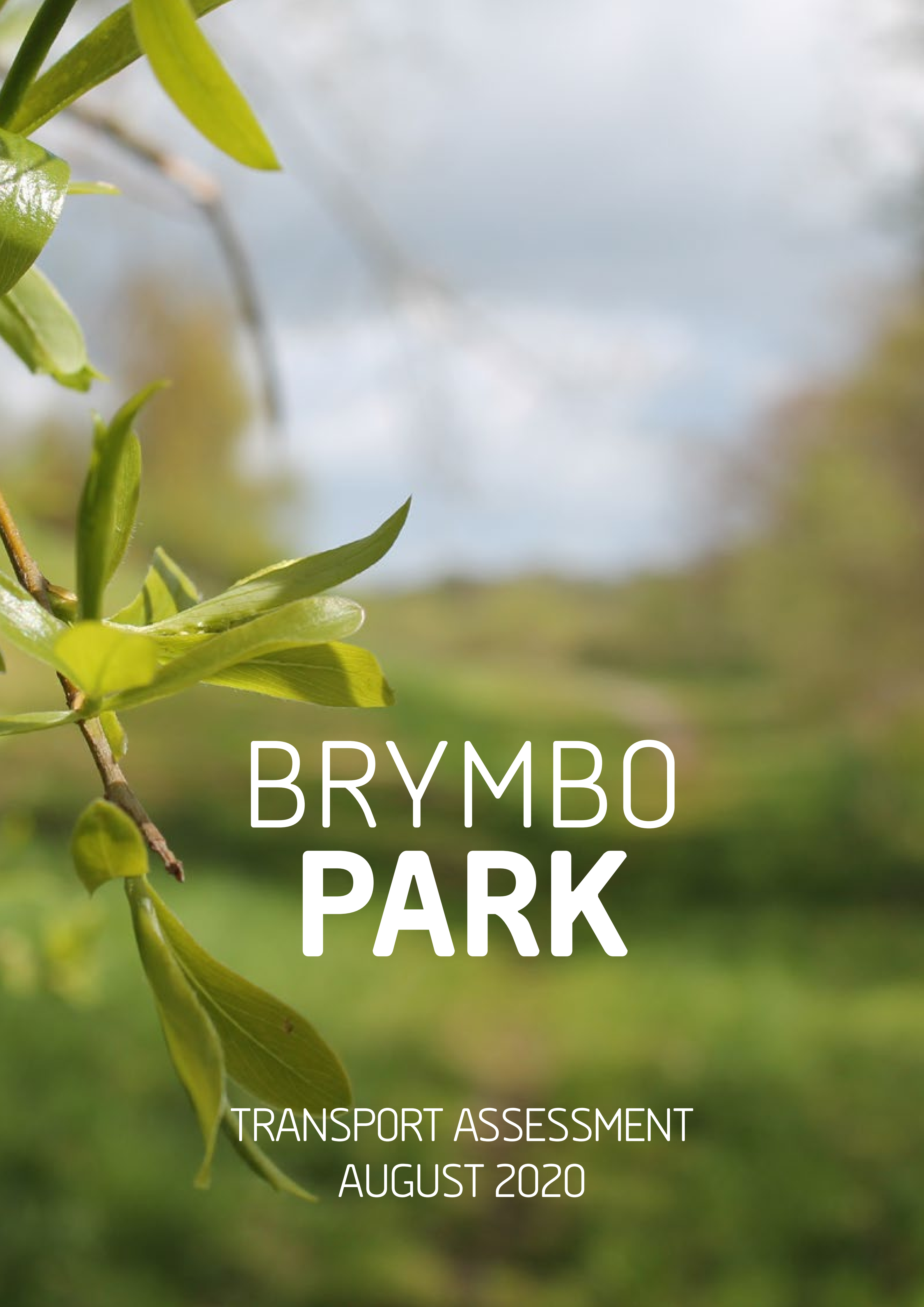

BRYMBO **PARK**

TRANSPORT ASSESSMENT
AUGUST 2020

Brymbo Developments Ltd

Brymbo Park, Brymbo

Transport Assessment

August 2020

Project Code: 3499

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Executive Summary

This report provides an assessment of the transport impacts of the outline planning application by Brymbo Development Ltd for development of Land at the Former Brymbo Steelworks, Brymbo. This document has been prepared following engagement with Wrexham County Borough Council (WCBC) and the Welsh Government.

Outline planning permission is sought for Outline planning permission for up to 300 dwellings (Class C3 use), provision of a primary school (2-form entry), small district centre comprising up to 1,395sqm of Class A1 Retail, up to 372sqm of Class A3 Restaurant/Public House, up to 465sqm of Class D1 use, multi-functional green infrastructure, including children's play areas and informal open space, surface water attenuation, vehicle accesses, car parking, engineering works, public footpaths and hard and soft landscaping, underground services, and all ancillary and enabling works, with all matters reserved except for access.

The Site would be developed to accommodate a mix of uses; namely, residential, retail, healthcare and education.

Vehicular access will be from the recently constructed spine road, Phoenix Drive, via access stubs constructed as part of the spine road.

The site has a significant planning history with the wider land having previous consent (some of which has been implemented) for various land uses. Much of the area to the south of the proposed site has been developed for residential purposes with the completion of approximately 500 dwellings in this area. The current application boundary also benefits from extant permission for the construction of food/non-food retail units and a primary school. Therefore, the principle for developing the site for some of the proposed uses set out in this report has already been tested and established.

A comprehensive review of local, regional and national transport related policy has been carried out. This review has demonstrated that the proposed development accords with relevant policy with areas for mitigation identified.

The report includes a review of existing sustainable travel provision in the surrounding area including pedestrian and cycle links and public transport provision. The existing provision is currently limited, it is however proposed to implement a full strategy for improving accessibility as follows:

- Provision of new footways;
- Provision of key local facilities within the small district centre to reduce the need to travel by car for existing and future residents;
- Improved bus service frequency and provision of new bus stops along Phoenix Drive;
- Downgrading the area of Phoenix Drive adjacent to the small district centre to create a more pedestrian/cyclist friendly environment; and

- Provision of cycle and vehicular parking.

Some existing safety concerns were established from the analysis of highway safety data. This included multiple occurrences of collisions on Heritage Way in the vicinity of the Brymbo Sports Club. Further assessment of these however identified implementation of further measures by WCBC. Following the introduction of these measures, no personal injury collisions were recorded in the data received. As such, no further measures are required.

Vehicle trips generation of the development has been calculated using surveys from a nearby residential site. The TRICS database has been utilised to forecast the traffic generation of the other non-residential land uses.

There are limited nearby facilities and so existing residents are required to travel some distance to local facilities. The provision of facilities within the Brymbo Park development would reduce the need to travel for existing residents and hence reduce the impact on the surrounding highway network. In order to provide a robust assessment however, no reductions have been made for this.

Capacity of local junctions has been assessed using forecast traffic conditions for a future assessment year. The assessment accounts for background traffic growth and committed developments in accordance with national planning policy and Welsh Government guidance.

There are existing capacity issues observed at the A525/Heritage Way junction. During the PM peak hour, there are long queues associated with vehicles turning right into Heritage Way. This is forecast to worsen in future assessment years with issues also identified for vehicles turning out of Heritage Way. It is therefore proposed to provide signal control at the A525/Heritage Way junction to better manage these turning movements. The modelling of the proposed improvement scheme demonstrates a significant betterment in the operation of the junction.

Existing capacity issues have also been observed at Junction 4 of the A483, as follows:

- Queues for vehicles in both directions on the A525 with particularly long queues in an eastbound direction in the AM peak hour and a westbound direction in the PM peak hour.
- Queues on the southbound off-slip of the A483 in the AM peak hour and northbound off-slip in the PM peak hour.

The assessment has shown the uplift in traffic flows resulting from the proposed development is modest and the queuing forecast would not impact on the safe operation of the A483 mainline. The Welsh Government is currently developing schemes for various junctions along the A483 including Junction 4 and therefore no interim/standalone schemes to mitigate the impact of the proposed development at Brymbo in this location are deemed to be required or proposed.

1 Introduction

1.1 Background

1.1.1 PJA has been appointed by Brymbo Developments Ltd (BDL) to prepare a Transport Assessment to accompany an outline planning application to develop land at and surrounding the former Brymbo Steelworks, Brymbo. The site is within the administrative area of Wrexham County Borough Council.

1.2 Proposed Development

1.2.1 Outline permission is sought for the following:

"*Up to 300 dwellings (Class C3 use), provision of a primary school (2-form entry), small district centre comprising up to 1,395sqm of Class A1 Retail, up to 372sqm of Class A3 Restaurant/Public House, up to 465sqm of Class D1 use, multi-functional green infrastructure, including informal open space, surface water attenuation, vehicle accesses, car parking, engineering works, public footpaths and hard and soft landscaping, underground services, and all ancillary and enabling works, with all matters reserved except for access*."

1.2.2 The indicative land use plan is provided in **Appendix A**.

1.3 Planning History

1.3.1 There is significant planning history associated with the Site. A summary of the planning history within the site boundary is as follows:

- P/2004/1153 – Amendment to Condition no.3 of Planning Permission P/2002/1171 relating to 1.2 hectares to be provided for a new school within the new housing area – Approved 8th November 2004. (Not implemented)
- P/2005/1484 – Light industrial units (Phase 1) – Approved 6th March 2006. (Not implemented)
- P/2005/1485 – Outline application for residential development (northern development area) – Approved 6th March 2006.
- P/2005/1486 – Outline application for residential development – Refused 6th December 2010.
- P/2005/1488 – Outline for petrol filling station and retail facility, northern area – Approved 6th March 2006. (Not implemented)
- P/2005/1489 – Commercial development phase 1 northern module – Approved 6th March 2006
- P/2009/0939 – Outline application for erection of supermarket and small retail units and associated car parking – Refused 6th December 2010. Appeal dismissed 29th November 2011.
- P/2010/0516 – Reserved matters for north spine road – Approved 3rd August 2010

- P/2012/0816 – Outline application for erection of supermarket and small retail units and associated car parking – Approved 11th July 2014 (Not implemented)
- P/2017/0105 – Outline application for the erection of new primary school – Approved 21st March 2017. (Not implemented)
- P/2019/0546 – Outline application for up to 450 dwellings, provision of a primary school, small district centre. (Pending Decision)

1.3.2 The principle of developing the site for various land uses is therefore well established. In particular, there is extant permission for the construction of food and non-food retail provision on the site and for the construction of a new primary school. As such, the traffic impact of these uses has been deemed to be acceptable previously. This Transport Assessment therefore builds upon the previous consent on-site and considers any additional impacts of other land uses proposed as part of this outline application.

1.4 Completions

1.4.1 Approximately 500 dwellings have been constructed on the wider site, all of which are accessed from Phoenix Drive, a purpose-built spine road, connecting the B5101 (to the north) to Heritage Way (to the south).

1.5 Scoping Discussions

1.5.1 PJA has engaged with officers from Wrexham County Borough Council (WCBC) to discuss the scope and content of the Transport Assessment. In summary, the following was agreed:

- The principle of access and the requirement for further details to be provided within the TA was established.
- The study area for accident analysis and junction capacity assessment.
- Trip rate methodology using local donor Sites for residential development and quantifying the trip envelope for extant planning consents on the Site.
- Local committed development Sites.

1.5.2 PJA has also engaged with the Welsh Government. Discussions had relating to the pending outline application submitted last year have also been taken on board in this report.

1.5.3 This Transport Assessment has therefore been prepared in accordance with the discussions with WCBC and in line with Planning Policy Wales, Technical Advice Note 18: Transport.

1.6 Report Format

1.6.1 Following this introduction, the Transport Assessment comprises the following sections:

- Section 2 provides a summary of relevant transport related policy;

- Section 3 sets out the existing conditions;
- Section 4 details the development proposals;
- Section 5 provides details of the forecast travel demand;
- Section 6 sets out the junction capacity assessment; and
- Section 7 summarises the report and concludes the findings.

2 Policy Context

2.1 Introduction

2.1.1 This chapter provides a review of relevant transport related policy at a local, regional and national level. This chapter will establish whether the proposed development accords with these policies and where the development does not accord, establish when measures may be required to ensure compliance.

2.2 Planning Policy Wales, Edition 10 (Welsh Government)

2.2.1 The 10th Edition of Planning Policy Wales (PPW10) was published in December 2018. The document sets out the land use planning policies of the Welsh Government and places a presumption in favour of sustainable development. The document is supported by various Technical Advice Notes (TANs).

2.2.2 The document sets out principles to achieve sustainable development in Section 2; part of this is to ensure wellbeing through placemaking. There are five National Sustainable Placemaking Outcomes set out, of key importance is:

"Facilitating accessible and healthy environments:

- *Accessible and high-quality green space;*
- *Accessible by means of active travel and public transport;*
- *Not car dependent;*
- *Minimises the need to travel;*
- *Provides equality of access;*
- *Feels safe and inclusive;*
- *Supports a diverse population;*
- *Good connections;*
- *Convenient access to goods and services; and*
- *Promotes physical and mental health and wellbeing."*

2.2.3 PPW10 sets out objectives of good design in Section 3, the following are of relevance:

- Access and Inclusivity – PPW10 sets out that developments should be designed to meet the needs of the people accessing them. As such, proposals should meet the needs of people with sensory, learning and mobility impairments as well as older people and people with young children. Development proposals should also ensure access to essential services including education and employment by modes other than private car. Design should allow easy access by walking, cycling and public transport.

- Movement – Design of developments should avoid car-dominated environments and instead opportunities for people to make sustainable and healthy travel choices should be encouraged. This will require sites to be selected which can be made accessible by sustainable modes as well as creating suitable links within and between developments. PPW10 emphasises the importance of utilising existing infrastructure where possible. Where new infrastructure is required to mitigate development impact, this should be well integrated with current infrastructure.

2.2.4 Section 4 of PPW10, sets out the creation of Active and Social Places. A key theme of this is '*Moving within and Between Places*'. This states that "*the planning system should enable people to access jobs and services through shorter, more efficient and sustainable journeys, by walking, cycling and public transport*".

2.2.5 The location, scale, density, mix of uses and design of development can improve choice in transport and secure accessibility in a way which encourages sustainable development by:

- *"Enabling more sustainable travel choices – measures to increase walking, cycling and public transport, reduce dependency on the car for daily travel;*
- *Network management – measures to make best use of the available capacity, supported by targeted new infrastructure; and*
- *Demand management – the application of strategies and policies to reduce travel demand, specifically that of single-occupancy private vehicles."*

2.2.6 PPW10 (paragraph 4.1.8) sets out the Welsh Government's commitment to reducing reliance on the private car and supporting a modal shift to sustainable travel modes. The planning system has a key role to play in this by facilitating developments which:

- *"Are sited in the right locations where they can be easily accessed by sustainable modes of travel and without the need for a car;*
- *Are designed in a way which integrates them with existing land uses and neighbourhoods; and*
- *Make it possible for short journeys within and beyond the development to be easily made by walking and cycling."*

2.2.7 Development proposals must maximise opportunities for walking, cycling and public transport uses by giving priority to these users. As such, the hierarchy of users places pedestrians and cyclists at the top with less priority given to private motor vehicles.

2.2.8 In Section 4, PPW10 sets out the importance of Transport Assessments and their role in setting out the level of impacts of a proposed development. Further guidance is provided in TAN 18: Transport, as set out in proceeding sections.

2.3 Active Travel (Wales) Act 2013 – Design Guidance

2.3.1 A Design Guidance document has been published under powers granted to Welsh Minister under the Active Travel (Wales) Act 2013. The document provides guidance on the "*planning, design, construction and maintenance of active travel networks and infrastructure*". The guidance within this document has been considered in the design of the scheme.

2.4 Technical Advice Note 18: Transport (Welsh Government)

2.4.1 The Technical Advice Note 18: Transport (TAN) provides guidance on development and associated transport issues. Namely it provides advice on:

- The Integration between Land Use Planning and Transport;
- Accessible Housing Development;
- Design of Development including Street Design;
- Sustainable Modes of Transport including Walking, Cycling and Public Transport; and
- Assessing Impacts and Managing Implementation.

The Integration between Land Use Planning and Transport

2.4.2 The TAN states that the *"integration of land use planning and development of transport infrastructure has a key role to play in addressing the environmental aspects of sustainable development…"*

2.4.3 Namely, integration can help in:

- *"Ensuring new development is located where there is, or will be, good access by public transport, walking and cycling thereby minimising the need for travel and fostering social inclusion;*
- *Promoting cycling and walking;*
- *Supporting the provision of high quality, inclusive public transport; and*
- *Ensuring that transport infrastructure or service improvements necessary to serve new development allow existing transport networks to continue to perform their identified functions"*

Accessible Housing Development

2.4.4 In providing guidance concerning the accessibility of housing developments, the TAN outlines that developers should use the Transport Assessment to demonstrate that:

- *"The development will facilitate access by new residents to public transport stops, local shops and facilities by walking and cycling;*

- *New or existing walking and cycling routes provide direct and safe links to public transport stops, local shops and facilities;*
- *Any public transport routes through the development are suitably direct, are of a geometry to avoid obstructions and that any features that give buses priority (e.g. bus gates or bus only routes) are shown; and*
- *The walking, cycling, public transport and car routes through or adjacent to the Site are integrated in accordance with expressed principles and in the context of their relationship with parking areas and public recreation spaces."*

Street Design

2.4.5 In providing advice relating to Street Design, the TAN states that *"transport infrastructure should contribute to a sense of place and community within a development"* and that *"the design of streets has a crucial role in this regard"*.

2.4.6 Namely the TAN states that streets should **not be:**

- *"Primarily designed to meet the needs of motor traffic;*
- *Unsafe and unwelcoming to pedestrians and cyclists; and*
- *Difficult to serve by public transport"*

2.4.7 In addition to this, the TAN outlines that *"the design of new streets should be considered in the context of the particular location"*. Namely, it states that:

- *"Carriageway widths should be appropriate to the particular context and the street character;*
- *Tracking should be used to ensure vehicles (including emergency and service vehicles) can move within streets; and*
- *New junctions must have adequate visibility."*

Sustainable Transport

2.4.8 In providing guidance relating to **walking**, the Technical Advice Note outlines the need to:

- *"ensure that new development encourages walking as a prime means for local journeys by giving careful consideration to location, access arrangements and design;*
- *Ensure that pedestrian routes provide a safe and fully inclusive pedestrian environment, particularly for routes to primary schools;*
- *Ensure the adoption of suitable measures, such as wide pavements and road crossings; and*

- *Identify and protect existing and proposed routes suitable for the use of cyclists and walkers."*

2.4.9 When discussing **cycling**, the note states that *"cycling has potential to act as a substitute for shorter car journeys in urban or rural areas, or form part of a longer journey when combined with public transport"*. Most notably the TAN outlines the need for development to encourage cycling by *"giving careful consideration to location, design, access arrangements, travel 'desire lines' through a development, and integration with existing and potential off-Site links".*

2.4.10 Finally, in providing guidance on the provision of **public transport**, the Technical Advice Note outlines that *"new or improved public transport provision has the potential to provide alternatives to private vehicle use and to change existing travel demands"*.

2.4.11 Most notably, the note states that prior to the occupation of a development, *"reasonable public transport provision should be in place … to ensure travel by car is not necessary at the outset"*.

Assessing Impacts and Managing Implementation

Transport Assessments

2.4.12 The TAN states that *"Transport Assessments provide the information necessary to assess the suitability of an application in terms of travel demand and impact"*. It outlines that within the Transport Assessment, a Transport Implementation Strategy (TIS) should be included. The TIS *"should set objectives and targets relating to managing travel demand for the development and set out the infrastructure, demand management measures and financial contributions necessary to achieve them"*.

2.4.13 Most notably according to the TAN, the aims of completing a Transport Assessment and creating a TIS are to:

- *"Understand the transport impacts of the development;*
- *Clearly communicate the impacts to assist the decision-making process;*
- *Demonstrate the development is Sited in a location that will produce a desired and predicted output (for example in terms of target modal split);*
- *Mitigate negative transport impacts through the design process; and*
- *Maximise the accessibility of the development by non-car modes."*

2.4.14 The details provided in this Transport Assessment and the accompanying Outline Travel Plan meet the above aims.

2.5 North Wales Joint Local Transport Plan (Various North Wales Authorities)

2.5.1 The North Wales Joint Local Transport Plan has been produced by the six Local Authorities of North Wales (including WCBC) and covers a detailed programme from 2015 to 2020.

2.5.2 The Local Transport Plan (LTP) has several key aims. These are:

- *"To improve connections to key destinations and markets;*
- *Enhance access to employment and services;*
- *Increase levels of walking and cycling;*
- *Bring improved safety and security; and*
- *Bring benefits and minimised impacts on the environment."*

2.5.3 In assessing transport in North Wales, the LTP outlines several key issues associated with the region. These include:

- *"Access to rail stations by car, public transport, walking or cycling can be poor;*
- *Increased congestion on strategic road network, increased journey times and reduced journey time reliability for the movement of people;*
- *People without access to a car may be excluded from accessing some job and leisure opportunities; and*
- *There is a lack of public transport for rural communities compared to the more urban areas."*

2.5.4 These issues will be considered when determining appropriate access for the Site and in ensuring the development impact is adequately assessed and mitigated where appropriate.

2.6 Wrexham Connected (Sustainable Urban Mobility Plan) (WCBC)

2.6.1 Wrexham Connected (Sustainable Urban Mobility Plan) (SUMP) works in conjunction with the North Wales Joint Local Transport Plan.

2.6.2 The aim of the Wrexham Connected Plan *"is for Wrexham to be a place where people want to live, work and visit"*. This aim is supported by several other key goals that need to be met. Most notably this includes the use of "*the planning system to make sure sustainable travel choices are provided alongside the options to use motorised transport."* This will be achieved by giving consideration to *"transport implications… when new developments are proposed"*.

2.6.3 As such, this Transport Assessment provides details of proposed measures to enhance sustainable travel to and from the Site and sets out the assessment of the development impact.

2.7 Local Planning Guidance Note No. 15 – Cycling (WCBC)

2.7.1 The Local Planning Guidance Note No.15 – Cycling, which forms a material consideration in the planning application process, outlines Wrexham County Borough Council's policies on cycling.

2.7.2 The note's aim is to increase the number of journeys made by bicycle. To do this, the note *"sets out how developers will be expected to provide facilities for cyclists in the preparation of relevant development schemes"*.

2.7.3 The key points contained within the note are as follows:

- *"Safe, coherent and attractive cycle routes, either on or off-road are essential to encourage cycle use";*
- *"New residential roads in particular should be designed with the needs of cyclists and with low traffic speeds in mind"; and*
- *"Cycle lanes are not usually required where cyclists would use minor roads carrying fewer than 4000 vehicles per day, travelling at speeds of 20mph or less".*

2.7.4 The Transport Assessment provides details of the provision for cyclists in proceeding sections.

2.8 Local Planning Guidance Note No. 16 – Parking Standards (WCBC)

2.8.1 The Local Planning Guidance Note No. 16 – Parking Standards, which forms a material consideration in the planning application process, details the parking standards Wrexham County Borough Council applies to new developments. Further details of the parking standards and application of these is provided in **Chapter 4**.

2.9 Summary

2.9.1 In summary, the proposed development meets national and local policy objectives, with regard to transport as:

- Safe and suitable access can be gained for all users;
- The Site would be accessible by a range of sustainable travel modes;
- The Site has been designed to accommodate both non-vehicular and vehicular travel modes; and
- It will be ensured that any negative impacts are mitigated accordingly.

3 Existing Conditions

3.1 Site Location

3.1.1 The Site is located to the south of the existing settlement of Brymbo, 5km north west of Wrexham. The site, which is located to the east of Phoenix Drive, forms part of the wider land holding associated with the former Brymbo Steelworks, some of which has already been significantly redeveloped. The Site covers an area of approximately 13.41 hectares of former industrial land which has been remediated and regraded, formed of two distinct areas separated by a steeply sloping bank.

3.1.2 Phoenix Drive splits the site north to south and forms the main route into Brymbo as well as to Wrexham to the south east.

3.1.3 There are existing residential properties to the north, east and south, with the Site sitting centrally within the settlement of Brymbo. The Brymbo Enterprise Centre is located to the north of the site and provides facilities such as a community hub, sports hall, meeting rooms, café and post office. To the east are existing footpaths running adjacent to the site and Kent Road (B5101) and to the west there is agricultural land as well as a substation and a number of farmsteads.

3.1.4 Phoenix Drive splits the site north to south and forms the main route into Brymbo as well as to Wrexham to the south east. Brymbo Road is located on the southern boundary of western and links Brymbo with Bwlchgwyn to the west.

3.1.5 The Site location is shown on **Figure 3-1**.

Figure 3-1: Site Location Plan

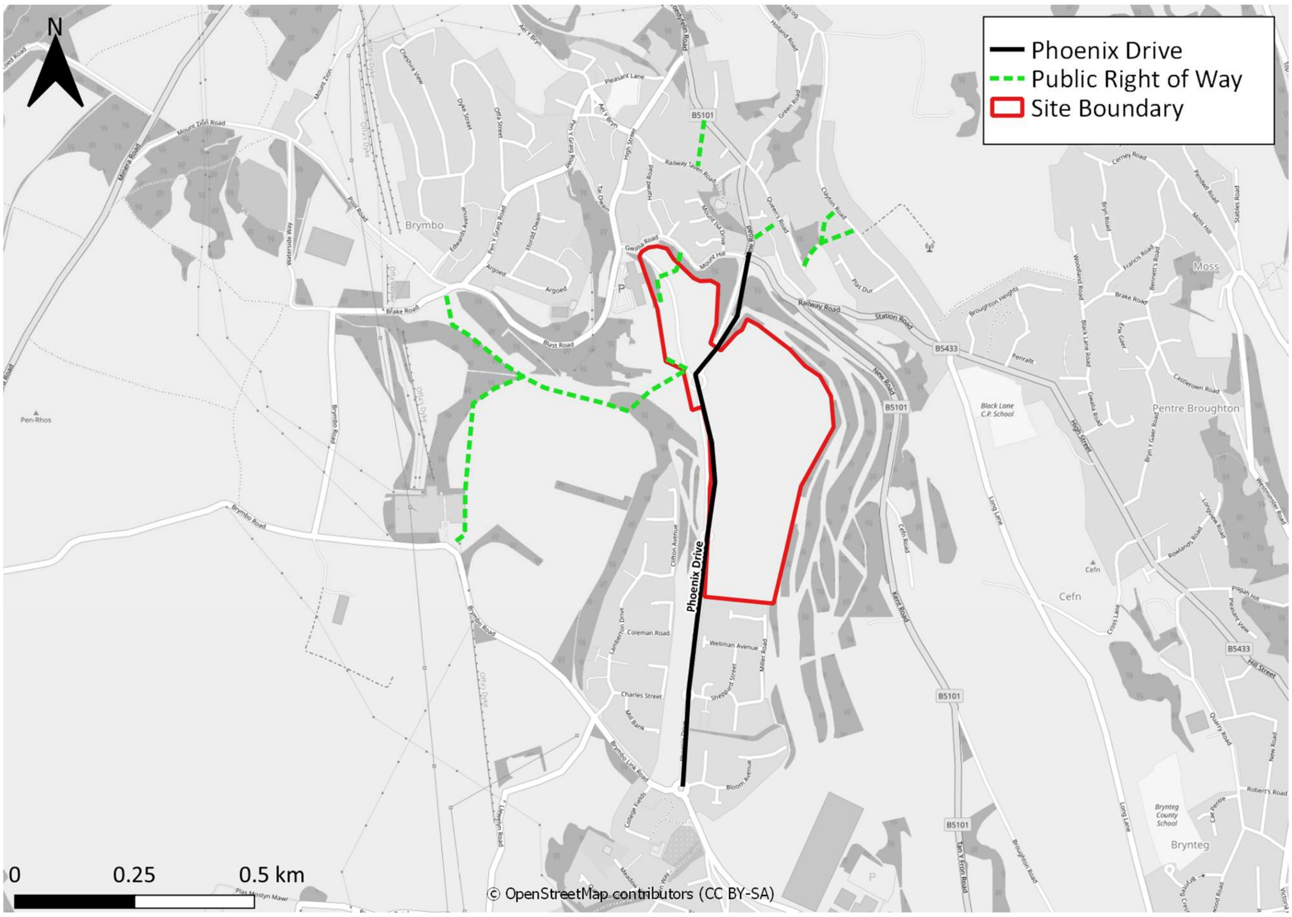
3.2 Sustainable Travel Provision

3.2.1 This section provides a review of the existing local provision supporting travel by sustainable modes.

Walking

3.2.2 There are footways and street lighting provided along Phoenix Drive, the purpose-built spine road. The footways are provided predominantly along the eastern side of Phoenix Drive at a width of at least 3m. There are pedestrian footways also linking into Brymbo to the north and Tanyfron to the south which are typically 2m in width. There are various public rights of way running through the Site and within close proximity of the Site as shown in **Figure 3-2**.

Figure 3-2: Local Public Rights of Way



3.2.3 Guidance provided by the Institution of Highways and Transport (IHT) in their publication ‘Guidelines for Providing for Journeys on Foot’ suggests that in terms of commuting, walking to school and recreational journeys for pedestrians without mobility impairment: walk distances of up to 2,000m can be considered as a preferred maximum, with ‘desirable’ and ‘acceptable’ distance being 500 and 1,000m respectively.

3.2.4 For a non-commuter journey, the Guidance suggests that walk distances of up to 1,200m can be considered as a preferred maximum, with the ‘desirable’ and ‘acceptable’ distance being 400 and 800m, respectively. In reality, longer distance journeys are often undertaken on foot.

3.2.5 Assuming a typical walking speed of approximately 1.4m/s as suggested in Guidelines for Providing Journeys on Foot, **Table 3-1** summarises the walking journey times that can fall under each category.

Table 3-1: Acceptable Walking Distance Thresholds

IHT Standard	Distance (m)		Walk Time (mins)	
	Commuting, Walking to School and Recreation	Other, non-commuter journeys	Commuting, Walking to School and Recreation	Other, non-commuter journeys
Desirable	500	400	6	5
Acceptable	1000	800	12	10
Preferred Maximum	2000	1200	24	14

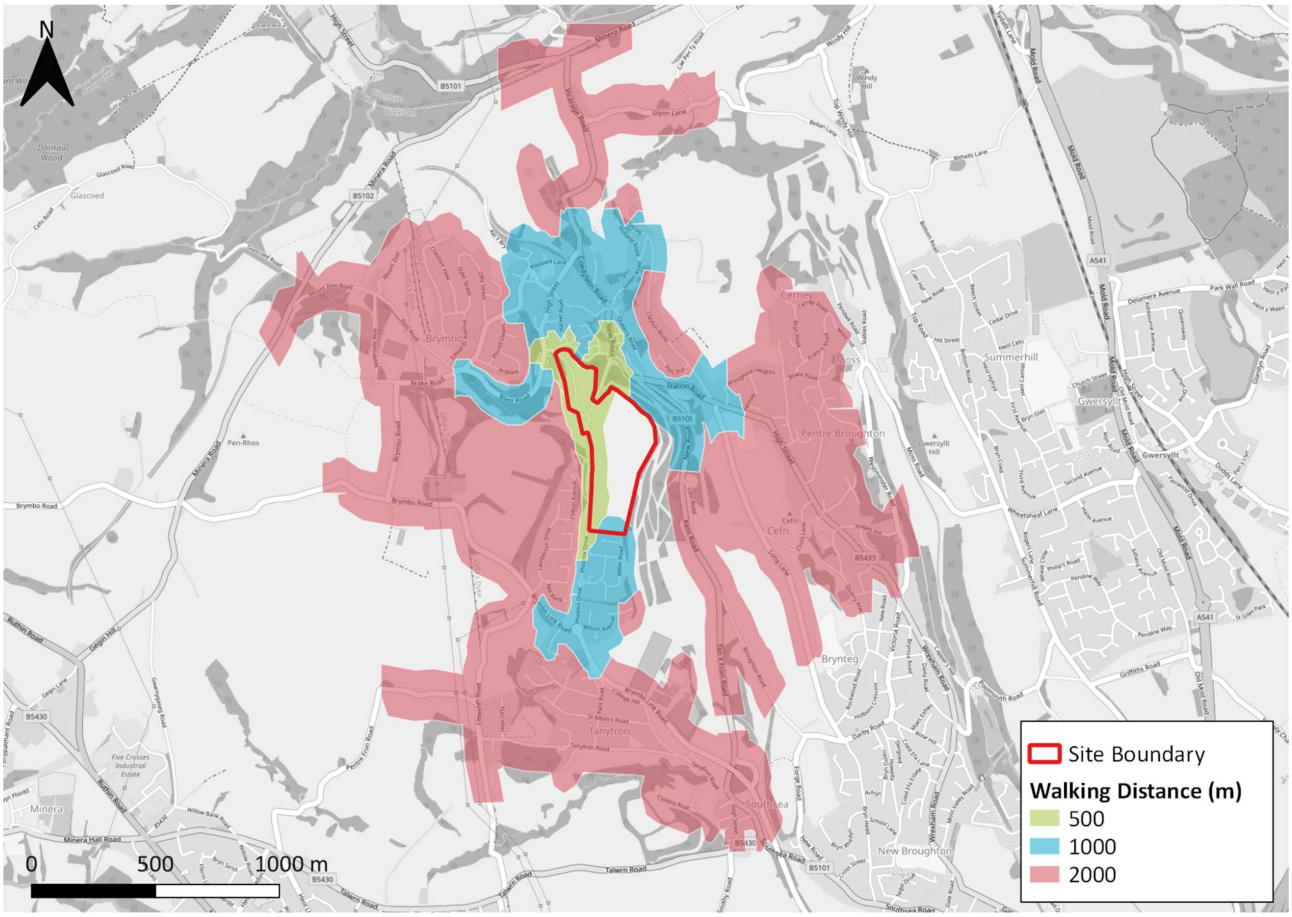
3.2.6 The key local facilities surrounding the Site that are within the distance thresholds are detailed in **Table 3-2**. The areas surrounding the Site, which are within these walking distance thresholds, are displayed in the walking isochrone illustrated in **Figure 3-3**.

Table 3-2: Walk Journey Distance[2] and Time Thresholds to Key Local Facilities

Amenity	Location	Distance from Site (km)	Walking Time (mins)[1]	Within IHT Walking Standard
Well Brymbo Pharmacy	Ael- Y- Bryn	0.8	10	Acceptable
Saint Mary's VA Church in Wales Primary School	Bryn Coch	1	12	Acceptable
Black Lane County Primary School	Long Lane	1	12	Acceptable
Brymbo Library	Offa Street	1.1	13	Preferred Maximum
Premier Stores Convenience	Offa Street	1.1	13	Preferred Maximum
Ysgol Tanyfron (School)	Tanyfron Road	1.4	17	Preferred Maximum

[1] Assuming a typical walking speed of 5km/hr (1.4m/s) as suggested in Guidelines for Providing Journeys on Foot (REF: C5, para. 3.30)
[2] Approximate distances measured from the proposed Site access to the amenities / facility

Figure 3-3: Walking Isochrone



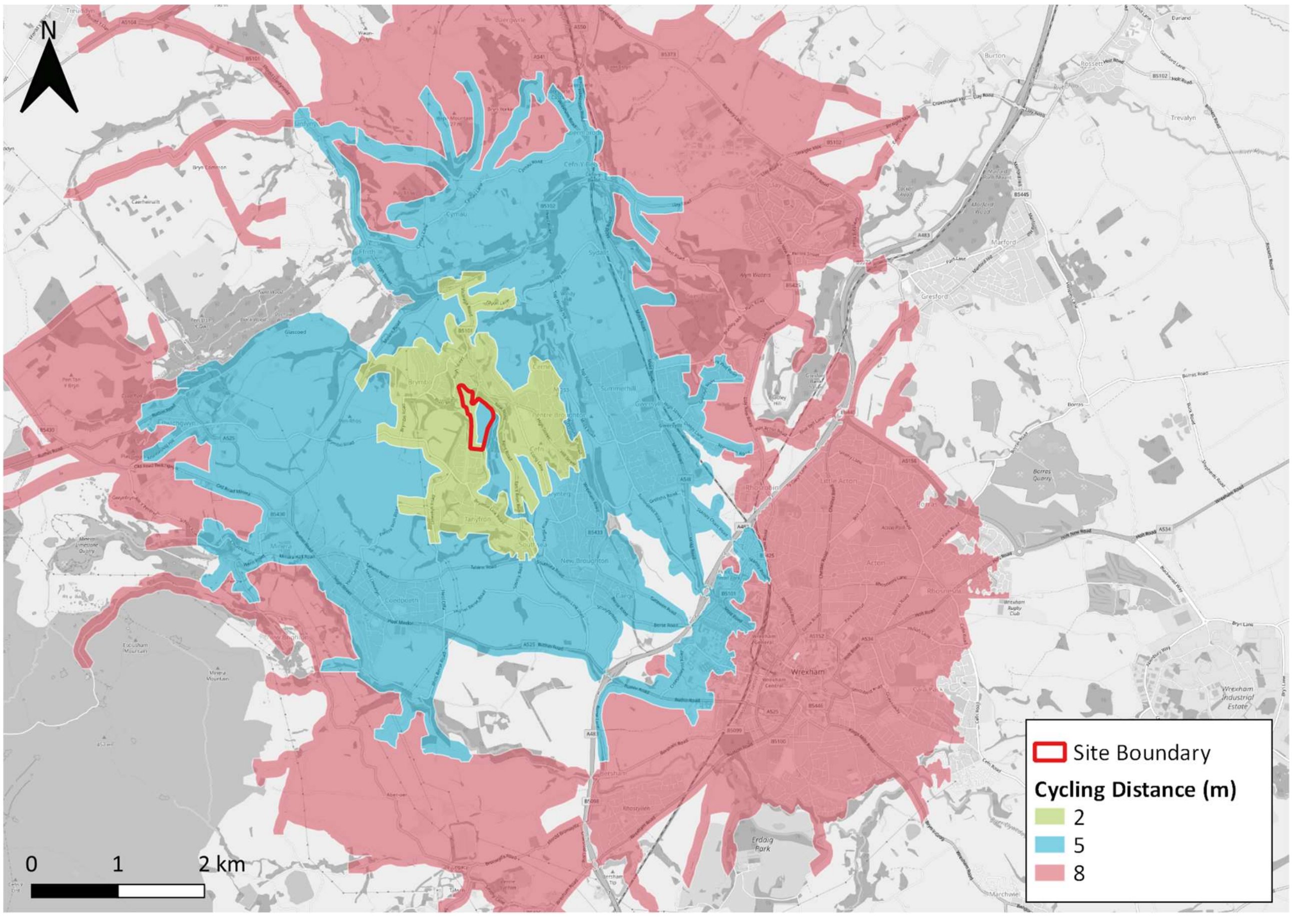
Cycling

3.2.7 The existing cycling provision within the vicinity of the Site is limited to sections of shared footway/cycleway located to the south of the Site around the Phoenix Drive/Brymbo Road roundabout and along Brymbo Road adjacent to the existing residential development.

3.2.8 Although the dedicated provision for cyclists is limited, due to the relatively quiet nature of the highway network within the residential expanses surrounding the Site, areas within the immediate vicinity of the Site can be considered accessible by bicycle.

3.2.9 Due to the relatively rural setting of the Site, there is a relatively limited supply of local amenities within a short distance of the Site. As such, it is currently necessary to travel to Wrexham to access a number of key amenities. There are no formal cycle routes between the Site and Wrexham and therefore it is necessary to cycle along the road network. **Figure 3-4** shows all areas within an 8km cycle of the Site.

Figure 3-4: Cycling Isochrone



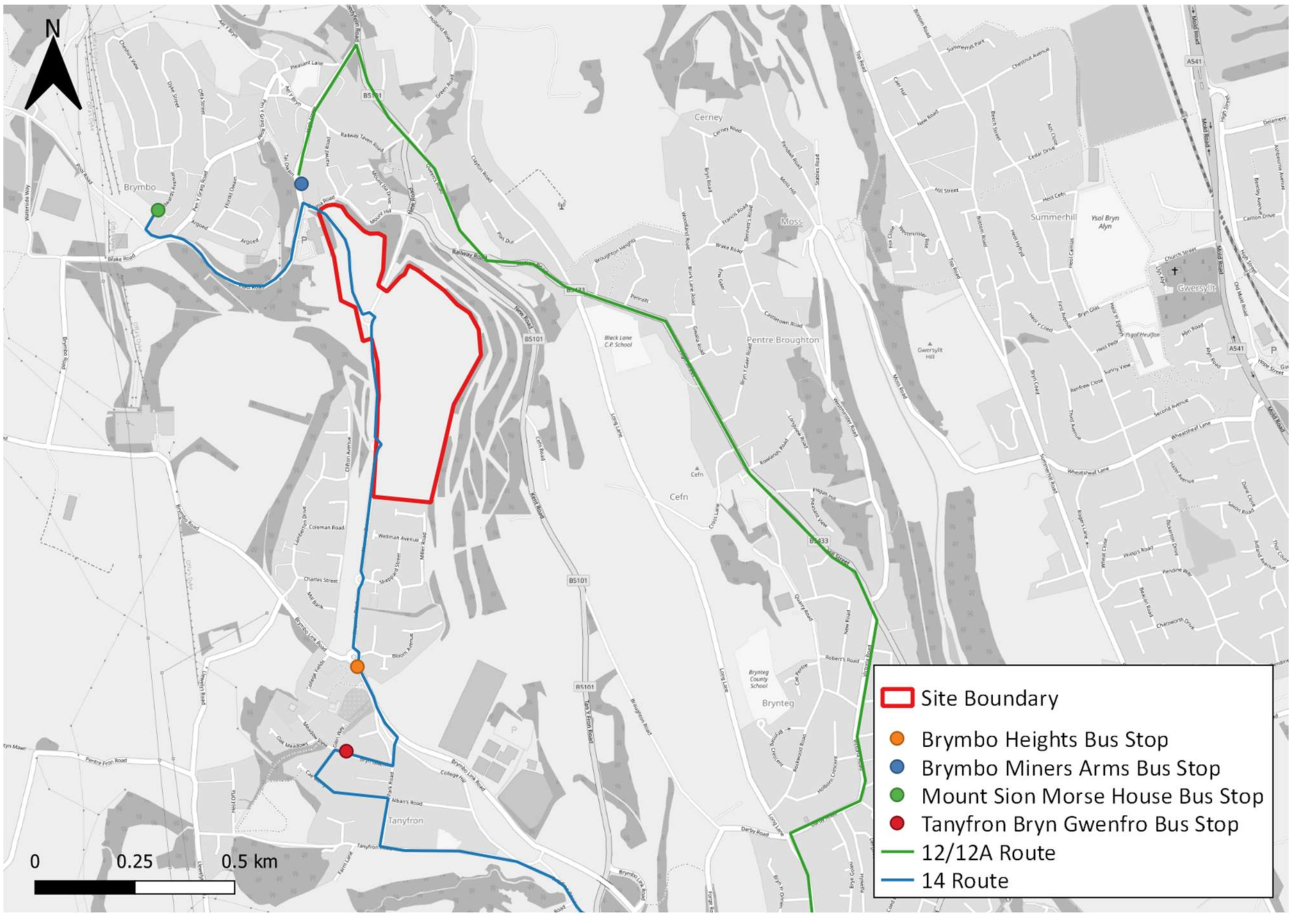
Bus Services

3.2.10 There are currently two key bus routes operating within the vicinity of the Site; the number 12/12A and the number 14. **Table 3-3** provides details of these routes including the location of the nearest stop in relation to the Site, key destinations along each of the routes and the respective service frequencies. This information is then illustrated in **Figure 3-5**.

Table 3-3: Summary of Local Bus Services

Service No.	Nearest Stop	Operator	Route	Weekday Hours of Operation	Weekday Frequency	Days of Operation
12/12A	Brymbo Miners Arms	Arriva	Brymbo Post Office- Brynteg Post Office- Caego Chapel Gardens- Wrexham Bus Station	08:01- 17:41	4 per hour (2 per hour on Sunday)	Mon-Sun
14	Tanyfron Bryn Gwenfro	Arriva	Tanyfron Primary School- Southsea Post Office- Caego Chapel Gardens-Wrexham Bus Station	08:02- 17:02	1 per hour	Mon-Sat

Figure 3-5: Surrounding Bus Service Routes and Stops



3.2.11 Both bus services terminate at Wrexham Bus Station which itself is surrounded by several key destinations; including Maelor Hospital, Wrexham Central Railway Station and Wrexham General Railway Station.

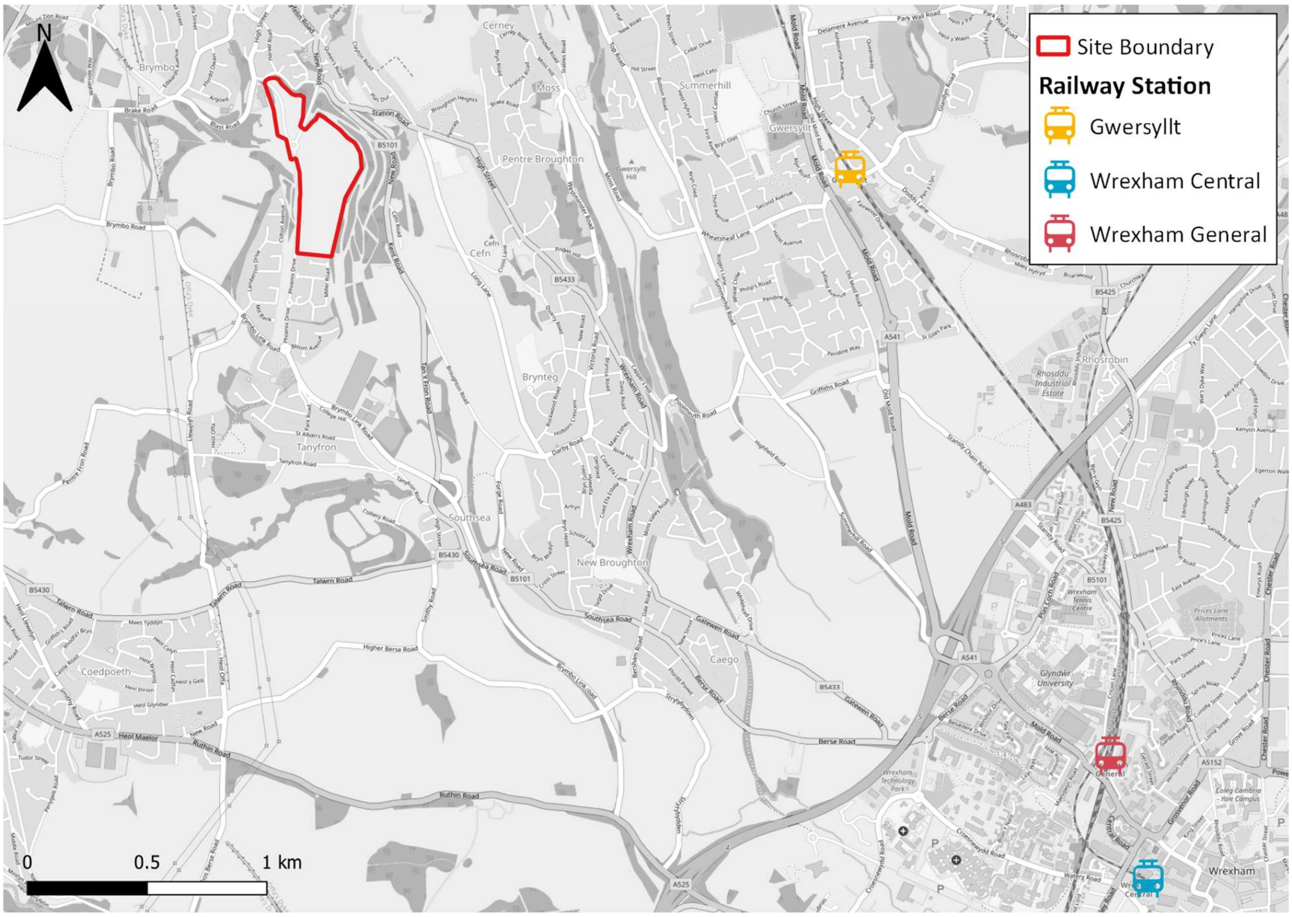
3.2.12 The entirety of the area within the red line boundary is within 400m of the existing bus route.

Rail Services

3.2.13 There are three railway stations within 8km of the Site; Wrexham General, Wrexham Central and Gwersyllt all of which can be accessed within a reasonable journey time by bicycle. Wrexham General and Wrexham Central provide 20 and eight bike storage spaces respectively to encourage multi-modal journeys.

3.2.14 Both Wrexham General and Wrexham Central can be accessed from the Site by bus. The number 12/12A and 14 services terminate at Wrexham Bus Station, with a bus journey time of approximately 15 minutes followed by just over a 10-minute walk to both railway stations.

Figure 3-6: Local Railway Stations



3.2.15 Of the three stations, Wrexham General provides the most comprehensive rail service with direct services to key strategic cities, including Cardiff and Birmingham. Wrexham Central and Gwersyllt provide access to local and regional services. **Table 3-4** summarises these rail services.

Table 3-4: Key Railway Services

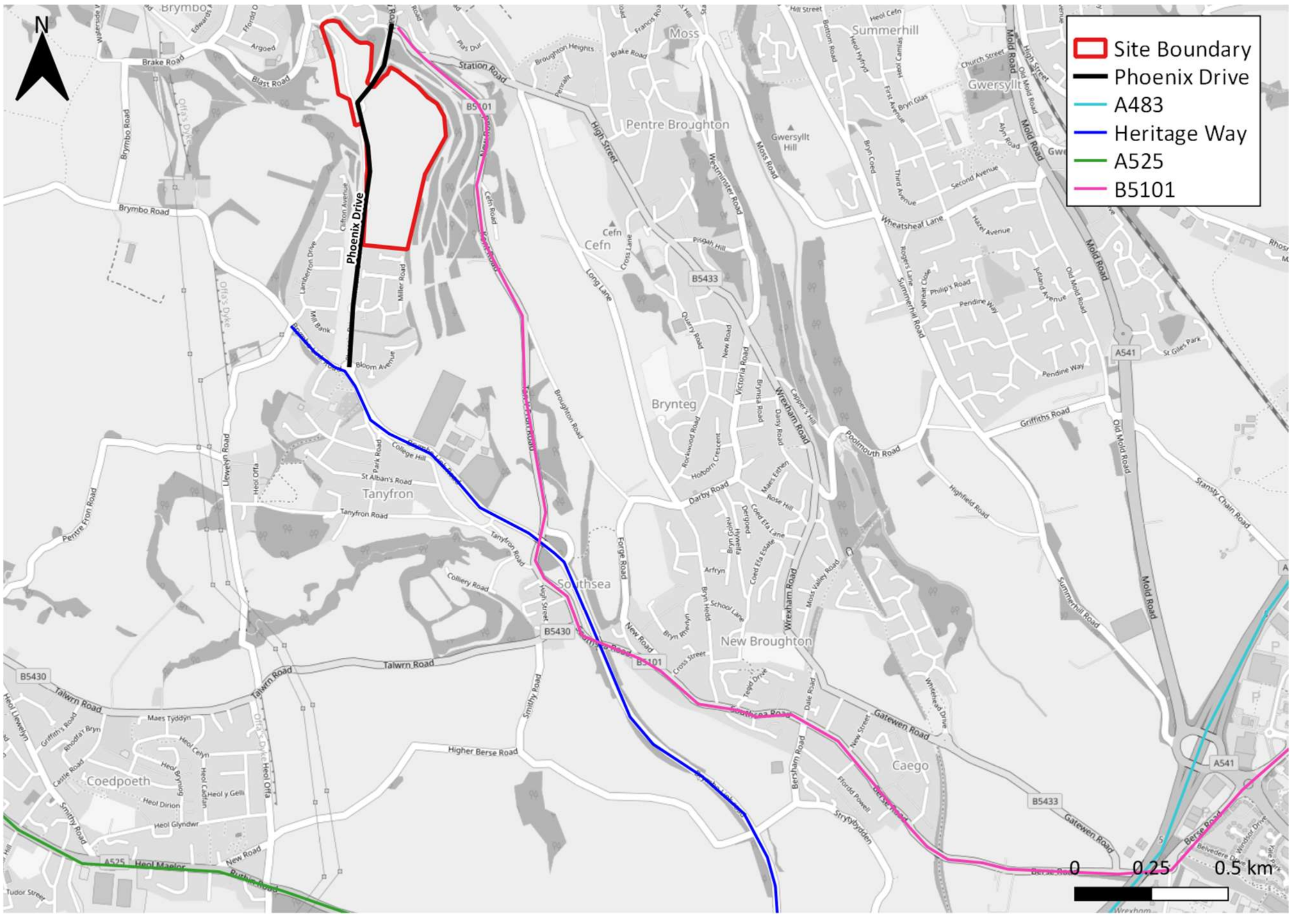
Route	Operator	Frequency (mins)			
		Mon - Fri		Saturday	Sunday
		Peak	Off-Peak		
Wrexham General- Shrewsbury- Telford- Wolverhampton- **Birmingham New Street**	Transport for Wales	1 per 2 hours	1 per 2 hours	1 per 2 hours	1 per 2 hours
Wrexham General- Shrewsbury- Hereford- **Newport- Cardiff Central**	Transport for Wales	1 per hour	1 per 2 hours	1 per 2 hours	2 services (12:44pm and 18:40pm)
Gwersyllt- Wrexham General	Transport for Wales	1 per hour	1 per hour	1 per hour	1 per 2 hours

3.3 Local Highway Network

3.3.1 A purpose-built spine road, Phoenix Drive, has been constructed to serve the wider development. Phoenix Drive connects to the B5101 to the north and the A525 (via Heritage Way) to the south.

3.3.2 The A525 provides access to the A483 at Junction 4 leading to Chester to the north and the A5 and Welshpool to the south. The A525 also provides access to Wrexham to the east. The surrounding highway network is illustrated in **Figure 3-7**.

Figure 3-7: Local Highway Network



Phoenix Drive

3.3.3 Phoenix Drive is a recently constructed single carriageway spine road connecting Heritage Way to the B5101. It is approximately 6.5m in width with footway provision and streetlighting present. The road is subject to a 30mph speed limit. Phoenix Drive was constructed to provide access to development on this wider Site.

3.3.4 Access points have been provided taking the form of roundabout and priority junctions to provide access to already developed parcels and those which were anticipated would be developed in future.

Heritage Way

3.3.5 Heritage Way, previously known as the Brymbo Link Road, is a single carriageway road providing access between the strategic road network (A483 and A525) and Brymbo. It also provides access to the settlements of New Broughton, Pentre Broughton, Lodge and Tanyfron.

3.3.6 Heritage Way is typically around 7.5m in width. There is footway provision between the roundabout formed with Bloom Avenue and the junction formed with Higher Berse Road. There is streetlighting provided between the roundabout formed with Bloom Avenue and the junction formed with the B5101 access.

3.3.7 The speed limit of the road varies with the section to the south of the roundabout formed with Bloom Avenue subject to a 40mph speed limit. On the approach to the junction formed with the A525, the road is subject to the national speed limit of 60mph.

A525

3.3.8 The A525 is a single carriageway road which links Coedpoeth and Wrexham. It also provides access to the strategic network of the A483 at Junction 4. It is approximately 7.5m in width and has footway provision along its northern side between Coedpoeth and Wrexham. There is also street lighting provided between the junction formed with Heritage Way and Junction 4 of the A483.

3.3.9 In the vicinity of Heritage Way, the road is subject to the national speed limit of 60mph, reducing to 50mph around Junction 4 of the A483.

A483

3.3.10 The A483 is part of the strategic road network linking Wrexham to Chester (to the north) and Oswestry (to the south). The section between Ruabon and Chester is dualled.

3.4 Personal Injury Accident Data Analysis

3.4.1 In order to establish whether there are any safety concerns on the local highway network that could be exacerbated by travel demand associated with the proposed development, Personal Injury Collision (PIC) data has been sourced from Wrexham County Borough Council for the five-year period between 01 March 2012 and 28 February 2017[3]. The scope of analysis and location of incidents is shown below in **Figure 3-8**. The analysis is summarised in **Table 3-5**.

[3] PJA has requested updated information from WCBC but this has not been provided at the time of preparing this report.

Figure 3-8: Location and Severity of Personal Injury Collisions

Table 3-5: Recorded Personal Injury Collisions[4]

Link / Junction	Accident Severity			Involving Sensitive Users		
	Slight	Serious	Fatal	Pedestrian	Cycle	Motorcycle
Links						
Heritage Way between Heritage Way / Phoenix Drive / Bloom Avenue roundabout and A525 Ruthin Road	5	-	-	-	-	1
A525 Ruthin Road between Heritage Way and A483 Junction 4	2	1	-	1	-	-
Junctions						
Heritage Way / Tanyfron Road	-	2	-	-	-	-
Heritage Way / B5101	1	1	-	-	-	-
Heritage Way / Bersham Road	1	-	-	-	-	-
Heritage Way / Higher Berse Road	1	-	-	-	-	-
Heritage Way / A525 Ruthin Road	1	-	-	-	-	-
A525 Ruthin Road / A483 Junction 4	4	1	-	-	-	2
Total	**15**	**5**	**-**	**1**	**-**	**3**

Heritage Way between Heritage Way / Phoenix Drive / Bloom Avenue Roundabout and A525 Ruthin Road

3.4.2 A total of five collisions have occurred on Heritage Way between the Heritage Way / Phoenix Drive / Bloom Avenue roundabout and A525 Ruthin Road, all of which were classified as slight in severity. One of the five incidents involved sensitive road users; involving a motorcycle. Driver error was stated as a contributory factor in all five incidents with loss of control being a feature in four of the five collisions. In three of the five incidents, slippery road surface was also given as a contributory factor.

3.4.3 All five PIAs occurred in the vicinity of the access to the Brymbo Sports and Social Complex but only one involved a vehicle accessing the facility. A common causation factor relating to loss of control is present within four of the five recorded incidents in this location. It is understood, in response to the recorded PICs, that the local authority subsequently implemented mitigation measures including a reduced speed limit and advanced warning signs. The data available shows that since the implementation of these measures, no Personal Injury Collisions (PICs) have been recorded at this location.

[4] The table only includes locations where there has been recorded PICs.

A525 Ruthin Road between Heritage Way and A483 Junction 4

3.4.4 A total of three collisions have occurred on A525 Ruthin Road between Heritage Way and A483 junction 4, with one of these incidents involving a pedestrian. Two of these were classified as slight in severity and one was classified as serious. The first slight incident was due to a vehicle's failure to stop in time and the second occurred as a result of careless / reckless driving. The serious incident involved a vehicle colliding with a pedestrian. The pedestrian was found to be impaired by alcohol and had stepped out in front of the oncoming vehicle.

Heritage Way / Tanyfron Road

3.4.5 A total of two collisions have occurred at the Heritage Way / Tanyfron Road junction, both of which were serious in severity and neither of which involved sensitive road users. One collision was caused by aggressive driving and loss of control on the bend on the northern approach to the junction on Heritage Way. The second collision occurred in the dark and was as a result of slippery road conditions, a poor road surface and deposit on the road (e.g. oil or mud).

Heritage Way / B5101

3.4.6 A total of two collisions have occurred at the Heritage Way / B5101 junction. One incident was classified as serious and the other was classified as slight in severity. Neither collision involved sensitive road users. The serious incident was caused by a driver who failed to look properly and who performed a poor turn / manoeuvre whilst exiting the junction towards Brymbo. The slight collision was caused by a vehicle that failed to slow down and collided with the rear of a vehicle slowing to turn left into the junction.

Heritage Way / Bersham Road

3.4.7 One collision, which did not involve sensitive road users, has occurred at the Heritage Way / Bersham Road junction and was classified as slight in severity. The collision was as a result of driver error including junction overshoot, carrying out a poor manoeuvre, failure to / misleading signal and failure to look properly. This resulted in a vehicle pulling out into the path of an oncoming vehicle.

Heritage Way / Higher Berse Road

3.4.8 One collision, which did not involve sensitive road users, has occurred at the Heritage Way / Higher Berse Road junction and was classified as slight in severity. The collision occurred as a result of a driver's failure to judge another person's path / speed. This led to a vehicle colliding with the rear of another vehicle waiting to turn right into the junction.

Heritage Way / A525 Ruthin Road

3.4.9 One collision, which did not involve sensitive road users, has occurred at the Heritage Way / A525 Ruthin Road junction and was classified as slight in severity. The incident occurred as a result of a poor manoeuvre and a driver's failure to look properly. This led to a vehicle pulling out of the junction into the path of an oncoming vehicle.

A525 Ruthin Road / A483 Junction 4

3.4.10 A total of five collisions have occurred at the A525 Ruthin Road / A483 (Junction 4 of the A483). Four of these were classified as slight in severity and one was classified as serious. The serious incident was caused by a driver being impaired by alcohol and took place at the junction of the A483 northbound off slip and the A525. Of the four incidents classified as slight two of these involved motorcycles with both occurring on the carriageway between the A483 northbound and southbound on / off slips. Of the two remaining incidents classified as slight, one occurred at the northbound off slip and the other at the crossroads between the southbound on and off slips.

Summary

3.4.11 Over the five-year period for which data has been provided, there has been a total of 20 collisions, five of which were serious and four of which involved sensitive road users. Analysis of the data revealed common occurrences of PICs on Heritage Way in the vicinity of the Brymbo Sports and Social Complex. However, the local authority has subsequently implemented mitigation measures and since this action was taken, no Personal Injury Collisions (PICs) have been recorded at this location.

3.4.12 As a result, it is considered that there are no inherent highway safety concerns that might be exacerbated by the proposed development.

3.5 Summary

3.5.1 This chapter provides a review of the baseline conditions surrounding the Site. In summary:

- The Site centrally within the settlement of Brymbo and is to the north west of Wrexham.
- The Site is accessed from Phoenix Drive, a newly constructed spine road with the purpose of serving existing and proposed development.
- There are existing pedestrian and cycle facilities in the area surrounding the Site.
- There are also public transport services serving local bus stops and railway stations.
- There are limited local facilities which can be accessed using sustainable travel modes. Improvements as part of the proposed development to enhance access by sustainable travel modes are suggested in **Chapter 4** as part of a comprehensive integrated transport strategy for the Site.

- It is considered that there are no inherent highway safety concerns that might be exacerbated by the proposed development.

4 Proposed Development and Integrated Transport Strategy

4.1 Development Proposals

4.1.1 It is proposed to develop the site to accommodate the following development mix:

- 300 dwellings;
- Small district centre, comprising:
  - Food store – 930sqm;
  - Local retail – 465sqm; and
  - Public house/restaurant – 372sqm.
  - Health centre/other non-residential use – up to 465sqm; and
- Primary School – 2FE/c. 420 pupils.

4.1.2 The facilities proposed would benefit both existing residents in the surrounding area and future residents. The facilities would reduce the need for future residents to travel and also reduce the distances travelled by existing residents to reach existing facilities. This is particularly the case for travel to food and non-food retail, healthcare and education which are also proposed to be provided on-site.

4.1.3 It is proposed that the development would accommodate a small district centre and primary school, these would be centred around the northernmost roundabout on Phoenix Drive. This area would also include residential properties. This area of the development would be accessed from various access points from Phoenix Drive.

4.1.4 Further details of the access strategy are provided in the proceeding sections.

4.2 Integrated Transport Strategy

4.2.1 The purpose of the proceeding sections is to define the strategy for accessing the development, as follows:

- Pedestrian and cycle access;
- Public transport access;
- Vehicular access;
- Parking; and
- Access around and through the small district centre.

Pedestrian and Cycle Access Strategy

4.2.2 The development infrastructure will be designed to accommodate pedestrians and cyclists. The design will ensure good connectivity between and permeability through the development and minimise conflicts with vehicular traffic. Where appropriate, pedestrians and cyclists will be placed at the top of the user hierarchy.

4.2.3 It will be ensured that the infrastructure for non-motorised users links well to the existing network. Footway provision, with street lighting, is already in place along Phoenix Drive which links to the existing wider pedestrian network. There are also existing public rights of way passing adjacent to the Site as shown in **Figure 3-2**. These will be maintained and enhanced, where appropriate.

4.2.4 Secure and convenient to use cycle parking will be provided in line with minimum standards contained in Local Planning Policy Guidance Note 16 (Wrexham County Borough Council).

Public Transport Access Strategy

4.2.5 The number 14 bus service (operated by Arriva), currently provides services between Brymbo and Wrexham. The service routes along Phoenix Drive and operates at an hourly frequency during the daytime between Monday and Saturday.

4.2.6 The development is within 400m of the existing bus route (Phoenix Drive) and so no re-routing is required.

4.2.7 Bus stops will be provided along Phoenix Drive at locations to best serve the development. The stops will be placed at appropriate intervals and it is likely there would be a stop provided in the area adjacent to the small district centre to enhance accessibility to this area. Consideration will also be given to increasing the service frequency.

Vehicular Access Strategy

4.2.8 Vehicular access to the proposed development will be facilitated by multiple access junctions formed with Phoenix Drive.

4.2.9 In terms of servicing and deliveries, roads will be constructed to adequate geometries to accommodate such vehicles. This will include appropriate turning and manoeuvring space where required. This will be considered further at the reserved matters stage.

Residential Parking

4.2.10 It is proposed to provide parking in line with WCBC parking standards. A summary of the parking standards applicable to residential properties is provided in **Table 4-1**. This will be considered further at reserved matters stage.

Table 4-1: Residential Parking Standards

Number of Bedrooms	Car Parking Standard	Cycle Parking Standard
1 bedroom	1.5 spaces per dwelling	Sufficient space to provide at least 2 secure cycle parking spaces per dwelling. In the case of flats, this should be provided via safe and secure communal cycle parking areas.
2 bedrooms	2 spaces per dwelling	
3/4 bedrooms	3 spaces per dwelling	
5 or more bedrooms	4 spaces per dwelling	

Small District Centre Parking and Movement Strategy

4.2.11 It is proposed to provide a small district centre comprising a primary school, food and non-food retail, healthcare and a public house/restaurant. These facilities will be concentrated in the area surrounding the northernmost roundabout on Phoenix Drive.

Non-Motorised User Access

4.2.12 The area surrounding the small district centre and school will be designed to ensure that pedestrians and cyclists can adequately access the facilities from existing and future development. Access to the centre from the surrounding residential development will be as direct as possible for pedestrians and cyclists.

Public Transport Access

4.2.13 It is intended that existing bus services would be improved to serve the development. It is likely that bus stops would be provided on Phoenix Drive adjacent to the small district centre to allow public transport access to the proposed facilities.

Cycle Parking

4.2.14 Cycle parking will be provided in line with WCBC parking standards. A summary of the applicable parking standards is provided in **Table 4-2**.

Table 4-2: WCBC Cycle Parking Standards

Land Use	Parking Standard	Proposed GFA	Minimum Parking Spaces
Food Retail (>300sqm)	1 per 140sqm GFA	930sqm	7
Non-Food Retail (>300sqm)	1 per 200sqm GFA	465sqm	3

Car Parking

4.2.15 Car parking will be provided within the small district centre area, this will not however be to the detriment of non-motorised user access. This section provides an indication of the level of parking which would be provided as part of the development. The details will be discussed and agreed at reserved matters stage.

4.2.16 It is proposed to provide car parking in line with WCBC parking standards to meet the likely demand for parking whilst ensuring that the parking provision does not dominate the development. Due to the mix of land uses proposed, it is proposed to encourage shared use of the car parking.

4.2.17 Indicatively:

- The food store would have a car park which would be primarily used by its customers although this could be used for other land uses;
- There would be on-street parking bays fronting the smaller retail units primarily for the use of these units;
- The health centre would have some operational car parking;
- The public house/restaurant would have a car park which, due to the hours of operation, could also be used for school drop offs and pick-ups; and
- The car parking at the Heritage centre could also be used for school drop offs and pickups.

4.2.18 The WCBC parking standards are set out in **Table 4-3**.

Table 4-3: WCBC Car Parking Standards

Land Use	Maximum Parking Standard	Proposed GFA	Maximum Parking Spaces
Food Retail (>300sqm)	1 per 14sqm GFA	930sqm	66
Non-Food Retail (>300sqm)	1 per 20sqm GFA	465sqm	23
Pub	1 space per 4sqm of public floor space	-	-

4.2.19 It is proposed to provide 46 spaces in the area fronting the food store and 16 spaces in the area fronting the small retail units which is within the maximum standards prescribed by WCBC. Due to the envisaged local catchment of customers and since there is likely to be a relatively higher turnover of parking than for a typical larger food store, this level of parking is envisaged to be sufficient.

4.2.20 To facilitate the school drop-offs and pick-ups, the shared use of other car parks is suggested. It is proposed that nearby on-street provision, parking for the Brymbo Heritage Trust facilities and parking for the other uses within the small district centre would be a relatively short walking distance to the school. Furthermore, it is unlikely that all these car parking areas would be busy during school drop off and pick up times.

4.2.21 The precise strategy would be determined at reserved matters stage.

4.3 Summary

4.3.1 This chapter has set out the strategy for multi-modal access:

- Access would be provided to the various development areas for pedestrians, cyclists and vehicles. Public transport access will also be ensured.
- Vehicular access would be provided from Phoenix Drive.

5 Travel Demand

5.1 Introduction

5.1.1 For the purposes of the assessment of travel demand, the following development mix has been assumed to provide a robust assessment although it should be noted that consent is sought for 300 dwellings:

- Up to 350 dwellings;
- Small district centre, comprising:
  - Express style food store – 930sqm;
  - Small retail units – 465sqm; and
  - Public house/restaurant – 372sqm.
  - Health centre/other non-residential use – up to 465sqm; and
- Primary School – 2FE/c. 420 pupils.

5.1.2 The primary school already has outline consent and so has been treated as committed development. There is also extant permission for a 1,700sqm 'express' style food store and six no. non-food retail units (93sqm each) (ref: P/2012/0816) which have been used to determine the net trip generation.

5.2 Extant Development Trip Generation

Retail

5.2.1 To forecast the likely traffic generation of the extant retail uses as part of application P/2012/0816 (and in the absence of a supporting Transport Assessment), trip rates have been extracted from the TRICS database (outputs are included at **Appendix B**), as follows:

- Sites selected from 01 – Retail, I – Local Shops category;
- Sites surveyed on a weekday have been included;
- Sites located in a suburban/neighbourhood centre location have been included; and
- Sites which include convenience retail/small food store have been included.

5.2.2 The above provides an approximation of trip rates for the combined retail offering (small food store/convenience store and retail units). The corresponding average vehicle trip rates and resultant traffic generation is provided in **Table 5-1**.

Table 5-1: Retail Vehicle Trip Rates and Traffic Generation

Time Period[5]	Trip Rates (per 100sqm)			Trip Generation (2,258sqm)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
AM Peak Hour	4.376	3.859	8.235	99	87	186
PM Peak Hour	5.426	6.012	11.438	123	136	258

5.3 Committed Development Trip Generation

5.3.1 WCBC, during scoping meetings, requested consideration was given to the Tomlinson Dairies Site in terms of committed development. It is understood that the expansion and car park/access reconfiguration has already been completed and would have been operational at the time of the base traffic surveys. As such, no further consideration has been given to this.

5.3.2 Since the primary school already has outline planning consent, traffic generated by this has been included in the committed development scenario, as set out below.

5.3.3 There is already outline consent for the exhibition area in the former machine shop. It is however assumed that the vehicular trip generation during the peak hours considered in this assessment would be minimal. As such, no further consideration has been given to this.

5.3.4 PJA is not aware of any further committed developments which would impact on the local highway network and therefore any other growth in traffic levels has been adequately accounted for using TEMPro growth factors.

Primary School

5.3.5 A planning application was submitted and approved in 2017 (ref 2017/0105). As such, the school will be treated in trip generation terms as committed development.

5.3.6 To account for the traffic likely to be generated by the consented primary school, trip rates have been extracted from the TRICS database (outputs are included at **Appendix B**), as follows:

- Sites selected from 04 – Education, A – Primary;
- Sites surveyed on a weekday have been included;
- Sites located in a suburban/neighbourhood centre location have been included; and
- Sites with more than 250 pupils have been included.

5.3.7 The corresponding average vehicle trip rates and resultant traffic generation is provided in **Table 5-2**.

[5] AM Peak Hour of 08:00 to 09:00 and PM Peak Hour of 17:00 to 18:00 is assumed throughout.

Table 5-2: Primary School Vehicle Trip Rates and Traffic Generation

Time Period	Trip Rates (per pupil)			Trip Generation (420 pupils)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
AM Peak Hour	0.266	0.187	0.453	112	79	191
PM Peak Hour[6]	0.022	0.028	0.050	9	12	21

5.3.8 It is assumed that the departures during the AM peak hour are associated with pupil drop offs and the arrivals during the PM peak hour are associated with out of hours pupil pickups. On this basis, a breakdown of staff and pupil associated vehicle trips is provided in **Table 5-3**.

Table 5-3: Primary School Traffic Generation by Staff/Pupils

Time Period	Staff			Pupils		
	Arrivals	Departures	Total	Arrivals	Departures	Total
AM Peak Hour	33	0	33	79	79	158
PM Peak Hour	0	3	3	9	9	18

5.4 Proposed Development Trip Generation

Residential

5.4.1 Trip rates have been calculated for the proposed residential element utilising local traffic count data. A traffic count was undertaken at the Bloom Avenue/Brymbo Road/Phoenix Drive junction. A summary of the surveyed traffic flows is provided in **Table 5-4** using traffic volumes on the Bloom Avenue arm of the roundabout.

Table 5-4: AM and PM Peak Hour Traffic Survey Summary – Bloom Avenue

	To Bloom Avenue	From Bloom Avenue	Total
AM Peak Hour	19	44	63
PM Peak Hour	40	19	59

5.4.2 A total of 103 dwellings are accessed from Bloom Avenue, as follows:

- Bloom Avenue – 46 dwellings;
- Ingot Close – 31 dwellings; and
- Chariot Drive – 26 dwellings.

5.4.3 The corresponding calculated trip rates and resultant trip generation for the proposed residential development are provided in **Table 5-5**.

[6] This is the network PM peak hour of 17:00 to 18:00 which is being assessed, not the school PM peak hour.

Table 5-5: Calculated Residential Trip Rates and Traffic Generation

Time Period	Trip Rates (per dwelling)			Traffic Generation (up to 350 dwellings)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
AM Peak Hour	0.184	0.427	0.612	65	150	214
PM Peak Hour	0.388	0.184	0.573	136	65	201

5.4.4 The above trip rates provide a robust indication of residential traffic generation since the existing residential development is located some distance away from local facilities. The provision of local facilities within the development will reduce the need to travel by car, particularly to retail, healthcare and educational facilities.

5.4.5 Not only would this mean that the above forecast of traffic generation is likely to be high, the volume of traffic generated by the existing surrounding residential development could also reduce due to the reduced need to travel longer distances to everyday amenities.

Retail

5.4.6 The trip rates extracted for the extant retail use have been used to forecast the traffic likely to be generated by the proposed retail element. The corresponding average trip rates and resultant traffic generation is provided in **Table 5-6**.

Table 5-6: Retail Trip Rates and Traffic Generation

Time Period	Trip Rates (per 100sqm)			Trip Generation (1,394sqm)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
AM Peak Hour	4.376	3.859	8.235	61	54	115
PM Peak Hour	5.426	6.012	11.438	76	84	160

Public House/Restaurant

5.4.7 Trip rates have been extracted from the TRICS database to forecast the traffic likely to be generated by the proposed public house, (outputs are included at **Appendix B**), as follows:

- Sites selected from 06 – Hotel, Food & Drink, C – Pub/Restaurant;
- Sites surveyed on a weekday have been included;
- Sites located in a suburban/neighbourhood centre location have been included; and
- Sites occupying up to 1000sqm have been included.

5.4.8 The corresponding average trip rates and resultant traffic generation is provided in **Table 5-7**.

Table 5-7: Public House/Restaurant Trip Rates and Traffic Generation

Time Period	Trip Rates (per 100sqm)			Trip Generation (372sqm)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
AM Peak Hour	0	0	0	0	0	0
PM Peak Hour	2.745	2.297	5.042	10	9	19

Health Centre

5.4.9 Trip rates have been extracted from the TRICS database to forecast the traffic likely to be generated by the proposed healthcare element (outputs are included at **Appendix B**), as follows:

- Sites selected from 05 – Health, G – GP Surgeries;
- Sites surveyed on a weekday have been included;
- Sites located in a suburban/neighbourhood centre location have been included; and
- Sites occupying between 300 sqm and 700 sqm have been included.

5.4.10 The corresponding average trip rates and resultant traffic generation is provided in **Table 5-8**.

Table 5-8: Health Centre Trip Rates and Traffic Generation

Time Period	Trip Rates (per 100sqm)			Trip Generation (465sqm)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
AM Peak Hour	2.667	1.497	4.164	12	7	19
PM Peak Hour	2.041	3.021	5.062	9	14	23

Net Trip Generation

5.4.11 The Site already benefits from a range of previous planning consents. This includes extant outline permission for retail uses. A summary of the net trip generation is provided in **Table 5-9**.

Table 5-9: Net Trip Generation

Development	AM Peak Hour			PM Peak Hour		
	Arrivals	Departures	Total	Arrivals	Departures	Total
Proposed New Development (excl. Primary School)	138	210	348	231	171	402
Extant Permission – Retail Uses	*99*	*87*	*186*	*123*	*136*	*258*
Net Development	**39**	**123**	**162**	**108**	**35**	**144**

5.4.12 The proposed development is forecast to generate 162 and 144 total trips in the AM and PM peak hours respectively, net of trips forecast to be generated by extant permissions. This therefore forms the basis of the assessment.

5.4.13 It should however be noted that the provision of local facilities on the site is likely to reduce the need to travel for existing residents in the adjoining areas for retail, healthcare and education journey purposes. This has not been accounted for within this assessment and so provides a robust assessment of the impact of the proposals.

5.5 Trip Distribution and Assignment

5.5.1 Gravity models have been developed to appropriately distribute the traffic associated with the proposed development, as follows:

- Residential and School.
- Retail.

5.5.2 A Technical Note is provided in **Appendix C** which sets out the methodology used and also includes the traffic flow and distribution diagrams.

5.5.3 Since no Transport Assessment is available to directly inform the distribution of the extant retail uses, the Retail gravity model has been utilised. The distribution of traffic is in line with the catchment area identified by RPS in the Retail Study submitted with the planning application for the extant use.

5.6 Travel Demand Management

5.6.1 An overarching Travel Plan has been prepared to support the planning application. This provides a framework for the preparation of the final Travel Plan and covers the mix of uses proposed on-Site. To provide a robust assessment of development impact however, no reductions have been applied to the trip generation to account for the Travel Plan.

6 Development Impact

6.1 Network Study Area

6.1.1 Based on the assignment of development traffic the following junctions have been considered as part of the assessment:

- Bloom Avenue/Brymbo Road/Phoenix Drive;
- A525/Heritage Way; and
- A525/A483 (Junction 4 of A483).

6.1.2 PJA commissioned traffic surveys at the above junctions on Thursday 28 June 2018 between 07:00 and 10:00 hours in the AM period and between 16:00 and 19:00 hours in the PM period.

6.1.3 The impact of the proposed development has been assessed for the above junctions using standalone junction capacity modelling software (Junctions 9 or LinSig, as appropriate). Proportionate and reasonable mitigation has been considered where required and feasible.

6.2 Assessment Periods

6.2.1 The following peak hour time periods have been assessed in line with the peak hours for development traffic generation:

- AM: 08:00 to 09:00 hours; and
- PM: 17:00 to 18:00 hours.

6.2.2 The following scenarios have been assessed:

- 2020 Base;
- Future Year Base;
- Future Year Base + Committed Development; and
- Future Year Base + Committed Development + Proposed Development.

6.2.3 A future year of 2025 for the local network and 2030 for the strategic network (i.e. Junction 4 of the A483) have been assessed. The appropriate factors to growth traffic data from the base year of 2018 to the future years of 2025 and 2030 have been obtained from the TEMPro database, as set out in **Table 6-1**.

Table 6-1: TEMPro Growth Factors (Wrexham LA)

	AM Peak	PM Peak
2018 to 2020	1.0269	1.0264
2018 to 2025	1.0820	1.0820
2018 to 2030	1.1352	1.1365

6.3 Development Impact in Brymbo

6.3.1 In the area to the north of the Site, traffic has been distributed either towards Gwalia Road (via the unnamed road from the roundabout on Phoenix Drive) or towards the B5101 (via Phoenix Drive). Traffic forecast to travel to/from Brymbo centre, has been distributed along the unnamed road and traffic forecast to travel to/from areas to the east of the Site has been distributed along Phoenix Drive.

6.3.2 Approximately 30% of traffic has been distributed to the north of the Site following the gravity modelling. No capacity issues have been noted in this area and therefore further assessment of junction capacity has not been undertaken for this area.

6.4 Junction Capacity Assessments

6.4.1 Junction capacity assessments have been undertaken using standalone junction models. The modelling outputs are provided in **Appendix D**.

Phoenix Drive/Bloom Avenue/Heritage Way/Brymbo Road Roundabout

6.4.2 The Phoenix Drive/Bloom Avenue/Heritage Way/Brymbo Road junction takes the form of a four-arm roundabout. The junction has been modelled using Junctions 9. The results are presented in **Tables 6-2** to **6-5**.

Table 6-2: Phoenix Drive/Bloom Avenue/Heritage Way/Brymbo Road Roundabout – 2020 Base Results

Arm	AM Peak			PM Peak		
	RFC	Queue	Delay	RFC	Queue	Delay
Phoenix Drive	0.18	0	3	0.12	0	3
Bloom Avenue	0.06	0	4	0.02	0	4
Heritage Way	0.12	0	3	0.24	0	3
Brymbo Road	0.14	0	3	0.07	0	3

Table 6-3: Phoenix Drive/Bloom Avenue/Heritage Way/Brymbo Road Roundabout – 2025 Base Results

Link Name	AM Peak			PM Peak		
	RFC	Queue	Delay	RFC	Queue	Delay
Phoenix Drive	0.19	0	3	0.12	0	3
Bloom Avenue	0.06	0	5	0.02	0	4
Heritage Way	0.12	0	3	0.26	0	3
Brymbo Road	0.15	0	3	0.08	0	3

Table 6-4: Phoenix Drive/Bloom Avenue/Heritage Way/Brymbo Road Roundabout – 2025 Base + Committed Development Results

Link Name	AM Peak			PM Peak		
	RFC	Queue	Delay	RFC	Queue	Delay
Phoenix Drive	0.23	0	4	0.13	0	3
Bloom Avenue	0.06	0	5	0.02	0	4
Heritage Way	0.15	0	3	0.26	0	3
Brymbo Road	0.17	0	3	0.08	0	3

Table 6-5: Phoenix Drive/Bloom Avenue/Heritage Way/Brymbo Road Roundabout – 2025 Base + Committed Development + Net Development Results

Link Name	AM Peak			PM Peak		
	RFC	Queue	Delay	RFC	Queue	Delay
Phoenix Drive	0.30	0	4	0.14	0	3
Bloom Avenue	0.07	0	5	0.02	0	4
Heritage Way	0.17	0	3	0.29	0	3
Brymbo Road	0.17	0	3	0.09	0	3

6.4.3 The Phoenix Drive/Bloom Avenue/Heritage Way/Brymbo Road roundabout is forecast to operate well within acceptable thresholds of capacity in all the scenarios modelled. No capacity improvements are therefore required at this junction to facilitate the proposed development.

A525/Heritage Way Junction

6.4.4 The A525/Heritage Way junction takes the form of a priority junction. The minor arm is formed by Heritage Way and the major arms are formed by the A525. The junction has been modelled using Junctions 9. The results are presented in **Tables 6-6** to **6-9**, below.

Table 6-6: A525/Heritage Way Junction – 2020 Base Results

Link Name	AM Peak			PM Peak		
	RFC	Queue	Delay	RFC	Queue	Delay
Heritage Way – Left turn	0.66	2	18	0.51	1	13
Heritage Way – Right turn	0.03	0	15	0.09	0	44
A525 (E) – Ahead/Right turn	0.61	2	18	1.05	44	191

Table 6-7: A525/Heritage Way Junction – 2025 Base Results

Link Name	AM Peak			PM Peak		
	RFC	Queue	Delay	RFC	Queue	Delay
Heritage Way – Left turn	0.71	2	19	0.56	1	13
Heritage Way – Right turn	0.03	0	15	0.20	0	87
A525 (E) – Ahead/Right turn	0.65	2	19	1.12	80	388

Table 6-8: A525/Heritage Way Junction – 2025 Base + Committed Development Results

Link Name	AM Peak			PM Peak		
	RFC	Queue	Delay	RFC	Queue	Delay
Heritage Way – Left turn	0.71	2	20	0.56	1	13
Heritage Way – Right turn	0.04	0	15	0.20	0	87
A525 (E) – Ahead/Right turn	0.66	2	19	1.12	80	388

Table 6-9: A525/Heritage Way Junction – 2025 Base + Committed Development + Net Development Results

Link Name	AM Peak			PM Peak		
	RFC	Queue	Delay	RFC	Queue	Delay
Heritage Way – Left turn	0.80	4	28	0.64	2	17
Heritage Way – Right turn	0.04	0	16	0.44	1	236
A525 (E) – Ahead/Right turn	0.73	3	24	1.16	107	510

6.4.5 The A525/Heritage Way junction currently operates within capacity in the AM peak hour and outside acceptable thresholds of capacity during the PM peak hour. The junction continues to operate within capacity in the AM peak hour in the future year and with development scenarios. The performance of the junction is forecast to worsen further in the future assessment year and with the addition of development traffic.

6.4.6 It is therefore proposed that a scheme would be required in this location to mitigate the development impact. The predominant traffic movements during the peak periods which conflict with other movements are left out of Heritage Way and right into Heritage Way.

6.4.7 In order to better facilitate these movements, it is proposed to control traffic using traffic signals. Since the left turn movements out of Heritage Way and the right turn movements into Heritage Way are not in conflict, these movements could operate concurrently.

6.4.8 The proposed mitigation layout is shown on **Drawing 3499-0001-A-P0** included at **Appendix E**. The proposed scheme has been modelled in Linsig V3 and the results are provided in **Table 6-10** and **Appendix F**.

Table 6-10: A525/Heritage Way – Proposed Mitigation Layout – 2025 Base + Committed Development + Net Development

Link No.	Link Name	AM Peak			PM Peak		
		DoS	Ave. Delay (s/PCU)	MMQ (PCU)	DoS	Ave. Delay (s/PCU)	MMQ (PCU)
1/1+1/2	Heritage Way Left Right	51%	18	8	32%	11	4
2/1+2/2	A525 (E) Right Ahead	66%	15	8	94%	28	21
3/1	A525 (W) Left Ahead	65%	29	11	91%	66	15
PRC (Cycle Time)		36% (90s)			-5% (90s)		

6.4.9 The proposed junction improvement scheme more than mitigates the forecast development impact. In the AM peak hour, the junction is forecast to operate within acceptable capacity thresholds with the junction forecast to operate marginally above capacity in the PM peak hour this however mitigates the impact of the proposed development since queues and delays are no worse than the without development scenario for the current layout.

6.4.10 Whilst the introduction of signal control could add delays to through movements on the A525, the modelling has demonstrated that these delays would not be unacceptable with these movements operating within capacity in the AM peak hour and at capacity in the PM peak hour. Before the introduction of signal control, the queue of right turning vehicles from the A525 (E) in the PM peak hour is forecast in the future year to extend back beyond Junction 4 of the A483 thus obstructing the free flow of westbound movements on the A525. The introduction of signal control would greatly reduce this queuing and hence reduce delays for westbound through movements on the A525.

6.4.11 Furthermore, if an element of signal control is introduced at Junction 4 of the A483, coordination could be introduced to ensure a more efficient flow of traffic through this part of the network.

A483 Junction 4

6.4.12 Junction 4 of the A483 is signal controlled. The junction comprises two signal-controlled junctions formed with the A525.

6.4.13 One providing access to the A483 northbound on-slip and egress from the A483 northbound off slip. The other junction provides access to the A483 southbound on-slip and egress from the A483 southbound off slip. The junction has been modelled in LinSig V3 and the results are presented in **Tables 6-11** to **6-14**.

Table 6-11: A483 Junction 4 - 2020 Base Results

Link No.	Link Name	AM Peak			PM Peak		
		DoS	Ave. Delay (s/PCU)	MMQ (PCU)	DoS	Ave. Delay (s/PCU)	MMQ (PCU)
1/2+1/1	A525 West (Eastbound) Ahead Left	106%	171	40	98%	96	18
1/3	A525 West (Eastbound) Ahead	46%	37	5	57%	46	5
2/1	A483 Northbound Off-Slip Left	51%	32	6	111%	252	48
2/2	A483 Northbound Off-Slip Right	58%	34	7	41%	32	5
3/1	A525 West (Westbound) Ahead	74%	40	7	85%	16	10
3/2	A525 West (Westbound) Right	32%	5	2	22%	4	3
4/1	A525 East (Eastbound) Ahead	78%	16	10	54%	26	7
4/2	A525 East (Eastbound) Right	27%	3	2	22%	35	4
5/1	A483 Southbound Off-Slip Left	91%	62	16	32%	36	3
5/2	A483 Southbound Off-Slip Right	45%	32	5	99%	114	18
6/1	A525 East (Westbound) Left	47%	51	3	44%	48	3
6/2+6/3	A525 East (Westbound) Ahead	90%	71	9	107%	210	29
PRC (Cycle Time)		-17% (90s)			-23% (90s)		

6.4.14 In line with observations, the junction operates outside acceptable thresholds of capacity in both peak hours in the base year scenario. In the AM peak hour, the highest queues and delays are seen on the A525 (West) approach to the junction.

6.4.15 In the PM peak hour, the A525 (West) approach is again forecast to operate outside acceptable thresholds of capacity with higher associated queues and delays. The highest queues and delays are however observed on the A525 (East) approach with queues of 53 PCUs observed on this approach in the PM peak hour.

6.4.16 In the future year scenarios, the junction performance has been optimised to minimise queuing between the junctions and to minimise the impact of queuing on the A483 off-slips on the A483 mainline.

Table 6-12: A483 Junction 4 - 2030 Base Results

Link No.	Link Name	AM Peak			PM Peak		
		DoS	Ave. Delay (s/PCU)	MMQ (PCU)	DoS	Ave. Delay (s/PCU)	MMQ (PCU)
1/2+1/1	A525 West (Eastbound) Ahead Left	137%	580	132	198%	960	167
1/3	A525 West (Eastbound) Ahead	66%	50	6	126%	481	31
2/1	A483 Northbound Off-Slip Left	57%	34	7	100%	100	28
2/2	A483 Northbound Off-Slip Right	64%	36	8	37%	26	5
3/1	A525 West (Westbound) Ahead	58%	20	4	86%	16	10
3/2	A525 West (Westbound) Right	25%	4	2	22%	6	4
4/1	A525 East (Eastbound) Ahead	70%	10	10	46%	23	5
4/2	A525 East (Eastbound) Right	27%	3	3	21%	44	4
5/1	A483 Southbound Off-Slip Left	97%	86	22	30%	32	3
5/2	A483 Southbound Off-Slip Right	47%	31	6	91%	67	15
6/1	A525 East (Westbound) Left	78%	88	5	48%	49	3
6/2+6/3	A525 East (Westbound) Ahead	149%	547	67	118%	359	53
PRC (Cycle Time)		-65% (90s)			-120% (90s)		

6.4.17 In the future year base, the operation is forecast to worsen with the growth in the base year traffic.

Table 6-13: A483 Junction 4 - 2030 Base + Committed Development

Link No.	Link Name	AM Peak			PM Peak		
		DoS	Ave. Delay (s/PCU)	MMQ (PCU)	DoS	Ave. Delay (s/PCU)	MMQ (PCU)
1/2+1/1	A525 West (Eastbound) Ahead Left	138%	586	133	198%	962	168
1/3	A525 West (Eastbound) Ahead	66%	50	6	126%	481	31
2/1	A483 Northbound Off-Slip Left	57%	34	7	97%	77	24
2/2	A483 Northbound Off-Slip Right	64%	36	8	36%	25	5
3/1	A525 West (Westbound) Ahead	59%	21	4	85%	17	9
3/2	A525 West (Westbound) Right	25%	4	2	21%	4	4
4/1	A525 East (Eastbound) Ahead	70%	10	10	45%	22	5
4/2	A525 East (Eastbound) Right	27%	3	3	21%	45	4
5/1	A483 Southbound Off-Slip Left	97%	86	22	30%	32	3
5/2	A483 Southbound Off-Slip Right	48%	31	6	91%	68	15
6/1	A525 East (Westbound) Left	78%	88	5	52%	52	3
6/2+6/3	A525 East (Westbound) Ahead	149%	547	67	129%	482	70
PRC (Cycle Time)		-65% (90s)			-120% (90s)		

6.4.18 The addition of committed development traffic does not impact on the operation of the junction since the number of committed development trips on this part of the network is minimal.

Table 6-14: A483 Junction 4 - 2030 Base + Committed Development + Net Development Results

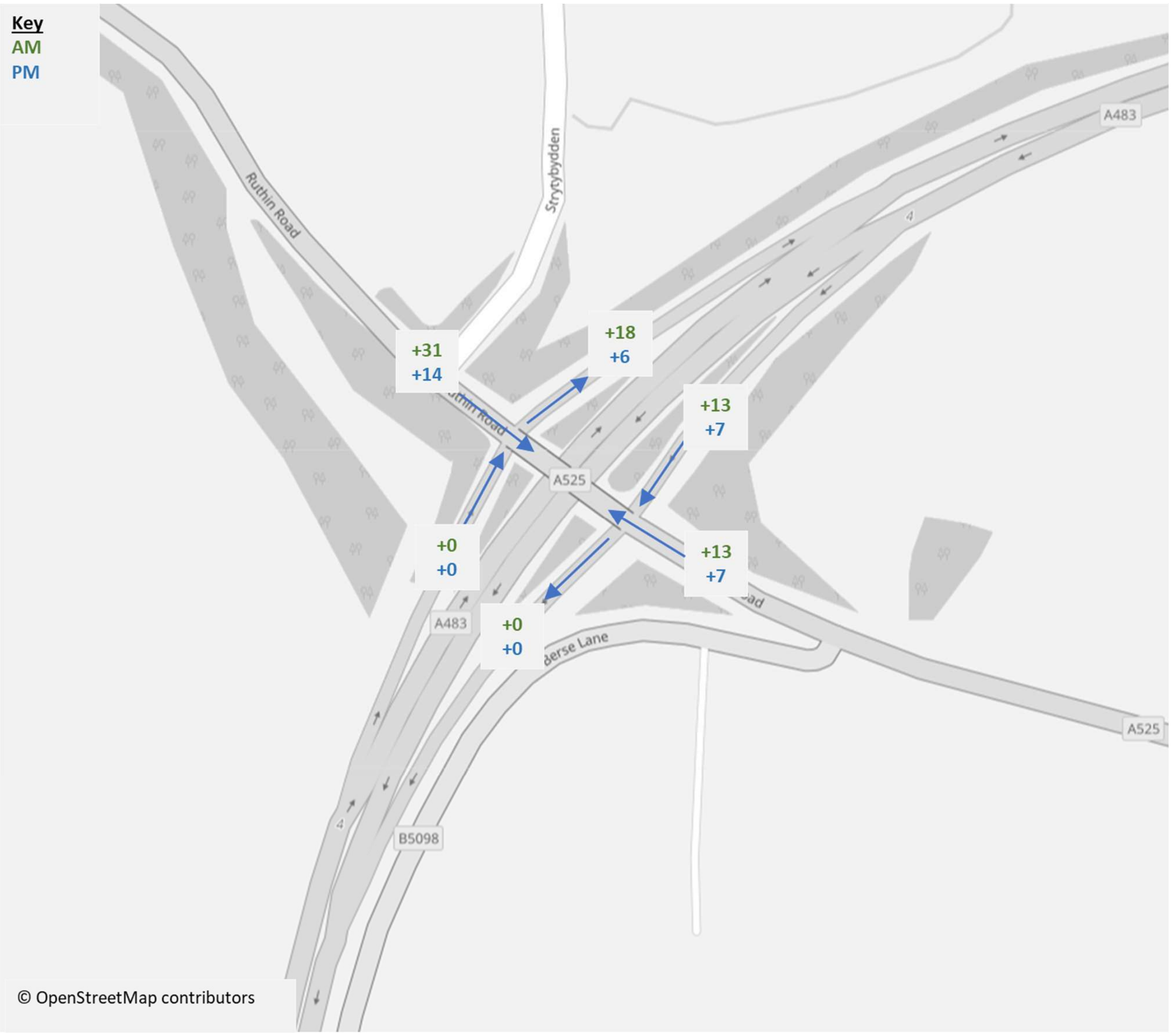
Link No.	Link Name	AM Peak			PM Peak		
		DoS	Ave. Delay (s/PCU)	MMQ (PCU)	DoS	Ave. Delay (s/PCU)	MMQ (PCU)
1/2+1/1	A525 West (Eastbound) Ahead Left	144%	646	156	206%	993	179
1/3	A525 West (Eastbound) Ahead	66%	50	6	126%	480	31
2/1	A483 Northbound Off-Slip Left	57%	34	7	97%	77	24
2/2	A483 Northbound Off-Slip Right	64%	36	8	36%	25	5
3/1	A525 West (Westbound) Ahead	60%	19	4	86%	17	9
3/2	A525 West (Westbound) Right	25%	4	2	19%	6	3
4/1	A525 East (Eastbound) Ahead	71%	10	10	45%	22	5
4/2	A525 East (Eastbound) Right	27%	3	3	21%	43	4
5/1	A483 Southbound Off-Slip Left	97%	86	22	30%	32	3
5/2	A483 Southbound Off-Slip Right	50%	32	6	93%	72	16
6/1	A525 East (Westbound) Left	78%	88	5	52%	52	3
6/2+6/3	A525 East (Westbound) Ahead	161%	610	80	136%	555	83
PRC (Cycle Time)		-79% (90s)			-129% (90s)		

6.4.19 With the addition of development traffic, the operation of the junction is forecast to worsen when compared to the base traffic scenario.

6.4.20 On those movements which were already operating at or beyond acceptable capacity thresholds (a degree of saturation of 90% or more), queuing has increased in line with the number of additional vehicles forecast to be generated by the development.

6.4.21 A summary of the net development traffic flows at the junction for the AM and PM peak hours are shown in Figure 6-1.

Figure 6-1: Net Development Traffic Flow Change (Vehicles)



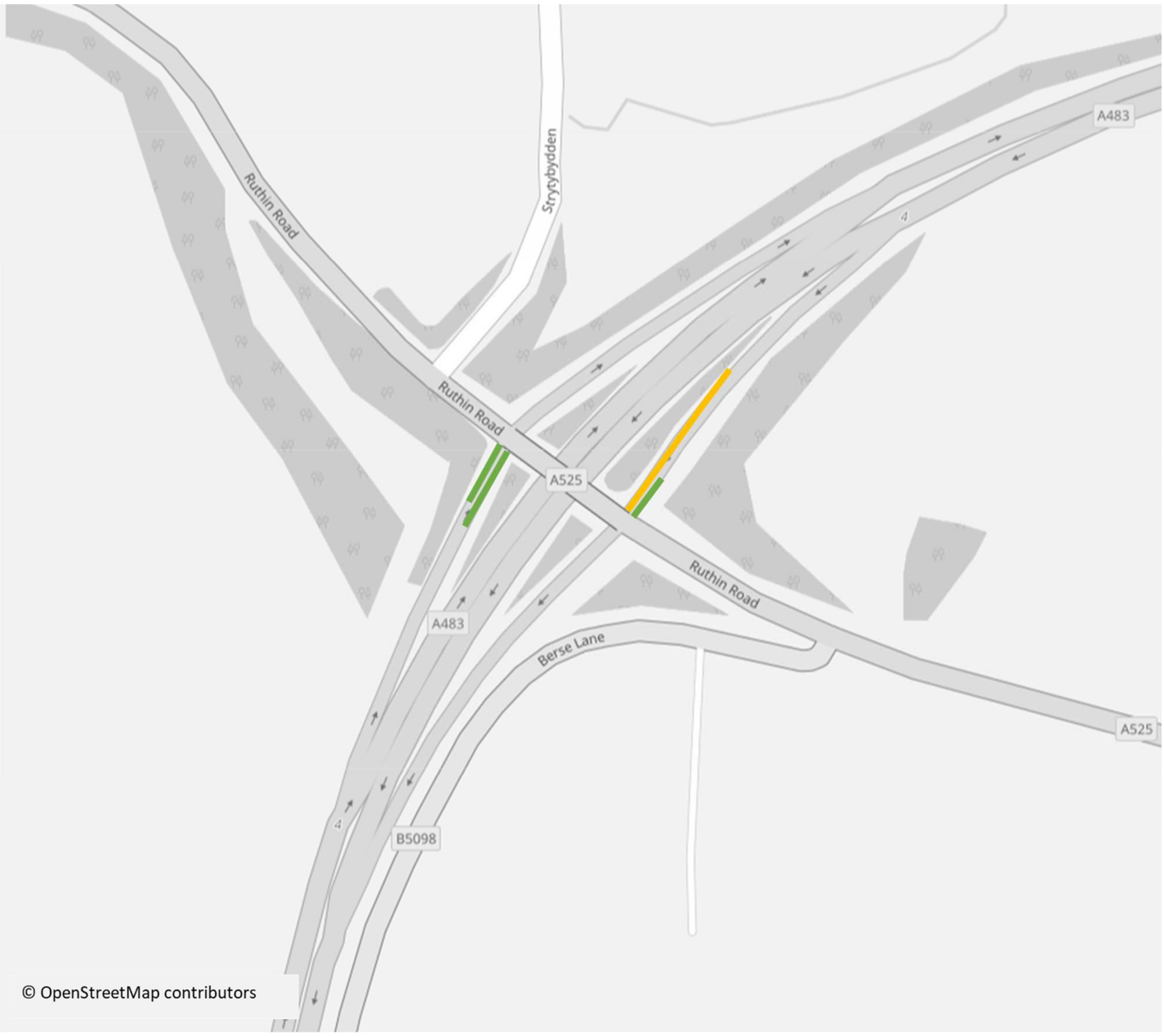
6.4.22 When compared to the baseline flow (2030 Base + Committed Development), the change in flows on the off-slip roads represents only a 1% to 2% increase. With respect to the through movements on the A525, the change in flows resulting from the development represents less than a 10% increase. These impacts are likely to be no worse than the daily fluctuations in vehicles across these movements and it is therefore suggested that this change in traffic flows would not result in a severe impact on the junction.

6.4.23 An illustration of the queuing in the 2030 Base + Committed Development + Net Development scenario is provided in Figures 6-2 and 6-3.

Figure 6-2: Extent of Slip Road Queuing (2030 AM Base + Committed Development + Net Development)[7]

[7] Green denotes a corresponding degree of saturation less than 90% and orange denotes a degree of saturation greater than 90%

Figure 6-3: Extent of Slip Road Queuing (2030 PM Base + Committed Development + Net Development) [8]



6.4.24 The proposed queuing in the future year scenario has been demonstrated to be wholly confined to the slip roads with no blocking back onto the A483 mainline. As such, the proposed development is not forecast to impact on the safe operation of the A483 mainline.

Wider Improvements

6.4.25 PJA has engaged with the Welsh Government Project Manager for the A483 improvement scheme to determine the timescales and progress with implementing a scheme in this location.

[8] Green denotes a corresponding degree of saturation less than 90% and orange denotes a degree of saturation greater than 90%

6.4.26 It has been advised that the Welsh Government is currently undertaking a WelTAG[9] Stage 2 study into the improvements that can be made to ease congestion and improve journey time reliability between Junctions 3 and 6 on the A483. Outline Business Case (Stage 2) was due to be completed by December 2019 which involves outline infrastructure solutions that will have been modelled and shortlisted to take forward to Full Business Case (Stage 3). The timescales and funding sources for implementation of a scheme in this location is not yet known.

6.4.27 In lieu of more up-to-date information, the latest study PJA has been provided has been examined. This was undertaken by CAPITA considering the capacity and potential improvements at junctions along the A483 corridor; this study included Junction 4 of the A483. The findings of the baseline modelling of the junction are consistent with the findings of the above modelling which demonstrated issues with capacity on the A525 (West) in the AM peak and on the A525 (East) and A483 northbound off-slip in the PM peak.

6.4.28 As part of the published study, two options were considered to improve the junction performance in the future year scenario with the addition of traffic generated by wider development and growth aspirations for the area. One option comprised the construction of a new link road linking the A525/Heritage Way junction with Croesnewydd Road to by-pass Junction 4 of the A483. The second option comprised the provision of a grade separated roundabout at Junction 4 of the A483. The report concluded that the provision of a grade separated junction provided the greatest benefit in terms of junction performance with the junction forecast to operate within acceptable thresholds of capacity in the future year with development and growth aspirations scenario.

6.4.29 It is likely that a scheme would have been implemented prior to the full occupation/completion of the Brymbo Park development. If not, it is likely that the impact resulting from full build out would be temporary prior to the implementation of a scheme in this location in line with the likely impacts presented visually in Figure 6-1 to 6-3.

6.4.30 Furthermore, there is currently extant permission for food/non-food retail and education uses on-site. These did not require the delivery of improvements at Junction 4 of the A483 as it was deemed the impact was not severe. In addition, the provision of food/non-food retail on-site, would likely reduce the number of vehicle movements (associated with existing adjoining residential areas) to/from Wrexham for shopping trips. This would reduce the number of vehicles passing through Junction 4 of the A483 although this has not been accounted for in the modelling to provide a robust assessment.

6.5 Summary

6.5.1 In summary:

[9] Welsh Transport Appraisal Guidance

- The Phoenix Drive/Bloom Avenue/Heritage Way/Brymbo Road roundabout is forecast to operate within acceptable thresholds of capacity including with the inclusion of development traffic.
- The A525/Heritage Way junction currently operates within capacity in the AM peak hour and outside acceptable thresholds of capacity during the PM peak hour. The junction continues to operate outside acceptable capacity thresholds in the PM peak hour in the future year and with development scenarios. It is therefore proposed to implement a junction improvement scheme at this location taking the form of a signal-controlled junction which has been shown to mitigate the development impact.
- Junction 4 of the A483 currently operates outside acceptable thresholds of capacity in both peak hours. This operation is forecast to worsen in the future year and with the inclusion of development traffic. The uplift in vehicle numbers is forecast to be modest however and it has been demonstrated that queuing on the slip roads is not forecast to impact on the safe operation of the A483 mainline.

7 Summary and Conclusions

7.1.1 PJA has been commissioned to prepare a Transport Assessment to accompany the proposed development of land at the former Brymbo Steelworks site for a residential led mixed-use development.

7.1.2 The Transport Assessment has been prepared in accordance with discussions with WCBC highways officers and in line with Planning Policy Wales, Technical Advice Note 18: Transport.

7.1.3 Over the latest five-year period for which data has been provided, there has been a total of 20 collisions, five of which were serious and four of which involved sensitive road users. Analysis of the data revealed common occurrences of PICs on Heritage Way in the vicinity of the Brymbo Sports and Social Complex. However, the local authority has subsequently implemented mitigation measures and since this action was taken, no Personal Injury Collisions (PICs) have been recorded at this location. As a result, it is considered that there are no inherent highway safety concerns that might be exacerbated by the proposed development.

7.1.4 It is proposed to develop the Site for 300 dwellings, a primary school and a small district centre comprising retail, a public house/restaurant and health centre/other non-residential use. The provision of local facilities will benefit future residents by reducing the need to travel as well as improving accessibility for existing residents of adjoining areas to retail, healthcare and educational facilities, again reducing the need to travel.

7.1.5 The development will be designed to adequately accommodate pedestrians, cyclists, public transport services and other vehicular traffic. Vehicular access is proposed to be facilitated from Phoenix Drive.

7.1.6 It is proposed to provide cycle and car parking facilities in line with WCBC parking standards.

7.1.7 Trip generation has been calculated using traffic surveys for the residential development. Thus, provide a robust indication of traffic generation as existing residents are required to travel some distance to access local amenities whereas future residents would have access to key facilities within walking distance. The trip generation for the other uses has been estimated using data extracted from the TRICS database. Gravity models have been developed to appropriately distribute and assign traffic to the highway network.

7.1.8 In terms of the forecast impact in Brymbo to the north of the Site, approximately 30% of traffic is forecast to route in this direction. No capacity issues have been noted in this area and therefore further assessment of junction capacity has not been undertaken.

7.1.9 The following junctions have been considered as part of the capacity assessment:

- Bloom Avenue/Brymbo Road/Phoenix Drive;
- A525/Heritage Way; and
- A525/A483 (Junction 4 of A483).

7.1.10 The impact of the proposed development has been assessed for the above junctions using standalone junction capacity modelling software (Junctions or LinSig, as appropriate).

7.1.11 The Phoenix Drive/Bloom Avenue/Heritage Way/Brymbo Road roundabout is forecast to operate within acceptable thresholds of capacity in its current form with the inclusion of development traffic.

7.1.12 The A525/Heritage Way junction currently operates within capacity in the AM peak hour and outside acceptable capacity thresholds in the PM peak hour. The operation is forecast to worsen in the future year base and with the addition of traffic forecast to be generated by the proposed development. It is therefore proposed to implement a junction improvement scheme in this location.

7.1.13 Junction 4 of the A483 currently operates outside acceptable thresholds of capacity in both peak hours. This operation is forecast to worsen in the future year and within the inclusion of development traffic. The uplift in traffic flows generated by the development is however modest and the modelling has demonstrated that any queuing on the slip roads will not impact on the safe operation of the A483 mainline. The Welsh Government is currently developing schemes for various junctions along the A483 including Junction 4 and therefore no interim/standalone schemes to mitigate the impact of the proposed development at Brymbo in this location are deemed to be required or proposed.

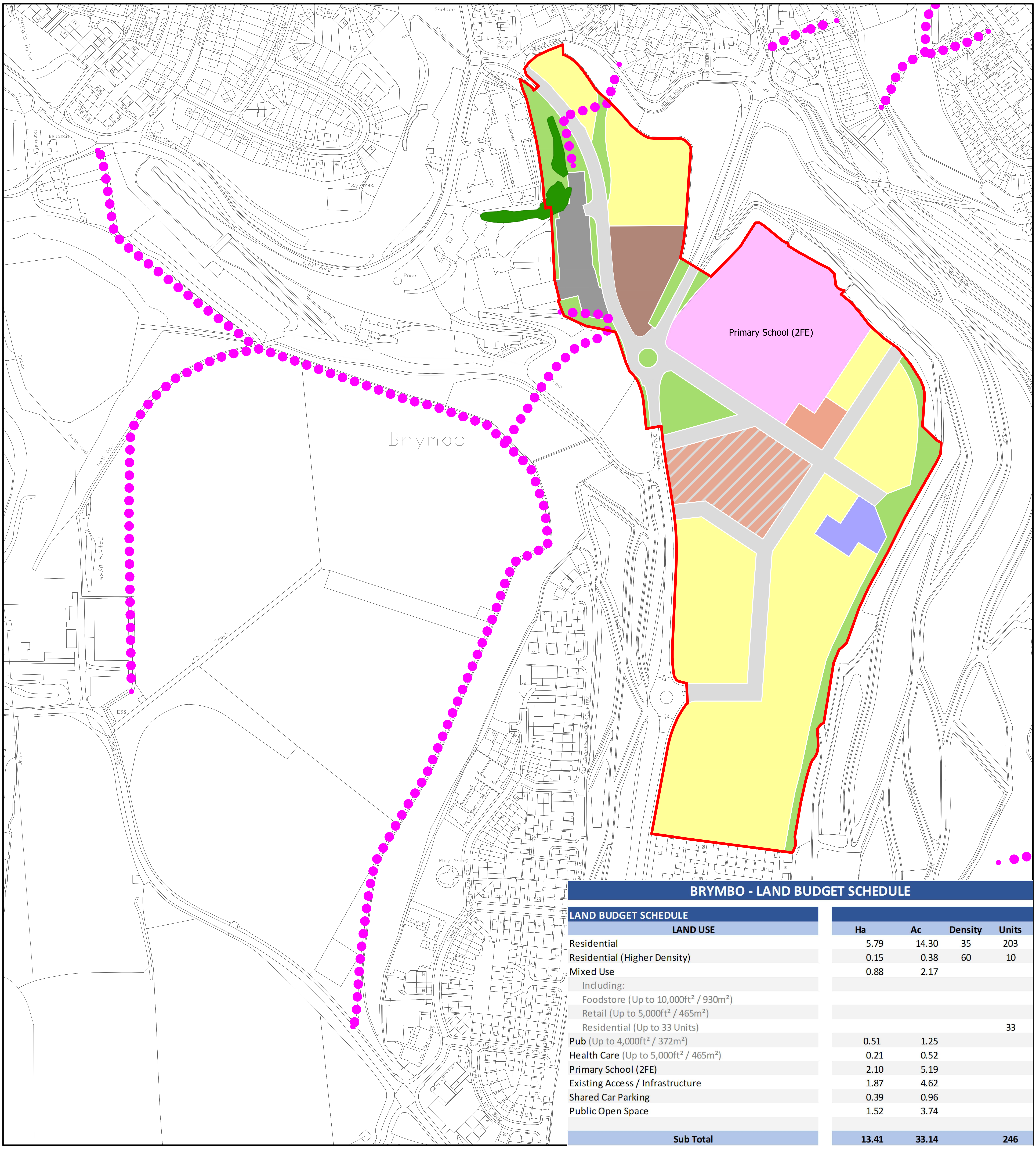
7.2 Conclusion

7.2.1 From the assessment undertaken, it has been demonstrated that the residual cumulative impacts of the development are not severe. Therefore, the proposed development should not be prevented or refused on highways grounds.

Appendix A Indicative Land Use Plan

The scaling of this drawing cannot be assured

Revision		Date	Drn	Ckd
K	Amended Site Boundary	14.02.20	EH	VA/JH



BRYMBO - LAND BUDGET SCHEDULE

LAND BUDGET SCHEDULE				
LAND USE	Ha	Ac	Density	Units
Residential	5.79	14.30	35	203
Residential (Higher Density)	0.15	0.38	60	10
Mixed Use	0.88	2.17		
Including:				
Foodstore (Up to 10,000ft² / 930m²)				
Retail (Up to 5,000ft² / 465m²)				
Residential (Up to 33 Units)				33
Pub (Up to 4,000ft² / 372m²)	0.51	1.25		
Health Care (Up to 5,000ft² / 465m²)	0.21	0.52		
Primary School (2FE)	2.10	5.19		
Existing Access / Infrastructure	1.87	4.62		
Shared Car Parking	0.39	0.96		
Public Open Space	1.52	3.74		
Sub Total	13.41	33.14		246

- Site Boundary Boundary
- Residential
- Residential (Higher Density)
- Pub/Restaurant
- Mixed Use (Foodstore, retail & residential)
- Non Residential Use
- Primary School (2FE)
- Existing Access / Infrastructure
- Shared Car Parking and Public Realm
- Public Open Space
- Existing Public Right of Way

Project
Brymbo Park

N

Drawing Title
Land Use Plan

Date	Scale	Drawn by	Check by
06.09.18	1:2500@A2	ALC	VA

Project No	Drawing No	Revision
27968	RG-M-05-1	K

0 20 40 60 80 100m

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 J:\27000 - 27999\27900 - 27999\27968 - Brymbo Colliery\A4 - Dwgs & Registers\M Planning\27968 - RG-M-05K - Land Use Plan.dwg - -1 (1-2500@A2)

Appendix B TRICS Outputs

Filtering Summary

Land Use	01/I	RETAIL/SHOPPING CENTRE - LOCAL SHOPS
Selected Trip Rate Calculation Parameter Range	500-2000 sqm GFA	
Actual Trip Rate Calculation Parameter Range	525-1840 sqm GFA	
Date Range	Minimum: 01/01/10	Maximum: 22/09/15
Days of the week selected	Monday	3
	Tuesday	1
	Wednesday	1
	Thursday	1
	Friday	1
Main Location Types selected	Suburban Area (PPS6 Out of Centre)	2
	Neighbourhood Centre (PPS6 Local Centre)	5
Population <1 Mile ranges selected	5,001 to 10,000	1
	15,001 to 20,000	1
	20,001 to 25,000	2
	25,001 to 50,000	2
	50,001 to 100,000	1
Population <5 Mile ranges selected	125,001 to 250,000	3
	250,001 to 500,000	4
Car Ownership <5 Mile ranges selected	0.6 to 1.0	2
	1.1 to 1.5	5
PTAL Rating	No PTAL Present	7

Calculation Reference: AUDIT-231601-181008-1013

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 01 - RETAIL
Category : I - SHOPPING CENTRE - LOCAL SHOPS
VEHICLES

Selected regions and areas:

03	**SOUTH WEST**		
	BR	BRISTOL CITY	1 days
	GS	GLOUCESTERSHIRE	1 days
08	**NORTH WEST**		
	LC	LANCASHIRE	1 days
09	**NORTH**		
	TV	TEES VALLEY	2 days
	TW	TYNE & WEAR	1 days
11	**SCOTLAND**		
	EB	CITY OF EDINBURGH	1 days

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

Secondary 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: 525 to 1840 (units: sqm)
Range Selected by User: 500 to 2000 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/10 to 22/09/15

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	1 days
Wednesday	1 days
Thursday	1 days
Friday	1 days

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

Selected survey types:

Manual count	7 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:

Suburban Area (PPS6 Out of Centre)	2
Neighbourhood Centre (PPS6 Local Centre)	5

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:

Residential Zone	7

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.

Secondary Filtering selection:

Use Class:

A1	5 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

5,001 to 10,000	1 days
15,001 to 20,000	1 days
20,001 to 25,000	2 days
25,001 to 50,000	2 days
50,001 to 100,000	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	3 days
250,001 to 500,000	4 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	2 days
1.1 to 1.5	5 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.

Petrol filling station:

Included in the survey count	0 days
Excluded from count or no filling station	7 days

This data displays the number of surveys within the selected set that include petrol filling station activity, and the number of surveys that do not.

Travel Plan:

No	7 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	7 days

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

LIST OF SITES relevant to selection parameters

Site(1):	BR-01-I-01	Gross floor area:	770 sqm
Development Name:	LOCAL SHOPS	Retail floor area:	635 sqm
Location:	BRISTOL		
Postcode:	BS14 0EW	Number of Employees:	49
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	22/09/15
Sub-Location Type:	Residential Zone	Survey Day:	Tuesday
PTAL:	n/a	Parking Spaces:	22
Site(2):	EB-01-I-01	Gross floor area:	825 sqm
Development Name:	LOCAL SHOPS	Retail floor area:	650 sqm
Location:	EDINBURGH		
Postcode:	EH14 1BY	Number of Employees:	21
Main Location Type:	Suburban Area (PPS6 Out of Centre)	Survey Date:	28/10/10
Sub-Location Type:	Residential Zone	Survey Day:	Thursday
PTAL:	n/a	Parking Spaces:	14
Site(3):	GS-01-I-01	Gross floor area:	525 sqm
Development Name:	LOCAL SHOPS	Retail floor area:	335 sqm
Location:	CHELTENHAM		
Postcode:	GL51 3GA	Number of Employees:	26
Main Location Type:	Suburban Area (PPS6 Out of Centre)	Survey Date:	26/04/10
Sub-Location Type:	Residential Zone	Survey Day:	Monday
PTAL:	n/a	Parking Spaces:	
Site(4):	LC-01-I-01	Gross floor area:	720 sqm
Development Name:	LOCAL SHOPS	Retail floor area:	555 sqm
Location:	NEAR CHORLEY		
Postcode:	PR7 6HS	Number of Employees:	50
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	17/10/11
Sub-Location Type:	Residential Zone	Survey Day:	Monday
PTAL:	n/a	Parking Spaces:	19
Site(5):	TV-01-I-03	Gross floor area:	1840 sqm
Development Name:	LOCAL SHOPS	Retail floor area:	1185 sqm
Location:	MIDDLESBROUGH		
Postcode:	TS5 7BP	Number of Employees:	108
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	04/10/13
Sub-Location Type:	Residential Zone	Survey Day:	Friday
PTAL:	n/a	Parking Spaces:	62
Site(6):	TV-01-I-04	Gross floor area:	585 sqm
Development Name:	LOCAL SHOPS	Retail floor area:	354 sqm
Location:	MIDDLESBROUGH		
Postcode:	TS3 0PL	Number of Employees:	21
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	07/10/13
Sub-Location Type:	Residential Zone	Survey Day:	Monday
PTAL:	n/a	Parking Spaces:	13
Site(7):	TW-01-I-02	Gross floor area:	540 sqm
Development Name:	LOCAL SHOPS	Retail floor area:	410 sqm
Location:	SUNDERLAND		
Postcode:	SR3 4BX	Number of Employees:	34
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	21/11/12
Sub-Location Type:	Residential Zone	Survey Day:	Wednesday
PTAL:	n/a	Parking Spaces:	16

TRIP RATE for Land Use 01 - RETAIL/I - SHOPPING CENTRE - LOCAL SHOPS
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									
06:00 - 07:00	1	540	1.296	1	540	1.296	1	540	2.592
07:00 - 08:00	7	829	4.496	7	829	4.048	7	829	8.544
08:00 - 09:00	7	829	4.376	7	829	3.859	7	829	8.235
09:00 - 10:00	7	829	6.081	7	829	5.099	7	829	11.180
10:00 - 11:00	7	829	5.185	7	829	4.841	7	829	10.026
11:00 - 12:00	7	829	5.392	7	829	5.409	7	829	10.801
12:00 - 13:00	**7**	**829**	**6.512**	**7**	**829**	**6.408**	**7**	**829**	**12.920**
13:00 - 14:00	7	829	5.840	7	829	5.891	7	829	11.731
14:00 - 15:00	7	829	5.168	7	829	5.754	7	829	10.922
15:00 - 16:00	7	829	4.410	7	829	4.789	7	829	9.199
16:00 - 17:00	7	829	5.151	7	829	4.169	7	829	9.320
17:00 - 18:00	7	829	5.426	7	829	6.012	7	829	11.438
18:00 - 19:00	7	829	5.909	7	829	6.288	7	829	12.197
19:00 - 20:00	7	829	5.340	7	829	5.685	7	829	11.025
20:00 - 21:00	7	829	3.618	7	829	4.152	7	829	7.770
21:00 - 22:00	5	852	3.638	5	852	3.779	5	852	7.417
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			77.838			77.479			155.317

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.*

Filtering Summary

Land Use	04/A	EDUCATION/PRIMARY
Selected Trip Rate Calculation Parameter Range	250-657 PUPILS	
Actual Trip Rate Calculation Parameter Range	260-621 PUPILS	
Date Range	Minimum: 01/01/10	Maximum: 28/09/16
Days of the week selected	Monday	3
	Tuesday	1
	Wednesday	3
	Thursday	4
Main Location Types selected	Suburban Area (PPS6 Out of Centre)	7
	Neighbourhood Centre (PPS6 Local Centre)	4
Population <1 Mile ranges selected	1,001 to 5,000	1
	5,001 to 10,000	3
	10,001 to 15,000	3
	25,001 to 50,000	3
	50,001 to 100,000	1
Population <5 Mile ranges selected	50,001 to 75,000	1
	75,001 to 100,000	2
	125,001 to 250,000	2
	250,001 to 500,000	4
	500,001 or More	2
Car Ownership <5 Mile ranges selected	0.6 to 1.0	7
	1.1 to 1.5	4
PTAL Rating	No PTAL Present	11

Calculation Reference: AUDIT-231601-181008-1009

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 04 - EDUCATION
Category : A - PRIMARY
VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	SC	SURREY	1 days
05	**EAST MIDLANDS**		
	LN	LINCOLNSHIRE	1 days
	NR	NORTHAMPTONSHIRE	1 days
07	**YORKSHIRE & NORTH LINCOLNSHIRE**		
	WY	WEST YORKSHIRE	2 days
08	**NORTH WEST**		
	LC	LANCASHIRE	2 days
	MS	MERSEYSIDE	1 days
09	**NORTH**		
	TW	TYNE & WEAR	1 days
11	**SCOTLAND**		
	DU	DUNDEE CITY	1 days
	FI	FIFE	1 days

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

Secondary 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: Number of pupils
Actual Range: 260 to 621 (units:)
Range Selected by User: 250 to 657 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/10 to 28/09/16

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	1 days
Wednesday	3 days
Thursday	4 days

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

Selected survey types:

Manual count	11 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:

Suburban Area (PPS6 Out of Centre)	7
Neighbourhood Centre (PPS6 Local Centre)	4

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:

Residential Zone	8
Village	2
No Sub Category	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.

Secondary Filtering selection:

Use Class:	
D1	11 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:	
1,001 to 5,000	1 days
5,001 to 10,000	3 days
10,001 to 15,000	3 days
25,001 to 50,000	3 days
50,001 to 100,000	1 days

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

Population within 5 miles:	
50,001 to 75,000	1 days
75,001 to 100,000	2 days
125,001 to 250,000	2 days
250,001 to 500,000	4 days
500,001 or More	2 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	7 days
1.1 to 1.5	4 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:	
Yes	2 days
No	9 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	11 days

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

LIST OF SITES relevant to selection parameters

Site(1):	DU-04-A-01	Gross floor area:	3288 sqm
Development Name:	PRIMARY SCHOOL	Number of pupils:	412
Location:	DUNDEE		
Postcode:	DD5 3SQ	Number of Employees:	32
Main Location Type:	Suburban Area (PPS6 Out of Centre)	Survey Date:	21/05/12
Sub-Location Type:	Residential Zone	Survey Day:	Monday
PTAL:	n/a	Parking Spaces:	25
Site(2):	FI-04-A-01	Gross floor area:	1975 sqm
Development Name:	PRIMARY SCHOOL	Number of pupils:	285
Location:	NEAR DUNFERMLINE		
Postcode:	KY12 8RN	Number of Employees:	36
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	27/05/15
Sub-Location Type:	Village	Survey Day:	Wednesday
PTAL:	n/a	Parking Spaces:	26
Site(3):	LC-04-A-05	Gross floor area:	3359 sqm
Development Name:	PRIMARY SCHOOL	Number of pupils:	472
Location:	BLACKBURN		
Postcode:	BB1 1NE	Number of Employees:	75
Main Location Type:	Suburban Area (PPS6 Out of Centre)	Survey Date:	28/09/16
Sub-Location Type:	No Sub Category	Survey Day:	Wednesday
PTAL:	n/a	Parking Spaces:	23
Site(4):	LC-04-A-06	Gross floor area:	4520 sqm
Development Name:	PRIMARY SCHOOL	Number of pupils:	449
Location:	BLACKPOOL		
Postcode:	FY4 1EE	Number of Employees:	90
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	27/09/16
Sub-Location Type:	Residential Zone	Survey Day:	Tuesday
PTAL:	n/a	Parking Spaces:	5
Site(5):	LN-04-A-01	Gross floor area:	1990 sqm
Development Name:	PRIMARY SCHOOL	Number of pupils:	312
Location:	GRANTHAM		
Postcode:	NG31 8HQ	Number of Employees:	39
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	12/06/13
Sub-Location Type:	Residential Zone	Survey Day:	Wednesday
PTAL:	n/a	Parking Spaces:	17
Site(6):	MS-04-A-02	Gross floor area:	2500 sqm
Development Name:	PRIMARY SCHOOL	Number of pupils:	264
Location:	LIVERPOOL		
Postcode:	L18 9SB	Number of Employees:	31
Main Location Type:	Suburban Area (PPS6 Out of Centre)	Survey Date:	13/06/13
Sub-Location Type:	Residential Zone	Survey Day:	Thursday
PTAL:	n/a	Parking Spaces:	16
Site(7):	NR-04-A-03	Gross floor area:	2635 sqm
Development Name:	PRIMARY SCHOOL	Number of pupils:	400
Location:	NORTHAMPTON		
Postcode:	NN3 6JQ	Number of Employees:	121
Main Location Type:	Suburban Area (PPS6 Out of Centre)	Survey Date:	24/03/16
Sub-Location Type:	Residential Zone	Survey Day:	Thursday
PTAL:	n/a	Parking Spaces:	47
Site(8):	SC-04-A-01	Gross floor area:	2175 sqm
Development Name:	PRIMARY SCHOOL	Number of pupils:	414
Location:	NEAR WOKING		
Postcode:	GU24 0JN	Number of Employees:	55
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	22/11/12
Sub-Location Type:	Village	Survey Day:	Thursday
PTAL:	n/a	Parking Spaces:	36
Site(9):	TW-04-A-01	Gross floor area:	2900 sqm
Development Name:	PRIMARY SCHOOL	Number of pupils:	260
Location:	GATESHEAD		
Postcode:	NE9 5SY	Number of Employees:	40
Main Location Type:	Suburban Area (PPS6 Out of Centre)	Survey Date:	07/10/13
Sub-Location Type:	Residential Zone	Survey Day:	Monday
PTAL:	n/a	Parking Spaces:	35
Site(10):	WY-04-A-01	Gross floor area:	3756 sqm
Development Name:	PRIMARY SCHOOL	Number of pupils:	370
Location:	LEEDS		
Postcode:	LS9 7HP	Number of Employees:	82
Main Location Type:	Suburban Area (PPS6 Out of Centre)	Survey Date:	19/09/13
Sub-Location Type:	Residential Zone	Survey Day:	Thursday
PTAL:	n/a	Parking Spaces:	36

LIST OF SITES relevant to selection parameters (Cont.)

Site(11):	WY-04-A-02	Gross floor area:	3150 sqm
Development Name:	PRIMARY SCHOOL	Number of pupils:	621
Location:	LEEDS		
Postcode:	LS11 8PN	Number of Employees:	80
Main Location Type:	Suburban Area (PPS6 Out of Centre)	Survey Date:	19/10/15
Sub-Location Type:	Residential Zone	Survey Day:	Monday
PTAL:	n/a	Parking Spaces:	40

TRIP RATE for Land Use 04 - EDUCATION/A - PRIMARY
VEHICLES
Calculation factor: 1 PUPILS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	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	312	0.000	1	312	0.000	1	312	0.000
06:00 - 07:00	1	312	0.013	1	312	0.003	1	312	0.016
07:00 - 08:00	11	387	0.053	11	387	0.022	11	387	0.075
08:00 - 09:00	**11**	**387**	**0.266**	11	387	0.187	**11**	**387**	**0.453**
09:00 - 10:00	11	387	0.036	11	387	0.050	11	387	0.086
10:00 - 11:00	11	387	0.013	11	387	0.011	11	387	0.024
11:00 - 12:00	11	387	0.019	11	387	0.012	11	387	0.031
12:00 - 13:00	11	387	0.017	11	387	0.020	11	387	0.037
13:00 - 14:00	11	387	0.013	11	387	0.023	11	387	0.036
14:00 - 15:00	11	387	0.051	11	387	0.019	11	387	0.070
15:00 - 16:00	11	387	0.170	**11**	**387**	**0.224**	11	387	0.394
16:00 - 17:00	11	387	0.043	11	387	0.094	11	387	0.137
17:00 - 18:00	11	387	0.022	11	387	0.028	11	387	0.050
18:00 - 19:00	11	387	0.014	11	387	0.018	11	387	0.032
19:00 - 20:00	1	312	0.000	1	312	0.000	1	312	0.000
20:00 - 21:00	1	312	0.000	1	312	0.032	1	312	0.032
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.730			0.743			1.473

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.*

Filtering Summary

Land Use	05/G	HEALTH/GP SURGERIES
Selected Trip Rate Calculation Parameter Range	300-700 sqm GFA	
Actual Trip Rate Calculation Parameter Range	300-601 sqm GFA	
Date Range	Minimum: 01/01/10	Maximum: 21/11/17
Days of the week selected	Monday	1
	Tuesday	3
	Wednesday	1
	Friday	3
Main Location Types selected	Suburban Area (PPS6 Out of Centre)	3
	Neighbourhood Centre (PPS6 Local Centre)	5
Population <1 Mile ranges selected	1,000 or Less	1
	1,001 to 5,000	1
	10,001 to 15,000	1
	15,001 to 20,000	1
	20,001 to 25,000	1
	25,001 to 50,000	3
Population <5 Mile ranges selected	5,001 to 25,000	1
	100,001 to 125,000	2
	125,001 to 250,000	2
	250,001 to 500,000	3
Car Ownership <5 Mile ranges selected	0.5 or Less	1
	0.6 to 1.0	2
	1.1 to 1.5	5
PTAL Rating	No PTAL Present	8

Calculation Reference: AUDIT-231601-181008-1051

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 05 - HEALTH
Category : G - GP SURGERIES
VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	BU	BUCKINGHAMSHIRE	1 days
03	**SOUTH WEST**		
	WL	WILTSHIRE	1 days
05	**EAST MIDLANDS**		
	LE	LEICESTERSHIRE	1 days
	NT	NOTTINGHAMSHIRE	1 days
06	**WEST MIDLANDS**		
	WM	WEST MIDLANDS	1 days
09	**NORTH**		
	TW	TYNE & WEAR	1 days
11	**SCOTLAND**		
	FI	FIFE	2 days

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

Secondary 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: 300 to 601 (units: sqm)
Range Selected by User: 300 to 700 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/10 to 21/11/17

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
Tuesday	3 days
Wednesday	1 days
Friday	3 days

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

Selected survey types:

Manual count	8 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:

Suburban Area (PPS6 Out of Centre)	3
Neighbourhood Centre (PPS6 Local Centre)	5

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:

Residential Zone	6
Village	2

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.

Secondary Filtering selection:

Use Class:

D1	7 days
Sui Generis	1 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

1,000 or Less	1 days
1,001 to 5,000	1 days
10,001 to 15,000	1 days
15,001 to 20,000	1 days
20,001 to 25,000	1 days
25,001 to 50,000	3 days

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

Population within 5 miles:

5,001 to 25,000	1 days
100,001 to 125,000	2 days
125,001 to 250,000	2 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:

0.5 or Less	1 days
0.6 to 1.0	2 days
1.1 to 1.5	5 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	8 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	8 days

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

LIST OF SITES relevant to selection parameters

Site(1):	BU-05-G-02	Gross floor area:	601 sqm
Development Name:	GP SURGERY	Number of doctors:	5
Location:	MILTON KEYNES		
Postcode:	MK7 7PB	Number of Employees:	30
Main Location Type:	Suburban Area (PPS6 Out of Centre)	Survey Date:	19/10/10
Sub-Location Type:	Residential Zone	Survey Day:	Tuesday
PTAL:	n/a	Parking Spaces:	25
Site(2):	FI-05-G-02	Gross floor area:	325 sqm
Development Name:	GP SURGERY	Number of doctors:	2
Location:	NEAR DUNFERMLINE		
Postcode:	KY11 3ED	Number of Employees:	14
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	29/05/15
Sub-Location Type:	Village	Survey Day:	Friday
PTAL:	n/a	Parking Spaces:	20
Site(3):	FI-05-G-03	Gross floor area:	425 sqm
Development Name:	GP SURGERY	Number of doctors:	6
Location:	DUNFERMLINE		
Postcode:	KY11 3BA	Number of Employees:	15
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	21/03/16
Sub-Location Type:	Residential Zone	Survey Day:	Monday
PTAL:	n/a	Parking Spaces:	12
Site(4):	LE-05-G-02	Gross floor area:	363 sqm
Development Name:	GP SURGERY	Number of doctors:	7
Location:	NEAR MELTON MOWBRAY		
Postcode:	LE14 4PA	Number of Employees:	22
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	29/11/16
Sub-Location Type:	Village	Survey Day:	Tuesday
PTAL:	n/a	Parking Spaces:	
Site(5):	NT-05-G-01	Gross floor area:	460 sqm
Development Name:	GP SURGERY	Number of doctors:	2
Location:	NOTTINGHAM		
Postcode:	NG5 2EJ	Number of Employees:	11
Main Location Type:	Suburban Area (PPS6 Out of Centre)	Survey Date:	24/06/15
Sub-Location Type:	Residential Zone	Survey Day:	Wednesday
PTAL:	n/a	Parking Spaces:	10
Site(6):	TW-05-G-01	Gross floor area:	600 sqm
Development Name:	GP SURGERY	Number of doctors:	2
Location:	SUNDERLAND		
Postcode:	SR3 4BY	Number of Employees:	16
Main Location Type:	Suburban Area (PPS6 Out of Centre)	Survey Date:	30/11/12
Sub-Location Type:	Residential Zone	Survey Day:	Friday
PTAL:	n/a	Parking Spaces:	16
Site(7):	WL-05-G-01	Gross floor area:	300 sqm
Development Name:	GP SURGERY	Number of doctors:	4
Location:	SWINDON BOROUGH C.		
Postcode:	SN2 7BG	Number of Employees:	27
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	23/09/16
Sub-Location Type:	Residential Zone	Survey Day:	Friday
PTAL:	n/a	Parking Spaces:	11
Site(8):	WM-05-G-04	Gross floor area:	600 sqm
Development Name:	GP SURGERY	Number of doctors:	4
Location:	DUDLEY		
Postcode:	DY1 2ER	Number of Employees:	21
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	21/11/17
Sub-Location Type:	Residential Zone	Survey Day:	Tuesday
PTAL:	n/a	Parking Spaces:	27

TRIP RATE for Land Use 05 - HEALTH/G - GP SURGERIES

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									
06:00 - 07:00									
07:00 - 08:00	7	459	0.933	7	459	0.062	7	459	0.995
08:00 - 09:00	8	459	2.667	8	459	1.497	8	459	4.164
09:00 - 10:00	8	459	3.674	8	459	3.021	8	459	6.695
10:00 - 11:00	**8**	**459**	**5.008**	8	459	4.437	**8**	**459**	**9.445**
11:00 - 12:00	8	459	4.273	8	459	4.219	8	459	8.492
12:00 - 13:00	8	459	3.348	**8**	**459**	**4.464**	8	459	7.812
13:00 - 14:00	8	459	2.858	8	459	2.858	8	459	5.716
14:00 - 15:00	8	459	2.994	8	459	2.803	8	459	5.797
15:00 - 16:00	8	459	2.994	8	459	2.858	8	459	5.852
16:00 - 17:00	8	459	3.566	8	459	3.375	8	459	6.941
17:00 - 18:00	8	459	2.041	8	459	3.021	8	459	5.062
18:00 - 19:00	8	459	0.435	8	459	1.551	8	459	1.986
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			34.791			34.166			68.957

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.*

Filtering Summary

Land Use	06/C	HOTEL, FOOD & DRINK/PUB/RESTAURANT
Selected Trip Rate Calculation Parameter Range	112-1000 sqm GFA	
Actual Trip Rate Calculation Parameter Range	450-875 sqm GFA	
Date Range	Minimum: 01/01/10	Maximum: 10/11/17
Days of the week selected	Tuesday	1
	Friday	2
Main Location Types selected	Suburban Area (PPS6 Out of Centre)	1
	Neighbourhood Centre (PPS6 Local Centre)	2
Population <1 Mile ranges selected	10,001 to 15,000	1
	25,001 to 50,000	1
	50,001 to 100,000	1
Population <5 Mile ranges selected	125,001 to 250,000	1
	250,001 to 500,000	2
Car Ownership <5 Mile ranges selected	1.1 to 1.5	3
PTAL Rating	No PTAL Present	3

Calculation Reference: AUDIT-231601-181008-1024

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 06 - HOTEL, FOOD & DRINK
Category : C - PUB/RESTAURANT

VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	ES	EAST SUSSEX	1 days
04	**EAST ANGLIA**		
	SF	SUFFOLK	1 days
05	**EAST MIDLANDS**		
	NT	NOTTINGHAMSHIRE	1 days

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

Secondary 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: 450 to 875 (units: sqm)
Range Selected by User: 112 to 1000 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/10 to 10/11/17

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:
Tuesday 1 days
Friday 2 days

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

Selected survey types:
Manual count 3 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:
Suburban Area (PPS6 Out of Centre) 1
Neighbourhood Centre (PPS6 Local Centre) 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
Residential Zone 2

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.

Secondary Filtering selection:

Use Class:
A4 3 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Secondary Filtering selection (Cont.):

Population within 1 mile:

10,001 to 15,000	1 days
25,001 to 50,000	1 days
50,001 to 100,000	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
250,001 to 500,000	2 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	3 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	3 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	3 days

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

LIST OF SITES relevant to selection parameters

Site(1):	ES-06-C-02	Gross floor area:	460 sqm
Development Name:	PUB/RESTAURANT		
Location:	BRIGHTON	Parking spaces:	4
Postcode:	BN3 2DH	Number of Employees:	9
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	22/09/17
Sub-Location Type:	Residential Zone	Survey Day:	Friday
PTAL:	n/a		

Site(2):	NT-06-C-03	Gross floor area:	450 sqm
Development Name:	HARVESTER		
Location:	NOTTINGHAM	Parking spaces:	72
Postcode:	NG11 7AT	Number of Employees:	25
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	18/06/13
Sub-Location Type:	Residential Zone	Survey Day:	Tuesday
PTAL:	n/a		

Site(3):	SF-06-C-02	Gross floor area:	875 sqm
Development Name:	PUB/RESTAURANT		
Location:	IPSWICH	Parking spaces:	32
Postcode:	IP3 0AT	Number of Employees:	21
Main Location Type:	Suburban Area (PPS6 Out of Centre)	Survey Date:	18/09/15
Sub-Location Type:	Industrial Zone	Survey Day:	Friday
PTAL:	n/a		

TRIP RATE for Land Use 06 - HOTEL, FOOD & DRINK/C - PUB/RESTAURANT

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									
06:00 - 07:00									
07:00 - 08:00									
08:00 - 09:00									
09:00 - 10:00									
10:00 - 11:00	3	595	0.504	3	595	0.392	3	595	0.896
11:00 - 12:00	3	595	0.952	3	595	0.392	3	595	1.344
12:00 - 13:00	3	595	1.905	3	595	1.064	3	595	2.969
13:00 - 14:00	3	595	1.457	3	595	1.345	3	595	2.802
14:00 - 15:00	3	595	0.784	3	595	1.176	3	595	1.960
15:00 - 16:00	3	595	0.168	3	595	0.560	3	595	0.728
16:00 - 17:00	3	595	1.961	3	595	0.840	3	595	2.801
17:00 - 18:00	3	595	2.745	3	595	2.297	3	595	5.042
18:00 - 19:00	3	595	2.521	3	595	2.185	3	595	4.706
19:00 - 20:00	**3**	**595**	**2.801**	**3**	**595**	**3.081**	**3**	**595**	**5.882**
20:00 - 21:00	3	595	1.849	3	595	2.353	3	595	4.202
21:00 - 22:00	3	595	0.728	3	595	1.849	3	595	2.577
22:00 - 23:00	3	595	1.008	3	595	2.241	3	595	3.249
23:00 - 24:00	3	595	0.336	3	595	0.672	3	595	1.008
Total Rates:			19.719			20.447			40.166

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 C Vehicular Trip Distribution and Assignment Methodology Technical Note

Technical Note

Project: Brymbo, Wrexham

Subject: Gravity Modelling Methodology

Client:	Brymbo Developments Ltd	**Version:**	A
Project No:	3499	**Author:**	KN
Date:	20th February 2020	**Approved:**	CS

1 Introduction

1.1 Overview

1.1.1 This note sets out the methodology used for the preparation of the gravity models relating to the Brymbo Park site to distribute the traffic forecast to be generated by the proposed development onto the local network.

1.1.2 The following development quantum has been assumed:

- Up to 350 Dwellings;
- 930sqm Food Retail;
- 464sqm Non-Food Retail;
- 372sqm Public House;
- 2FE Primary School (420 pupils); and
- 465sqm Healthcare Facility.

1.1.3 In order to identify the likely trip distribution for the proposed development, two gravity models have been developed, comprising;

- Residential & School Gravity Model; and
- Retail Gravity Model.

1.2 Document Structure

1.2.1 The remainder of this note is structured as follows:

- Section 2: Residential and School Gravity Model;
- Section 3: Retail Gravity Model;

- Section 4: Whole Site Distribution; and
- Section 5: Route Assignment.

2 Residential Gravity Model

2.1 Travel Demand

Vehicle Trip Generation

2.1.1 Residential trip generation has been derived from a donor site survey. Full details of the trip rates are contained within the Transport Assessment.

2.1.2 Table 2-1 identifies the resultant trip rates and associated trip generation for the residential element of the development.

Table 2-1: Trip Rates and Generation

	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
Trip Rate (per dwelling)	0.184	0.427	0.612	0.388	0.184	0.573
Trip Generation (350 dwellings)	65	150	214	136	65	200

Vehicle Trip Generation – By Journey Purpose

2.1.3 TEMPRO data has been collected for the local 'Wrexham 006' super output area – middle layer (MSOA) in order to determine the modal split of travel for the site and the journey purpose.

2.1.4 The TEMPRO journey purposes have been aggregated into the 'Employment', 'Education' and 'Retail' categories as follows:

- **Employment –** 'Work', 'Employers Business', 'Personal Business';
- **Education -** 'Education'; and
- **Retail –** 'Shopping', 'Recreation', 'Visit', 'Holiday'.

Table 2-2: Journey Purpose by Mode – Wrexham 006 MSOA

Mode of Travel	Employment	Education	Retail	Total
AM Peak Hour				
Walk	4%	14%	3%	22%
Cycle	1%	0%	0%	1%
Car Driver	29%	5%	9%	43%
Car Passenger	6%	13%	5%	24%
Bus	2%	5%	1%	8%
Rail	1%	0%	0%	2%
Total	**44%**	**38%**	**19%**	**100%**
PM Peak Hour				
Walk	5%	3%	8%	16%
Cycle	1%	0%	1%	2%
Car Driver	25%	2%	22%	49%
Car Passenger	6%	3%	17%	26%
Bus	2%	1%	2%	5%
Rail	1%	0%	0%	1%
Total	**40%**	**10%**	**50%**	**100%**

2.1.5 The forecast traffic generation has been split by journey purpose using the above splits for 'car driver' trips as shown in Table 2-3.

Table 2-3: Car Journey Purpose

Peak Period	Employment	Education	Retail	Total
AM Peak Hour	67%	11%	22%	100%
PM Peak Hour	51%	5%	44%	100%

2.1.6 The residential trip generation according to journey purpose has been calculated using this and is summarised in Table 2-4.

Table 2-4: Residential Trip Generation

AM Peak Hour			PM Peak Hour		
Arrivals	Departures	Two-Way	Arrivals	Departures	Two-Way
Employment					
43	100	143	70	33	103
Education					
7	17	24	7	3	10
Retail					
14	32	46	59	28	87
Total					
65	149	214	136	64	200

Internalisation

Employment Journey Purpose

2.1.7 It is considered that some residents will work within the development on site. Therefore, some trips to/from the residential element can be considered to be internal.

2.1.8 In order to estimate the level of internal trips generated by the residential element, Journey to Work data for the 'Wrexham 006' MSOA has been used to calculate the proportion of residents who both live and work within the same area. This indicates that out of 2735 residents, a total of 101 also work within the 'Wrexham 006' MSOA resulting in an internalisation factor of 4% of the total trips generated. A summary of the internal/external split is provided in Table 2-5.

Table 2-5: Internal/External Residential Trip Generation – Employment Journey Purpose

	AM Peak Hour (0800 to 0900)			PM Peak Hour (1700 to 1800)		
	Arrivals	Departures	Two-Way	Arrivals	Departures	Two-Way
Internal Trips	2	4	6	3	1	4
External Trips	42	96	137	67	32	99

Education Journey Purpose

2.1.9 As part of development, it is proposed to provide one 2-form entry (2FE) primary school. It is considered that all primary aged pupils residing on site will attend this school, and therefore these trips can be considered to be internal. The degree of internalisation is detailed in Section 2-2 below.

2.2 School - Travel Demand

Pupil Trips

2.2.1 It is proposed to provide one 2FE primary school onsite, which would be able to accommodate 420 pupils. Details of the internal and external breakdown of pupil trips has been detailed within Section 2.3 below.

Staff Trips

2.2.2 Staff trip generation has been derived using TRICS trip rates. Full details of the trip rates are contained within the Transport Assessment.

2.2.3 Table 2-6 identifies the resultant trip generation associated with the staff of the proposed on-site education provision.

Table 2-6: Trip Generation – School Staff Trips

	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
Primary School Staff Trips	33	0	33	0	3	3

Internalisation

2.2.4 In order to estimate the percentage of staff both living and working onsite, and subsequently the number of internal trips, the same internalisation factor as for the residential employment journey purpose (4%) has been used. The internal/external split is provided in Table 2-7.

Table 2-7: School Staff Trips - Internal/External Split

	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
Internal Trips	1	0	1	0	0	0
External Trips	32	0	32	0	3	3

2.3 Travel Distribution

2.3.1 A manual approach to traffic distribution has been carried out for each journey purpose as indicated in Figure 2-1.

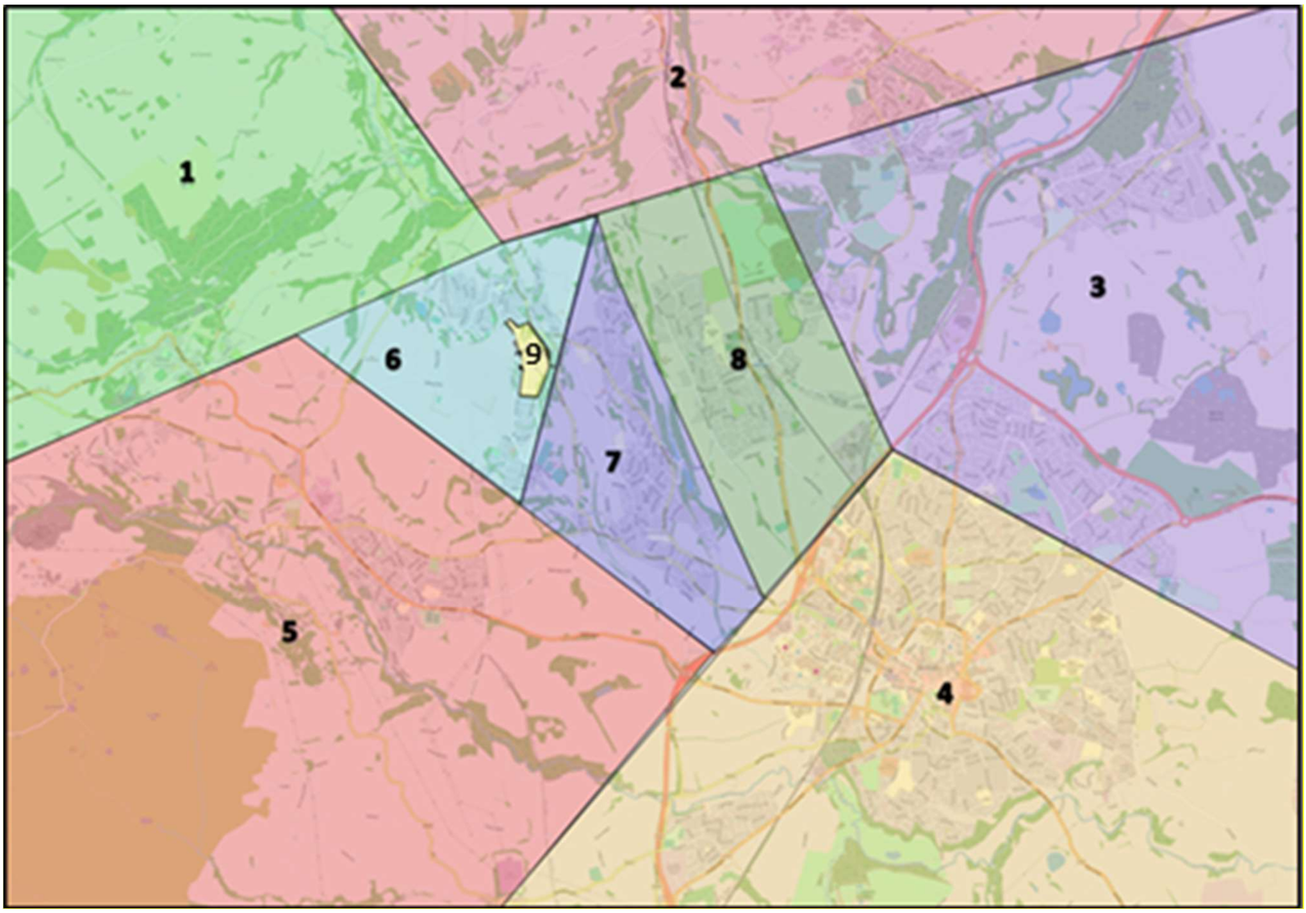
Figure 2-1: Travel Distribution Methodology

Travel Distribution

Employment	Education	Retail
Journey to Work data derived from the 2011 Census	Gravity Model – Calculated using pupil capacity and distance to site for Primary, Secondary, and FE	Gravity Model – Calculated using gross floor area distance to site for ‘food’ and ‘other’ retail

2.3.2 A zone system has been identified to ensure that there is a common basis for the distribution of trips by each journey purpose, as shown in Figure 2-2.

Figure 2-2: Zone Plan



Journey Purpose – Employment

2.3.3 The employment trip distribution has been calculated using 'Journey to Work' data derived from the 2011 Census. The trip distribution of vehicular employment trips for those whose 'usual residence' was 'Wrexham 006' MSOA has been used as a proxy for trips generated by the residential development.

2.3.4 Figure 2-3 provides a plan showing the distribution of trips to employment from those residing on the development.

Figure 2-3: Trip Distribution – Employment Journey Purpose

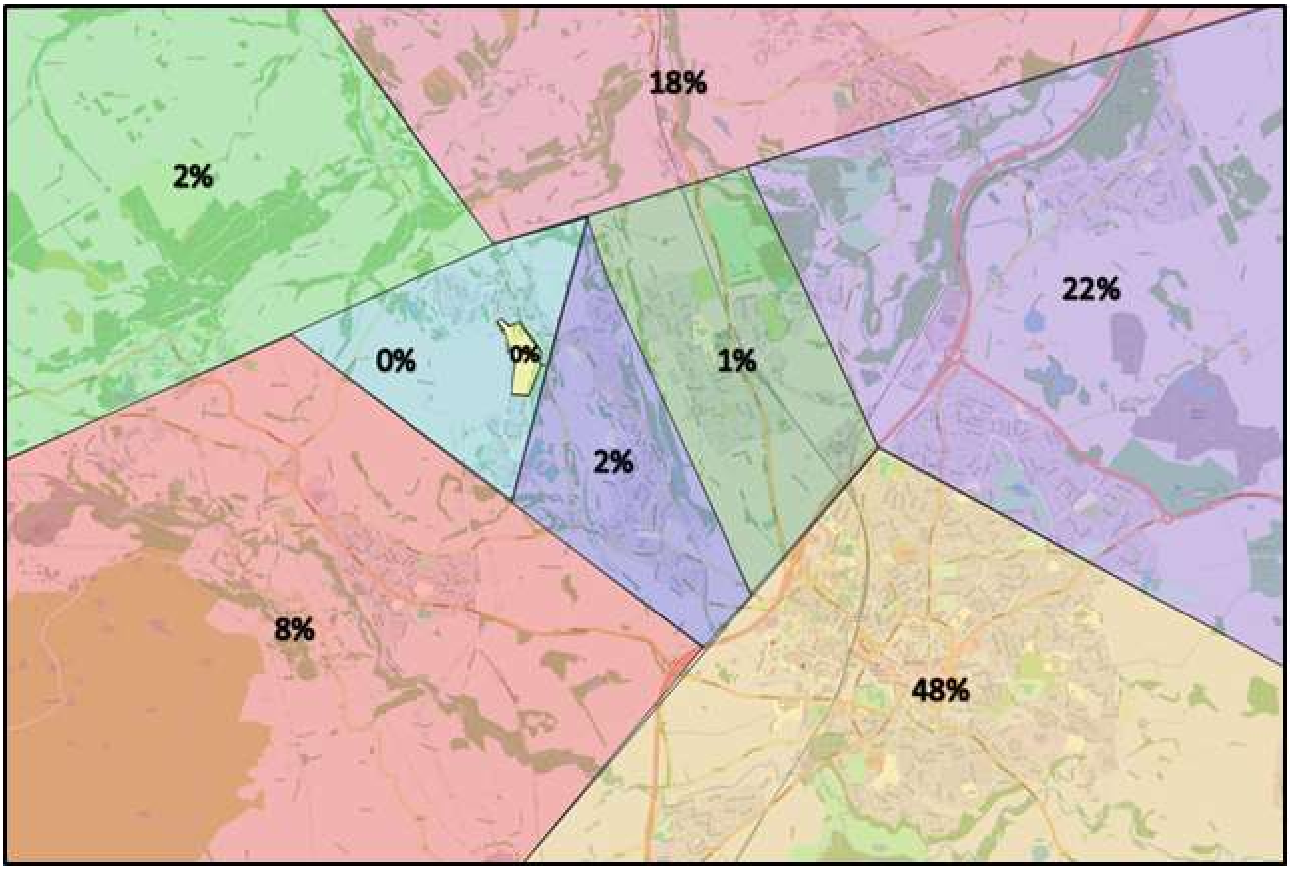


Table 2-8: Employment Journey Purpose Trips

Zone	Distribution	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
1	2%	1	2	2	1
2	18%	7	17	12	6
3	22%	9	21	15	7
4	48%	20	46	32	15
5	8%	3	7	5	2
6	0%	0	0	0	0
7	2%	1	2	1	0
8	1%	0	1	1	0
9	0%	0	0	0	0
Total	**100%**	**42**	**96**	**67**	**32**

Journey Purpose – Education

Pupil Trips

2.3.5 The vehicle trips for education journeys at the proposed development have been distributed using a gravity model for 'Primary', 'Secondary', and 'Further Education' (FE) elements individually.

2.3.6 Using census data, the proposed development is estimated to generate the following school aged pupils:

- 63 primary aged pupils (aged 5-11);
- 45 secondary aged pupils (aged 11-16); and
- 17 further education pupils (aged 16-18).

2.3.7 For the purposes of this assessment, it has been assumed that a one 2FE primary school will be provided on site, with capacity for 420 pupils. The resultant education journeys are summarised in Table 2-9.

Table 2-9: Education Trip Breakdown

Stage of Education	Pupils on site	On-Site Provision	Pupil Trips off Site	External Pupil Trips to Site
Primary School (5 to 11)	63	420	0	357
Secondary School (11 to 16)	43	0	32	0
Further Education (17 to 18)	17	0	12	0
Total	**126**	**0**	**90**	**0**

2.3.8 The vehicle trips generated are distributed individually for internal pupils travelling off site, and external pupils travelling to the site.

2.3.9 In the case of pupils travelling off site for education purposes, demand has been determined based on the capacity and distance from the site of the education establishment.

Table 2-10: Pupil Trips Off Site Distribution

School / College	Pupil Capacity[1]	Distance to Site (KM)[2]	Weighted Distribution	Zone
Secondary School				
Ysgol Clywedog	700	5.0	40%	4
Ysgol Bryn Alyn	696	4.1	60%	8
Total	-	-	**100%**	-
Further Education				
Castell Alun High School/Sixth Form	310	6.3	100%	2
Total	-	-	**100%**	-

2.3.10 In the case of pupils travelling to the site for education purposes, demand has been determined based on the 'associated school age population'[3] within adjacent lower super output areas (LSOA) at the site, and 'distance to the site' of those areas. A weighting factor has been applied to the model which weights establishments in favour of distance over population.

[1] Pupil capacity has been sourced from http://mylocalschool.gov.wales/?lang=en, with the exception of the proposed on-site provision.

[2] Distance calculated as driving distance from proposed site access point on Phoenix Drive.

[3] Primary School – LSOA Population for 5 to 11 year olds / Secondary School – LSOA Population for 11 to 16 year olds / FE – LSOA Population for 16 to 18 year olds

Table 2-11: External Pupil Trips to Site Distribution

LSOA	LSOA Education Age Population	Distance to Site (KM)	Weighted Distribution	Zone
		Primary School		
Wrexham 004A	101	2.9	3%	8
Wrexham 004B	138	3.7	2%	8
Wrexham 004C	104	3.7	2%	8
Wrexham 004D	82	3.1	2%	8
Wrexham 005A	136	1.0	29%	7
Wrexham 005B	150	2.6	5%	7
Wrexham 005C	112	2.1	5%	7
Wrexham 005D	150	3.7	2%	7
Wrexham 006A	188	1.3	24%	6
Wrexham 006B	142	1.2	21%	6
Wrexham 006C	121	3.7	2%	5
Wrexham 006D	100	4.4	1%	5
Wrexham 006E	115	4.4	1%	5
Wrexham 013A	85	4.7	1%	5
Wrexham 013B	71	4.4	1%	1
Total	-	-	**100%**	-

2.3.11 The trip distribution associated with school pupils is shown below, broken down by zone.

Table 2-12: Education Journey Purpose Trips – External Pupil Trips

Zone	AM Peak Hour		PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
1	1	1	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	4	4	0	0
6	33	31	3	3
7	31	29	2	3
8	6	6	0	1
9	0	0	0	0
Total	**75**	**70**	**6**	**8**

Staff Trips

2.3.12 The distribution of staff trips associated with the proposed primary school has been calculated using 'Journey from Work' data derived from the 2011 Census. Figure 2-4 provides a plan showing the distribution of trips to home from those employed on the development.

Figure 2-4: Staff Trip Distribution – Journey from Work 2011 Census

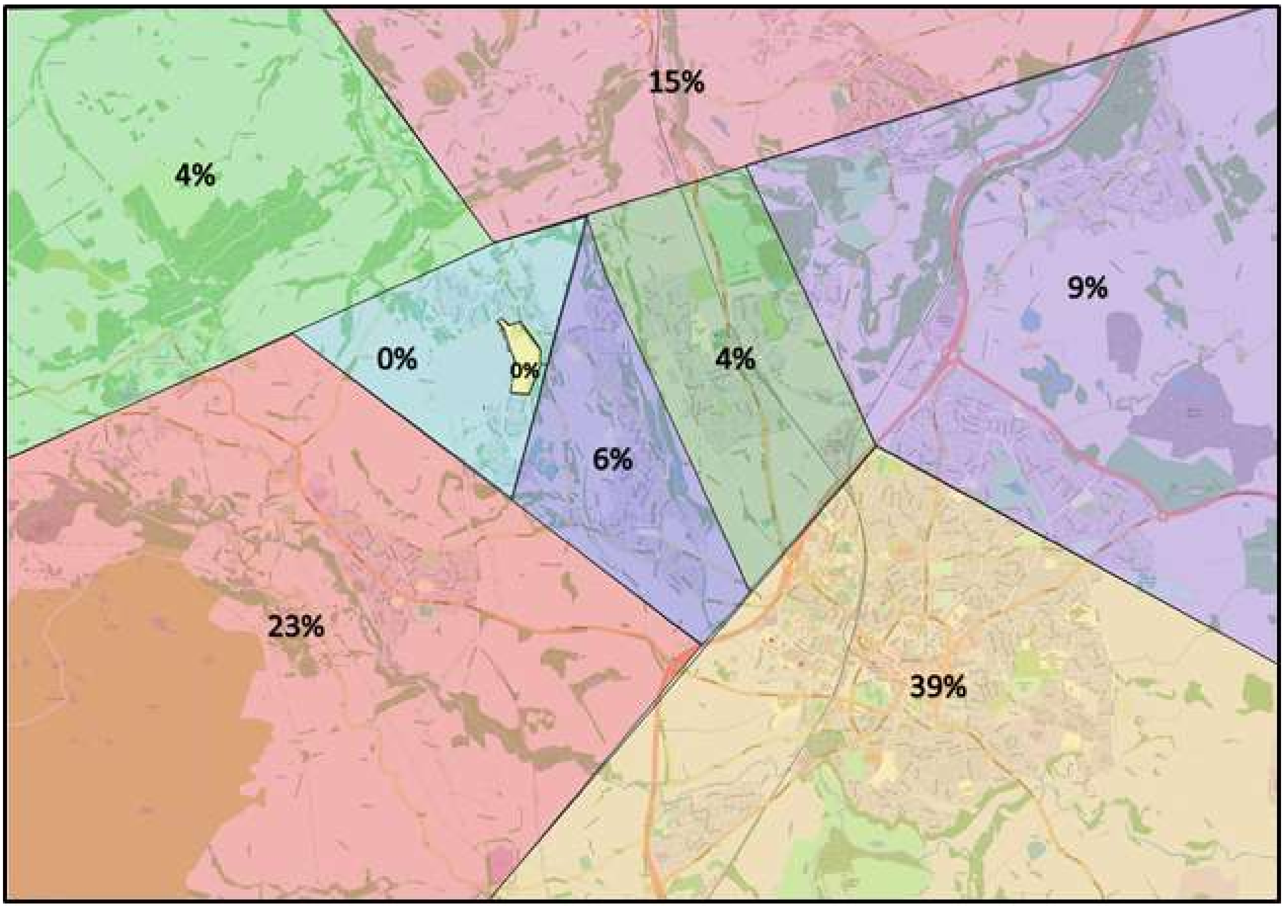


Table 2-13: Education Trips – External Staff Trips

Zone	Distribution	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
1	4%	1	0	0	0
2	15%	5	0	0	0
3	9%	3	0	0	0
4	39%	13	0	0	1
5	23%	7	0	0	1
6	0%	0	0	0	0
7	6%	2	0	0	0
8	4%	1	0	0	0
9	0%	1	0	0	0
Total	**100%**	**33**	**0**	**0**	**3**

Whole Site – Residential Trips (Education Journey Purpose) and School Trips

2.3.13 The full education trip generation and distribution breakdown by zone is as follows.

Table 2-14: Education Journey Purpose External Trips (Pupils & Staff)

Zone	AM Peak Hour		PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
1	2	1	0	0
2	5	0	0	0
3	3	0	0	0
4	13	0	0	1
5	11	4	0	1
6	33	31	3	3
7	33	29	2	3
8	7	6	0	1
9	1	0	0	0
Total	**108**	**70**	**6**	**10**

Journey Purpose – Retail

2.3.14 The forecast vehicular trips for retail journeys from the development have been distributed using a gravity model that considers 'food' and 'other' retail trips individually.

2.3.15 The retail gravity model determines demand based on the 'size' (measured in gross floor area) of the retail element and 'distance to the site'. A factor has been applied that weights retail elements in favour of distance over size.

2.3.16 'Food' retail journeys are based upon food stores located within a 7km[4] catchment area of the site, and 'other' retail journeys are based on several major shopping areas and centres in the vicinity of the site. Table 2-9 indicates the distribution model for retail trips.

Table 2-15: Retail Trips Gravity Model

Store	Store Size (sqm)[5]	Distance to Site (km)	Weighted Distribution	Zone
		Food Retail		
On Site Provision	930	0.3	48%	9
Iceland, Ruthin Road	350	4.6	1%	8
Lidl, Old Mold Road	1,500	4.2	6%	8
Aldi, Plas Coch Retail Park	1,300	5.5	4%	4
Sainsbury's, Plas Coch Retail Park	7,000	5.7	19%	4
Morrisons, Ruthin Road	5,500	5.1	17%	4
Aldi, Ruthin Road	1,800	5.3	5%	4
Total	-	-	**100%**	-
		Other Retail		
On Site Provision	464	0.3	2%	9
Dodds Lane Retail Park	13,000	7.0	2%	8
Plas Coch Retail Park	97,000	5.5	23%	4
Wrexham Town Centre	360,000	6.4	73%	4
Total	-	-	**100%**	-

2.3.17 In order to determine whether a retail journey is associated with 'food' retail or 'other' retail a split of travel has been estimated based on the ratio of average two-way peak trips rates for the most relevant TRICS subcategories, 'Retail / A - Food Superstore' and 'Retail / I - Shopping Centre - Local Shops'. This forecasts that 42% of trips will be 'Food' associated and 58% will be 'Other' retail trips.

2.3.18 The trip generation and distribution for retail journeys from the site is presented as follows. Figure 2-5 provides a plan showing the distribution of retail trips.

[4] Considered to be the average travel distance for shopping trips in the UK (National Travel Survey, NTS0405)
[5] Store size has been estimated based on Google Maps Aerial view.

Figure 2-5: Trip Distribution - Retail Journey Purpose

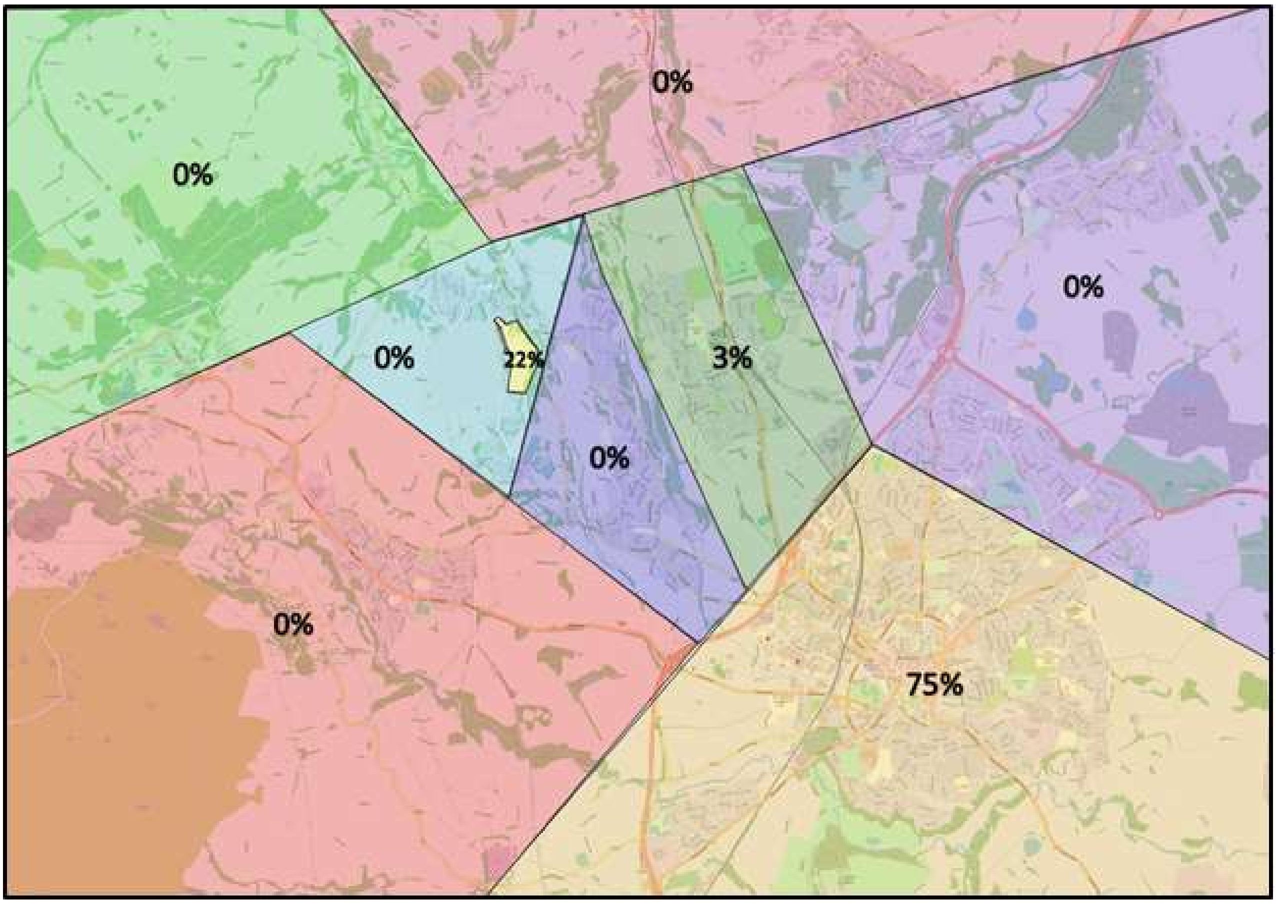


Table 2-16: Retail Journey Purpose Trips

Zone	Distribution	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
1	0%	0	0	0	0
2	0%	0	0	0	0
3	0%	0	0	0	0
4	75%	6	14	25	12
5	0%	0	0	0	0
6	0%	0	0	0	0
7	0%	0	0	0	0
8	3%	0	0	1	0
9	22%	8	18	34	16
Total	**100%**	**14**	**32**	**59**	**28**

Total Residential & School Distribution

2.3.19 The total trip generation and zone distribution associated with the residential and school elements of the development is provided in Table 2-17 as follows.

Table 2-17: Total Residential & School External Trip Distribution

Zone	AM Peak Hour		PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
1	3	3	2	1
2	13	19	13	6
3	12	21	15	7
4	39	62	58	29
5	14	11	5	3
6	33	31	3	3
7	34	30	4	4
8	10	11	3	2
9	0	0	0	0
Total	**158**	**189**	**102**	**56**

3 Retail Gravity Model

3.1 Travel Demand

3.1.1 Vehicle trip generation for the proposed retail land uses has been derived from TRICS trip rates. The proposed trip generation outlined in Table 3-1 below, includes trips associated with the proposed Retail uses, Public House and Healthcare facility.

Table 3-1: Retail/Leisure/Healthcare Trip Generation

	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
Retail/Leisure/Healthcare Trip Generation	73	61	134	95	106	202

3.1.2 Retail journey purpose from the residential element identified a total of 26 and 50 internal trips (Table 2-16, Zone 9) in the AM and PM peaks respectively. The resultant internal/external split is as follows.

Table 3-2: Retail/Leisure Trips - Internal/External Split

	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
Internal Trips	8	18	26	34	16	50
External Trips	65	42	108	62	90	152

3.2 Trip Distribution

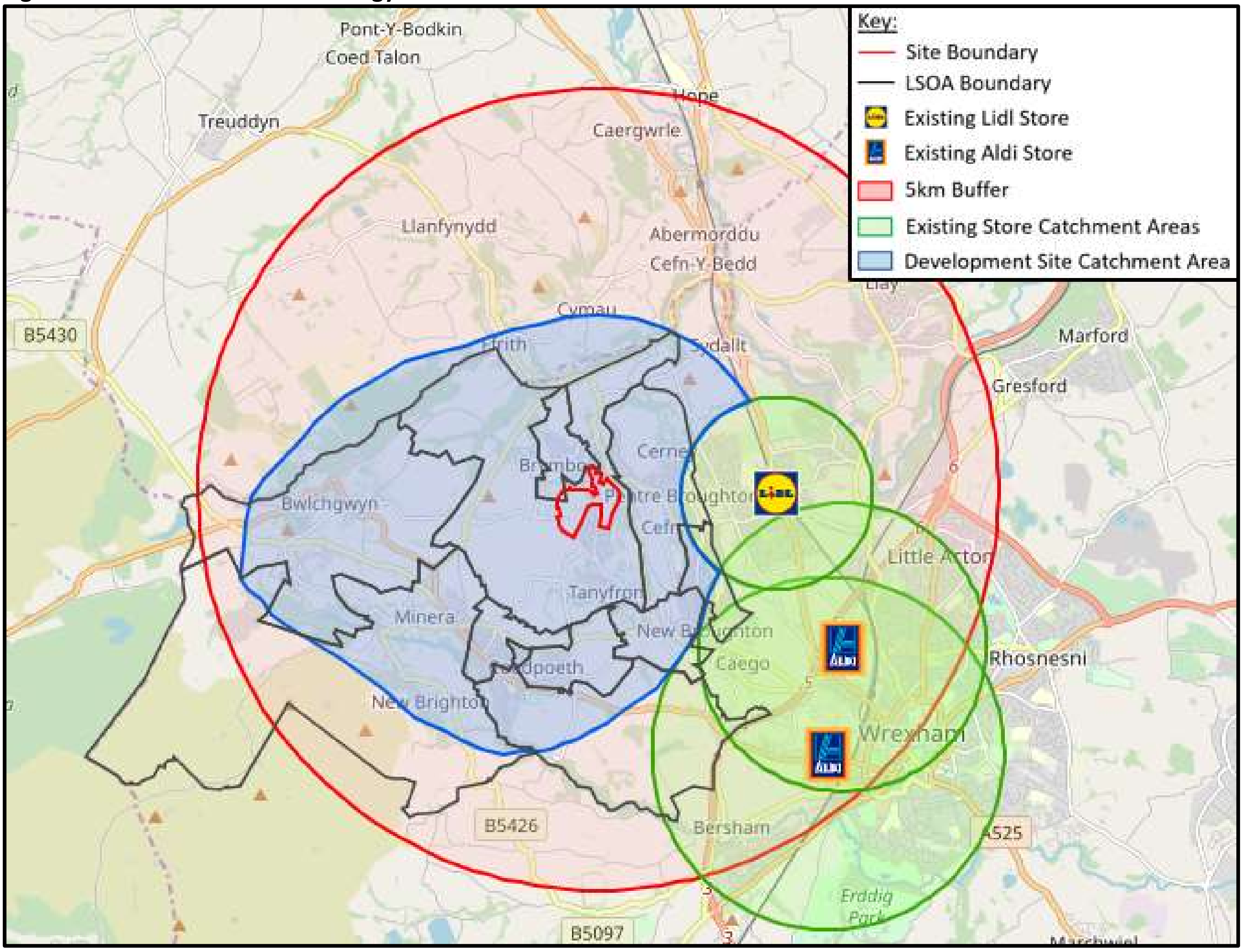
3.2.1 Following the identification of the likely travel demand associated with the proposed facilities, the following method has been followed to identify the trip distribution.

- Lower Super Output Areas (LSOA's) within a 5km catchment of the site have been identified;
- Nearby food stores within the catchment area have been identified. Where two stores are located adjacent to each other, only one has been used. This resulted in the identification of three main stores, including:
  - Lidl, Old Mold Road, Gwesyllt;
  - Aldi, Plas Coch Retail Park, Wrexham; and
  - Aldi, Ruthin Road, Wrexham.
- A buffer around each store has been plotted to a point equidistant between the existing store and proposed on-site store. This has defined the likely catchment areas for each existing store;

- The catchment has been manually extended to include the villages of Bwlchgwyn, Minera, New Brighton and Coedpoeth. Each of these stores is located closer to the proposed site than the existing stores. It is therefore considered that the on-site provision would likely be their preferred store;
- LSOA's within the proposed store catchment area have been identified; and
- A distribution proportion has been calculated based on population within the identified catchment LSOA's.

3.2.2 Figure 3-1 illustrates the catchment areas.

Figure 3-1: Distribution Methodology: Catchment Areas and LSOA's Selected [6]



[6] LSOA's selected: Wrexham 005A, 005B, 005D, 006A, 006B, 006C, 006D, 006E, 013A, and 013B.

Table 3-3: Retail Development Trip Distribution

Zone	Distribution	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
1	1%	1	0	1	1
2	0%	0	0	0	0
3	0%	0	0	0	0
4	0%	0	0	0	0
5	6%	4	3	4	6
6	46%	30	19	28	41
7	47%	31	20	29	42
8	0%	0	0	0	0
9	0%	0	0	0	0
Total	**100%**	**65**	**42**	**62**	**90**

4 Whole Site Distribution

4.1.1 The total trip generation and zone distribution associated with the whole site is provided in Table 4-1 as follows.

Table 4-1: Total Site Trip Distribution (Internal and External Trips)

Zone	AM Peak Hour			PM Peak Hour		
	Arrivals	Departures	Total	Arrivals	Departures	Total
1	4	3	7	2	2	4
2	13	19	33	13	6	19
3	12	21	33	15	7	22
4	39	62	101	58	29	87
5	18	13	32	9	9	18
6	63	51	114	31	45	76
7	64	50	115	32	46	79
8	10	11	20	3	2	5
9	26	58	84	77	37	113
Total	**250**	**289**	**538**	**240**	**183**	**423**

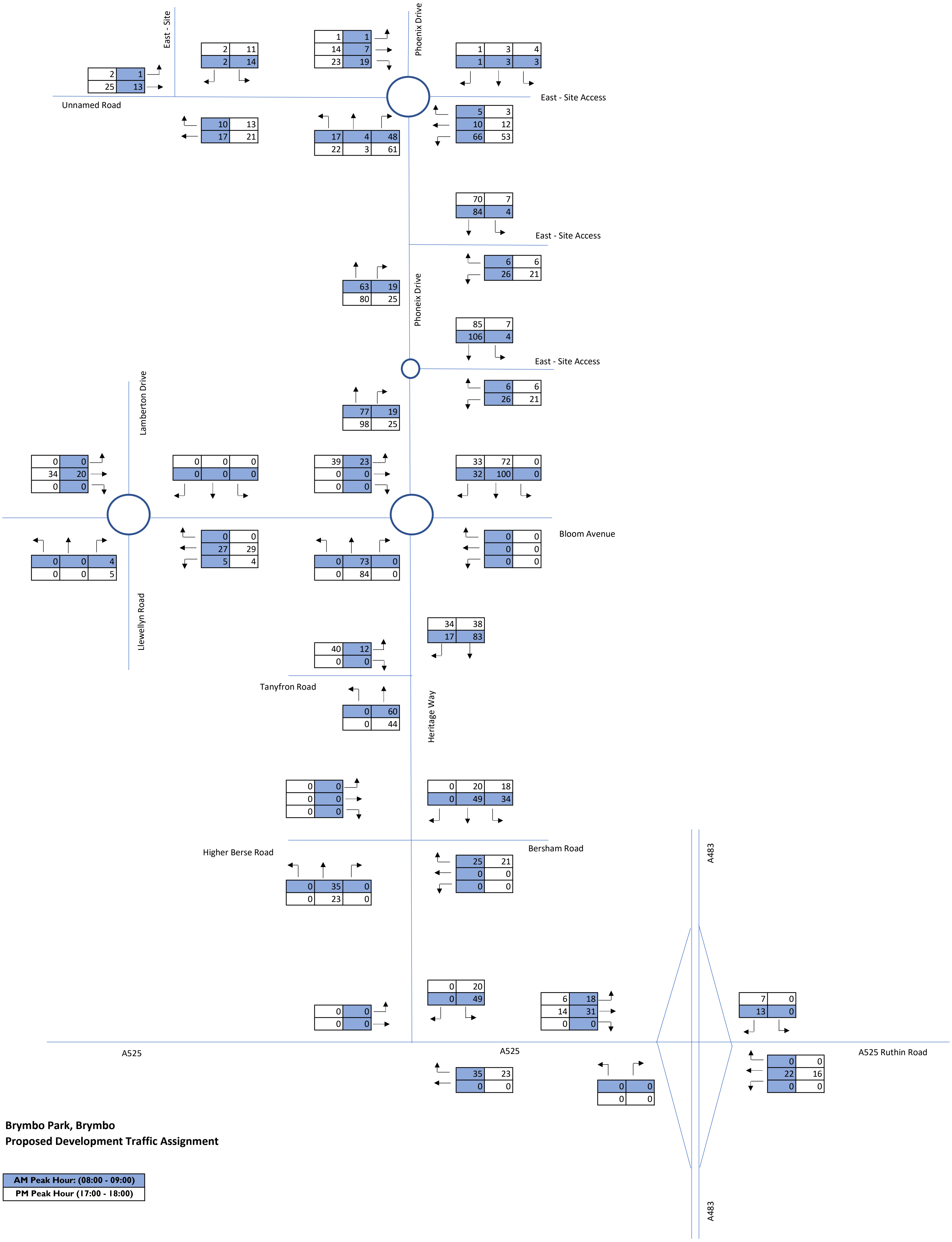
5 Route Assignment

5.1.1 The vehicle trips have been assigned to the local highway network based upon the above distribution and the logical routes to and from these areas. Possible routing has been derived from Google Maps from the site access points to each zone.

5.1.2 The model has been developed to account for route choice, and where multiple routes were identified by Google Maps, trips have been proportionally split between each route.

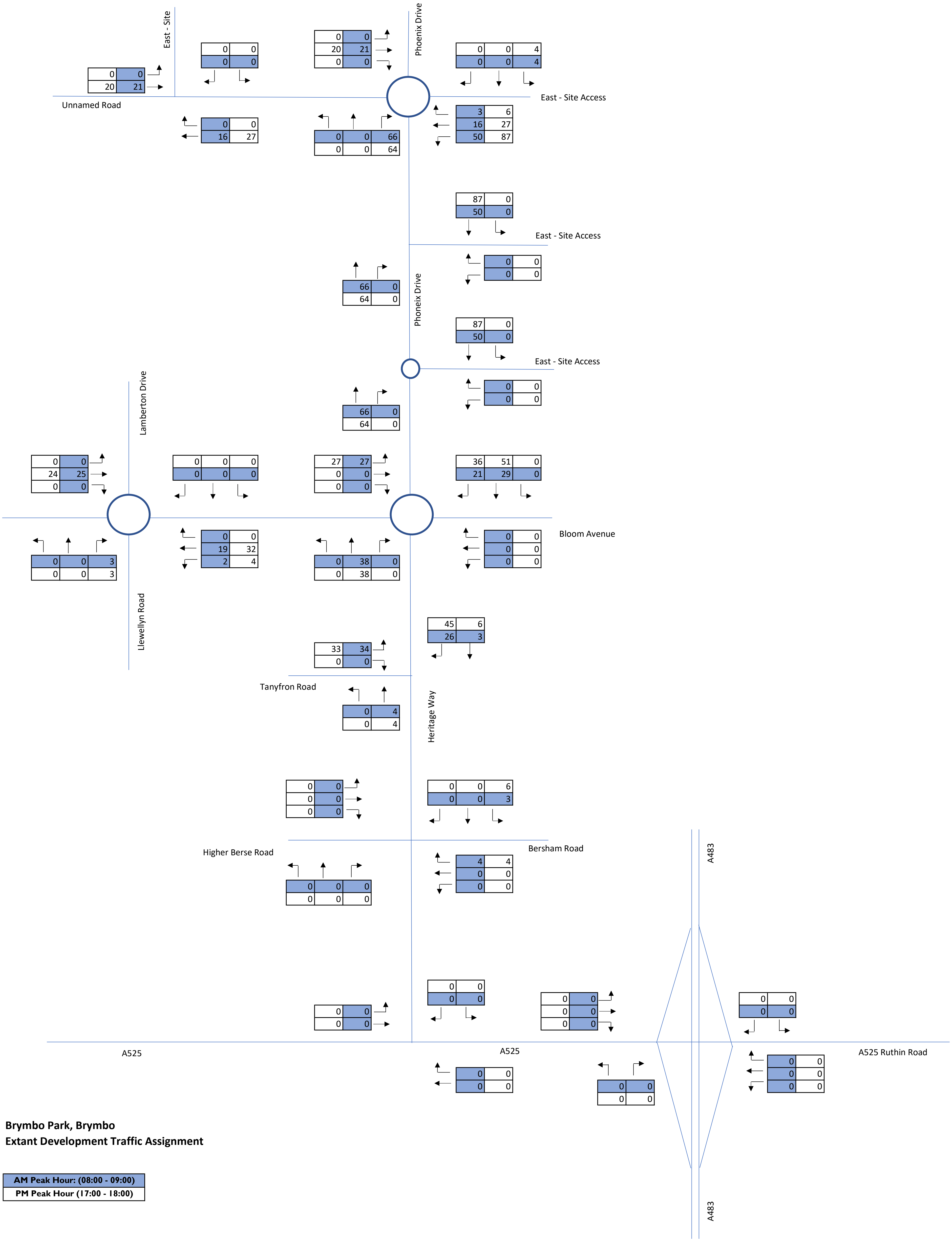
5.1.3 A full route assignment diagram has been included within **Appendix A.**

Appendix A Route Assignment Diagrams



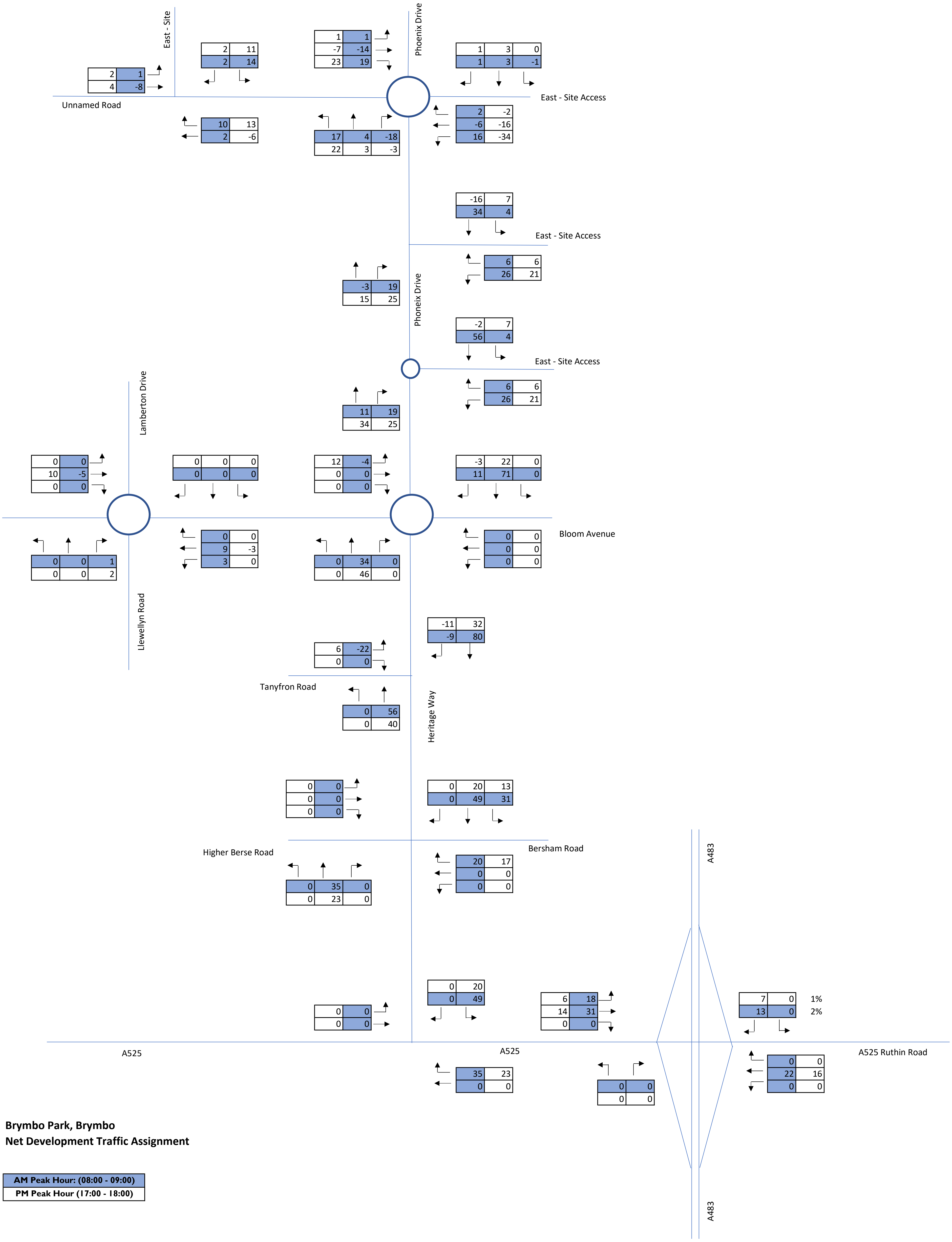
Brymbo Park, Brymbo
Proposed Development Traffic Assignment

AM Peak Hour: (08:00 - 09:00)
PM Peak Hour (17:00 - 18:00)



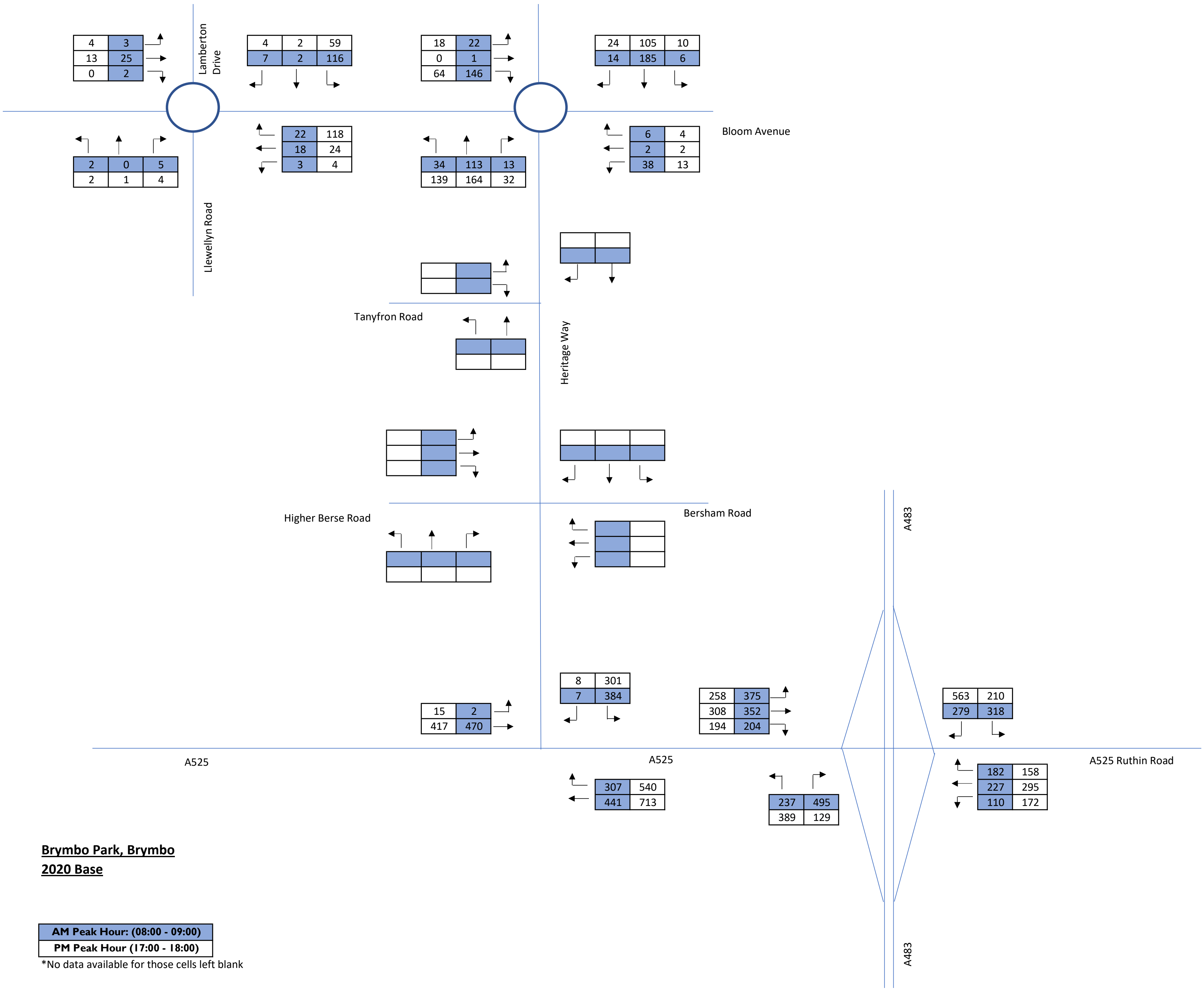
Brymbo Park, Brymbo
Extant Development Traffic Assignment

AM Peak Hour: (08:00 - 09:00)
PM Peak Hour (17:00 - 18:00)



Brymbo Park, Brymbo
Net Development Traffic Assignment

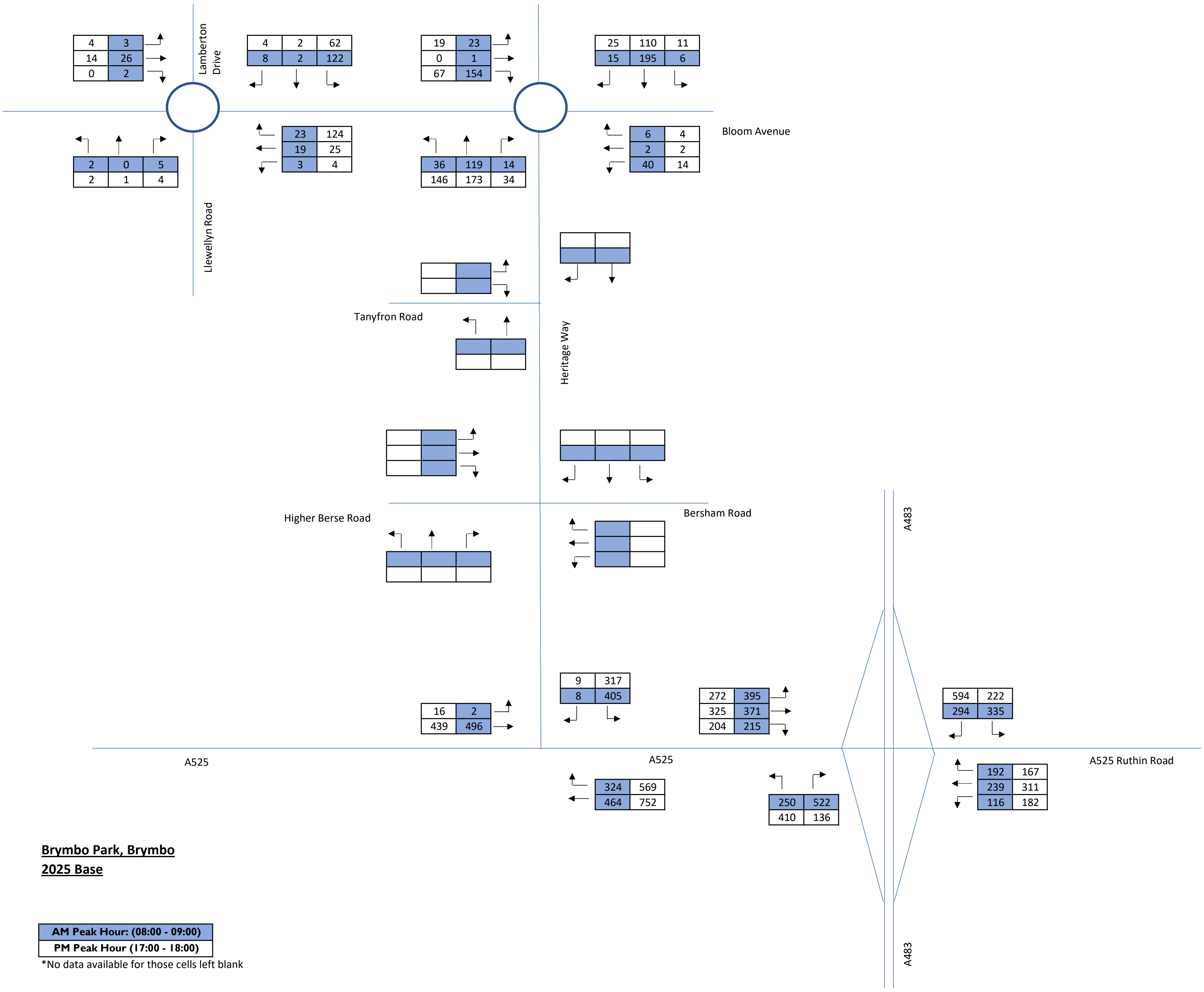
AM Peak Hour: (08:00 - 09:00)
PM Peak Hour (17:00 - 18:00)



Brymbo Park, Brymbo
2020 Base

AM Peak Hour: (08:00 - 09:00)
PM Peak Hour (17:00 - 18:00)

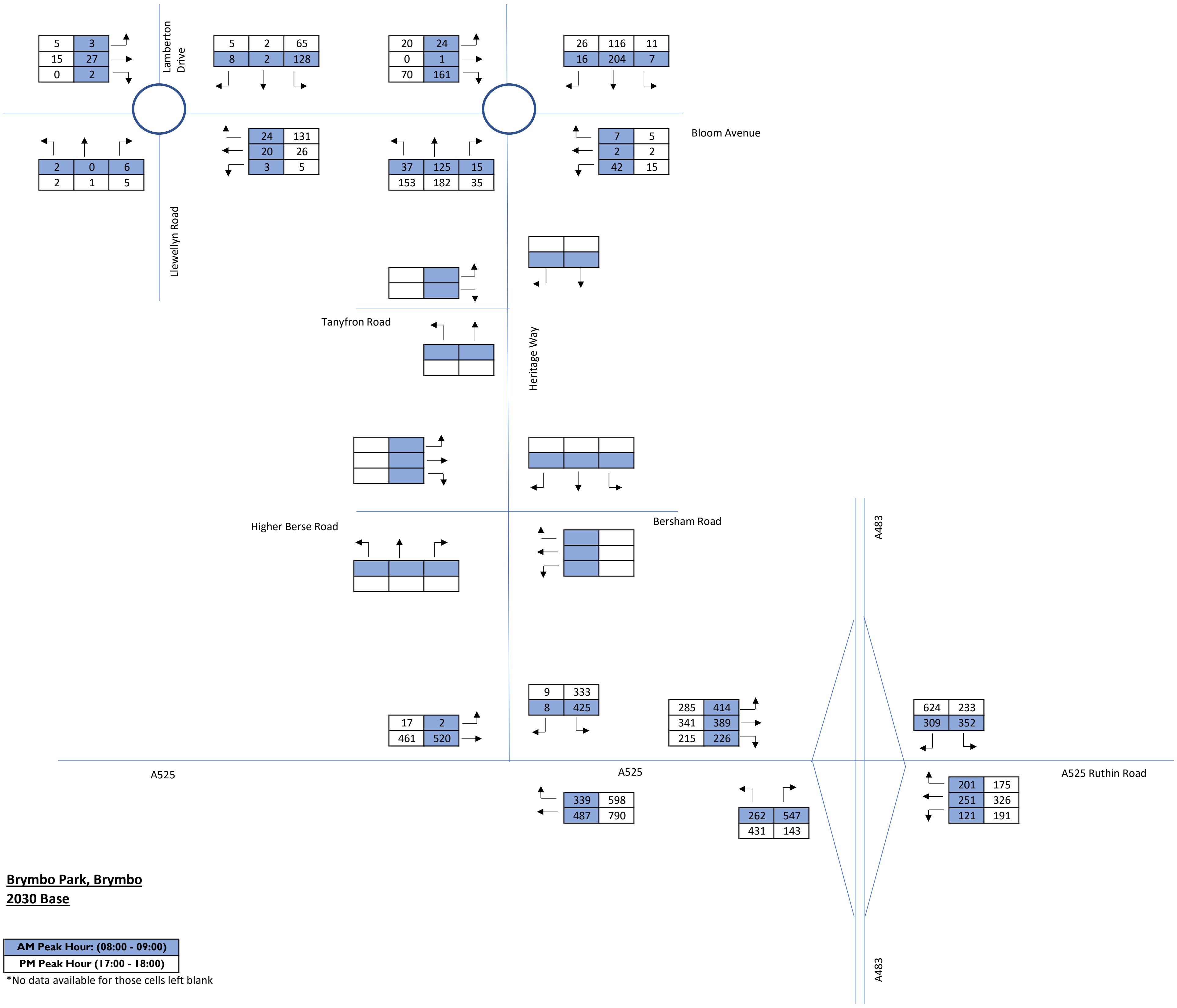
*No data available for those cells left blank

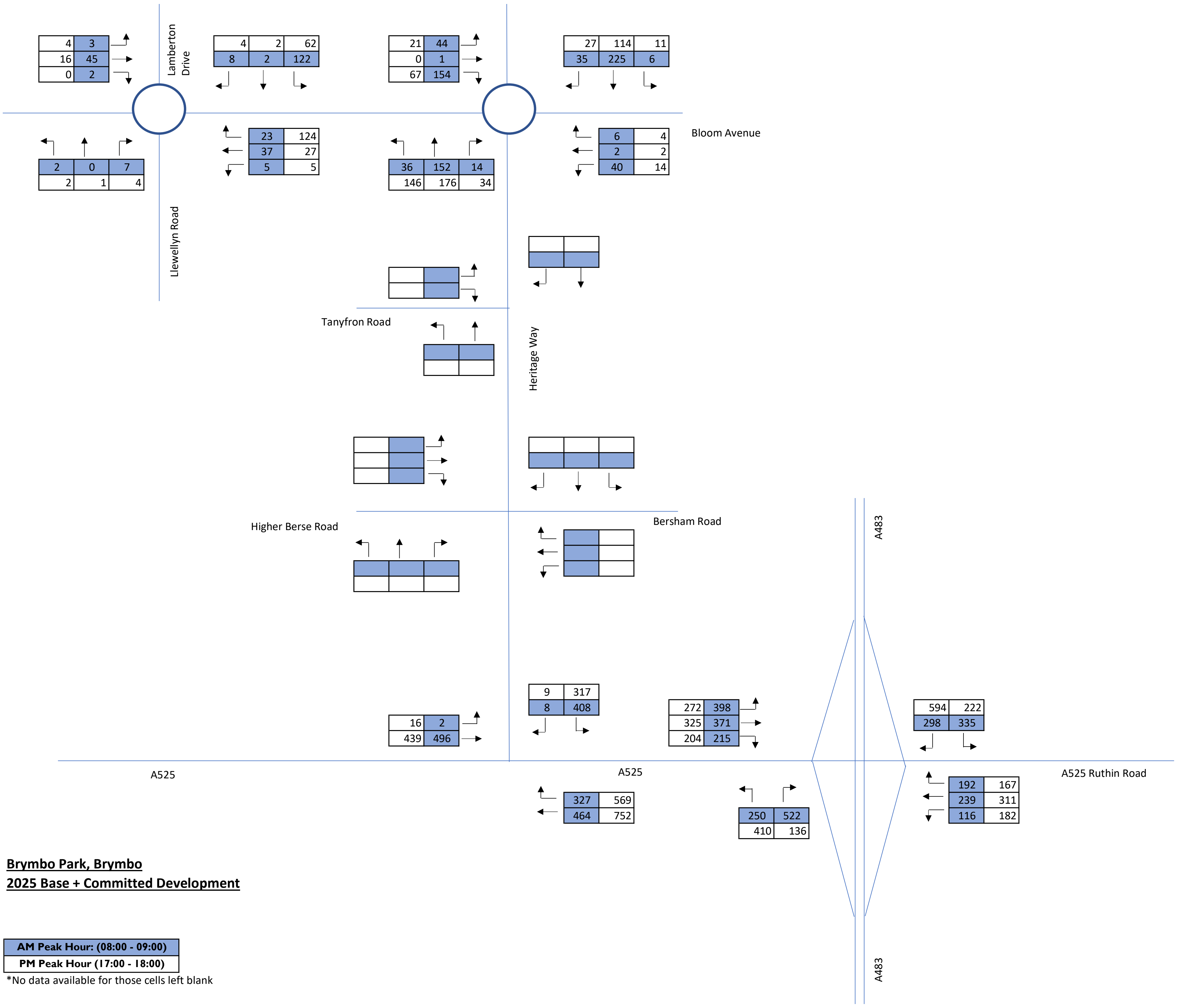


Brymbo Park, Brymbo
2025 Base

AM Peak Hour: (08:00 - 09:00)
PM Peak Hour (17:00 - 18:00)

*No data available for those cells left blank

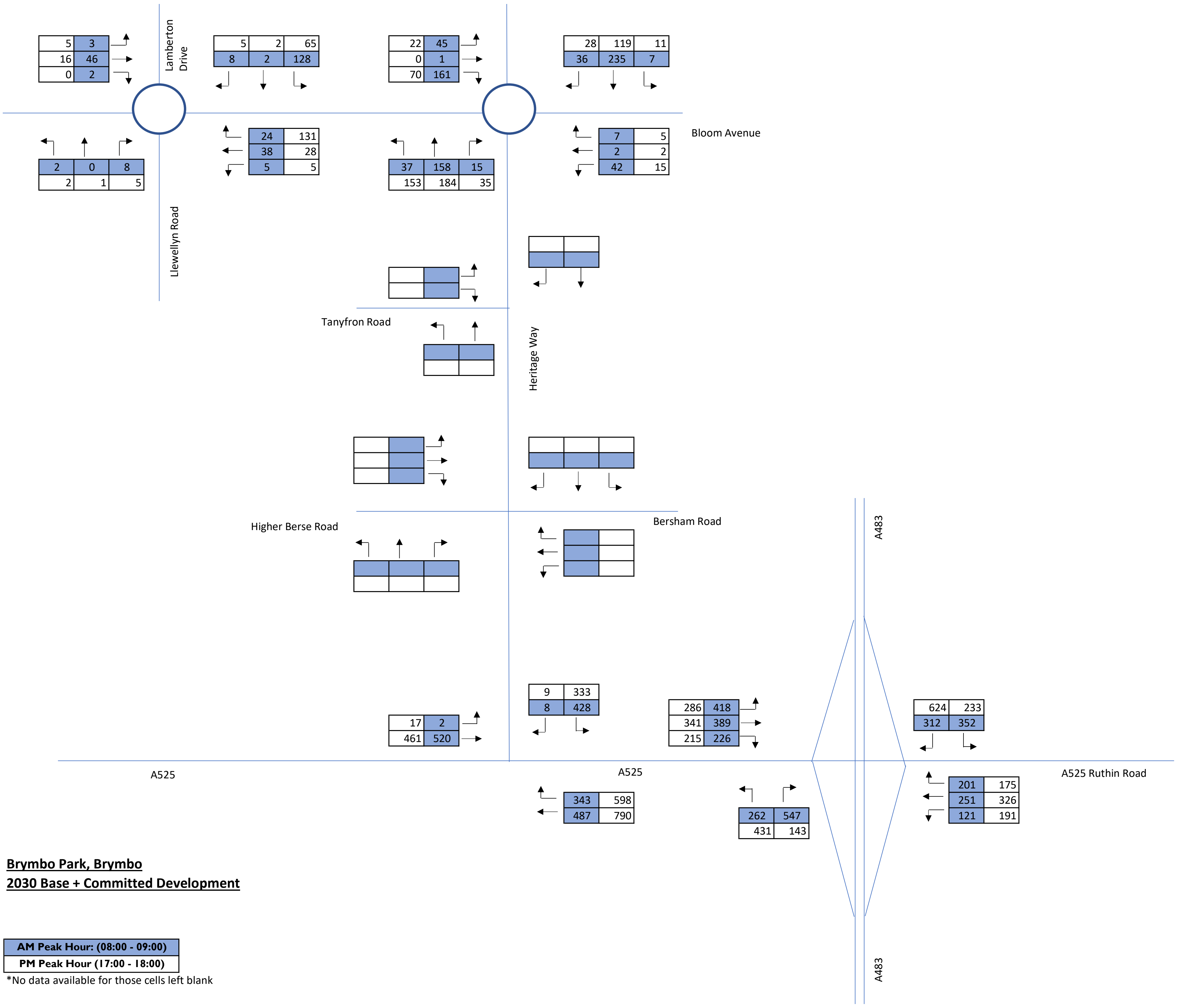

Lamberton Drive
Llewellyn Road
Bloom Avenue
Tanyfron Road
Heritage Way
Higher Berse Road
Bersham Road
A483
A525
A525
A525 Ruthin Road
A483
5 3
15 27
0 2
5 2 65
8 2 128
20 24
0 1
70 161
26 116 11
16 204 7
24 131
20 26
3 5
2 0 6
2 1 5
37 125 15
153 182 35
7 5
2 2
42 15
9 333
8 425
17 2
461 520
285 414
341 389
215 226
624 233
309 352
339 598
487 790
262 547
431 143
201 175
251 326
121 191
Brymbo Park, Brymbo
2030 Base
AM Peak Hour: (08:00 - 09:00)
PM Peak Hour (17:00 - 18:00)
*No data available for those cells left blank



Brymbo Park, Brymbo
2025 Base + Committed Development

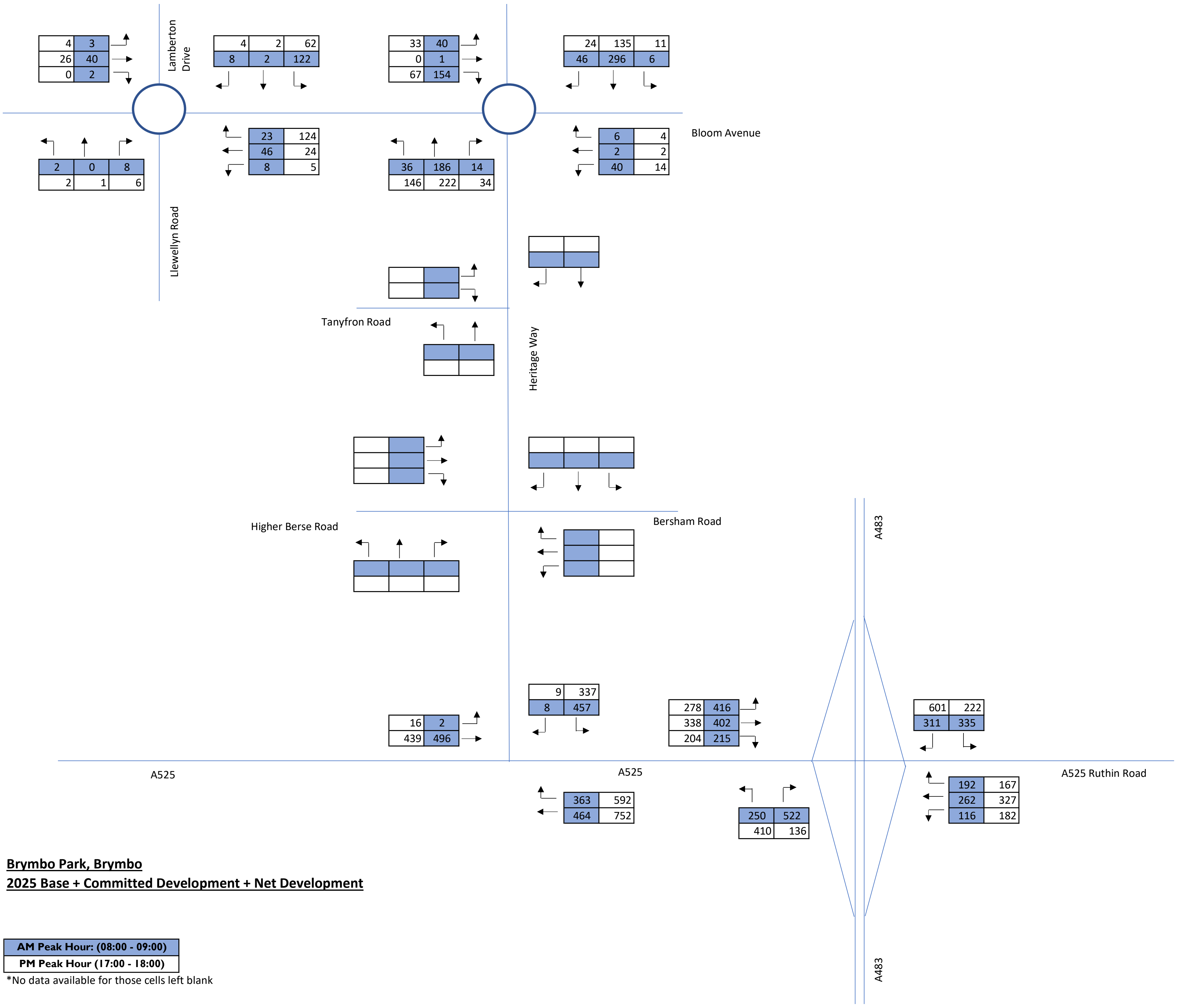
AM Peak Hour: (08:00 - 09:00)
PM Peak Hour (17:00 - 18:00)

*No data available for those cells left blank



<u>Brymbo Park, Brymbo</u>
<u>2030 Base + Committed Development</u>

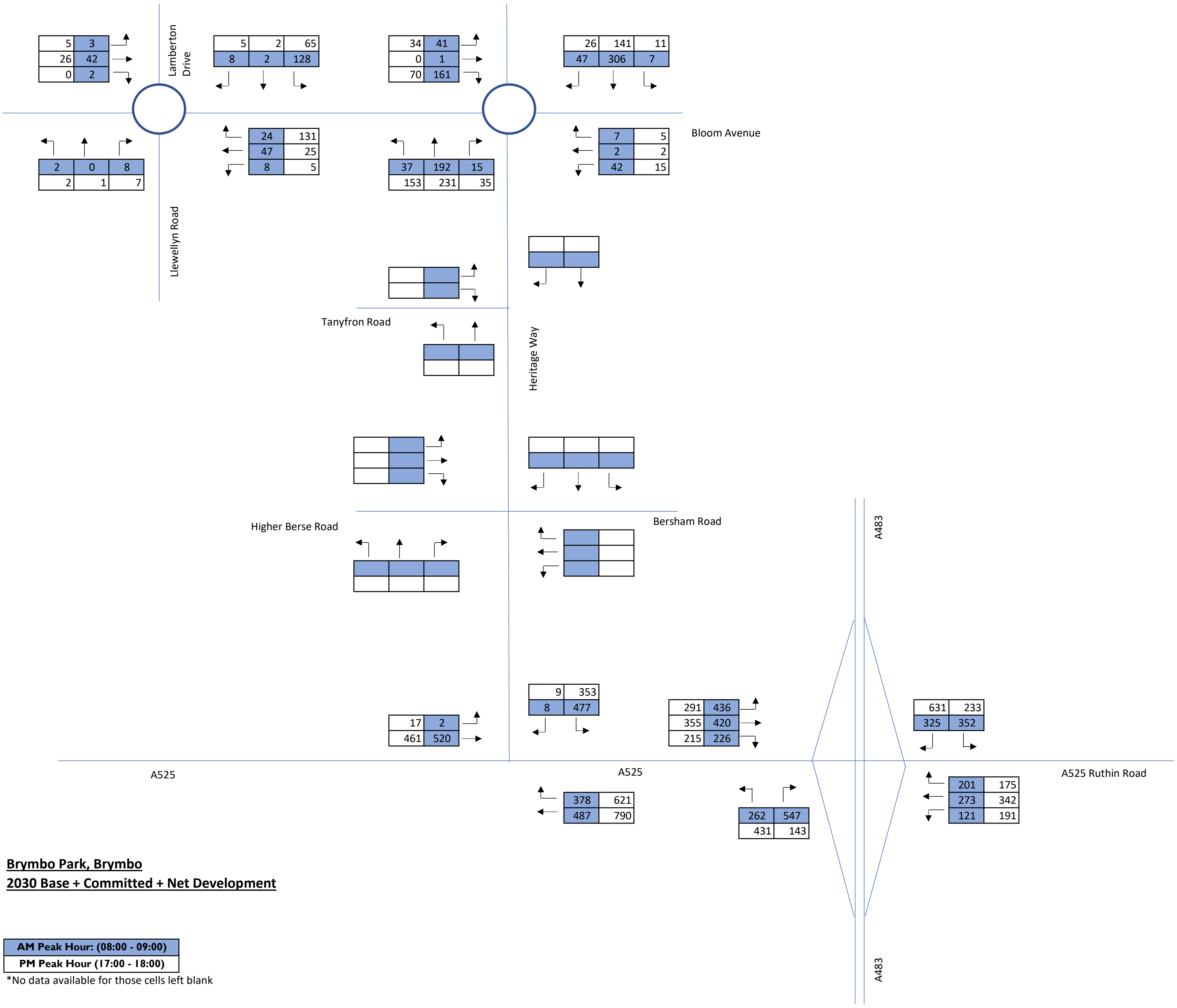
*No data available for those cells left blank



Brymbo Park, Brymbo
2025 Base + Committed Development + Net Development

AM Peak Hour: (08:00 - 09:00)
PM Peak Hour (17:00 - 18:00)

*No data available for those cells left blank



<u>Brymbo Park, Brymbo</u>

<u>2030 Base + Committed + Net Development</u>

AM Peak Hour: (08:00 - 09:00)
PM Peak Hour (17:00 - 18:00)

*No data available for those cells left blank

Appendix D Junction Capacity Modelling Outputs

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.0.6896

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The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: Phoenix Drive_ Bloom Ave_ Brymbo Road.j9
Path: C:\PJA\Phil Jones Associates\SharedData - 03499 Brymbo, Wrexham\3. Technical\3.2 Modelling\Revised Application\Phoenix Way_Brymbo Road
Report generation date: 17/08/2020 14:00:16

»Existing Layout - 2020 Base, AM
»Existing Layout - 2020 Base, PM
»Existing Layout - 2025 Base , AM
»Existing Layout - 2025 Base , PM
»Existing Layout - 2025 Base + Committed, AM
»Existing Layout - 2025 Base + Committed, PM
»Existing Layout - 2025 Base + Committed + Net , AM
»Existing Layout - 2025 Base + Committed + Net, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	Existing Layout - 2020 Base							
Arm 1	0.2	3.39	0.18	A	0.1	3.06	0.12	A
Arm 2	0.1	4.41	0.06	A	0.0	3.87	0.02	A
Arm 3	0.1	2.68	0.12	A	0.3	3.14	0.24	A
Arm 4	0.2	3.20	0.14	A	0.1	3.06	0.07	A
	Existing Layout - 2025 Base							
Arm 1	0.2	3.45	0.19	A	0.1	3.09	0.12	A
Arm 2	0.1	4.48	0.06	A	0.0	3.89	0.02	A
Arm 3	0.1	2.70	0.12	A	0.3	3.20	0.26	A
Arm 4	0.2	3.24	0.15	A	0.1	3.09	0.08	A
	Existing Layout - 2025 Base + Committed							
Arm 1	0.3	3.65	0.23	A	0.1	3.11	0.13	A
Arm 2	0.1	4.64	0.06	A	0.0	3.91	0.02	A
Arm 3	0.2	2.80	0.15	A	0.3	3.21	0.26	A
Arm 4	0.2	3.38	0.17	A	0.1	3.11	0.08	A
	Existing Layout - 2025 Base + Committed + Net							
Arm 1	0.4	4.01	0.30	A	0.2	3.16	0.14	A
Arm 2	0.1	4.93	0.07	A	0.0	3.95	0.02	A
Arm 3	0.2	2.91	0.17	A	0.4	3.35	0.29	A
Arm 4	0.2	3.44	0.17	A	0.1	3.23	0.09	A

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 average delay per arriving vehicle.

File summary

File Description

Title	(untitled)

Location	
Site number	
Date	22/11/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	PJA\Jack Hanly
Description	

Units

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

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2020 Base	AM	ONE HOUR	08:00	09:30	15
D2	2020 Base	PM	ONE HOUR	17:00	18:30	15
D3	2025 Base	AM	ONE HOUR	08:00	09:30	15
D4	2025 Base	PM	ONE HOUR	17:00	18:30	15
D5	2025 Base + Committed	AM	ONE HOUR	08:00	09:30	15
D6	2025 Base + Committed	PM	ONE HOUR	17:00	18:30	15
D7	2025 Base + Committed + Net	AM	ONE HOUR	08:00	09:30	15
D8	2025 Base + Committed + Net	PM	ONE HOUR	17:00	18:30	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Existing Layout	100.000

Existing Layout - 2020 Base, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

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	3.22	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	untitled	
2	untitled	
3	untitled	
4	untitled	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1	3.70	6.10	4.3	34.0	32.0	34.0	
2	2.80	4.50	6.5	15.7	32.0	44.0	
3	3.70	4.90	13.2	37.6	32.0	9.0	
4	3.00	5.70	9.9	23.9	32.0	21.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.595	1391
2	0.506	1059
3	0.652	1537
4	0.606	1399

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)
D1	2020 Base	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)

HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	205	100.000
2		✓	46	100.000
3		✓	160	100.000
4		✓	169	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	6	185	14
	2	6	0	38	2
	3	113	13	0	34
	4	22	1	146	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.18	3.39	0.2	A
2	0.06	4.41	0.1	A
3	0.12	2.68	0.1	A
4	0.14	3.20	0.2	A

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	154	120	1319	0.117	154	0.1	3.086	A
2	35	259	928	0.037	34	0.0	4.029	A
3	120	16	1526	0.079	120	0.1	2.560	A
4	127	99	1339	0.095	127	0.1	2.971	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	184	144	1305	0.141	184	0.2	3.210	A
2	41	310	902	0.046	41	0.0	4.182	A
3	144	20	1524	0.094	144	0.1	2.607	A

4	152	119	1327	0.115	152	0.1	3.063	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	226	176	1286	0.176	226	0.2	3.394	A
2	51	380	867	0.058	51	0.1	4.410	A
3	176	24	1521	0.116	176	0.1	2.675	A
4	186	145	1311	0.142	186	0.2	3.200	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	226	176	1286	0.176	226	0.2	3.394	A
2	51	380	867	0.058	51	0.1	4.410	A
3	176	24	1521	0.116	176	0.1	2.675	A
4	186	145	1310	0.142	186	0.2	3.200	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	184	144	1305	0.141	184	0.2	3.212	A
2	41	310	902	0.046	41	0.0	4.183	A
3	144	20	1524	0.094	144	0.1	2.609	A
4	152	119	1327	0.115	152	0.1	3.067	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	154	121	1319	0.117	154	0.1	3.090	A
2	35	260	927	0.037	35	0.0	4.032	A
3	120	17	1526	0.079	121	0.1	2.562	A
4	127	99	1338	0.095	127	0.1	2.972	A

Existing Layout - 2020 Base, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

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	3.13	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

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)
D2	2020 Base	PM	ONE HOUR	17:00	18:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	139	100.000
2		✓	19	100.000
3		✓	335	100.000
4		✓	82	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	10	105	24
	2	4	0	13	2
	3	164	32	0	139
	4	18	0	64	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	0	0
	2	0	0	0	0

	3	0	0	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.12	3.06	0.1	A
2	0.02	3.87	0.0	A
3	0.24	3.14	0.3	A
4	0.07	3.06	0.1	A

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	105	72	1348	0.078	104	0.1	2.894	A
2	14	145	986	0.015	14	0.0	3.705	A
3	252	23	1522	0.166	251	0.2	2.831	A
4	62	150	1308	0.047	62	0.0	2.888	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	125	86	1339	0.093	125	0.1	2.963	A
2	17	173	971	0.018	17	0.0	3.772	A
3	301	27	1520	0.198	301	0.2	2.954	A
4	74	180	1290	0.057	74	0.1	2.959	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	153	106	1328	0.115	153	0.1	3.063	A
2	21	212	951	0.022	21	0.0	3.868	A
3	369	33	1516	0.243	369	0.3	3.138	A
4	90	220	1265	0.071	90	0.1	3.063	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	153	106	1328	0.115	153	0.1	3.063	A
2	21	212	951	0.022	21	0.0	3.868	A
3	369	33	1516	0.243	369	0.3	3.138	A
4	90	220	1265	0.071	90	0.1	3.063	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	125	86	1339	0.093	125	0.1	2.966	A
2	17	174	971	0.018	17	0.0	3.775	A
3	301	27	1519	0.198	301	0.2	2.957	A
4	74	180	1289	0.057	74	0.1	2.963	A

18:15 - 18:30

Arm	Total Demand	Circulating	Capacity	RFC	Throughput	End queue	Delay (s)	Unsignalised

	(PCU/hr)	flow (PCU/hr)	(PCU/hr)		(PCU/hr)	(PCU)		level of service
1	105	72	1348	0.078	105	0.1	2.895	A
2	14	145	985	0.015	14	0.0	3.706	A
3	252	23	1522	0.166	252	0.2	2.834	A
4	62	151	1307	0.047	62	0.0	2.892	A

Existing Layout - 2025 Base , AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

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	3.26	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

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)
D3	2025 Base	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	216	100.000
2		✓	48	100.000
3		✓	169	100.000
4		✓	178	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	6	195	15
	2	6	0	40	2
	3	119	14	0	36
	4	23	1	154	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	0	0
	2	0	0	0	0

	3	0	0	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.19	3.45	0.2	A
2	0.06	4.48	0.1	A
3	0.12	2.70	0.1	A
4	0.15	3.24	0.2	A

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	163	127	1315	0.124	162	0.1	3.119	A
2	36	273	921	0.039	36	0.0	4.069	A
3	127	17	1526	0.083	127	0.1	2.573	A
4	134	104	1335	0.100	134	0.1	2.995	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	194	152	1300	0.149	194	0.2	3.253	A
2	43	327	893	0.048	43	0.1	4.233	A
3	152	21	1524	0.100	152	0.1	2.623	A
4	160	125	1323	0.121	160	0.1	3.095	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	238	186	1280	0.186	238	0.2	3.452	A
2	53	400	856	0.062	53	0.1	4.480	A
3	186	25	1521	0.122	186	0.1	2.697	A
4	196	153	1306	0.150	196	0.2	3.242	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	238	186	1280	0.186	238	0.2	3.453	A
2	53	401	856	0.062	53	0.1	4.481	A
3	186	25	1521	0.122	186	0.1	2.697	A
4	196	153	1306	0.150	196	0.2	3.242	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	194	152	1300	0.149	194	0.2	3.254	A
2	43	328	893	0.048	43	0.1	4.235	A
3	152	21	1524	0.100	152	0.1	2.624	A
4	160	125	1323	0.121	160	0.1	3.096	A

09:15 - 09:30

Arm	Total Demand	Circulating	Capacity	RFC	Throughput	End queue	Delay (s)	Unsignalised

	(PCU/hr)	flow (PCU/hr)	(PCU/hr)		(PCU/hr)	(PCU)		level of service
1	163	127	1315	0.124	163	0.1	3.126	A
2	36	274	920	0.039	36	0.0	4.074	A
3	127	17	1526	0.083	127	0.1	2.575	A
4	134	105	1335	0.100	134	0.1	2.997	A

Existing Layout - 2025 Base , PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

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	3.18	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

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)
D4	2025 Base	PM	ONE HOUR	17:00	18:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	146	100.000
2		✓	20	100.000
3		✓	353	100.000
4		✓	86	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	11	110	25
	2	4	0	14	2
	3	173	34	0	146
	4	19	0	67	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	0	0
	2	0	0	0	0

	3	0	0	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.12	3.09	0.1	A
2	0.02	3.89	0.0	A
3	0.26	3.20	0.3	A
4	0.08	3.09	0.1	A

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	110	76	1346	0.082	110	0.1	2.912	A
2	15	152	982	0.015	15	0.0	3.721	A
3	266	23	1522	0.175	265	0.2	2.863	A
4	65	158	1303	0.050	65	0.1	2.907	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	131	91	1337	0.098	131	0.1	2.985	A
2	18	181	967	0.019	18	0.0	3.792	A
3	317	28	1519	0.209	317	0.3	2.995	A
4	77	190	1284	0.060	77	0.1	2.983	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	161	111	1325	0.121	161	0.1	3.092	A
2	22	222	946	0.023	22	0.0	3.894	A
3	389	34	1515	0.257	388	0.3	3.195	A
4	95	232	1258	0.075	95	0.1	3.094	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	161	111	1325	0.121	161	0.1	3.092	A
2	22	222	946	0.023	22	0.0	3.894	A
3	389	34	1515	0.257	389	0.3	3.195	A
4	95	232	1258	0.075	95	0.1	3.094	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	131	91	1337	0.098	131	0.1	2.988	A
2	18	182	967	0.019	18	0.0	3.795	A
3	317	28	1519	0.209	318	0.3	2.999	A
4	77	190	1283	0.060	77	0.1	2.984	A

18:15 - 18:30

Arm	Total Demand	Circulating	Capacity	RFC	Throughput	End queue	Delay (s)	Unsignalised

	(PCU/hr)	flow (PCU/hr)	(PCU/hr)		(PCU/hr)	(PCU)		level of service
1	110	76	1346	0.082	110	0.1	2.915	A
2	15	152	982	0.015	15	0.0	3.725	A
3	266	23	1522	0.175	266	0.2	2.868	A
4	65	159	1302	0.050	65	0.1	2.911	A

Existing Layout - 2025 Base + Committed, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

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	3.40	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

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)
D5	2025 Base + Committed	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	266	100.000
2		✓	48	100.000
3		✓	202	100.000
4		✓	199	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	6	225	35
	2	6	0	40	2
	3	152	14	0	36
	4	44	1	154	0

Vehicle Mix

Heavy Vehicle Percentages

	To				

		1	2	3	4
From	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.23	3.65	0.3	A
2	0.06	4.64	0.1	A
3	0.15	2.80	0.2	A
4	0.17	3.38	0.2	A

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	200	127	1315	0.152	200	0.2	3.225	A
2	36	311	902	0.040	36	0.0	4.158	A
3	152	32	1516	0.100	152	0.1	2.638	A
4	150	129	1320	0.113	149	0.1	3.072	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	239	152	1300	0.184	239	0.2	3.391	A
2	43	372	871	0.050	43	0.1	4.349	A
3	182	39	1512	0.120	181	0.1	2.705	A
4	179	155	1305	0.137	179	0.2	3.196	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	293	186	1280	0.229	293	0.3	3.645	A
2	53	455	829	0.064	53	0.1	4.640	A
3	222	47	1506	0.148	222	0.2	2.803	A
4	219	189	1284	0.171	219	0.2	3.380	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	293	186	1280	0.229	293	0.3	3.645	A
2	53	456	828	0.064	53	0.1	4.641	A
3	222	47	1506	0.148	222	0.2	2.803	A
4	219	189	1284	0.171	219	0.2	3.380	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	239	152	1300	0.184	239	0.2	3.393	A
2	43	373	870	0.050	43	0.1	4.353	A
3	182	39	1512	0.120	182	0.1	2.708	A
4	179	155	1305	0.137	179	0.2	3.197	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	200	127	1315	0.152	200	0.2	3.229	A
2	36	312	901	0.040	36	0.0	4.163	A
3	152	32	1516	0.100	152	0.1	2.639	A
4	150	130	1320	0.113	150	0.1	3.076	A

Existing Layout - 2025 Base + Committed, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

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	3.19	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

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)
D6	2025 Base + Committed	PM	ONE HOUR	17:00	18:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	152	100.000
2		✓	20	100.000
3		✓	356	100.000
4		✓	88	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	**2**	**3**	**4**
From	**1**	0	11	114	27
	2	4	0	14	2
	3	176	34	0	146
	4	21	0	67	0

Vehicle Mix

Heavy Vehicle Percentages

	To				

		1	2	3	4
From	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.13	3.11	0.1	A
2	0.02	3.91	0.0	A
3	0.26	3.21	0.3	A
4	0.08	3.11	0.1	A

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	114	76	1346	0.085	114	0.1	2.923	A
2	15	156	980	0.015	15	0.0	3.730	A
3	268	25	1521	0.176	267	0.2	2.870	A
4	66	161	1301	0.051	66	0.1	2.914	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	137	91	1337	0.102	137	0.1	2.998	A
2	18	187	964	0.019	18	0.0	3.803	A
3	320	30	1518	0.211	320	0.3	3.005	A
4	79	192	1282	0.062	79	0.1	2.992	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	167	111	1325	0.126	167	0.1	3.109	A
2	22	229	943	0.023	22	0.0	3.908	A
3	392	36	1513	0.259	392	0.3	3.209	A
4	97	235	1256	0.077	97	0.1	3.105	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	167	111	1325	0.126	167	0.1	3.110	A
2	22	229	943	0.023	22	0.0	3.908	A
3	392	36	1513	0.259	392	0.3	3.209	A
4	97	236	1256	0.077	97	0.1	3.105	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	137	91	1337	0.102	137	0.1	3.002	A
2	18	187	964	0.019	18	0.0	3.803	A
3	320	30	1518	0.211	320	0.3	3.006	A
4	79	193	1282	0.062	79	0.1	2.995	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	114	76	1346	0.085	115	0.1	2.926	A
2	15	157	980	0.015	15	0.0	3.734	A
3	268	25	1521	0.176	268	0.2	2.876	A
4	66	161	1301	0.051	66	0.1	2.917	A

Existing Layout - 2025 Base + Committed + Net , AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

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	3.61	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

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)
D7	2025 Base + Committed + Net	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	348	100.000
2		✓	48	100.000
3		✓	236	100.000
4		✓	195	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	6	296	46
	2	6	0	40	2
	3	186	14	0	36
	4	40	1	154	0

Vehicle Mix

Heavy Vehicle Percentages

	To

		1	2	3	4
From	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.30	4.01	0.4	A
2	0.07	4.93	0.1	A
3	0.17	2.91	0.2	A
4	0.17	3.44	0.2	A

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	262	127	1315	0.199	261	0.2	3.411	A
2	36	372	871	0.042	36	0.0	4.311	A
3	178	40	1511	0.118	177	0.1	2.697	A
4	147	155	1305	0.113	146	0.1	3.105	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	313	152	1300	0.241	313	0.3	3.644	A
2	43	446	834	0.052	43	0.1	4.554	A
3	212	49	1505	0.141	212	0.2	2.782	A
4	175	185	1286	0.136	175	0.2	3.239	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	383	186	1280	0.299	383	0.4	4.009	A
2	53	546	783	0.068	53	0.1	4.930	A
3	260	59	1498	0.173	260	0.2	2.906	A
4	215	227	1261	0.170	215	0.2	3.439	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	383	186	1280	0.299	383	0.4	4.013	A
2	53	546	783	0.068	53	0.1	4.932	A
3	260	59	1498	0.173	260	0.2	2.906	A
4	215	227	1261	0.170	215	0.2	3.439	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	313	152	1300	0.241	313	0.3	3.650	A
2	43	446	833	0.052	43	0.1	4.559	A
3	212	49	1505	0.141	212	0.2	2.786	A
4	175	185	1286	0.136	175	0.2	3.243	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	262	127	1315	0.199	262	0.2	3.419	A
2	36	374	870	0.042	36	0.0	4.318	A
3	178	41	1511	0.118	178	0.1	2.702	A
4	147	155	1305	0.113	147	0.1	3.111	A

Existing Layout - 2025 Base + Committed + Net, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

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	3.31	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

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)
D8	2025 Base + Committed + Net	PM	ONE HOUR	17:00	18:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	170	100.000
2		✓	20	100.000
3		✓	402	100.000
4		✓	100	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	11	135	24
	2	4	0	14	2
	3	222	34	0	146
	4	33	0	67	0

Vehicle Mix

Heavy Vehicle Percentages

	To				

		1	2	3	4
From	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.14	3.16	0.2	A
2	0.02	3.95	0.0	A
3	0.29	3.35	0.4	A
4	0.09	3.23	0.1	A

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	128	76	1346	0.095	128	0.1	2.955	A
2	15	170	973	0.015	15	0.0	3.756	A
3	303	23	1522	0.199	302	0.2	2.946	A
4	75	195	1280	0.059	75	0.1	2.986	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	153	91	1337	0.114	153	0.1	3.039	A
2	18	203	956	0.019	18	0.0	3.836	A
3	361	27	1520	0.238	361	0.3	3.107	A
4	90	234	1257	0.072	90	0.1	3.083	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	187	111	1325	0.141	187	0.2	3.164	A
2	22	249	933	0.024	22	0.0	3.951	A
3	443	33	1516	0.292	442	0.4	3.354	A
4	110	286	1225	0.090	110	0.1	3.227	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	187	111	1325	0.141	187	0.2	3.164	A
2	22	249	933	0.024	22	0.0	3.951	A
3	443	33	1516	0.292	443	0.4	3.354	A
4	110	286	1225	0.090	110	0.1	3.228	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	153	91	1337	0.114	153	0.1	3.043	A
2	18	203	956	0.019	18	0.0	3.837	A
3	361	27	1519	0.238	362	0.3	3.109	A
4	90	234	1257	0.072	90	0.1	3.087	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	128	76	1346	0.095	128	0.1	2.958	A
2	15	170	973	0.015	15	0.0	3.761	A
3	303	23	1522	0.199	303	0.2	2.952	A
4	75	196	1280	0.059	75	0.1	2.990	A

Junctions 9

PICADY 9 - Priority Intersection Module

Filename: J1 _ Heritage Way _ A525.j9
Path: C:\PJA\Phil Jones Associates\SharedData - 03499 Brymbo, Wrexham\3. Technical\3.2 Modelling\Revised Application\A525_Heritage Way
Report generation date: 17/08/2020 13:57:10

»2020 Base, AM
»2020 Base, PM
»2025 Base , AM
»2025 Base , PM
»2025 Base + Committed, AM
»2025 Base + Committed, PM
»2025 Base + Committed + Net , AM
»2025 Base + Committed + Net , PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	2020 Base							
Stream B-C	2.1	18.15	0.66	C	1.1	12.60	0.51	B
Stream B-A	0.0	14.90	0.03	B	0.1	43.77	0.09	E
Stream C-AB	1.7	18.21	0.61	C	43.9	191.21	1.05	F
	2025 Base							
Stream B-C	2.3	19.39	0.71	C	1.3	13.26	0.56	B
Stream B-A	0.0	14.81	0.03	B	0.2	86.73	0.20	F
Stream C-AB	1.8	18.80	0.65	C	79.8	388.14	1.12	F
	2025 Base + Committed							
Stream B-C	2.4	19.74	0.71	C	1.3	13.26	0.56	B
Stream B-A	0.0	14.90	0.04	B	0.2	86.73	0.20	F
Stream C-AB	1.9	19.12	0.66	C	79.8	388.14	1.12	F
	2025 Base + Committed + Net							
Stream B-C	3.7	27.75	0.80	D	1.7	17.20	0.64	C
Stream B-A	0.0	16.11	0.04	C	0.5	235.68	0.44	F
Stream C-AB	2.6	23.96	0.73	C	107.1	510.20	1.16	F

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 average delay per arriving vehicle.

File summary

File Description

Title	A525 / Heritage Way
Location	
Site number	
Date	19/10/2018
Version	

Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	PJA\Joe Platt
Description	

Units

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

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2020 Base	AM	ONE HOUR	07:45	09:15	15
D2	2020 Base	PM	ONE HOUR	16:45	18:15	15
D3	2025 Base	AM	ONE HOUR	07:45	09:15	15
D4	2025 Base	PM	ONE HOUR	16:45	18:15	15
D5	2025 Base + Committed	AM	ONE HOUR	07:45	09:15	15
D6	2025 Base + Committed	PM	ONE HOUR	16:45	18:15	15
D7	2025 Base + Committed + Net	AM	ONE HOUR	07:45	09:15	15
D8	2025 Base + Committed + Net	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2020 Base, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	A525 / Heritage Way	T-Junction	Two-way		7.86	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	A525 West		Major
B	Heritage Way		Minor
C	A525 East		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Width for right turn (m)	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	6.60		✓	3.00	105.0	✓	15.00

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	Lane Width (Left) (m)	Lane Width (Right) (m)	Visibility to left (m)	Visibility to right (m)
B	Two lanes	3.60	3.00	230	210

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	667	0.118	0.299	0.188	0.427
1	B-C	802	0.120	0.302	-	-
1	C-B	690	0.260	0.260	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.
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)
D1	2020 Base	AM	ONE HOUR	07:45	09:15	15

Default vehicle mix	Vehicle mix source	PCU Factor for a HV (PCU)
✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	472	100.000
B		✓	391	100.000
C		✓	748	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	2	470
	B	7	0	384
	C	441	307	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	10	10	10
	B	10	10	10
	C	10	10	10

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.66	18.15	2.1	C
B-A	0.03	14.90	0.0	B
C-AB	0.61	18.21	1.7	C
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	289	692	0.418	286	0.8	9.680	A
B-A	5	400	0.013	5	0.0	10.036	B
C-AB	231	598	0.387	228	0.7	10.653	B
C-A	332			332			
A-B	2			2			
A-C	354			354			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	345	670	0.515	344	1.1	12.064	B

B-A	6	347	0.018	6	0.0	11.631	B
C-AB	276	580	0.476	275	1.0	12.941	B
C-A	396			396			
A-B	2			2			
A-C	423			423			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	423	640	0.660	419	2.0	17.631	C
B-A	8	275	0.028	8	0.0	14.837	B
C-AB	338	555	0.609	336	1.6	17.820	C
C-A	485			485			
A-B	2			2			
A-C	517			517			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	423	640	0.660	423	2.1	18.151	C
B-A	8	273	0.028	8	0.0	14.903	B
C-AB	338	555	0.609	338	1.7	18.207	C
C-A	485			485			
A-B	2			2			
A-C	517			517			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	345	670	0.515	349	1.2	12.442	B
B-A	6	345	0.018	6	0.0	11.694	B
C-AB	276	580	0.476	279	1.0	13.269	B
C-A	396			396			
A-B	2			2			
A-C	423			423			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	289	692	0.418	291	0.8	9.907	A
B-A	5	398	0.013	5	0.0	10.083	B
C-AB	231	598	0.387	232	0.7	10.883	B
C-A	332			332			
A-B	2			2			
A-C	354			354			

2020 Base, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	A525 / Heritage Way	T-Junction	Two-way		82.58	F

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

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)
D2	2020 Base	PM	ONE HOUR	16:45	18:15	15

Default vehicle mix	Vehicle mix source	PCU Factor for a HV (PCU)
✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	432	100.000
B		✓	309	100.000
C		✓	1253	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	**B**	**C**
From	**A**	0	15	417
	B	8	0	301
	C	713	540	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	**B**	**C**
From	**A**	10	10	10
	B	10	10	10
	C	10	10	10

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.51	12.60	1.1	B
B-A	0.09	43.77	0.1	E
C-AB	1.05	191.21	43.9	F
C-A				
A-B				
A-C				

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	227	702	0.323	225	0.5	8.265	A
B-A	6	297	0.020	6	0.0	13.597	B
C-AB	408	608	0.672	400	2.1	18.367	C
C-A	535			535			
A-B	11			11			
A-C	314			314			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	271	681	0.397	270	0.7	9.617	A
B-A	7	222	0.032	7	0.0	18.453	C
C-AB	523	635	0.824	514	4.5	30.677	D
C-A	603			603			
A-B	13			13			
A-C	375			375			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	331	648	0.511	330	1.1	12.370	B
B-A	9	119	0.074	9	0.1	35.924	E
C-AB	1380	1314	1.050	1305	23.1	60.354	F
C-A	0			0			
A-B	17			17			
A-C	459			459			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	331	645	0.513	331	1.1	12.598	B
B-A	9	99	0.089	9	0.1	43.769	E
C-AB	1380	1314	1.050	1296	43.9	111.249	F
C-A	0			0			
A-B	17			17			
A-C	459			459			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	271	679	0.398	272	0.7	9.770	A
B-A	7	174	0.041	7	0.0	23.777	C
C-AB	523	635	0.824	627	18.0	191.211	F
C-A	603			603			
A-B	13			13			

A-C	375			375			

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	227	701	0.323	227	0.5	8.375	A
B-A	6	268	0.023	6	0.0	15.156	C
C-AB	408	608	0.672	470	2.4	39.590	E
C-A	535			535			
A-B	11			11			
A-C	314			314			

2025 Base , AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	A525 / Heritage Way	T-Junction	Two-way		8.28	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

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)
D3	2025 Base	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	498	100.000
B		✓	413	100.000
C		✓	788	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	2	496
	B	8	0	405
	C	464	324	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.71	19.39	2.3	C
B-A	0.03	14.81	0.0	B
C-AB	0.65	18.80	1.8	C
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	305	686	0.445	302	0.8	9.302	A
B-A	6	385	0.016	6	0.0	9.492	A
C-AB	244	592	0.412	241	0.7	10.171	B
C-A	349			349			
A-B	2			2			
A-C	373			373			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	364	663	0.549	362	1.2	11.921	B
B-A	7	329	0.022	7	0.0	11.175	B
C-AB	291	573	0.508	290	1.0	12.638	B
C-A	417			417			
A-B	2			2			
A-C	446			446			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	446	631	0.707	442	2.3	18.630	C
B-A	9	253	0.035	9	0.0	14.726	B
C-AB	357	548	0.652	354	1.8	18.271	C
C-A	510			510			
A-B	2			2			
A-C	546			546			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	446	630	0.707	446	2.3	19.393	C
B-A	9	252	0.035	9	0.0	14.811	B
C-AB	357	548	0.652	357	1.8	18.798	C
C-A	510			510			
A-B	2			2			
A-C	546			546			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service

B-C	364	663	0.549	368	1.3	12.402	B
B-A	7	327	0.022	7	0.0	11.246	B
C-AB	291	573	0.508	294	1.1	13.031	B
C-A	417			417			
A-B	2			2			
A-C	446			446			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	305	686	0.445	307	0.8	9.541	A
B-A	6	383	0.016	6	0.0	9.541	A
C-AB	244	592	0.412	245	0.7	10.414	B
C-A	349			349			
A-B	2			2			
A-C	373			373			

2025 Base , PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	A525 / Heritage Way	T-Junction	Two-way		168.66	F

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

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)
D4	2025 Base	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	455	100.000
B		✓	326	100.000
C		✓	1321	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	16	439
	B	9	0	317
	C	752	569	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.56	13.26	1.3	B
B-A	0.20	86.73	0.2	F
C-AB	1.12	388.14	79.8	F
C-A				
A-B				
A-C				

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	239	696	0.343	237	0.5	7.804	A
B-A	7	277	0.024	7	0.0	13.304	B
C-AB	431	604	0.713	422	2.3	18.865	C
C-A	564			564			
A-B	12			12			
A-C	331			331			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	285	673	0.423	284	0.7	9.227	A
B-A	8	198	0.041	8	0.0	18.983	C
C-AB	594	677	0.877	580	5.7	33.497	D
C-A	594			594			
A-B	14			14			
A-C	395			395			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	349	635	0.550	347	1.2	12.445	B
B-A	10	88	0.113	10	0.1	45.774	E
C-AB	1454	1299	1.120	1318	39.8	86.747	F
C-A	0			0			
A-B	18			18			
A-C	483			483			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	349	620	0.563	349	1.3	13.260	B
B-A	10	51	0.196	10	0.2	86.731	F
C-AB	1454	1299	1.120	1295	79.8	197.555	F
C-A	0			0			
A-B	18			18			
A-C	483			483			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service

B-C	285	666	0.428	287	0.8	9.535	A
B-A	8	109	0.074	9	0.1	36.163	E
C-AB	594	677	0.877	761	38.0	388.137	F
C-A	594			594			
A-B	14			14			
A-C	395			395			

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	239	694	0.344	240	0.5	7.930	A
B-A	7	217	0.031	7	0.0	17.129	C
C-AB	431	604	0.713	570	3.1	124.458	F
C-A	564			564			
A-B	12			12			
A-C	331			331			

2025 Base + Committed, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	A525 / Heritage Way	T-Junction	Two-way		8.46	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

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)
D5	2025 Base + Committed	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	498	100.000
B		✓	416	100.000
C		✓	791	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	2	496
	B	8	0	408
	C	464	327	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.71	19.74	2.4	C
B-A	0.04	14.90	0.0	B
C-AB	0.66	19.12	1.9	C
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	307	686	0.448	304	0.8	9.354	A
B-A	6	384	0.016	6	0.0	9.516	A
C-AB	246	592	0.416	243	0.7	10.236	B
C-A	349			349			
A-B	2			2			
A-C	373			373			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	367	663	0.553	365	1.2	12.025	B
B-A	7	328	0.022	7	0.0	11.215	B
C-AB	294	573	0.513	293	1.0	12.758	B
C-A	417			417			
A-B	2			2			
A-C	446			446			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	449	631	0.712	445	2.3	18.930	C
B-A	9	252	0.035	9	0.0	14.813	B
C-AB	361	548	0.658	357	1.8	18.559	C
C-A	510			510			
A-B	2			2			
A-C	546			546			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	449	630	0.713	449	2.4	19.742	C
B-A	9	250	0.035	9	0.0	14.902	B
C-AB	361	548	0.658	360	1.9	19.119	C
C-A	510			510			
A-B	2			2			
A-C	546			546			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service

B-C	367	663	0.553	371	1.3	12.530	B
B-A	7	326	0.022	7	0.0	11.290	B
C-AB	294	573	0.513	297	1.1	13.172	B
C-A	417			417			
A-B	2			2			
A-C	446			446			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	307	686	0.448	309	0.8	9.602	A
B-A	6	382	0.016	6	0.0	9.566	A
C-AB	246	592	0.416	248	0.7	10.485	B
C-A	349			349			
A-B	2			2			
A-C	373			373			

2025 Base + Committed, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	A525 / Heritage Way	T-Junction	Two-way		168.66	F

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

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)
D6	2025 Base + Committed	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	455	100.000
B		✓	326	100.000
C		✓	1321	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	16	439
	B	9	0	317
	C	752	569	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.56	13.26	1.3	B
B-A	0.20	86.73	0.2	F
C-AB	1.12	388.14	79.8	F
C-A				
A-B				
A-C				

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	239	696	0.343	237	0.5	7.804	A
B-A	7	277	0.024	7	0.0	13.304	B
C-AB	431	604	0.713	422	2.3	18.865	C
C-A	564			564			
A-B	12			12			
A-C	331			331			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	285	673	0.423	284	0.7	9.227	A
B-A	8	198	0.041	8	0.0	18.983	C
C-AB	594	677	0.877	580	5.7	33.497	D
C-A	594			594			
A-B	14			14			
A-C	395			395			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	349	635	0.550	347	1.2	12.445	B
B-A	10	88	0.113	10	0.1	45.774	E
C-AB	1454	1299	1.120	1318	39.8	86.747	F
C-A	0			0			
A-B	18			18			
A-C	483			483			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	349	620	0.563	349	1.3	13.260	B
B-A	10	51	0.196	10	0.2	86.731	F
C-AB	1454	1299	1.120	1295	79.8	197.555	F
C-A	0			0			
A-B	18			18			
A-C	483			483			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service

B-C	285	666	0.428	287	0.8	9.535	A
B-A	8	109	0.074	9	0.1	36.163	E
C-AB	594	677	0.877	761	38.0	388.137	F
C-A	594			594			
A-B	14			14			
A-C	395			395			

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	239	694	0.344	240	0.5	7.930	A
B-A	7	217	0.031	7	0.0	17.129	C
C-AB	431	604	0.713	570	3.1	124.458	F
C-A	564			564			
A-B	12			12			
A-C	331			331			

2025 Base + Committed + Net , AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	A525 / Heritage Way	T-Junction	Two-way		12.03	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

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)
D7	2025 Base + Committed + Net	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	498	100.000
B		✓	465	100.000
C		✓	827	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	2	496
	B	8	0	457
	C	464	363	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.80	27.75	3.7	D
B-A	0.04	16.11	0.0	C
C-AB	0.73	23.96	2.6	C
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	344	686	0.502	340	1.0	10.307	B
B-A	6	373	0.016	6	0.0	9.817	A
C-AB	273	592	0.461	270	0.8	11.053	B
C-A	349			349			
A-B	2			2			
A-C	373			373			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	411	663	0.620	408	1.6	14.031	B
B-A	7	314	0.023	7	0.0	11.729	B
C-AB	326	574	0.569	325	1.3	14.355	B
C-A	417			417			
A-B	2			2			
A-C	446			446			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	503	630	0.799	495	3.5	25.363	D
B-A	9	234	0.038	9	0.0	15.953	C
C-AB	403	552	0.730	398	2.5	22.715	C
C-A	508			508			
A-B	2			2			
A-C	546			546			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	503	630	0.799	502	3.7	27.753	D
B-A	9	232	0.038	9	0.0	16.108	C
C-AB	403	552	0.730	403	2.6	23.962	C
C-A	508			508			
A-B	2			2			
A-C	546			546			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service

B-C	411	663	0.620	419	1.7	15.222	C
B-A	7	311	0.023	7	0.0	11.850	B
C-AB	326	574	0.569	331	1.4	15.146	C
C-A	417			417			
A-B	2			2			
A-C	446			446			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	344	686	0.502	347	1.0	10.707	B
B-A	6	370	0.016	6	0.0	9.885	A
C-AB	273	592	0.461	275	0.9	11.419	B
C-A	349			349			
A-B	2			2			
A-C	373			373			

2025 Base + Committed + Net , PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	A525 / Heritage Way	T-Junction	Two-way		229.83	F

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

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)
D8	2025 Base + Committed + Net	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	455	100.000
B		✓	346	100.000
C		✓	1344	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	16	439
	B	9	0	337
	C	752	592	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.64	17.20	1.7	C
B-A	0.44	235.68	0.5	F
C-AB	1.16	510.20	107.1	F
C-A				
A-B				
A-C				

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	254	696	0.365	251	0.6	8.062	A
B-A	7	270	0.025	7	0.0	13.678	B
C-AB	450	607	0.742	440	2.6	20.414	C
C-A	561			561			
A-B	12			12			
A-C	331			331			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	303	673	0.450	302	0.8	9.676	A
B-A	8	188	0.043	8	0.0	19.970	C
C-AB	687	753	0.912	668	7.3	36.592	E
C-A	521			521			
A-B	14			14			
A-C	395			395			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	371	631	0.588	369	1.4	13.588	B
B-A	10	75	0.132	10	0.1	54.497	F
C-AB	1480	1270	1.165	1292	54.2	109.357	F
C-A	0			0			
A-B	18			18			
A-C	483			483			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	371	577	0.643	370	1.7	17.200	C
B-A	10	23	0.440	8	0.5	235.676	F
C-AB	1480	1270	1.165	1268	107.1	267.340	F
C-A	0			0			
A-B	18			18			
A-C	483			483			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service

B-C	303	654	0.463	306	0.9	10.437	B
B-A	8	67	0.121	10	0.1	64.175	F
C-AB	687	753	0.912	804	78.0	510.197	F
C-A	521			521			
A-B	14			14			
A-C	395			395			

18:00 - 18:15

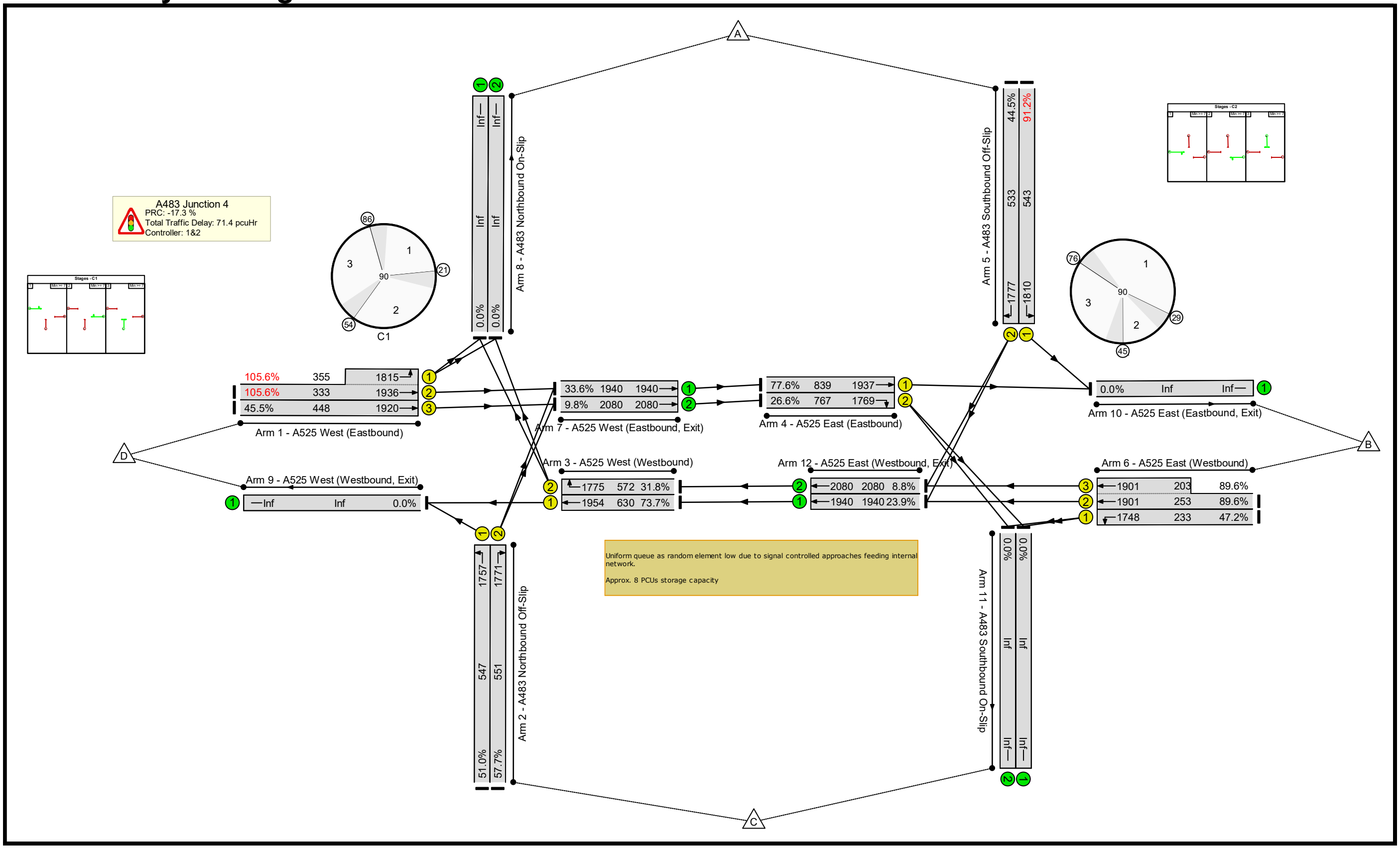
Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	254	692	0.367	255	0.6	8.263	A
B-A	7	153	0.044	7	0.0	24.695	C
C-AB	450	607	0.742	606	39.2	359.530	F
C-A	561			561			
A-B	12			12			
A-C	331			331			

Basic Results Summary
Basic Results Summary

User and Project Details

Project:	**Brymbo Park, Brymbo**
Title:	
Location:	
Client:	Brymbo Development Ltd
Additional detail:	
File name:	J2 _ A483 Junction 4 - Base Model.lsg3x
Author:	
Company:	
Address:	

Scenario 1: '2020 Base AM' (FG3: '2020 Base AM', Plan 1: 'Network Control Plan 1')
Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**105.6%**	**0**	**0**	**0**	**71.4**	-	-
A483 Junction 4	-	-	-		-	-	-	-	-	-	**105.6%**	**0**	**0**	**0**	**71.4**	-	-
1/2+1/1	A525 West (Eastbound) Ahead Left	U	C1:A		1	20	-	727	1936:1815	333+355	105.6 : 105.6%	-	-	-	34.5	171.0	40.0
1/3	A525 West (Eastbound) Ahead	U	C1:A		1	20	-	204	1920	448	45.5%	-	-	-	2.1	37.0	4.8
2/1	A483 Northbound Off-Slip Left	U	C1:C		1	27	-	279	1757	547	51.0%	-	-	-	2.5	32.1	6.2
2/2	A483 Northbound Off-Slip Right	U	C1:C		1	27	-	318	1771	551	57.7%	-	-	-	3.0	33.7	7.3
3/1	A525 West (Westbound) Ahead	U	C1:B		1	28	-	464	1954	630	73.7%	-	-	-	5.2	40.2	7.3
3/2	A525 West (Westbound) Right	U	C1:B		1	28	-	182	1775	572	31.8%	-	-	-	0.2	4.9	1.8
4/1	A525 East (Eastbound) Ahead	U	C2:A		1	38	-	670	1937	839	77.6%	-	-	-	3.0	16.4	9.7
4/2	A525 East (Eastbound) Right	U	C2:A		1	38	-	204	1769	767	26.6%	-	-	-	0.2	3.4	2.2
5/1	A483 Southbound Off-Slip Left	U	C2:B		1	26	-	495	1810	543	91.2%	-	-	-	8.5	62.1	16.2
5/2	A483 Southbound Off-Slip Right	U	C2:B		1	26	-	237	1777	533	44.5%	-	-	-	2.1	31.5	5.1
6/1	A525 East (Westbound) Left	U	C2:C		1	11	-	110	1748	233	47.2%	-	-	-	1.5	50.6	3.0

Basic Results Summary

6/2+6/3	A525 East (Westbound) Ahead	U	C2:C		1	11	-	409	1901:1901	253+203	89.6 : 89.6%	-	-	-	8.0	70.6	9.3
7/1	A525 West (Eastbound, Exit) Ahead	U	-		-	-	-	670	1940	1940	33.6%	-	-	-	0.3	1.4	0.3
7/2	A525 West (Eastbound, Exit) Ahead	U	-		-	-	-	204	2080	2080	9.8%	-	-	-	0.1	1.0	0.1
12/1	A525 East (Westbound, Exit) Ahead	U	-		-	-	-	464	1940	1940	23.9%	-	-	-	0.2	1.2	0.2
12/2	A525 East (Westbound, Exit) Ahead	U	-		-	-	-	182	2080	2080	8.8%	-	-	-	0.0	0.9	0.0

C1 PRC for Signalled Lanes (%): -17.3 Total Delay for Signalled Lanes (pcuHr): 47.51 Cycle Time (s): 90

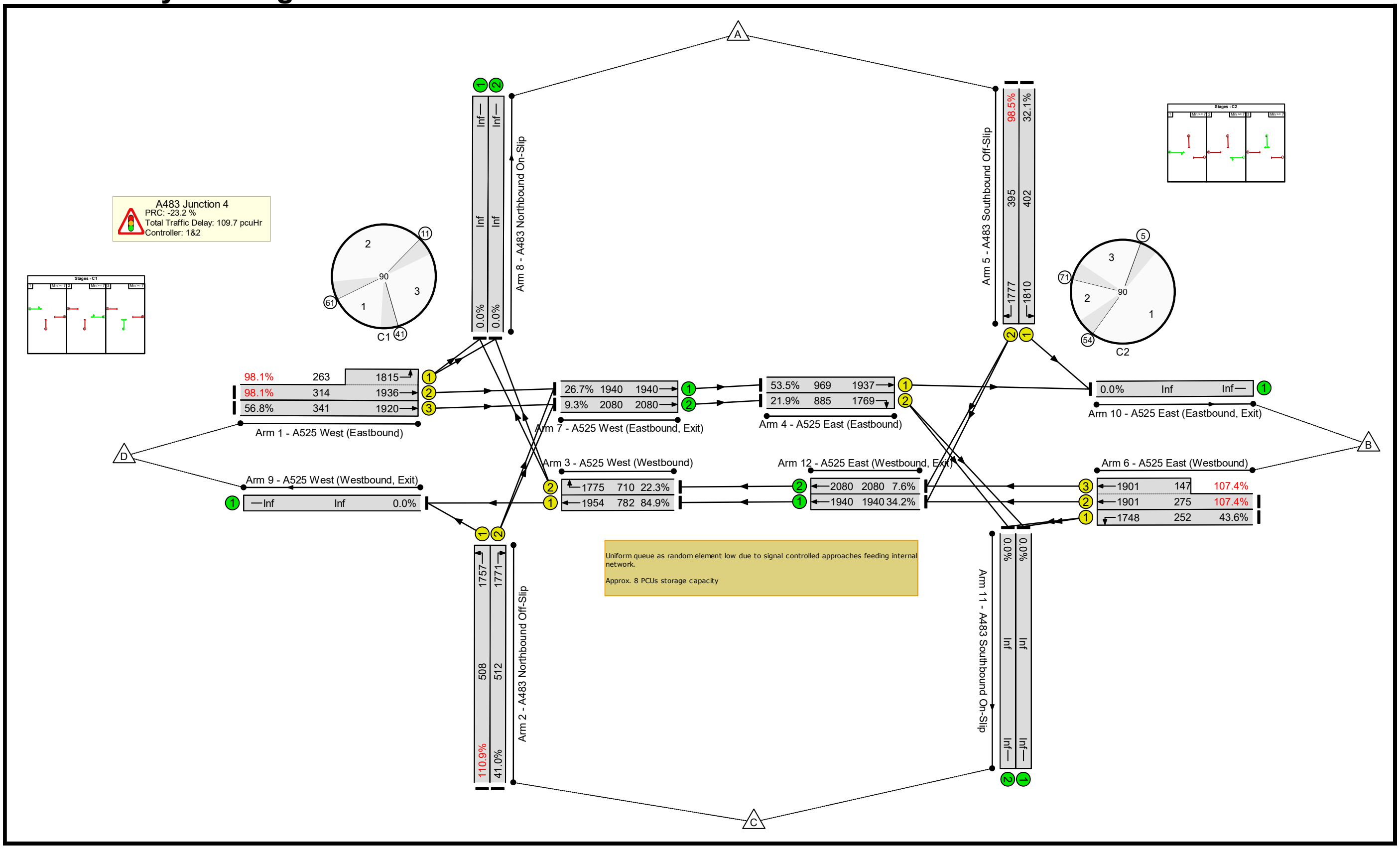
C2 PRC for Signalled Lanes (%): -1.3 Total Delay for Signalled Lanes (pcuHr): 23.33 Cycle Time (s): 90

PRC Over All Lanes (%): -17.3 Total Delay Over All Lanes(pcuHr): 71.36

Basic Results Summary

Scenario 2: '2020 Base PM' (FG4: '2020 Base PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**110.9%**	**0**	**0**	**0**	**109.7**	-	-
A483 Junction 4	-	-	-		-	-	-	-	-	-	**110.9%**	**0**	**0**	**0**	**109.7**	-	-
1/2+1/1	A525 West (Eastbound) Ahead Left	U	C1:A		1	15	-	566	1936:1815	314+263	98.1 : 98.1%	-	-	-	15.1	96.1	17.7
1/3	A525 West (Eastbound) Ahead	U	C1:A		1	15	-	194	1920	341	56.8%	-	-	-	2.5	46.0	5.1
2/1	A483 Northbound Off-Slip Left	U	C1:C		1	25	-	563	1757	508	110.9%	-	-	-	39.4	252.0	47.6
2/2	A483 Northbound Off-Slip Right	U	C1:C		1	25	-	210	1771	512	41.0%	-	-	-	1.9	31.8	4.5
3/1	A525 West (Westbound) Ahead	U	C1:B		1	35	-	684	1954	782	84.9%	-	-	-	3.0	16.4	9.5
3/2	A525 West (Westbound) Right	U	C1:B		1	35	-	158	1775	710	22.3%	-	-	-	0.2	3.9	3.3
4/1	A525 East (Eastbound) Ahead	U	C2:A		1	44	-	518	1937	969	53.5%	-	-	-	3.7	26.0	7.1
4/2	A525 East (Eastbound) Right	U	C2:A		1	44	-	194	1769	885	21.9%	-	-	-	1.9	35.2	3.7
5/1	A483 Southbound Off-Slip Left	U	C2:B		1	19	-	129	1810	402	32.1%	-	-	-	1.3	35.9	2.9
5/2	A483 Southbound Off-Slip Right	U	C2:B		1	19	-	389	1777	395	98.5%	-	-	-	12.3	113.5	18.1
6/1	A525 East (Westbound) Left	U	C2:C		1	12	-	110	1748	252	43.6%	-	-	-	1.5	47.7	2.9

Basic Results Summary

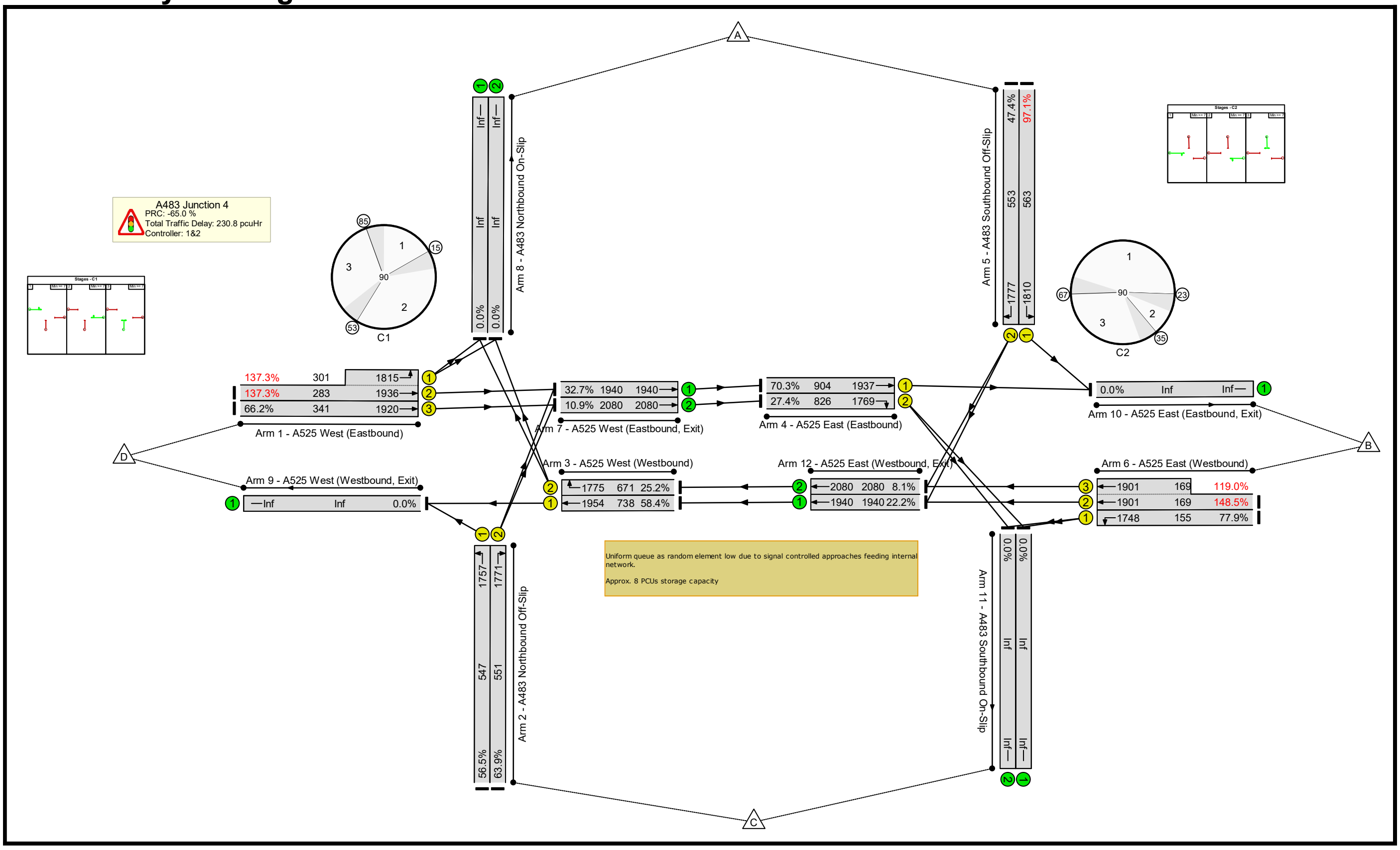
6/2+6/3	A525 East (Westbound) Ahead	U	C2:C		1	12	-	453	1901:1901	275+147	107.4 : 107.4%	-	-	-	26.4	210.0	28.9
7/1	A525 West (Eastbound, Exit) Ahead	U	-		-	-	-	518	1940	1940	26.7%	-	-	-	0.2	1.3	0.2
7/2	A525 West (Eastbound, Exit) Ahead	U	-		-	-	-	194	2080	2080	9.3%	-	-	-	0.1	1.0	0.1
12/1	A525 East (Westbound, Exit) Ahead	U	-		-	-	-	684	1940	1940	34.2%	-	-	-	0.3	1.4	0.3
12/2	A525 East (Westbound, Exit) Ahead	U	-		-	-	-	158	2080	2080	7.6%	-	-	-	0.0	0.9	0.0

C1	PRC for Signalled Lanes (%):	-23.2	Total Delay for Signalled Lanes (pcuHr):	62.04	Cycle Time (s):	90
C2	PRC for Signalled Lanes (%):	-19.4	Total Delay for Signalled Lanes (pcuHr):	47.08	Cycle Time (s):	90
	PRC Over All Lanes (%):	-23.2	Total Delay Over All Lanes(pcuHr):	109.65		

Basic Results Summary

Scenario 3: '2030 Base AM' (FG5: '2030 Base AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**148.5%**	**0**	**0**	**0**	**230.8**	-	-
A483 Junction 4	-	-	-		-	-	-	-	-	-	**148.5%**	**0**	**0**	**0**	**230.8**	-	-
1/2+1/1	A525 West (Eastbound) Ahead Left	U	C1:A		1	15	-	803	1936:1815	283+301	137.3 : 137.3%	-	-	-	129.3	579.6	131.6
1/3	A525 West (Eastbound) Ahead	U	C1:A		1	15	-	226	1920	341	66.2%	-	-	-	3.1	49.8	6.2
2/1	A483 Northbound Off-Slip Left	U	C1:C		1	27	-	309	1757	547	56.5%	-	-	-	2.9	33.5	7.1
2/2	A483 Northbound Off-Slip Right	U	C1:C		1	27	-	352	1771	551	63.9%	-	-	-	3.5	35.6	8.4
3/1	A525 West (Westbound) Ahead	U	C1:B		1	33	-	513	1954	738	58.4%	-	-	-	2.4	20.2	3.7
3/2	A525 West (Westbound) Right	U	C1:B		1	33	-	201	1775	671	25.2%	-	-	-	0.2	3.6	1.7
4/1	A525 East (Eastbound) Ahead	U	C2:A		1	41	-	741	1937	904	70.3%	-	-	-	1.8	10.2	9.5
4/2	A525 East (Eastbound) Right	U	C2:A		1	41	-	226	1769	826	27.4%	-	-	-	0.2	3.3	3.2
5/1	A483 Southbound Off-Slip Left	U	C2:B		1	27	-	547	1810	563	97.1%	-	-	-	13.0	85.5	21.7
5/2	A483 Southbound Off-Slip Right	U	C2:B		1	27	-	262	1777	553	47.4%	-	-	-	2.3	31.2	5.7
6/1	A525 East (Westbound) Left	U	C2:C		1	7	-	121	1748	155	77.9%	-	-	-	3.0	88.0	4.6

Basic Results Summary

6/2+6/3	A525 East (Westbound) Ahead	U	C2:C		1	7	-	452	1901:1901	169+169	148.5 : 119.0%	-	-	-	68.7	547.4	67.3
7/1	A525 West (Eastbound, Exit) Ahead	U	-		-	-	-	741	1940	1940	32.7%	-	-	-	0.2	1.4	0.2
7/2	A525 West (Eastbound, Exit) Ahead	U	-		-	-	-	226	2080	2080	10.9%	-	-	-	0.1	1.0	0.1
12/1	A525 East (Westbound, Exit) Ahead	U	-		-	-	-	513	1940	1940	22.2%	-	-	-	0.1	1.2	0.1
12/2	A525 East (Westbound, Exit) Ahead	U	-		-	-	-	201	2080	2080	8.1%	-	-	-	0.0	0.9	0.0

C1 PRC for Signalled Lanes (%): -52.6 Total Delay for Signalled Lanes (pcuHr): 141.36 Cycle Time (s): 90

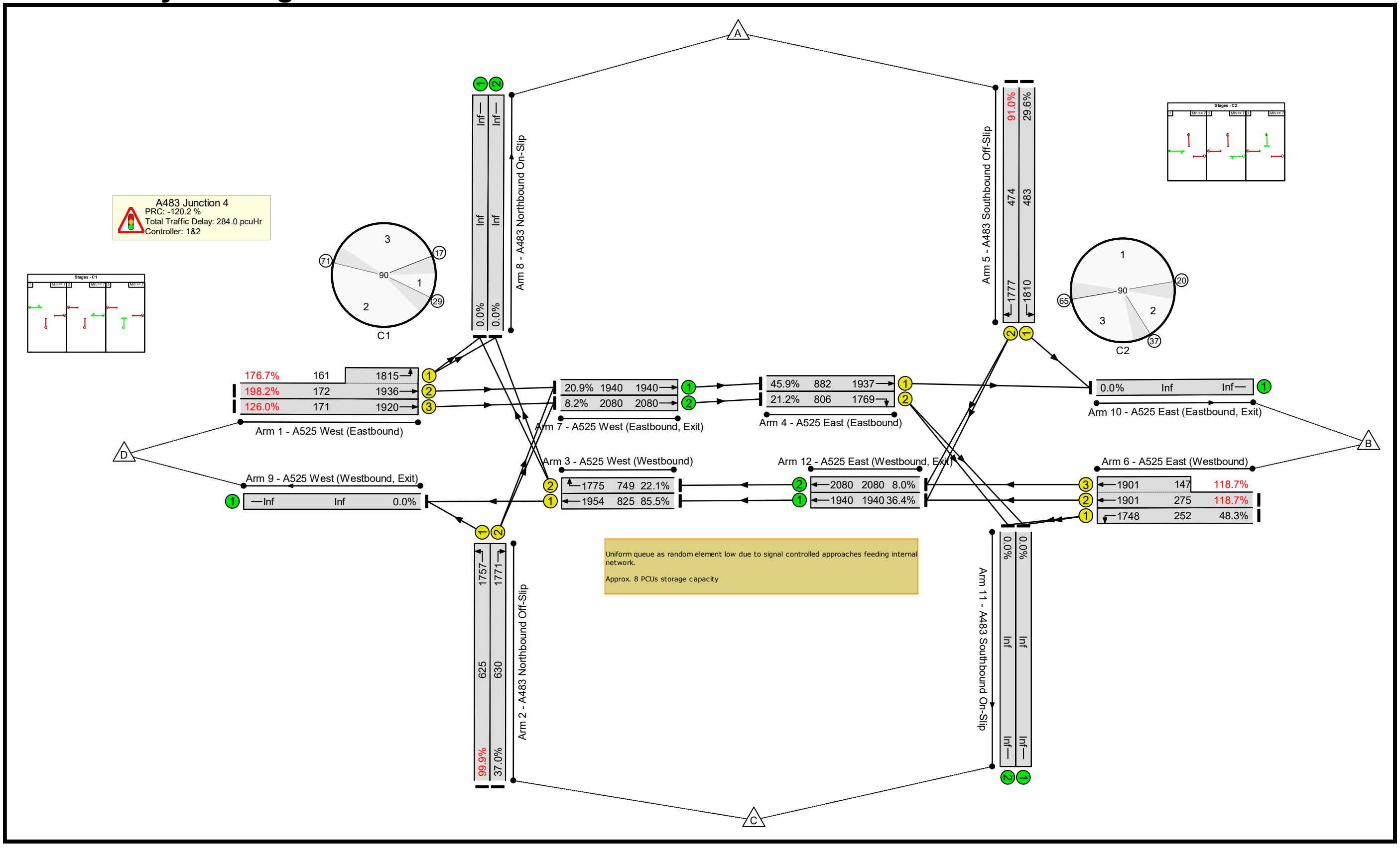
C2 PRC for Signalled Lanes (%): -65.0 Total Delay for Signalled Lanes (pcuHr): 88.96 Cycle Time (s): 90

PRC Over All Lanes (%): -65.0 Total Delay Over All Lanes(pcuHr): 230.81

Basic Results Summary

Scenario 4: '2030 Base PM' (FG6: '2030 Base PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**198.2%**	**0**	**0**	**0**	**284.0**	-	-
A483 Junction 4	-	-	-		-	-	-	-	-	-	**198.2%**	**0**	**0**	**0**	**284.0**	-	-
1/2+1/1	A525 West (Eastbound) Ahead Left	U	C1:A		1	7	-	626	1936:1815	172+161	198.2 : 176.7%	-	-	-	166.9	959.7	167.1
1/3	A525 West (Eastbound) Ahead	U	C1:A		1	7	-	215	1920	171	126.0%	-	-	-	28.7	480.5	30.9
2/1	A483 Northbound Off-Slip Left	U	C1:C		1	31	-	624	1757	625	99.9%	-	-	-	17.3	100.0	27.7
2/2	A483 Northbound Off-Slip Right	U	C1:C		1	31	-	233	1771	630	37.0%	-	-	-	1.7	26.1	4.6
3/1	A525 West (Westbound) Ahead	U	C1:B		1	37	-	757	1954	825	85.5%	-	-	-	3.1	15.9	9.7
3/2	A525 West (Westbound) Right	U	C1:B		1	37	-	175	1775	749	22.1%	-	-	-	0.3	5.6	4.2
4/1	A525 East (Eastbound) Ahead	U	C2:A		1	40	-	574	1937	882	45.9%	-	-	-	2.5	22.6	5.0
4/2	A525 East (Eastbound) Right	U	C2:A		1	40	-	215	1769	806	21.2%	-	-	-	2.1	44.4	4.4
5/1	A483 Southbound Off-Slip Left	U	C2:B		1	23	-	143	1810	483	29.6%	-	-	-	1.3	31.6	3.0
5/2	A483 Southbound Off-Slip Right	U	C2:B		1	23	-	431	1777	474	91.0%	-	-	-	8.0	67.1	14.6
6/1	A525 East (Westbound) Left	U	C2:C		1	12	-	122	1748	252	48.3%	-	-	-	1.7	49.1	3.2

Basic Results Summary

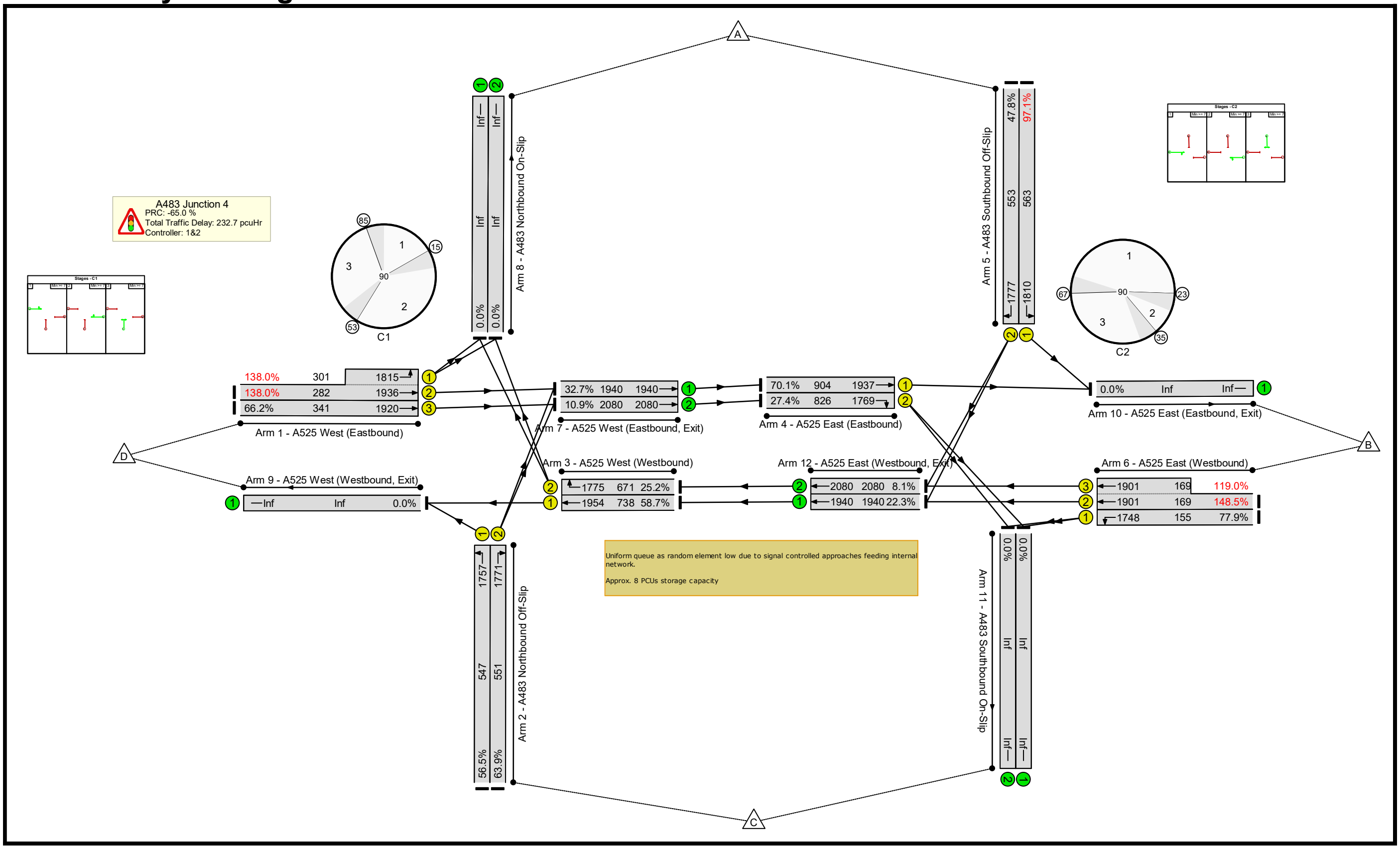
6/2+6/3	A525 East (Westbound) Ahead	U	C2:C		1	12	-	501	1901:1901	275+147	118.7 : 118.7%	-	-	-	49.9	358.9	53.1
7/1	A525 West (Eastbound, Exit) Ahead	U	-		-	-	-	574	1940	1940	20.9%	-	-	-	0.1	1.2	0.1
7/2	A525 West (Eastbound, Exit) Ahead	U	-		-	-	-	215	2080	2080	8.2%	-	-	-	0.0	0.9	0.0
12/1	A525 East (Westbound, Exit) Ahead	U	-		-	-	-	757	1940	1940	36.4%	-	-	-	0.3	1.5	0.3
12/2	A525 East (Westbound, Exit) Ahead	U	-		-	-	-	175	2080	2080	8.0%	-	-	-	0.0	0.9	0.0

C1 PRC for Signalled Lanes (%): -120.2 Total Delay for Signalled Lanes (pcuHr): 217.98 Cycle Time (s): 90
C2 PRC for Signalled Lanes (%): -31.9 Total Delay for Signalled Lanes (pcuHr): 65.54 Cycle Time (s): 90
PRC Over All Lanes (%): -120.2 Total Delay Over All Lanes(pcuHr): 284.02

Basic Results Summary

Scenario 5: '2030 Base + Com AM' (FG11: '2030 AM Base + Com', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**148.5%**	**0**	**0**	**0**	**232.7**	-	-
A483 Junction 4	-	-	-		-	-	-	-	-	-	**148.5%**	**0**	**0**	**0**	**232.7**	-	-
1/2+1/1	A525 West (Eastbound) Ahead Left	U	C1:A		1	15	-	805	1936:1815	282+301	138.0 : 138.0%	-	-	-	131.1	586.1	133.4
1/3	A525 West (Eastbound) Ahead	U	C1:A		1	15	-	226	1920	341	66.2%	-	-	-	3.1	49.8	6.2
2/1	A483 Northbound Off-Slip Left	U	C1:C		1	27	-	309	1757	547	56.5%	-	-	-	2.9	33.5	7.1
2/2	A483 Northbound Off-Slip Right	U	C1:C		1	27	-	352	1771	551	63.9%	-	-	-	3.5	35.6	8.4
3/1	A525 West (Westbound) Ahead	U	C1:B		1	33	-	515	1954	738	58.7%	-	-	-	2.5	20.5	3.7
3/2	A525 West (Westbound) Right	U	C1:B		1	33	-	201	1775	671	25.2%	-	-	-	0.2	3.6	1.7
4/1	A525 East (Eastbound) Ahead	U	C2:A		1	41	-	741	1937	904	70.1%	-	-	-	1.8	10.2	9.5
4/2	A525 East (Eastbound) Right	U	C2:A		1	41	-	226	1769	826	27.4%	-	-	-	0.2	3.3	3.2
5/1	A483 Southbound Off-Slip Left	U	C2:B		1	27	-	547	1810	563	97.1%	-	-	-	13.0	85.5	21.7
5/2	A483 Southbound Off-Slip Right	U	C2:B		1	27	-	264	1777	553	47.8%	-	-	-	2.3	31.3	5.7
6/1	A525 East (Westbound) Left	U	C2:C		1	7	-	121	1748	155	77.9%	-	-	-	3.0	88.0	4.6

Basic Results Summary

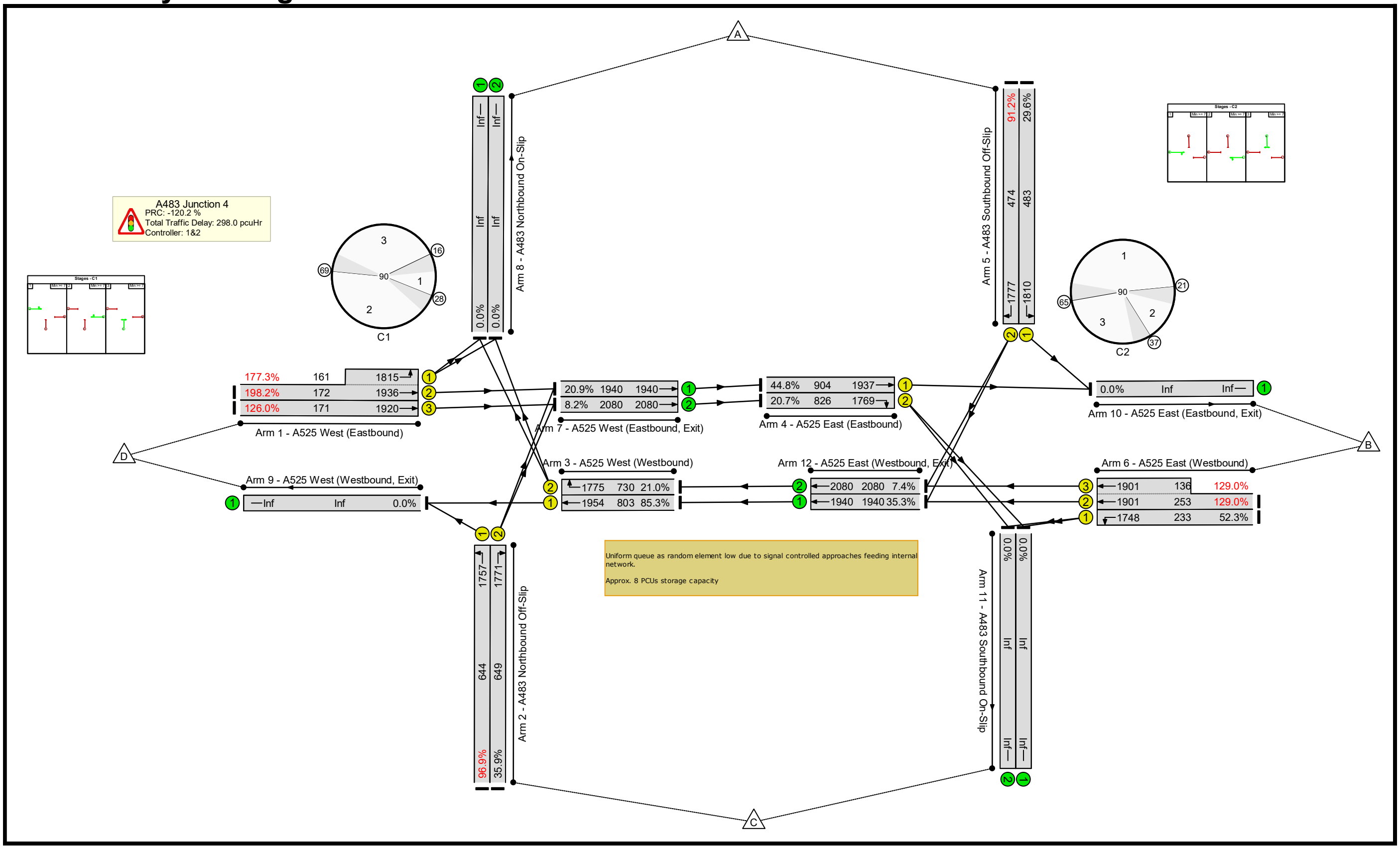
6/2+6/3	A525 East (Westbound) Ahead	U	C2:C		1	7	-	452	1901:1901	169+169	148.5 : 119.0%	-	-	-	68.7	547.4	67.3
7/1	A525 West (Eastbound, Exit) Ahead	U	-		-	-	-	741	1940	1940	32.7%	-	-	-	0.2	1.4	0.2
7/2	A525 West (Eastbound, Exit) Ahead	U	-		-	-	-	226	2080	2080	10.9%	-	-	-	0.1	1.0	0.1
12/1	A525 East (Westbound, Exit) Ahead	U	-		-	-	-	515	1940	1940	22.3%	-	-	-	0.1	1.2	0.1
12/2	A525 East (Westbound, Exit) Ahead	U	-		-	-	-	201	2080	2080	8.1%	-	-	-	0.0	0.9	0.0

C1 PRC for Signalled Lanes (%): -53.3 Total Delay for Signalled Lanes (pcuHr): 143.19 Cycle Time (s): 90
C2 PRC for Signalled Lanes (%): -65.0 Total Delay for Signalled Lanes (pcuHr): 88.98 Cycle Time (s): 90
PRC Over All Lanes (%): -65.0 Total Delay Over All Lanes(pcuHr): 232.65

Basic Results Summary

Scenario 6: '2030 Base + Com PM' (FG12: '2030 PM Base + Com', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**198.2%**	**0**	**0**	**0**	**298.0**	-	-
A483 Junction 4	-	-	-		-	-	-	-	-	-	**198.2%**	**0**	**0**	**0**	**298.0**	-	-
1/2+1/1	A525 West (Eastbound) Ahead Left	U	C1:A		1	7	-	627	1936:1815	172+161	198.2 : 177.3%	-	-	-	167.5	961.8	167.8
1/3	A525 West (Eastbound) Ahead	U	C1:A		1	7	-	215	1920	171	126.0%	-	-	-	28.7	480.7	30.9
2/1	A483 Northbound Off-Slip Left	U	C1:C		1	32	-	624	1757	644	96.9%	-	-	-	13.3	76.6	23.7
2/2	A483 Northbound Off-Slip Right	U	C1:C		1	32	-	233	1771	649	35.9%	-	-	-	1.6	25.1	4.5
3/1	A525 West (Westbound) Ahead	U	C1:B		1	36	-	759	1954	803	85.3%	-	-	-	3.2	16.8	9.4
3/2	A525 West (Westbound) Right	U	C1:B		1	36	-	175	1775	730	21.0%	-	-	-	0.2	3.7	3.6
4/1	A525 East (Eastbound) Ahead	U	C2:A		1	41	-	574	1937	904	44.8%	-	-	-	2.5	22.2	4.8
4/2	A525 East (Eastbound) Right	U	C2:A		1	41	-	215	1769	826	20.7%	-	-	-	2.1	45.4	4.4
5/1	A483 Southbound Off-Slip Left	U	C2:B		1	23	-	143	1810	483	29.6%	-	-	-	1.3	31.6	3.0
5/2	A483 Southbound Off-Slip Right	U	C2:B		1	23	-	432	1777	474	91.2%	-	-	-	8.1	67.7	14.7
6/1	A525 East (Westbound) Left	U	C2:C		1	11	-	122	1748	233	52.3%	-	-	-	1.8	52.4	3.4

Basic Results Summary

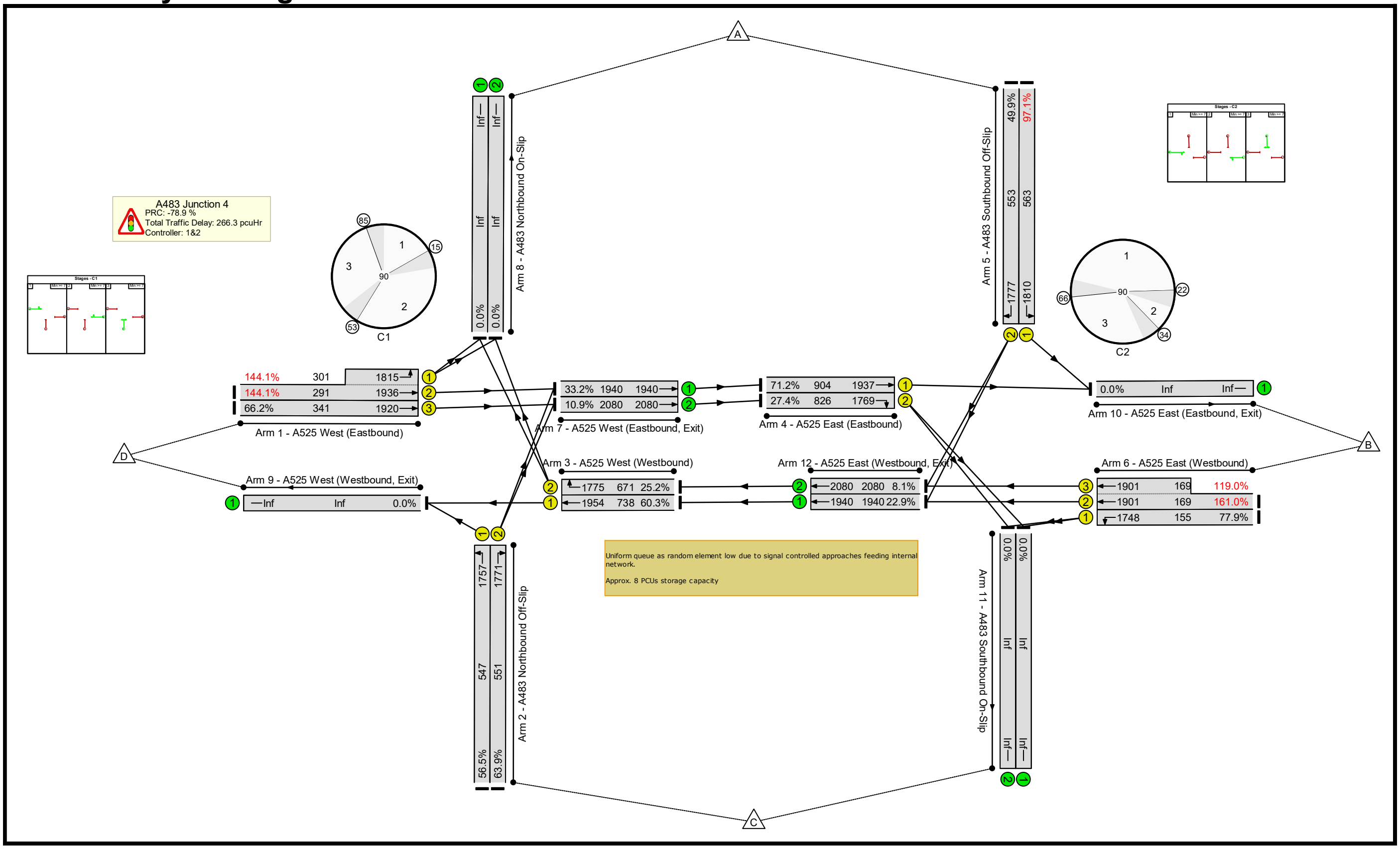
6/2+6/3	A525 East (Westbound) Ahead	U	C2:C		1	11	-	502	1901:1901	253+136	129.0 : 129.0%	-	-	-	67.3	482.3	70.3
7/1	A525 West (Eastbound, Exit) Ahead	U	-		-	-	-	574	1940	1940	20.9%	-	-	-	0.1	1.2	0.1
7/2	A525 West (Eastbound, Exit) Ahead	U	-		-	-	-	215	2080	2080	8.2%	-	-	-	0.0	0.9	0.0
12/1	A525 East (Westbound, Exit) Ahead	U	-		-	-	-	759	1940	1940	35.3%	-	-	-	0.3	1.4	0.3
12/2	A525 East (Westbound, Exit) Ahead	U	-		-	-	-	175	2080	2080	7.4%	-	-	-	0.0	0.9	0.0

C1 PRC for Signalled Lanes (%): -120.2 Total Delay for Signalled Lanes (pcuHr): 214.47 Cycle Time (s): 90
C2 PRC for Signalled Lanes (%): -43.3 Total Delay for Signalled Lanes (pcuHr): 83.05 Cycle Time (s): 90
PRC Over All Lanes (%): -120.2 Total Delay Over All Lanes(pcuHr): 298.01

Basic Results Summary

Scenario 7: '2030 Base + Com + Dev AM' (FG13: '2030 AM Base + Com + Dev', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**161.0%**	**0**	**0**	**0**	**266.3**	-	-
A483 Junction 4	-	-	-		-	-	-	-	-	-	**161.0%**	**0**	**0**	**0**	**266.3**	-	-
1/2+1/1	A525 West (Eastbound) Ahead Left	U	C1:A		1	15	-	854	1936:1815	291+301	144.1 : 144.1%	-	-	-	153.2	645.9	155.9
1/3	A525 West (Eastbound) Ahead	U	C1:A		1	15	-	226	1920	341	66.2%	-	-	-	3.1	49.8	6.2
2/1	A483 Northbound Off-Slip Left	U	C1:C		1	27	-	309	1757	547	56.5%	-	-	-	2.9	33.5	7.1
2/2	A483 Northbound Off-Slip Right	U	C1:C		1	27	-	352	1771	551	63.9%	-	-	-	3.5	35.6	8.4
3/1	A525 West (Westbound) Ahead	U	C1:B		1	33	-	548	1954	738	60.3%	-	-	-	2.4	19.4	3.6
3/2	A525 West (Westbound) Right	U	C1:B		1	33	-	201	1775	671	25.2%	-	-	-	0.2	3.6	1.7
4/1	A525 East (Eastbound) Ahead	U	C2:A		1	41	-	772	1937	904	71.2%	-	-	-	1.8	10.2	9.5
4/2	A525 East (Eastbound) Right	U	C2:A		1	41	-	226	1769	826	27.4%	-	-	-	0.2	3.4	3.2
5/1	A483 Southbound Off-Slip Left	U	C2:B		1	27	-	547	1810	563	97.1%	-	-	-	13.0	85.5	21.7
5/2	A483 Southbound Off-Slip Right	U	C2:B		1	27	-	276	1777	553	49.9%	-	-	-	2.4	31.8	6.1
6/1	A525 East (Westbound) Left	U	C2:C		1	7	-	121	1748	155	77.9%	-	-	-	3.0	88.0	4.6

Basic Results Summary

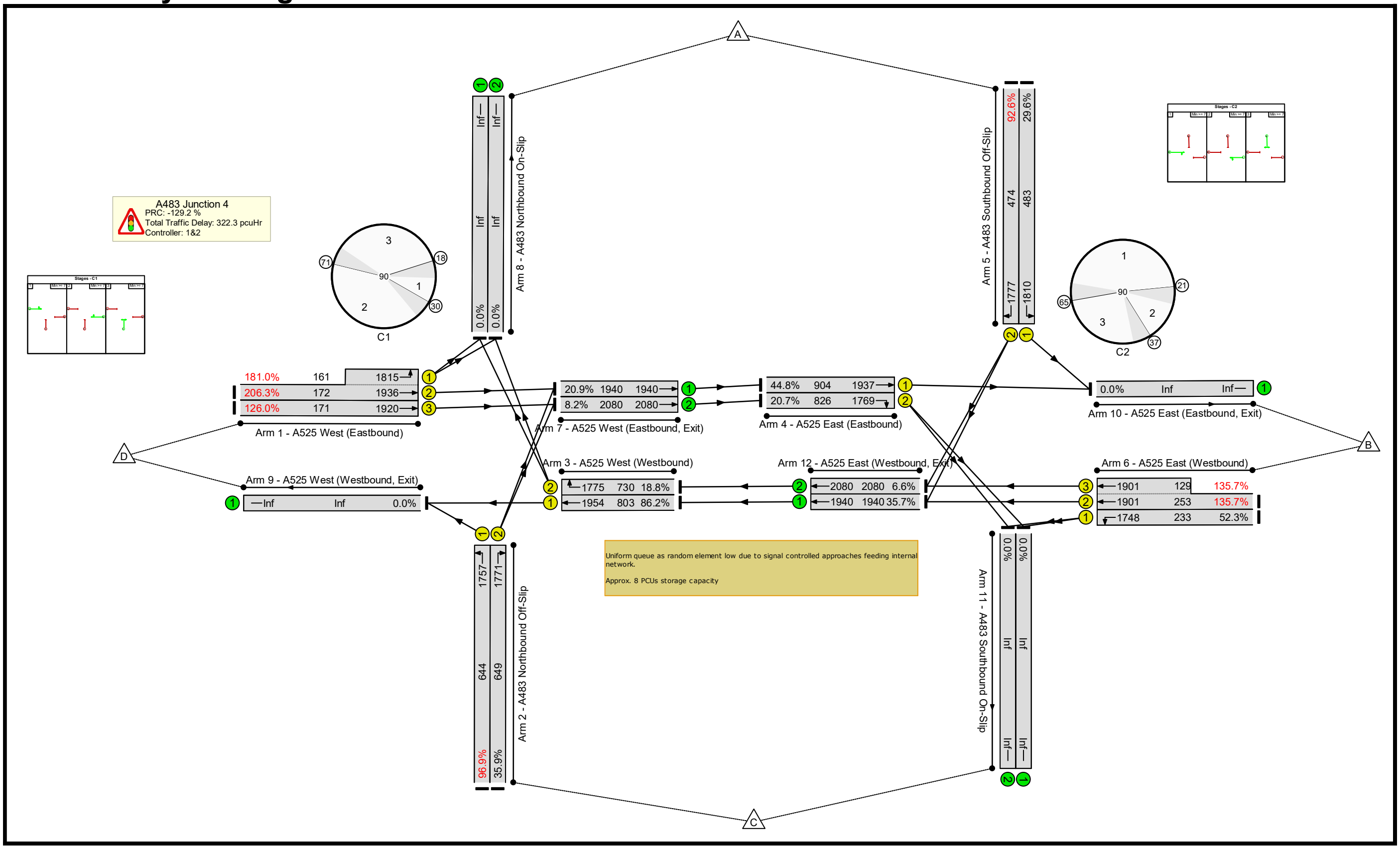
6/2+6/3	A525 East (Westbound) Ahead	U	C2:C		1	7	-	473	1901:1901	169+169	161.0 : 119.0%	-	-	-	80.2	610.0	79.9
7/1	A525 West (Eastbound, Exit) Ahead	U	-		-	-	-	772	1940	1940	33.2%	-	-	-	0.2	1.4	0.2
7/2	A525 West (Eastbound, Exit) Ahead	U	-		-	-	-	226	2080	2080	10.9%	-	-	-	0.1	1.0	0.1
12/1	A525 East (Westbound, Exit) Ahead	U	-		-	-	-	548	1940	1940	22.9%	-	-	-	0.1	1.2	0.1
12/2	A525 East (Westbound, Exit) Ahead	U	-		-	-	-	201	2080	2080	8.1%	-	-	-	0.0	0.9	0.0

C1	PRC for Signalled Lanes (%):	-60.1	Total Delay for Signalled Lanes (pcuHr):	165.27	Cycle Time (s):	90
C2	PRC for Signalled Lanes (%):	-78.9	Total Delay for Signalled Lanes (pcuHr):	100.57	Cycle Time (s):	90
	PRC Over All Lanes (%):	-78.9	Total Delay Over All Lanes(pcuHr):	266.34		

Basic Results Summary

Scenario 8: '2030 Base + Com + Dev PM' (FG14: '2030 PM Base + Com + Dev', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

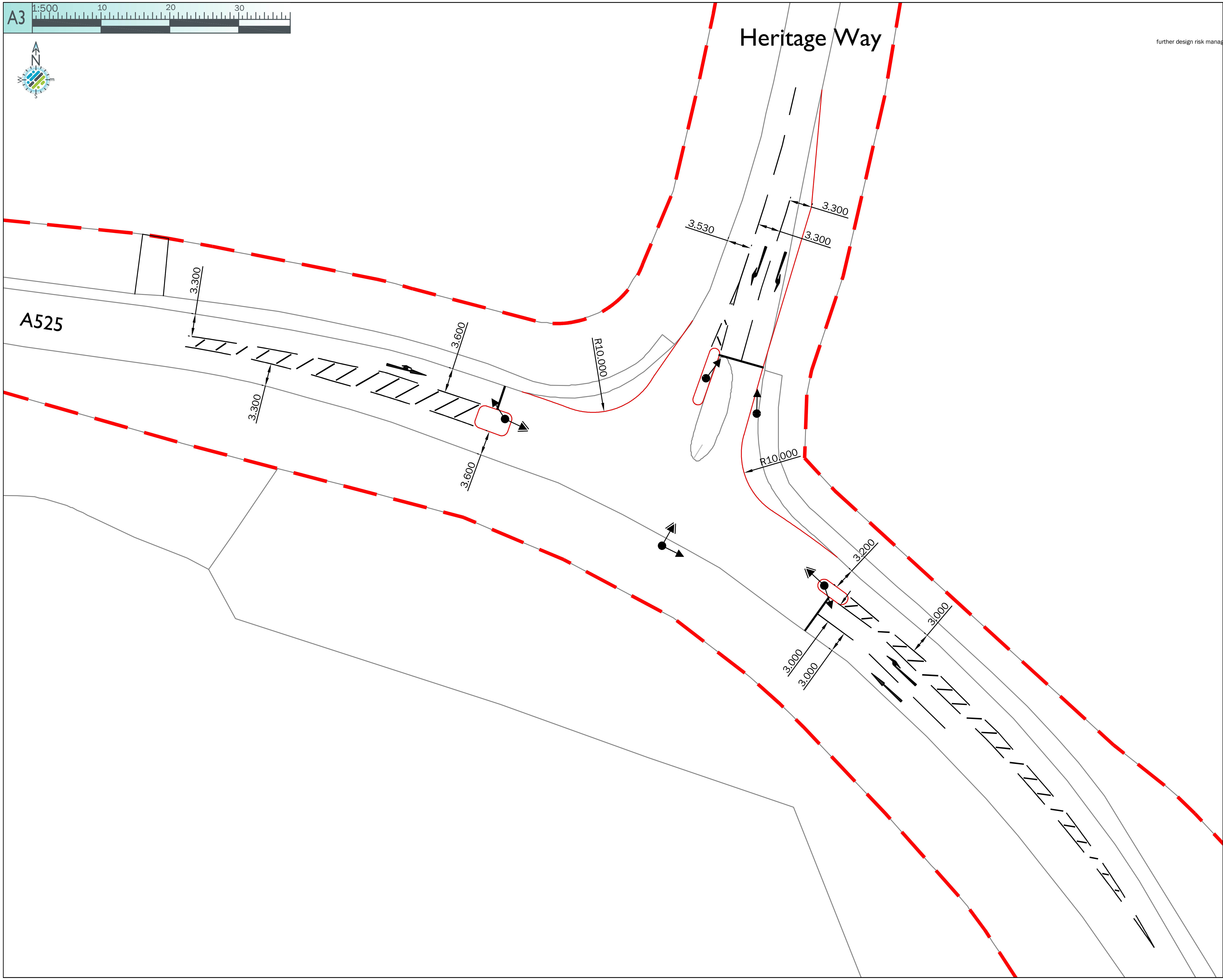
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**206.3%**	**0**	**0**	**0**	**322.3**	-	-
A483 Junction 4	-	-	-		-	-	-	-	-	-	**206.3%**	**0**	**0**	**0**	**322.3**	-	-
1/2+1/1	A525 West (Eastbound) Ahead Left	U	C1:A		1	7	-	647	1936:1815	172+161	206.3 : 181.0%	-	-	-	178.4	992.5	179.0
1/3	A525 West (Eastbound) Ahead	U	C1:A		1	7	-	215	1920	171	126.0%	-	-	-	28.7	480.3	30.9
2/1	A483 Northbound Off-Slip Left	U	C1:C		1	32	-	624	1757	644	96.9%	-	-	-	13.3	76.6	23.7
2/2	A483 Northbound Off-Slip Right	U	C1:C		1	32	-	233	1771	649	35.9%	-	-	-	1.6	25.1	4.5
3/1	A525 West (Westbound) Ahead	U	C1:B		1	36	-	783	1954	803	86.2%	-	-	-	3.3	17.0	9.4
3/2	A525 West (Westbound) Right	U	C1:B		1	36	-	175	1775	730	18.8%	-	-	-	0.2	5.5	3.4
4/1	A525 East (Eastbound) Ahead	U	C2:A		1	41	-	588	1937	904	44.8%	-	-	-	2.5	22.0	5.0
4/2	A525 East (Eastbound) Right	U	C2:A		1	41	-	215	1769	826	20.7%	-	-	-	2.1	43.4	4.4
5/1	A483 Southbound Off-Slip Left	U	C2:B		1	23	-	143	1810	483	29.6%	-	-	-	1.3	31.6	3.0
5/2	A483 Southbound Off-Slip Right	U	C2:B		1	23	-	439	1777	474	92.6%	-	-	-	8.8	72.4	15.5
6/1	A525 East (Westbound) Left	U	C2:C		1	11	-	122	1748	233	52.3%	-	-	-	1.8	52.4	3.4

Basic Results Summary

6/2+6/3	A525 East (Westbound) Ahead	U	C2:C		1	11	-	519	1901:1901	253+129	135.7 : 135.7%	-	-	-	79.9	554.5	83.1
7/1	A525 West (Eastbound, Exit) Ahead	U	-		-	-	-	588	1940	1940	20.9%	-	-	-	0.1	1.2	0.1
7/2	A525 West (Eastbound, Exit) Ahead	U	-		-	-	-	215	2080	2080	8.2%	-	-	-	0.0	0.9	0.0
12/1	A525 East (Westbound, Exit) Ahead	U	-		-	-	-	783	1940	1940	35.7%	-	-	-	0.3	1.4	0.3
12/2	A525 East (Westbound, Exit) Ahead	U	-		-	-	-	175	2080	2080	6.6%	-	-	-	0.0	0.9	0.0

C1	PRC for Signalled Lanes (%):	-129.2	Total Delay for Signalled Lanes (pcuHr):	225.44	Cycle Time (s):	90
C2	PRC for Signalled Lanes (%):	-50.8	Total Delay for Signalled Lanes (pcuHr):	96.33	Cycle Time (s):	90
	PRC Over All Lanes (%):	-129.2	Total Delay Over All Lanes(pcuHr):	322.27		

Appendix E Junction Mitigation Drawings



NOTES

These drawings have been produced with reference to the CDM Regulations 2015. Please note that these are pre-construction phase drawings and should be subject to further design risk management as required in accordance with Regulation 9

KEY

(red dashed boxes)	Highway Boundary
(red line)	Proposed Kerbline
(dot and arrow)	Proposed Traffic Signal

REV	DATE	REVISION NOTE	BY

PJA
Seven House - High Street
Longbridge - Birmingham
B31 2UQ - Tel: 0121 475 0234
London - Birmingham
Bristol - Reading - Exeter
www.pja.co.uk

CLIENT
Brymbo Developments Limted

PROJECT
Brymbo Park, Brymbo
Wrexham

DRAWING TITLE
Proposed Junction
Improvement Scheme
A525/Heritage Way

DRAWING ISSUE STATUS
PLANNING

JOB CODE	SUB-CODE	DRAWING NO.	REVISION
03499	A	001	P0

Revision Letter : P - Prelim / T - Tender / C - Construction

SCALE	DRAWN	REVIEWED	DATE
A3@ 1:500	AF	KN	04.12.18

Appendix F Junction Capacity Modelling Outputs - Mitigation

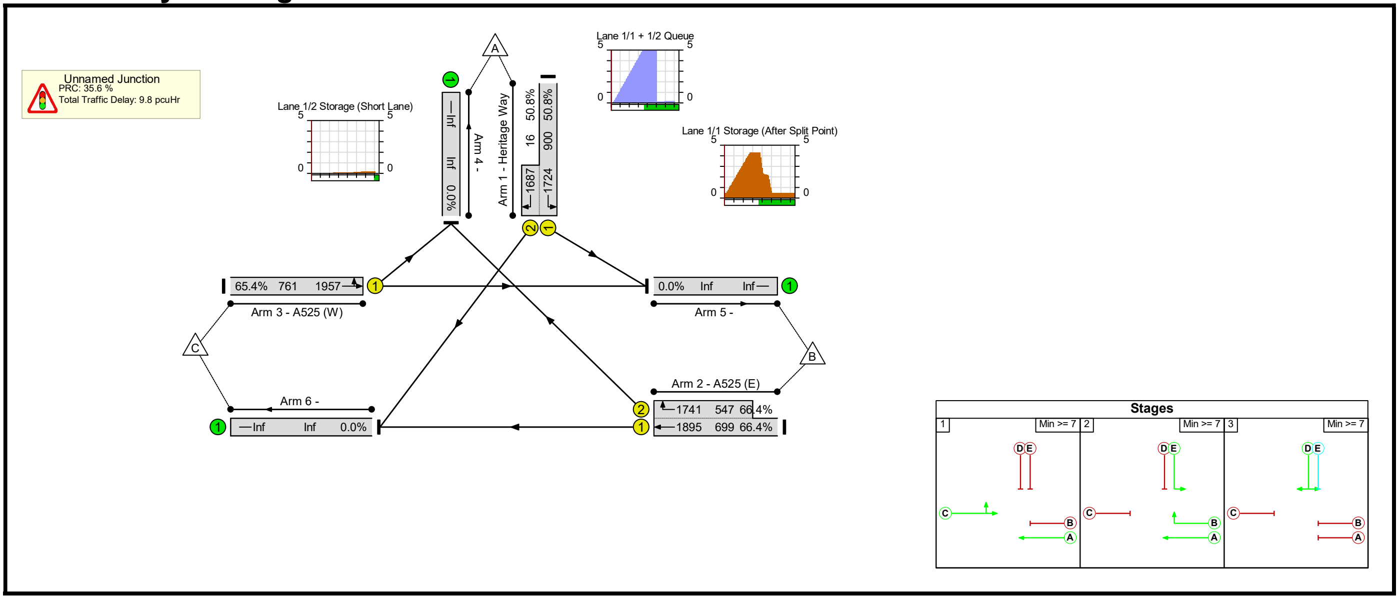
Basic Results Summary

User and Project Details

Project:	**Brymbo Park, Brymbo**
Title:	
Location:	
Client:	Brymbo Development Ltd
Additional detail:	
File name:	A525_Heritage Way - Proposed Mitigation.lsg3x
Author:	
Company:	
Address:	

Scenario 1: '2025 AM Base + Com + Net Dev' (FG1: '2025 AM Base + Com + Net Dev', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

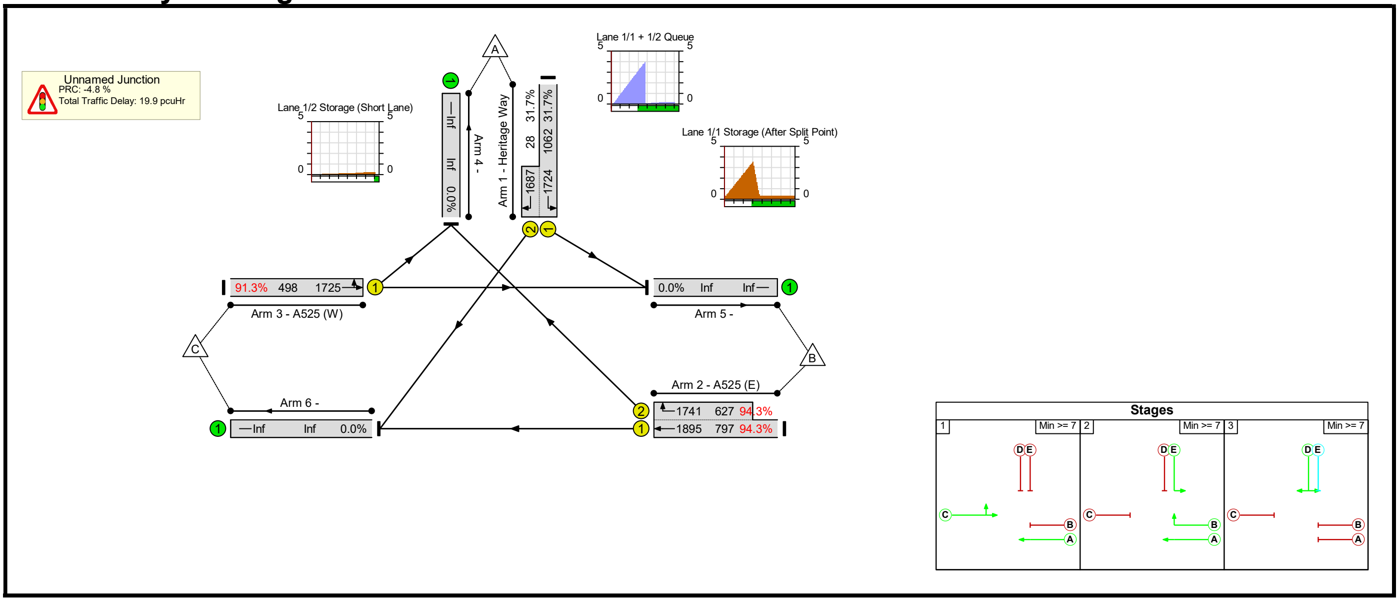
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**66.4%**	**0**	**0**	**0**	**9.8**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**66.4%**	**0**	**0**	**0**	**9.8**	-	-
1/1+1/2	Heritage Way Left Right	U	D	E	1	46:7	39	465	1724:1687	900+16	50.8 : 50.8%	-	-	-	2.4	18.4	7.9
2/1+2/2	A525 (E) Right Ahead	U	A B		1	73:34	-	827	1895:1741	699+547	66.4 : 66.4%	-	-	-	3.4	14.7	7.9
3/1	A525 (W) Left Ahead	U	C		1	34	-	498	1957	761	65.4%	-	-	-	4.1	29.3	11.0

C1 PRC for Signalled Lanes (%): 35.6 Total Delay for Signalled Lanes (pcuHr): 9.80 Cycle Time (s): 90
PRC Over All Lanes (%): 35.6 Total Delay Over All Lanes(pcuHr): 9.80

Basic Results Summary

Scenario 2: '2025 PM Base + Com + Net Dev' (FG2: '2025 PM Base + Com + Net Dev', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**94.3%**	**0**	**0**	**0**	**19.9**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**94.3%**	**0**	**0**	**0**	**19.9**	-	-
1/1+1/2	Heritage Way Left Right	U	D	E	1	55:7	48	346	1724:1687	1062+28	31.7 : 31.7%	-	-	-	1.1	11.2	4.2
2/1+2/2	A525 (E) Right Ahead	U	A B		1	73:43	-	1344	1895:1741	797+627	94.3 : 94.3%	-	-	-	10.5	28.3	21.1
3/1	A525 (W) Left Ahead	U	C		1	25	-	455	1725	498	91.3%	-	-	-	8.3	65.5	15.2

C1	PRC for Signalled Lanes (%):	-4.8	Total Delay for Signalled Lanes (pcuHr):	19.90	Cycle Time (s):	90
	PRC Over All Lanes (%):	-4.8	Total Delay Over All Lanes(pcuHr):	19.90		