vectos.

TRANSPORT ASSESSMENT

Cardiff Gate International Business Park

Plot 12 and 14 Redevelopment

November 2021

Transport Assessment

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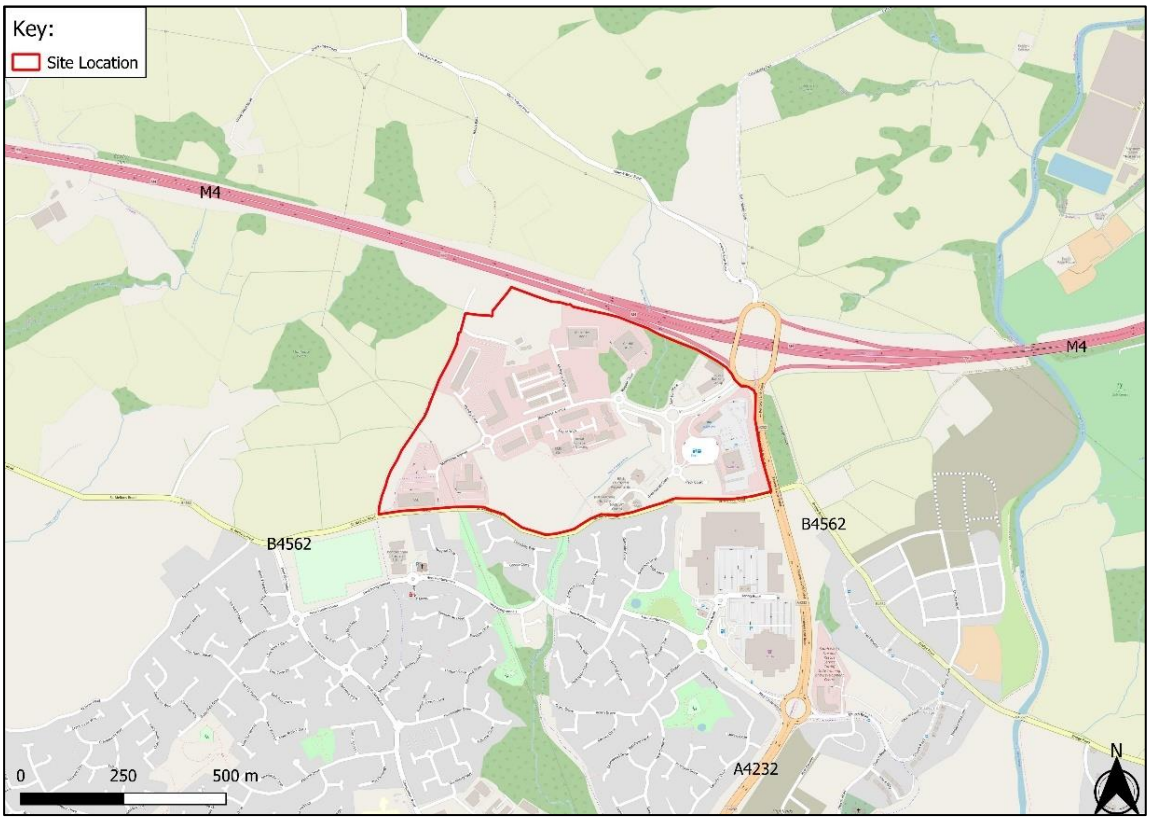
1 Introduction

1.1 Vectos is retained by Cardiff Gate International Business Park (CGIBP) to provide transport and highways advice in relation to a proposed development of Plots 12 and 14 and associated infrastructure works at Cardiff Gate International Business Park (the Site), Pontprennau.

1.2 The Site is bound to the north by the M4, to the east by Pentwyn Link Road Road, to the south by St Mellons Road and to the west by Strategic Site F (SSF) of the Local Plan. The location is shown in **Figure 1.1**.

Figure 1.1 – Site Location Plan



1.3 The proposals are for the development of CGIBP to provide a better balance of complimentary land uses. The application is an outline application for the following elements;

- Plot 12: Residential development of 120 units and 1,200 sqm of commercial floorspace;
- Plot 14: Mixed-use residential development of 25 units and 3,550 sqm of commercial floorspace;
- Bus, pedestrian and cycle connection to the Local Development Plan (LDP) Strategic Site F (SSF) to the west;
- Bus egress through Beck Court;
- Pedestrian / cycleway along Malthouse Avenue; and

— Alteration of Malthouse Avenue / Woodsy Close Roundabout.

1.4 This Transport Assessment assesses the potential impact of the proposed development at Plot 12 and Plot 14, and sets out the planned infrastructure which will be delivered to support the application and further enhance sustainable travel in this area of the city.

Structure of Report

1.5 This Transport Assessment is structured as follows:

— Section 2 - Existing Situation;

— Section 3 - Policy Context;

— Section 4 - Development Proposals;

— Section 5 - Trip Generation and Distribution;

— Section 6 - Impact on Walking and Cycling;

— Section 7 - Impact on Public Transport;

— Section 8 - Impact on Local Highway Network; and

— Section 9 - Summary and Conclusion.

2 Existing Situation

2.1 This section of the report establishes the existing conditions in relation to local walking and cycling networks, the public transport network and the highway network.

Site Location

2.2 The Site is located in Pontprennau, Cardiff (to the north of the city). The location of both Plot 12 and Plot 14 within the wider CGIBP Site is shown in **Figure 2.1**.

Figure 2.1 – Plot 12 and Plot 14 Location Plan

2.3 The Site is bound to the north by the M4, to the east by Pentwyn Link Road Road, to the south by St Mellons Road and to the west by Strategic Site F (SSF) of the Local Plan.

Accessibility

Walking

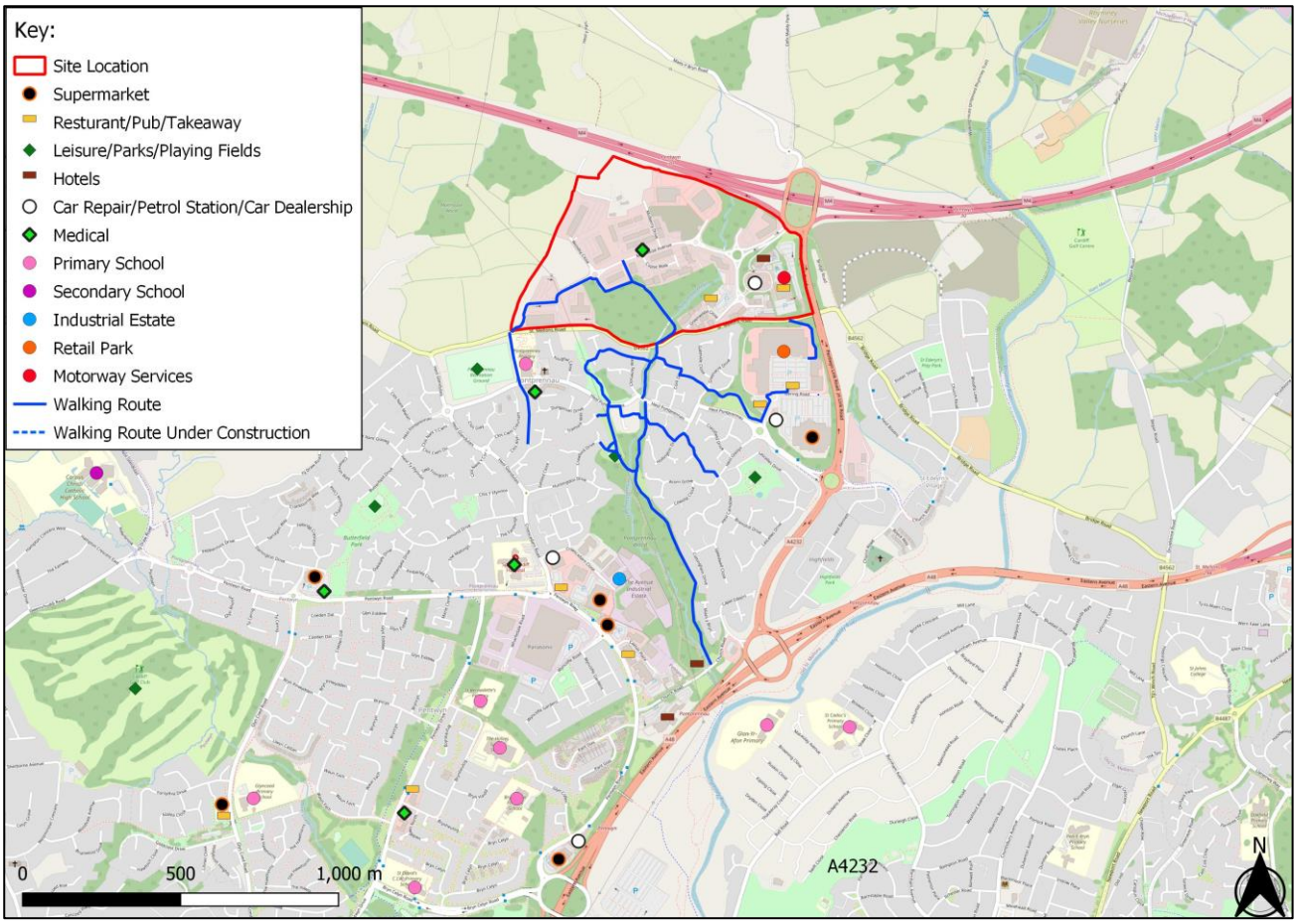
2.4 Malthouse Avenue, which is lit and equipped with pedestrian footways on both sides of the carriageway, serves CGIBP, and provides direct and continuous walking routes between Plots 12 and Plot 14 to the west of the Site.

2.5 Malthouse Avenue in turn provides access to a pedestrian and cycle link between CGIBP and Cardiff Gate Retail Park, and provides access to a shared footway / cycleway (Croescadarn Road) which connects CGIBP to Pontprennau, via the primary school. Malthouse Avenue, via Greenwood Close, also provides pedestrian access to the Toby Carvery, as well as facilitating access to the remainder of CGIBP (although there is currently no pedestrian access to the motorway services).

2.6 In addition, a PRoW, which connects St Mellons Road to CGIBP, routes along the western boundary of the Site, and provides access between the Site and Pontprennau to the south.

2.7 The location of the Site and key services and facilities, together with the available walking routes, is shown in **Figure 2.2**.

Figure 2.2 – Local Amenities



2.8 **Figure 2.2** demonstrates there is a range of services and facilities within walking distance of the Site, including employment, retail and health services, and education facilities, demonstrating the sustainability of the Site from a transport perspective and the opportunity for local living.

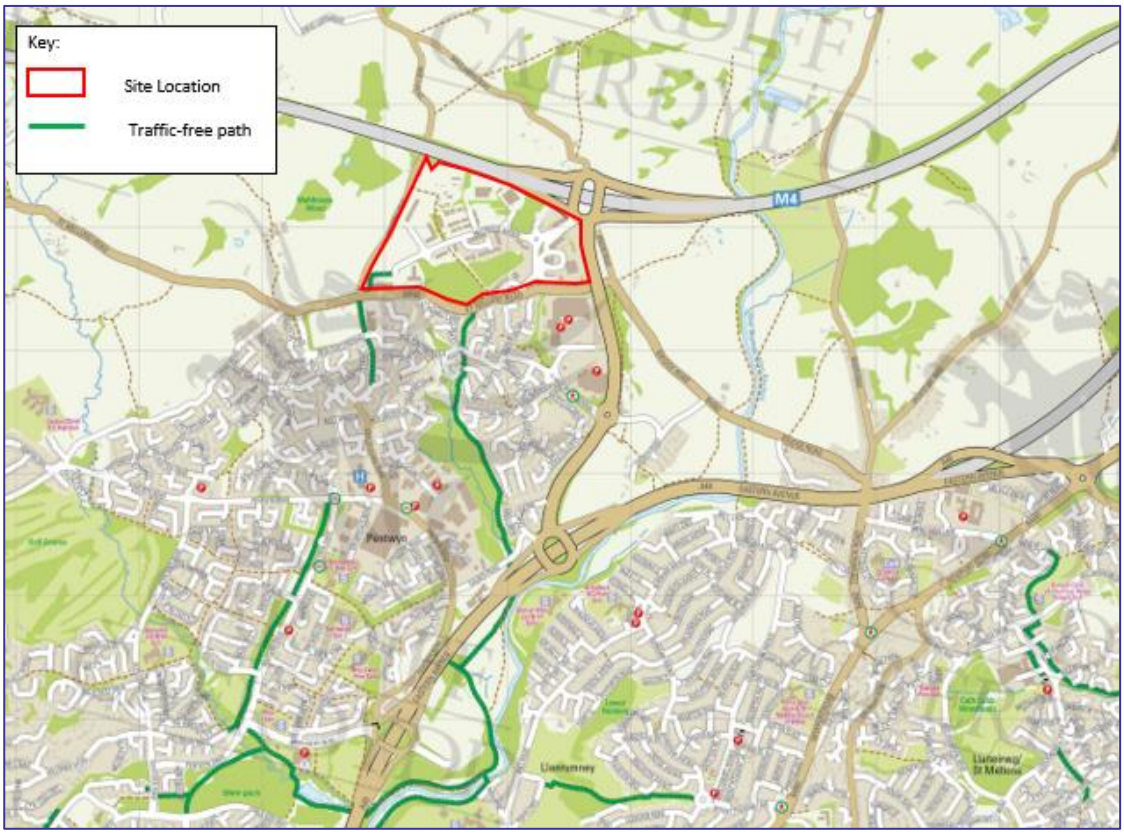
2.9 SSF is to the immediate west of CGIBP. There is the potential for walking, cycling and public transport links between SSF and CGIBP. The provision of walking, cycling and public transport links in this way would connect the Site directly to local centres, district centres and education facilities anticipated to come forward as part of SSF, and would further enhance the ability of future users of the Site to walk, cycle or use public transport for a significant proportion of everyday journeys.

Cycling

2.10 Malthouse Avenue is a lightly trafficked route, subject to a 30-mph speed limit, and is appropriate for cycling in the vicinity of the Site (at the western end of CGIBP). In addition, Croescadarn Road is a traffic free footway / cycleway, which connects directly to the wider cycle network, and the Rhymney Trail, a traffic free route providing access towards the city centre from the north-east of Cardiff, terminates to the immediate south of the Site.

2.11 The location of the Site in the context of the existing local cycle network, as described on Cardiff Council's Cycle Map, is shown in **Figure 2.3**.

Figure 2.3 – Local Cycle Links



Public Transport

Bus

2.12 The Site is accessible by bus, with a bus stop located within walking distance of the Site on Malthouse Avenue and Heol Pontprennau.

2.13 The Malthouse Avenue stop, known as 'Malthouse Avenue', is equipped with a shelter, seating and real time information, as shown in **Photograph 2.1**. The Heol Pontprennau stops, known as 'Youghal Close (eastbound)' and 'Youghal Close (westbound)', approximately 300m to the south of Plot 14.

Both stops benefit from safe and convenient walking routes and are equipped with shelters, seating and real time information, as shown in **Photograph 2.2** and **Photograph 2.3**.

Photograph 2.1 – Malthouse Avenue Bus Stop

Photograph 2.2 – Youghal Close (e/bound)

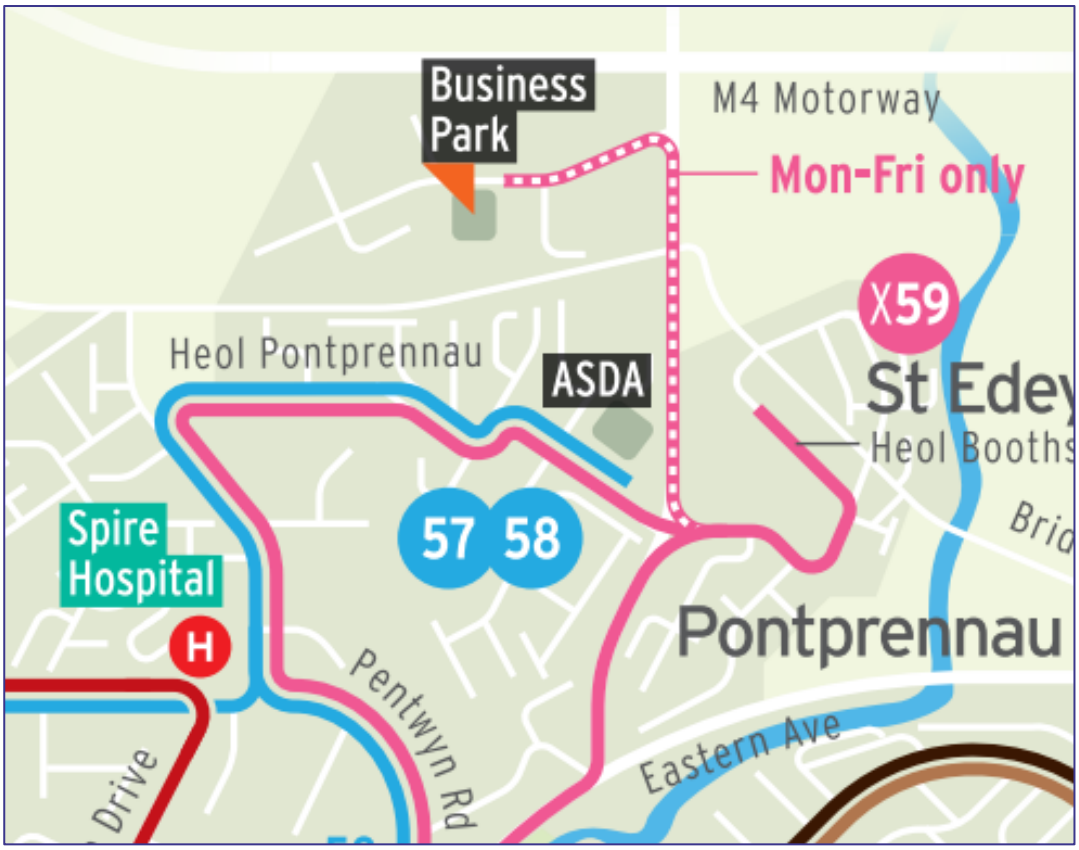
Photograph 2.3 – Youghal Close (w/bound)

2.14 A summary of the bus services which call at the Malthouse Avenue and Heol Pontprennau bus stops is provided in **Table 2.1**. An extract of Cardiff Bus's Route Map, which illustrates the route of these services, is contained at **Figure 2.4**. It is worth noting that the X59 which serves the Malthouse Avenue bus stop and Heol Pontprennau bus stops only routes to the Malthouse Avenue bus stop Mon-Fri.

Table 2.1 Summary of Local Bus Services

Service	Route	Average Frequency (bus per hour)		
		Weekday	Saturday	Sunday
X59	City Centre-Cardiff East P&R-CGIBP	2	2	-
X59	CGIBP-Cardiff East P&R-City Centre	2	2	-
57	City Centre-Pontprennau	2	2	2
57	Pontprennau-City Centre	2	2	2
58	City Centre-Pontprennau	2	2	2
58	Pontprennau-City Centre	2	2	2

Figure 2.4 – Local Bus Service Map



2.15 In total, there are approximately 2 buses per hour which serve the Malthouse Avenue stops on a weekday. The Heol Pontprennau stops are served by 8 buses per hour on weekdays, reducing to 6

buses per hour on weekends. The Heol Pontprennau bus stops are easily accessible from the site on foot, pedestrians will depart the site through the footpath to the south west of CGIBP and cross the B4562 to access the shared pedestrian cycleway (Croescadarn Road). The eastbound bus stop can be accessed from this point entirely through pedestrian footways, whilst the zebra crossing on Heol Pontprennau can be used for access to the westbound bus stop.

2.16 The approximate bus journey time between the Site and the city centre is between 35-40 minutes. This is comparable to car journey times to the same destination, particularly during peak hours, with bus services benefitting from significant bus priority measures on the A48 and Newport Road.

Train Services

2.17 The Site is located 4.2km east of Lisvane and Thornhill rail station and 11.2km north-east of Cardiff Central rail station. Therefore, whilst accessible to the rail network, any rail journeys will form part of a multi-modal journey, with the connection to the rail station forming a key part of this journey.

Local Highway Network

Malthouse Avenue

2.18 Malthouse Avenue is the spine road through the centre of CGIBP, providing access directly or indirectly (via other access roads) to all plots on CGIBP. Malthouse Avenue is a single-lane carriageway, with footways adjacent to both sides of the carriageway. It is lit and subject to a 30-mph speed limit.

Junction 30, M4

2.19 Junction 30 of the M4 is a grade-separated roundabout. It provides all movements access to the M4, and access to Maes y Bryn Road to the north and the A4232 to the south, and access to CGIBP (and motorway services). There are part-time traffic signals in place at this roundabout, which are sometimes activated at peak times, but for the majority of the time the roundabout operates under a priority arrangement.

A4232 / Heol Pontprennau Roundabout

2.20 A4232 / Heol Pontprennau Roundabout is a four-arm priority roundabout, which provides access to the A4232 to the north and south, Bridge Road to the east, and Heol Pontprennau to the west.

2.21 There is a signal-controlled pedestrian crossing on Heol Pontprennau to the west of the roundabout, linking Cardiff Gate Retail Park to the residential area to the south. Paired with this, the roundabout has recently been upgraded with footways located either side of the carriageway on all arms. Signalised pedestrian crossings are also located on the northern and southern A4232 arms with a dropped kerb pedestrian island crossing located on the Church Road arm.

St Mellons Road

2.22 St Mellons Road has the characteristics of a country lane. It is a two-way road, but narrow in places, requiring vehicles to slow down and give way.

Collision Data

2.23 Personal Injury Collision (PIC) data in the area surrounding the Site have been obtained from Stats Wales for the most recent five-year period from 1st January 2015 up to 30st November 2019. The PIC data for the surrounding roads is provided within **Appendix A**. The location and severity of each collision is displayed in **Figure 2.5**.

Figure 2.5 – Collision Locations

2.24 The review demonstrates that that there have been no fatal collisions within the study area.

2.25 A summary of the collisions recorded during the five-year period on surrounding the Site is provided in **Table 2.2**.

Table 2.2: Summary of Incidents

Year	Slight	Serious	Fatal	Total
2015	8	1	0	9
2016	6	0	0	6
2017	8	1	0	9
2018	2	0	0	2
2019	0	0	0	0
Total	24	2	0	26

2.26 **Table 2.2** shows that over the most recent six-year period there have been 24 slight and 2 serious collisions surrounding the Site which is not deemed as high. The first of the two serious collisions was a rear shunt which occurred in 2015 involving two cars. One driver was seriously injured. The second serious collision which occurred in 2017 involved a car and a cyclist, who was hit from the side by the car while negotiating the roundabout.

Summary of Accessibility

2.27 This Site is located in a highly accessible location in terms of the high quality, extensive pedestrian routes in its vicinity, as well as the good provision of cycling infrastructure. Furthermore, its proximity to local bus stops provides accessibility from destinations further afield. This will provide a genuine choice in travel for future residents and employees of the Site.

3 Policy Context

National Legislation

Well-Being of Future Generations (Wales) Act 2015

3.1 The Well-Being of Future Generations Act 2015 seeks to improve the social, economic, environmental and cultural well-being of Wales. It contains seven well-being goals which local authorities as well as other public bodies must seek to achieve in order to improve well-being both now and in the future.

Active Travel (Wales) Act 2013

3.2 The Active Travel Act 2013 aims to make it easier for people to walk and cycle in Wales and makes it a legal requirement for local authorities in Wales to map and plan for suitable routes for active travel, and to build and improve their infrastructure for walking and cycling every year. It creates new duties for highways authorities to consider the needs of walkers and cyclists and make better provision for them. It also requires both the Welsh Government and local authorities to promote walking and cycling as a mode of transport.

3.3 By connecting key sites such as workplaces, hospitals, schools and shopping areas with active travel routes, the Act will encourage people to rely less on their cars when making short journeys and make implementing successful Travel Plans easier.

Planning Policy Wales (Edition 10, December 2018)

3.4 Planning Policy Wales sets out the land use planning policies of the Welsh Government. This is supplemented by a series of Technical Advice Notes. In regard to 'Active and Social Places', the document 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. By influencing the location, scale, density, mix of uses and design of new development, the planning system can improve choice in transport and secure accessibility in a way which supports sustainable development, increases physical activity, improves health and helps to tackle the causes of climate change and airborne pollution 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."*

Technical Advice Note 18 (Transport)

3.5 Technical Advice Note (TAN 18) elaborates on the relationship between land use planning and transport infrastructure by outlining a range of key accessibility principles that should inform future patterns of development.

3.6 In the case of new residential development, sites that are accessible to jobs, shops and services by modes other than the car and are afforded sufficient capacity on public transport services are favoured.

3.7 TAN 18 advises that development plans should afford priority to the following:

- promote housing development at locations with good access by walking and cycling to primary and secondary schools and public transport stops, and by all modes to employment, further and higher education, services, shopping and leisure, or where such access will be provided as part of the scheme or is a firm proposal in the Regional Travel Plan;
- ensure that significant new housing schemes contain ancillary uses including local shops, and services and, where appropriate, local employment;
- include policies and standards on densities, and parking to achieve higher residential densities in places with good public transport accessibility and capacity;
- encourage residential layouts that incorporate traffic management proposals such as home zones, calming measures and 20 mph zones and where appropriate, layouts that allow public transport to pass through easily; and
- Require layouts and densities, which maximise the opportunity for residents to walk and cycle to local facilities and public transport stops.

3.8 The development is well located and within a good proximity to a wide range of local amenities and public transport options.

Local Policy

Cardiff Adopted Local Development Plan (LDP) 2006 – 2026

3.9 The LDP was adopted on 28th January 2016 and is founded on four strategic objectives:

— to respond to evidenced economic needs and provide the necessary infrastructure to deliver development;

— to respond to evidenced social needs;

— to deliver economic and social needs in a co-ordinated way that respects and enhances Cardiff's environment; and

— to create sustainable neighbourhoods that form part of a sustainable city.

3.10 Delivery of the strategy is dependent on the provision of new homes and jobs, with the key Strategic Sites identified in Policy KP2. These include a comprehensive development of circa 6,000 homes with employment and community uses in north-east Cardiff (SSF and SSG). SSG has been delivered, and part of SSF is currently under construction. The remainder of SSF is subject to a live planning application.

3.11 Policy T1 of the LDP deals with Transport and specifically Walking and Cycling. The policy states that in order to enable people to access services, employment and community facilities by walking and cycling, the council would support developments which incorporates;

- High quality, sustainable design which makes a positive contribution to the distinctiveness of communities and places;
- Permeable and legible networks of safe, convenient and attractive walking and cycling routes;
- Connections and extensions to the Cardiff Strategic Cycle Network and routes forming part of the Cardiff Walkable Neighbourhoods Plan;
- Measures to minimise vehicle speed and give priority to pedestrians and cyclists;
- Safe, convenient and attractive walking and cycling connections to existing developments, neighbourhoods, jobs and services;
- Infrastructure designed in accordance with standards of good practice including the Council's Cycling Design Guide;
- Supporting facilities including, signing, secure cycle parking and, where necessary shower and changing faculties; and
- The provision of Car-Free Zones.

3.12 Key to the Local Development Plan is the Transport Strategy which is seeking to achieve a modal split of 50:50 in 2026 for all trips on the network. The proposed development is in line with this policy by offering real travel choice for a range of activities/ requirements.

3.13 The other LDP policies relevant to this Site are numerous, and include:

3.14 KP4: Master Planning Approach

This development will accord with the masterplanning principles by providing suitable linkages and opportunity to integrate with the wider strategic sites.

3.15 KP5: Good Quality and Sustainable Design

The Site will provide good quality and sustainable design and seeks to provide enhanced Active Travel linkages.

3.16 KP6: New Infrastructure

The Site will provide the necessary proportionate infrastructure for a development of this magnitude.

3.17 KP8: Sustainable Transport

The development will seek to enhance the sustainability of this Site by prioritising Active Travel over car usage.

3.18 T2: Strategic Rapid Transit and Bus Corridors

The development can provide a strategic public transport connection to SSF and will seek to enhance pedestrian and cycle linkages to nearby bus stops and existing bus connections / corridors.

3.19 T5: Managing Transport Impacts

The development will seek to manage its traffic impact by enhancing Active Travel opportunities.

3.20 T6: Impact on Transport Networks and Services

The development will not cause any unacceptable harm to the safe and efficient growth of the highway network.

Managing Transportation Impacts (Incorporating Parking Standards) SPG

3.21 The Supplementary Planning Guidance (SPG) was adopted in July 2018.

3.22 The Car Parking Standards for C3 and C4 dwelling properties within Cardiff are shown in Table P.9 of the SPG. This includes standards for different development types, maximum car parking spaces and minimum cycle parking spaces, as well as disabled parking provision. Developers are expected to meet the parking standards through on-site provision and the proposed development will be in line with these standards.

3.23 The parking guidelines from the SPG are set out in Table 3.1.

Table 3.1 – Parking Standards

Area	Development Type	Maximum car parking spaces per unit	Minimum cycle parking	Disabled parking provision
Non Central	2+ bedroom dwellings	2 per unit	1 per bedroom	Provided in car parking allocation
Non Central	Offices. Highly technical and light industry. Offices for research and development processes.	1 per 50sqm	1 per 100sqm	6 spaces plus 2% of total parking spaces, and a further 2% of spaces should be enlarged standard Non spaces (Where car parking provision is over 200 car parking spaces)

Summary

3.24 The main themes of the policy documents are:

- Promoting travel choice, providing sustainable travel options, and providing a range of access options to day-to-day facilities; and
- Minimise the need to travel, the number and length of journeys, and the demand on the existing highway network.

3.25 The development supports national and local planning policy, and it has been developed to support the key objective of the LDP Deposit Plan of achieving a 50/50 sustainable travel mode split across the city.

4 Development Proposals

Development Schedule

4.1 The proposals are for the development of CGIBP to provide a better balance of complimentary land uses. The application is an outline application for the following elements;

- Plot 12: Residential development of 120 units and 1,200 sqm of commercial floorspace;
- Plot 14: Mixed-use residential development of 25 units and 3,550 sqm of commercial floorspace;
- Bus, pedestrian and cycle connection to the Deposit Local Development Plan (LDP) for Strategic Site F (SSF) to the west;
- Bus egress through Beck Court;
- Pedestrian / cycleway along Malthouse Avenue; and
- Alteration of Malthouse Avenue / Woodsy Close Roundabout.

4.2 The indicative masterplan is included at **Appendix B**.

4.3 The development proposal will be informed by the following key design principles:

- Sustainable Hierarchy of Movement;
- Sustainable Travel Choices;
- Sustainable Travel Corridors; and
- Integration with Neighbouring Areas.

4.4 These key design principles are reflected in the following measures:

- **Sustainable Hierarchy of Movement** - The development proposal follows a hierarchy of movement which provides greatest priority to pedestrians and cyclists, followed by public transport. The objective is to achieve a sustainable travel mode split, in line with the aims of CC's LDP, and provide travel choice and social inclusion for all.
- **Sustainable Travel Choices** - The development proposal will facilitate the provision of a strategic public transport connection to SSF. The Site will also be well served by public transport, with frequent bus services serving the Site.
- **Sustainable Travel Corridors** - The development proposal includes direct walking and cycling routes within the Site and to SSF to the west. Walking and cycling is the most efficient way to move people in urban areas, and the development proposal will focus on promoting these modes of travel for all local journeys, creating 'walkable neighbourhoods' and cycle friendly environments.

- **Integration with Neighbouring Areas** - The development proposals will be well connected to the existing urban form, with direct and continuous walking and cycling links to CGIBP, and existing connections between CGIBP, Cardiff Gate Retail Park (CGRP) and Pontprennau. The proposals will enhance bus connectivity in the area.

Pedestrian and Cycleway on Malthouse Avenue

4.5 As part of the indicative development proposals a new pedestrian and cycleway will be provided along Malthouse Avenue linking from the SSE (company) access to the west to the Cardiff Audi / Malthouse Avenue three-armed roundabout to the east. This new link, the indicative design of which is provided in **Appendix C**, will extend along Malthouse Avenue and take advantage of the proposed removal of the Malthouse Avenue / Woodsy Close Roundabout.

Pedestrian and Cycle Access

4.6 Walking and cycling routes will follow direct desire lines within the Site, and will include traffic free and recreational routes, connecting into and extending the existing network of routes in this area of the city. Currently there are footways on at least one, or for the majority, both sides of carriageways within CGIBP.

Bus, Pedestrian and Cycle Connection to SSF and Bus Egress through Becks Court

4.7 As part of the indicative development proposals a new bus, pedestrian and cycle connection will be provided at the western site boundary connecting the Site with SSF, located directly to the west. This new link, the indicative design of which is provided in **Appendix D**, will extend off Woodsy Close into SSF.

4.8 The purpose of this link is to allow for a new SSF funded bus service to route through the Site from the west, connecting SSF to the local highway network that links into the rest of Cardiff and Cardiff City Centre. To allow for this new route to link through the Site a new bus egress at Beck Court is also proposed at the south of the Site linking onto St Mellons Road. The new bus link requires the car park directly to the east to be reconfigured. The reconfiguration will result in a loss of 2 parking spaces changing from 32 existing to 30 proposed parking spaces. This new bus egress will also facilitate improved bus access to Strategic Site G and is presented in **Appendix E**.

Malthouse Avenue / Woodsy Close Alteration

4.9 As part of the indicative development proposals the four-armed roundabout with Woodsy Close / Malthouse Avenue will be removed and replaced with a priority junction. This new arrangement, the indicative design of which is provided in **Appendix C**, will alter Woodsy Close into the minor arm and allow better alignment for Malthouse Avenue which will operate as the major arms to the west and east. This arrangement will provide a better experience for pedestrians and cyclists and will allow the junction to operate in safer and more efficient manner.

Site Access for Vehicles

4.10 The Site will have one access onto the external highway network, which will be from the spine road on the eastern boundary of the Site to the M4 Junction 30 Roundabout. Plot 12 will be accessed via a

new access off Malthouse Avenue to the south with Plot 14 also being accessed of Malthouse Avenue to the north, directly west of the Plot 12 access. The alteration to the Malthouse Avenue / Woodsy Close roundabout means both accesses will be a priority junction with appropriate spacing between the existing accesses within CGIBP. The indicative access arrangement to each of the plots is included in the Site masterplan in **Appendix B**. Both site accesses will be subject to a Stage 1 Road Safety Audit (RSA).

Servicing & Refuse

4.11 All servicing and refuse will take place on Site with access to Plot 12 and Plot 14 from the two proposed site accesses. Both site accesses have been designed to MfS standards and therefore can accommodate the required vehicles for emergency access and servicing. Swept path analysis of both plot access is presented within **Appendix F**.

4.12 The internal access roads within CGIBP, which include Malthouse Avenue, can all accommodate a range of vehicles including refuse collection, emergency services and delivery vehicles, including 10m rigid delivery vehicles. The internal access route to each of the plots will allow all of the residential units and commercial land use to be serviced from within the Site.

Parking

4.13 Both Plot 12 and Plot 14 will accord with the Cardiff SPG vehicle and cycle parking standards for both residential and office land uses.

4.14 Plot 12 is required to provide a minimum of 120 cycle spaces for the residential aspect of the development, and a minimum of 12 cycle parking spaces for the office aspect of the development. The maximum level of car parking permitted is 240 spaces for the residential units, and 24 parking spaces for the office space. Further disabled parking spaces may be required for the office land use.

4.15 Plot 14 is required to provide a minimum of 25 cycle spaces for the residential aspect of the development, and a minimum of 36 cycle parking spaces for the office aspect of the development. The maximum level of car parking permitted is 50 spaces for the residential units, and 71 parking spaces for the office space. Further disabled parking spaces may be required for the office land use.

Travel Plan

4.16 CGIBP already operates a successful Travel Plan, and there have been a number of successes related to the Travel Plan, including:

- Extension of Cardiff Bus Service X59 to CGIBP.
- Introduction and promotion of CarShare2Cardiff.com car share scheme.

4.17 The existing Travel Plan will be updated to incorporate the additional commercial development brought forward with this application by way of condition.

4.18 The residential element of the development proposal is supported by a separate Interim Residential Travel Plan which is provided in **Appendix G**.

5 Trip Generation and Distribution

Introduction

5.1 This section sets out the methodology used for estimating the predicted level of person trips to and from the proposed development by all modes of transport. This methodology will be used to assess the impact of the proposals on movements by pedestrians, cyclists and public transport, as well as on the local highway network.

5.2 The following scenarios will be assessed:

- Peaks – AM Peak (08:00-09:00) and PM Peak (17:00-18:00)

5.3 To forecast a trip generation of the proposed development, the different land uses have been considered separately.

Proposed Trip Generation

Residential Use

5.4 For the residential element of the scheme, the trip generation by each mode of transport to and from the Site has been estimated for AM peak and PM peak. The previously accepted Plot 12 planning application residential trips rates have been used once more to calculate the total person trips the proposed Site is expected to generate.

5.5 The TRICS database was used to derive total person trips rates for the proposed residential units. For weekday trip rates which were taken from the Plot 12 application, the following criteria were used to ensure that the trip rates were representative.

- Land Use: Residential;
- Sub Land Use: Houses Privately Owned;
- Regions: All regions excluding London, Northern Ireland and Republic of Ireland;
- Location: Suburban Area, Edge of Town;
- Number of dwellings: 100 to 491 units;
- Survey Days: Weekdays only; and
- Date Range: 01/01/07 to 22/09/12.

5.6 To ensure a robust assessment, a ‘privately owned’ trip rate, which is the most trip intensive category, has been calculated for all dwellings.

5.7 In total, 9 sites fell within these parameters. The resultant average total person trip rate is summarised in **Table 5.1** and the full TRICS output data is provided at **Appendix H**.

Table 5.1 – Average Total Person Trip Rates

Mode	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arr	Dep	Total	Arr	Dep	Total
Trip Rate	0.286	0.914	1.200	0.642	0.419	1.061

5.8 The current indicative proposals are for circa 145 dwellings which includes Plot 12 and 14 combined, and therefore the trip rates in **Table 5.1** are applied to a proposed development of 145 residential dwellings, in order to assess the potential impact of the Site. This results in a total person trip generation as summarised in **Table 5.2**.

Table 5.2 – Total Persons Trip Generation (145 Dwellings)

Mode	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arr	Dep	Total	Arr	Dep	Total
Trips	41	133	174	93	61	154

Modal Split

5.9 To obtain a modal split for the Site, the journeys have been first considered by purpose. The National Travel Survey (NTS) gives an hourly breakdown of trips by journey purpose for weekdays, which is set out in **Table 5.3** for the weekday assessment hours. This uses Table 0502 of the latest available NTS dataset, from 2019.

Table 5.3 – NTS Trips by Journey Purpose

	AM Peak (08:00-09:00)	PM Peak (17:00-18:00)
Commuting	20%	32%
Business	3%	3%
Education	29%	3%
Escort Education	23%	2%
Shopping	4%	12%
Other Work / Other Escort / Personal Business	14%	20%
Visiting Friends / Entertainment / Sport	3%	20%
Holiday / Day Trip / Other	4%	8%
TOTAL	100%	100%

5.10 To allow an analysis of trips by purpose, this split has been classified into three general journey purposes: commuting, education and leisure/recreation, with the proportion of trips for each purpose, for each assessment hour, given in **Table 5.4**.

Table 5.4 – Trips by Journey Purpose

	Commuting	Education	Leisure
AM (08:00-09:00)	23%	51%	26%
PM (17:00-18:00)	36%	5%	59%

5.11 Distributing the weekday total person residential trips summarised in **Table 5.2** by the journey purpose given in **Table 5.4** results in a breakdown of trips by journey purpose as displayed in **Table 5.5**.

Table 5.5 – Total Person Residential Trips by Journey Purpose

Mode	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arr	Dep	Total	Arr	Dep	Total
Resi (Commuting)	9	30	40	33	22	55
Resi (Education)	21	68	89	5	3	8
Resi (Leisure/Recreation)	11	34	45	55	36	91
TOTAL	41	133	174	93	61	154

5.12 The trips for each journey purpose will be considered in turn.

Commuting Trips

5.13 To determine an appropriate modal split for commuting trips, census table QS701EW – Method of Travel to Work has been used to determine the mode split for existing residents of the area. Data has been obtained for output area 'W02000369 Cardiff 003', the output area in which the Site lies, and is summarised in **Table 5.6**. The mode split is informed from behaviours of residents of 2011, which may have shifted to more sustainable modes of transport since then. Additionally, this mode split makes no allowance for the 50:50 objective of CCC (50% of all journeys to be made by sustainable transport by 2021) and can be considered a robust assessment in terms of traffic impact.

Table 5.6 – Mode Split for MSOA Cardiff 003

	Number of People	Mode Split
Train	77	1.2%
Bus	573	9.1%
Taxi	16	0.3%
Motorcycle	33	0.5%
Car Driver	4,824	76.6%
Car Passenger	408	6.5%
Bicycle	77	1.2%
Walk	274	4.4%
Other	14	0.2%
Total	6,296	100.0%

5.14 The mode split in **Table 5.6** has been applied directly to the number of commuting trips, as given in **Table 5.5**, to result in a split of trips by mode as shown in **Table 5.7**.

Table 5.7 – Multi-Modal Trip Forecast, Residential Commuting Trips

	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arr	Dep	Total	Arr	Dep	Total
Train	0	0	0	0	0	1
Bus	1	3	4	3	2	5
Taxi	0	0	0	0	0	0
Motorcycle	0	0	0	0	0	0
Car Driver	7	23	30	25	17	42
Car Passenger	1	2	3	2	1	4
Bicycle	0	0	0	0	0	1
Walk	0	1	2	1	1	2
Other	0	0	0	0	0	0
Total	9	30	40	33	22	55

5.15 To ensure a robust assessment of all residential trips no internalisation has been allowed for trips between the residential and employment uses located on Site. This is very much a worst-case assessment given the number of jobs within CGIBP.

Education Trips

5.16 To assess the modal split of trips for education purposes, it is assumed that 50% of education trips are to primary education, and 50% are to secondary education.

5.17 The NTS provides data for the usual mode of travel to school by age group. The main mode for children aged 5-10 years, and aged 11-16 years, is given in **Table 5.8**.

Table 5.8 – NTS Travel to School Mode Split by Age

	Aged 5-10 years	Aged 11-16 years
Walk	45.2%	33.9%
Bicycle	2.6%	2.8%
Car / van	45.2%	26.6%
Private bus	1.6%	11.8%
Local bus	1.9%	19.2%
Surface rail	0.3%	1.9%
Other	1.5%	3.8%
Total	100.0%	100.0%

5.18 The NTS mode split for children aged 5-10 years has been used to approximate the likely mode split of trips to primary education from the proposed Site. A split of 45.2% travel by foot has been judged to be appropriate, since three primary schools are within easy walking distance of the Site.

5.19 The mode split has been applied to 50% of the residential trips for education purposes as set out in **Table 5.5**. The resultant multi-modal trip forecast is displayed in **Table 5.9**.

Table 5.9 – Multi-Modal Trip Forecast, Primary Education Trips

	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arr	Dep	Total	Arr	Dep	Total
Train	0	0	0	0	0	0
Bus	0	1	2	0	0	0
Taxi	0	0	0	0	0	0
Motorcycle	0	0	0	0	0	0
Car Driver	5	15	20	1	1	2
Car Passenger	0	0	0	0	0	0
Bicycle	0	1	1	0	0	0
Walk	5	16	21	1	1	2
Other	0	1	1	0	0	0
Total	11	34	45	2	2	4

5.20 The NTS mode split for children aged 11-16 years has been used to approximate the likely mode split of trips to secondary education from the proposed Site. This assumes a 33.9% mode split for walking, which is deemed appropriate given that there are 2 secondary schools approximately a 2km walking distance of the Site, and a 31.0% split by bus, which is also considered reasonable given that there is good bus provision in the vicinity of the Site for travel to other high schools within the Cardiff area.

5.21 Applying the NTS mode split for ages 11-16 to 50% of the residential trips to education, as set out in **Table 5.5**, results in a multi-modal trip forecast as set out in **Table 5.10**.

Table 5.10 – Multi-Modal Trip Forecast, Secondary Education Trips

	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arr	Dep	Total	Arr	Arr	Total
Train	0	1	1	0	0	0
Bus	3	11	14	1	0	1
Taxi	0	0	0	0	0	0
Motorcycle	0	0	0	0	0	0
Car Driver	3	9	12	1	0	1
Car Passenger	0	0	0	0	0	0
Bicycle	0	1	1	0	0	0
Walk	4	12	15	1	1	1
Other	0	1	2	0	0	0
Total	11	34	45	2	2	4

Leisure / Recreation Trips

5.22 For external trips for leisure / recreation, further data from the NTS is used. NTS table 0409 gives the average number of trips by journey purpose. The mode split obtained from this data is set out in **Table 5.11**. the data is the most recently available (from 2019).

Table 5.11 – Mode Split Trip Forecast, Residential Leisure / Recreation Trips

	Mode Split
Train	1.7%
Bus	4.1%
Taxi	1.3%
Motorcycle	0.1%
Car Driver	39.3%
Car Passenger	24.2%
Bicycle	1.3%
Walk	27.2%
Other	0.8%
Total	100.0%

5.23 **Table 5.12** sets out the trip generation for leisure / recreation trips split by mode as per the proportions set out in **Table 5.11**.

Table 5.12 – Multi-Modal Trip Forecast, Residential Leisure / Recreation Trips

	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arr	Dep	Total	Arr	Dep	Total
Train	0	1	1	1	1	2
Bus	0	1	2	2	1	4
Taxi	0	0	1	1	0	1
Motorcycle	0	0	0	0	0	0
Car Driver	4	13	18	22	14	36
Car Passenger	3	8	11	13	9	22
Bicycle	0	0	1	1	0	1
Walk	3	9	12	15	10	25
Other	0	0	0	0	0	1
Total	11	34	45	55	36	91

Total Residential Trips

5.24 The total external residential multi-modal trip generation, combining all journey purposes is summarised in **Table 5.13**.

Table 5.13 – Multi-Modal Trip Forecast, Total Residential Trips

	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arr	Dep	Total	Arr	Dep	Total
Train	1	2	2	1	1	2
Bus	5	16	21	6	4	10
Taxi	0	1	1	1	1	1
Motorcycle	0	0	0	0	0	0
Car Driver	19	61	80	49	32	81
Car Passenger	3	10	13	15	10	26
Bicycle	1	3	3	1	1	2
Walk	12	38	50	18	12	30
Other	1	2	3	1	0	1
Total	41	133	174	93	61	154

5.25 For the peak hours of residential trips, this Transport Assessment Report will consider the impact of the proposed residential development for all modes of travel, including assessment of walking, cycling and public transport networks, as well as a highway network assessment.

Office Trips

5.26 The proposed indicative commercial floorspace for each Plot is as follows:

— Plot 12 – Commercial 1,200 m^2; and

— Plot 14 – Commercial 3,550 m^2.

5.27 Given that B1 Office is highest generator of commercial floor space it has been assumed that all commercial floorspace will fall under this land use as a worst-case assessment. For the trip generation of the proposed office development, the trip generation by each mode of transport to and from the Site has been estimated for AM peak and PM peak.

5.28 The TRICS database has been used to derive total person trips rates for the proposed office units. For weekday trip rates, the following criteria were used to ensure that the trip rates were representative.

- Land Use: Employment;
- Sub Land Use: Business Park;
- Regions: All regions excluding London, Northern Ireland, Republic of Ireland and Scotland;
- Location: Suburban Area, Edge of Town, Edge of Town Centre;
- Gross Floor Area: 975 to 142687; and
- Survey Days: Weekdays only.

5.29 In total, 9 sites fell within these parameters. The resultant average total person trip rate is summarised in **Table 5.14** and the full TRICS output data is provided at **Appendix I**.

Trip Rates

5.30 Using the parameters identified, an average person trip rate was devised for the application Site which is shown in **Table 5.14.**

Table 5.14 – Average Total Person Trip Rates

Mode	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arr	Dep	Total	Arr	Dep	Total
Trip Rate	1.665	0.210	1.875	0.148	1.294	1.442

5.31 The proposed proposals are for circa 4,750 m2 office floorspace, and therefore the trip rates in **Table 5.14** are applied to a proposed development of circa 4,750 m2 office floorspace in order to assess the potential impact of the Site. This results in a total person trip generation as summarised in **Table 5.15**.

Table 5.15 – Total Persons Trip Generation (4,750 m² Office Floorspace)

Mode	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arr	Dep	Total	Arr	Dep	Total
Trips	79	10	89	7	61	68

Modal Split

5.32 To obtain a modal split for the Site, the 2011 Census 'WU03EW - Location of usual residence and place of work by method of travel to work (MSOA level)' data was obtained for trips traveling to the Site in 'W02000369 Cardiff 003 MSOA Area' which encompasses the Site. This modal split was then used to distribute the total person trips displayed in **Table 5.15** across the different modes at the Site. This mode split and multi-modal trips are presented in **Table 5.16** below.

Table 5.16 – Multi-Modal Trip Forecast, Proposed Office Trips

Mode	Mode Split %	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
		Arr	Dep	Total	Arr	Dep	Total
Train	1.2%	1	0	1	0	1	1
Bus	9.4%	7	1	8	1	6	6
Taxi	0.2%	0	0	0	0	0	0
Motorcycle	0.5%	0	0	0	0	0	0
Car Driver	76.3%	60	8	68	5	47	52
Car Passenger	6.6%	5	1	6	0	4	5
Bicycle	1.2%	1	0	1	0	1	1
Walk	4.3%	3	0	4	0	3	3
Other	0.1%	0	0	0	0	0	0
Total	100.0%	79	10	89	7	61	68

5.33 The multi-modal trips in **Table 5.16** show that the proposed employment aspect of the development is predicted to generate a total of 89 two-way journeys in the AM peak, and 68 two-way journeys in the PM peak. Of these, in the AM peak, 68 two-way car driver trips will be made, and there will be 52 two-way car driver trips in the PM peak. To be robust, no discount has been applied to allow for employment trips to originate in the new residential development.

Total Site Trip Generation

5.34 The total trip generation of the proposed development, which is the proposed residential and office development trips combined, is presented in **Table 5.17**.

Table 5.17 – Multi-Modal Trip Forecast, Total Site Trip Generation

Mode	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arr	Dep	Total	Arr	Dep	Total
Train	1	2	3	1	2	3
Bus	12	17	29	7	10	17
Taxi	0	1	1	1	1	1
Motorcycle	0	0	1	0	0	1
Car Driver	79	69	148	54	79	133
Car Passenger	8	11	19	16	14	30
Bicycle	2	3	5	1	2	3
Walk	15	39	54	19	15	33
Other	1	2	3	1	1	1
Total	121	143	263	100	122	222

5.35 **Table 5.17** displays that the proposed full development will generate a total of 263 two-way journeys in the AM peak, and 222 two-way journeys in the PM peak. Of these, in the AM peak 146 two-way car driver trips will be made, and there will be a total of 132 two-way car driver trips in the PM Peak.

Consented (Existing Trip Generation)

5.36 CGIBP was granted planning permission in 1993 to redevelop the Site and provide a range of office uses at each plot located within the Site boundary. The CGIBP development brief which details the size of office development that has been granted at each of the two plots that are part of the proposed development. The granted permission at each of the plots were as follows:

- Plot 12 – B1 Office 19,509 m^2; and
- Plot 14 – B1 Office 6,689 m^2.

5.37 From this development brief the consented (existing) trip generation the Site is predicted to generate can be forecasted. For the existing trip generation of the consented office development, the trip generation by each mode of transport to and from the Site has been estimated for AM peak and PM peak. The same trip rates used for the proposed office development have been used to assess the consented office development.

Trip Rates

5.38 Using the parameters identified, an average person trip rate was devised for the application Site which is shown in **Table 5.18**.

Table 5.18 – Average Total Person Trip Rates

Mode	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arr	Dep	Total	Arr	Dep	Total
Trip Rate	1.665	0.21	1.875	0.148	1.294	1.442

5.39 The consented proposals are for circa 26,198 m2 office floorspace, and therefore the trip rates in **Table 5.18** are applied to a consented development of circa 26,198 m2 office floorspace in order to assess the potential impact of the Site. This results in a total person trip generation as summarised in **Table 5.19**.

Table 5.19 – Total Persons Trip Generation (26,198 m² Office Floorspace)

Mode	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arr	Dep	Total	Arr	Dep	Total
Trips	436	55	491	39	339	378

Modal Split

5.40 To obtain a modal split for the Site, the 2011 Census 'WU03EW - Location of usual residence and place of work by method of travel to work (MSOA level)' data was obtained for trips traveling to the Site in 'W02000369 Cardiff 003 MSOA Area' which encompasses the Site. This modal split was then used to distribute the total person trips displayed in **Table 5.19** across the different modes at the Site. This mode split and multi-modal trips are presented in **Table 5.20** below.

Table 5.20 – Multi-Modal Trip Forecast, Consented Office Trips

Mode	Mode Split %	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
		Arr	Dep	Total	Arr	Dep	Total
Train	1.2%	5	1	6	0	4	5
Bus	9.4%	41	5	46	4	32	36
Taxi	0.2%	1	0	1	0	1	1
Motorcycle	0.5%	2	0	3	0	2	2
Car Driver	76.3%	333	42	375	30	259	288
Car Passenger	6.6%	29	4	33	3	23	25
Bicycle	1.2%	5	1	6	0	4	5
Walk	4.3%	19	2	21	2	15	16
Other	0.1%	1	0	1	0	0	0
Total	100.0%	436	55	491	39	339	378

5.41 **Table 5.20** shows that the consented development is predicted to generate a total of 491 two-way journeys in the AM peak, and 378 two-way journeys in the PM peak. Of these, in the AM peak 375 two-way car driver trips will be made, and there will be a total of 288 two-way car driver trips in the PM peak.

5.42 The total net trip generation of the proposed development, which is the consented office trip generation compared to the trip generation for the indicative proposed development, is presented in **Table 5.21**.

Table 5.21 – Multi-Modal Trip Forecast, Total Site Trip Generation

Mode	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arr	Dep	Total	Arr	Dep	Total
Train	-4	2	-2	2	-2	0
Bus	-29	12	-17	3	-22	-19
Taxi	-1	1	0	1	0	1
Motorcycle	-2	0	-2	0	-1	-1
Car Driver	-254	25	-228	24	-180	-156
Car Passenger	-20	10	-10	18	-5	13
Bicycle	-3	2	-1	1	-2	-1
Walk	-4	34	30	11	-4	7
Other	0	2	2	1	0	1
Total	-316	87	-228	61	-217	-155

5.43 **Table 5.21** displays that the net impact of the development if compared within the consented use will result in a net reduction of 228 two-way total trips in the AM Peak and will result in a net reduction of 155 two-way total trips in the PM Peak. There will be a reduction of 228 and 156 two-way car driver trips in the AM and PM peak period respectively.

5.44 To allow for a robust assessment within this Transport Assessment Report, the assessment work will be on the basis that all trips generated by the proposed development are new to the network, and the net position compared to the consented position will be ignored.

Trip Distribution

Residential

5.45 Vehicular trips associated with the residential component of the proposed development have been distributed across the local highway network based on 2011 Census data for place of work data as a proxy. The trip distribution flow diagram for the residential element is presented in **Appendix J** for reference.

Commercial

5.46 Vehicular trips associated with proposed commercial use have been distributed across the local highway network based on 2011 Census data for place of work. The trip distribution flow diagram for the office element is presented in **Appendix K** for reference.

6 Impact on Walking and Cycling

6.1 The forecast effect of the development proposal on the walking and cycling networks is summarised in **Table 6.1**.

Table 6.1 – Effect of Development Proposal on Walking and Cycling Networks

Mode	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arrivals	Departures	Totals	Arrivals	Departures	Totals
Walking	15	39	54	19	15	33
Bicycle	2	3	5	1	2	3

Walking Network

6.2 The Site will be designed to a pedestrian scale, with direct, convenient and attractive walking routes connecting the Site, both internally and externally.

6.3 The current pedestrian network is capable of accommodating the forecast additional demand, which equates to less than one pedestrian per minute during the busiest peak periods.

6.4 Notwithstanding this, and separate to this planning application, the owners of CGIBP undertook work to bring all roads and footways within CGIBP up to adoptable standard, and this includes the installation of a new lighting scheme for the footway / cycleway at the western edge of CGIBP, which connects CGIBP to Croescadarn Road, as well as some minor improvements to kerb lines / footway surfacing in two other locations with CGIBP.

6.5 At present, Malthouse Avenue is fully adopted up to the roundabout between Malthouse Avenue/Woodsy Close. The roundabout itself is adopted, and this is shown with pink shading at **Figure 6.1**. The proposed access points for Plot 12 and Plot 14 currently are not adopted, but they will be offered for adoption, together with the connecting sections of Malthouse Avenue as part of this development.

Figure 6.1 – CC Adopted Highways

6.6 In addition, a new pedestrian route between CGIBP and SSF to the west is proposed as part of this development, further enhancing the comfort, attractiveness and capacity of the pedestrian network in the vicinity of the Site.

Cycling Assessment

6.7 The level of forecast cycling demand summarised in **Table 6.1**, 5 trips in the AM peak and 3 trips in the PM peak, can be accommodated on the existing cycle network.

6.8 It is hoped the indicative design of the Site with the proposed new cycleway along Malthouse Avenue and the measures included within the Travel Plan, including cycle route information provision and sustainable travel vouchers, will lead to greater levels of cycling than forecast in **Table 6.1**, and should this occur there is sufficient flex in the existing cycle network to accommodate (significant) additional cycle demand.

7 Impact on Public Transport

7.1 The forecast effect of the development proposal on the public transport network is summarised in **Table 7.1**. For the purpose of this assessment and due to Cardiff Central rail station being 11.2km from the Site all rail trips have been added to the private bus trips.

Table 7.1 – Forecast Effect on Public Transport Network

Mode	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arrivals	Departures	Totals	Arrivals	Departures	Totals
Bus (incl. Train)	14	19	33	8	11	20

Bus Assessment

7.2 The Site is currently served by 12 buses per hour from Malthouse Avenue and Heol Pontprennau (6 in each direction). **Table 7.1** demonstrates that the development proposal will have a negligible impact on the bus network. The average additional level of demand is forecast to be approximately three passengers per service, and this level of demand can be accommodated within the existing level of provision.

7.3 In addition, the level of bus service in the vicinity of the Site is forecast to increase as SSF is brought forward, in line with the strategy identified in the LDP. In addition, bus operators are commercial organisations, and should demand on any route increase to a level where additional services are required, it is in their commercial interest to provide additional services, thus creating a virtuous circle of increased level of provision, increased convenience and increased demand.

7.4 In terms of school buses, Route 640 Route (Llanishen High School) and R144 (Ysgol Glantaf) both route along Heol Pontprennau, and therefore serve the Site, and it is anticipated these services can accommodate the level of additional demand forecast. A total of 17 two-way bus trips in the AM peak and 1 two-way bus trips in the PM peak are attributed to school trips. This will reduce the number of passengers per service in the AM peak from 3 to 1 which further reduces the impact.

Rail Assessment

7.5 The Site is not directly connected to the rail network, and any rail trips will form part of a multi-modal journey, with Lisvane and Thornhill rail station and Cardiff Central rail station the two stations most likely to accommodate any additional rail trips from the Site.

7.6 To ensure a robust assessment of the local transport network it has been assumed that all rail trips are assigned to the bus network. However, it is reasonable to expect a proportion on journeys will be undertaken on the rail network, but it is not expected that the number of additional rail trips will have an adverse impact on the rail network, nor result in a perceptible change to level of service on the rail network on a daily basis.

8 Impact on the Local Highway Network

8.1 This Section provides an assessment of the potential impact of the proposed development on the highway network.

Highway Network

8.2 On the basis of the volume of vehicle trips presented in **Section 5**, and the design of the Site with all vehicles accessing via the M4 Junction 30, the assessment focuses on the following junctions:

- Plot 12 Access;
- Plot 14 Access;
- M4 Junction 30 Roundabout;
- A4232 / Heol Pontprennau / Church Road Roundabout; and
- A48 / A4232 Roundabout.

8.3 Each of these assessments has been undertaken using industry standard standalone junction modelling software (Junctions 9).

8.4 The M4 Junction 30 Roundabout is also modelled as a signalised junction within LINSIG in the PM peak period due to the presence of part-time signals which are often turned on in the PM peak period.

Traffic Surveys and Baseline Assessment

8.5 Due to recent and current COVID-19 restrictions on working and travel, traffic flows may be lower than what is considered 'typical' and as such there has been and is limited opportunity to undertake traffic surveys of the junctions surrounding the Site. Therefore, in agreement with Cardiff Council, given the circumstances it is considered that the best course of action is to obtain historic data.

8.6 Traffic surveys of the local highway network were undertaken in 2013 for the St Edeyrn's Village planning application (planning application reference no: 13/00578/DCO). These flows informed the A48 / A4232 baseline flows with historic traffic data from 2017 obtained from Cardiff Council informing the baseline flows for the M4 Junction 30 roundabout and A4232 / Heol Pontprennau / Church Road roundabout. The 2017 baseline traffic data obtained from Cardiff Council is presented in **Appendix L** along with the 2013 traffic flows for the St Edeyrn's Village.

Committed Development

8.7 The following three committed developments have been included within the assessment scenarios and presented within a traffic flow diagram in **Appendix M**:

- North East Cardiff (19/02330/MJR);
- Churchlands (14/02891/MJR); and

— St Edeyrns (13/00578/DCO).

8.8 The proposed Cardiff Gate development will be complete by 2028, therefore the anticipated trip generation associated with the level of development operational by 2028 for the three committed developments has been used to consider an acceptable assessment.

Traffic Growth

8.9 It is not considered appropriate to apply generic background growth to the surveyed traffic flows from the historic surveys for both the base and future (completion) year. The LDP is underpinned by an aim to limit car driver trips within the City and maintain traffic flows at 2014 levels, and applying generic background growth would be contrary to this aim.

Assessment Scenarios

8.10 The local highway network has been assessed in the following scenarios;

— Base;

— Base + Committed Development; and

— Base + Committed Development + Proposed Development;

8.11 For each scenario, each of the junctions listed above have been assessed to determine the impact of the proposed development.

Percentage Traffic Impact

8.12 To provide an overview of the potential magnitude of change at each point of assessment of the highway network, excluding the points of access to Plot 12 and Plot 14, the percentage impact at each existing junction has been calculated in the AM and PM peak periods. This is summarised in **Table 8.1**.

Table 8.1 – Percentage Impact Assessment – Existing Junctions

	AM Peak (08:00 – 09:00)			PM Peak (17:00 – 18:00)		
	Base	Dev	% Change	Base	Dev	% Change
M4 Junction 30 Roundabout	4,095	148	3.6%	3,713	132	3.6%
A4232 / Heol Pontprennau / Church Road Roundabout	3,816	61	1.6%	4,322	58	1.3%
A48 / A4232	3,690	53	1.4%	3,245	50	1.5%

8.13 The overview in **Table 8.1** demonstrates that the proposed development will have a marginal percentage impact on all three junctions with a maximum impact of 3.6% observed at the M4 Junction 30 Roundabout in the AM and PM peak periods.

Plot 12 – Site Access

8.14 The Plot 12 site has been assessed in the Junctions 9 PICADY software programme. For a robust assessment it has been assumed that 25% of existing traffic during the assessed peaks that routes into and out the business park would route past the junction. A summary of the results is provided in **Table 8.2**. Full details of the Junctions 9 assessment are included in **Appendix N**.

Table 8.2 – Summary of Junctions 9 Results One Hour Profile – Site 12 Access

	AM Peak (08:00 – 09:00)			PM Peak (17:00 – 18:00)		
	Max Queue (Veh)	Max Delay (s)	Max RFC	Max Queue (Veh)	Max Delay (s)	Max RFC
Base + Committed + Development	0.1	9.08	0.13	0.1	8.84	0.09

8.15 The results demonstrate that the Site 12 Access operates within capacity under a one-hour profile for the development scenario with a maximum RFC of 0.13 recorded in the AM Peak and a maximum RFC of 0.09 recorded in the PM Peak.

Plot 14 – Site Access

8.16 The Plot 14 site has been assessed in the Junctions 9 PICADY software programme. For a robust assessment it has been assumed that 25% of existing traffic during the assessed peaks that routes into and out the business park would route past the junction. A summary of the results is provided in **Table 8.3**. Full details of the Junctions 9 assessment are included in **Appendix O**.

Table 8.3 – Summary of Junctions 9 Results One Hour Profile – Site 14 Access

	AM Peak (08:00 – 09:00)			PM Peak (17:00 – 18:00)		
	Max Queue (Veh)	Max Delay (s)	Max RFC	Max Queue (Veh)	Max Delay (s)	Max RFC
Base + Committed + Development	0.2	5.75	0.10	0.1	6.46	0.07

8.17 The results demonstrate that the Site 14 Access operates within capacity under a one-hour profile for the development scenario with a maximum RFC of 0.10 recorded in the AM Peak and a maximum RFC of 0.07 recorded in the PM Peak.

M4 Junction 30 Roundabout

8.18 The M4 Junction 30 has part-time signals present that control the junction at peak times. It was determined from a site visit that the part-time signals are lit for 3 five-minute periods in the AM peak, and are continuously lit for the whole of the PM peak period. As such, the AM peak period has been assessed in the Junctions 9 ARCADY software programme under a one-hour profile, while the PM peak period has been assessed in LINSIG.

8.19 A summary of the ARCADY AM peak results is provided in **Table 8.4**. Full details of the Junctions 9 AM peak assessment is included in **Appendix P**. A summary of the LINSIG PM peak results is provided in **Table 8.5**. Full details of the Linsig PM peak assessment are included in **Appendix Q**.

Table 8.4 – Summary of Junctions 9 Results AM Peak – M4 Junction 30

	AM Peak (08:00 – 09:00)		
	Max Queue (Veh)	Max Delay (s)	Max RFC
Base	2.5	10.60	0.72
Base + Committed	3.9	15.75	0.80
Base + Committed + Development	4.6	18.68	0.83

8.20 The results demonstrate that the M4 Junction 30 Roundabout operates within capacity under a one-hour profile for all of the scenarios, with a maximum RFC of 0.83 recorded in the Base + Committed + Development scenario. If the signals are activated for the entire AM peak the capacity of the junction

would also likely increase further. Paired with this the one-hour profile assessment is seen as robust as in reality during the AM peak the profile of traffic is likely to be flatter.

Table 8.5 – Summary of LINSIG Results PM Peak – M4 Junction 30

	PM Peak (17:00 – 18:00)		
	Max Queue (PCU)	Max Average Delay (s/PCU)	Max DoS
Base	25.3	48.1	85.2%
Base + Committed	29.2	54.9	89.9%
Base + Committed + Development	32.0	57.8	93.1%

8.21 The results demonstrate that the M4 Junction 30 Roundabout operates within capacity for all of the scenarios with a maximum Degree of Saturation (DoS) of 93.1% recorded in the Base + Committed + Development scenario. The maximum queues of 32 PCU (equivalent to approximately 192m) observed are on the A4232 arm of the junction will not block any junctions further downstream. When compared with the Base + Committed the maximum queues increase by 2.8 vehicles and maximum average delay by 2.9 seconds which is seen as a nominal increase.

A4232 / Heol Pontprennau / Church Road Roundabout

8.22 The A4232 / Heol Pontprennau / Church Road Roundabout has been assessed in the Junctions 9 ARCADY software programme. A summary of the results is provided in **Table 8.6**. Full details of the Junctions 9 assessment are included in **Appendix R**.

Table 8.6 – Summary of Junctions 9 Results One Hour Profile – A4232 / Heol Pontprennau / Church Road

	AM Peak (08:00 – 09:00)			PM Peak (17:00 – 18:00)		
	Max Queue (Veh)	Max Delay (s)	Max RFC	Max Queue (Veh)	Max Delay (s)	Max RFC
Base	2.0	3.64	0.66	1.4	3.73	0.58
Base + Committed	3.0	8.18	0.75	3.0	7.07	0.75
Base + Committed + Development	3.1	8.48	0.76	3.2	7.43	0.76

8.23 The results demonstrate that the A4232 / Heol Pontprennau / Church Road Roundabout operates within capacity under a one-hour profile for all of the scenarios with a maximum RFC of 0.76 recorded in both peak periods in the Base + Committed + Development scenario. When compared with the Base + Committed the maximum queues increase by 0.2 vehicles and maximum average delay by 0.4 seconds which is seen as a nominal increase.

A48 / A4232 Roundabout

8.24 The A48 / A4232 Roundabout has been assessed in the Junctions 9 ARCADY software programme. A summary of the results is provided in **Table 8.7**. Full details of the Junctions 9 assessment are included in **Appendix S**.

Table 8.7 – Summary of Junctions 9 Results One Hour Profile – A48 / A4232

	AM Peak (08:00 – 09:00)			PM Peak (17:00 – 18:00)		
	Max Queue (Veh)	Max Delay (s)	Max RFC	Max Queue (Veh)	Max Delay (s)	Max RFC
Base	1.2	5.57	0.55	0.7	6.56	0.41
Base + Committed	2.0	6.67	0.67	1.2	10.91	0.55
Base + Committed + Development	2.2	6.84	0.69	1.3	11.51	0.56

8.25 The results demonstrate that the A48 / A4232 Roundabout operates within capacity under a one-hour profile for all of the scenarios with a maximum RFC of 0.69 recorded in the AM Peak in the Base + Committed + Development scenario. When compared with the Base + Committed the maximum queues increase by 0.2 vehicles and maximum average delay by 0.6 seconds which is seen as a nominal increase.

Summary

8.26 The operation of the M4 Junction 30 does not alter significantly as a result of the proposed development. This is a busy junction which remains busy, with the development trips having a nominal impact on its operation.

8.27 The actual impact at the M4 Junction 30 in real terms is likely to be no change. On a busy network, when a junction approaches capacity, it is not unusual for traffic to begin to adjust the time it travels on the network, adjust its mode, adjust its route, or not to travel at all.

8.28 The results for the A4232 / Heol Pontprennau / Church Road and A48 A4232 Roundabouts demonstrate the forecast demand can be accommodated within the existing network.

8.29 It is not good practice to follow a predict and provide approach to highway assessment and design, and over-design highway infrastructure to accommodate irregular short-lived peaks in demand. The correct approach, which is much more efficient and sustainable is to accommodate additional demand through measures which promote and facilitate active travel, shared travel and public transport use, which is what the proposed development aims to do.

9 Summary and Conclusion

9.1 Vectos is retained by CGIBP to provide transport and highways advice in relation to a proposed development of Plots 12 and 14 and associated infrastructure works at Cardiff Gate International Business Park (the Site), Pontprennau.

9.2 The Site is bound to the north by the M4, to the east by Pentwyn Link Road Road, to the south by St Mellons Road and to the west by SSF of the Local Plan.

9.3 The proposals are for the development of CGIBP to provide a better balance of complimentary land uses. The application is an outline application for the following elements;

- Plot 12: Residential development of 120 units and 1,200 sqm of commercial floorspace;
- Plot 14: Mixed-use residential development of 25 units and 3,550 sqm of commercial floorspace;
- Bus, pedestrian and cycle connection to the Deposit Local Development Plan (LDP) for Strategic Site F (SSF) to the west;
- Bus egress through Beck Court;
- Pedestrian / cycleway along Malthouse Avenue; and
- Alteration of Malthouse Avenue / Woodsy Close Roundabout.

9.4 This Site is located in a highly accessible location in terms of the high quality, extensive pedestrian routes in its vicinity, as well as the good provision of cycling infrastructure. Furthermore, its proximity to local bus stops provide accessibility from destinations further afield. This will provide a genuine choice in travel for future residents and employees of the Site.

9.5 The Site will provide betterment to the existing arrangement. New bus, pedestrian and cycle connections to the west and east will be provided as well as a new pedestrian / cycleway along Malthouse Avenue and the conversion of the Malthouse Avenue / Woodsy Close roundabout into a priority junction. All off these mitigation proposals will create a safer and more sustainable transport network within the Site.

9.6 The walking, cycling and public transport networks can accommodate the forecast demand, and additional travel by these modes enhance the sustainable credentials of the proposed development.

9.7 The overall impact of the proposed development on the highway network will be limited. The net change of the proposed development, taking into account the existing consent would be negligible.

9.8 The traffic modelling work demonstrates the operation of the key junctions on the highway network does not alter significantly as a result of the proposed development. The busier junctions remain busy, with junctions further afield from the Site continuing to operate within capacity. All junctions modelled as part of this Transport Assessment remain within capacity with the addition of development traffic.

9.9 In addition, the traffic modelling results should be treated with caution. The actual level of demand on the highway network will flex over time, and will flex subject to the level of road space provided. This is primarily due to people adjusting the time they travel, the route they travel, the mode they use to travel, or choosing not to travel at all, subject to a myriad of different variables which they consider when making a decision about travel. A traffic model cannot account for all of these variables.

Conclusion

9.10 The proposed development of a new commercial and residential development at CGIBP accords with the aims and objectives of transport policy and should be supported.

Appendix A

Year	Quarter	PoliceForc	AccidentRe	Date Of Ac	Time Of Ac	Day Of Acc	Local Auth	Easting	Northing	Latitude	Longitude	RoadType	Road	Road2	SpeedLimit	TrunkRoad	Pedestrian	Total Vehi	Agricultur	Buses_coa	Cars	Light vans	Motorcyck	Pedal cycl	Ridden hor	Taxis or p	Trams or l	Other vehi	Total Casu	Fatal	Serious	Slight	Age Of Cas	Age Of C_1	Age Of C_2	Age Of C_3	Age Of C_4	Age Of C_5	Age Of C_6	Age Of C_7	Age Of C_8	Age Of C_9	Motorcycle	Motorcyl_	Young Fata	Young Seri	Older Driv	Young Driv	Severity
2018	2	62	1800520	########	1619	Friday	W0600001	321757	182743	51.53815	-3.12953	Single carri	B4562		30	0	0	2	0	0	1	1	0	0	0	0	0	2	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2018	3	62	1801050	########	1547	Friday	W0600001	321788	183196	51.54222	-3.12919	Slip Road	M4	A4232	40	1	0	2	0	0	0	1	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
2017	1	62	1700267	########	856	Monday	W0600001	321783	183188	51.54215	-3.12926	Slip Road	M4	A4232	30	1	0	2	0	1	0	1	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
2017	2	62	1700976	########	1802	Monday	W0600001	321920	182267	51.53389	-3.12708	Roundabou	A4232	U	40	0	0	2	0	0	1	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
2017	3	62	1701058	########	1121	Friday	W0600001	321878	182265	51.53387	-3.12768	Roundabou	A4232	U	30	0	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
2017	3	62	1701246	########	1627	Monday	W0600001	321855	183051	51.54093	-3.12819	Dual carria	M4	A4232	50	1	0	2	0	0	1	0	1	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
2017	3	62	1701272	########	1325	Sunday	W0600001	321806	183209	51.54234	-3.12893	Slip Road	M4	A4232	30	0	0	2	0	0	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2017	4	62	1701478	########	1119	Friday	W0600001	321849	183046	51.54088	-3.12827	Dual carria	M4	A4232	40	1	0	2	0	0	2	0	0	0	0	0	0	4	0	0	4	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
2017	4	62	1701569	########	1714	Tuesday	W0600001	321850	182835	51.53899	-3.12821	Dual carria	A4232		50	0	0	4	0	0	4	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
2017	4	62	1701574	########	1152	Monday	W0600001	321783	183189	51.54216	-3.12926	Dual carria	M4	A4232	50	1	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1
2017	4	62	1800021	########	1254	Monday	W0600001	321879	182265	51.53387	-3.12767	Roundabou	A4232	U	30	0	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
2016	1	62	1600219	########	1320	Tuesday	W0600001	321863	183074	51.54114	-3.12808	Dual carria	M4	A4232	50	0	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
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2015	1	62	1500449	########	843	Thursday	W0600001	321692	181762	51.52932	-3.13025	Dual carria	A4232	A48	50	0	0	2	0	0	1	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1
2015	2	62	1500690	########	1020	Monday	W0600001	321840	183016	51.54061	-3.1284	Slip Road	M4	A4232	50	0	0	2	0	0	2	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
2015	2	62	1500917	########	1647	Tuesday	W0600001	321854	182815	51.53881	-3.12815	Dual carria	A4232		50	0	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1
2015	2	62	1500985	########	906	Monday	W0600001	321350	182966	51.54009	-3.13545	Single carri	U	U	30	0	0	2	0	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
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2015	3	62	1501355	########	824	Friday	W0600001	321924	182213	51.5334	-3.12701	Dual carria	A4232	U	50	0	0	2	0	0	1	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
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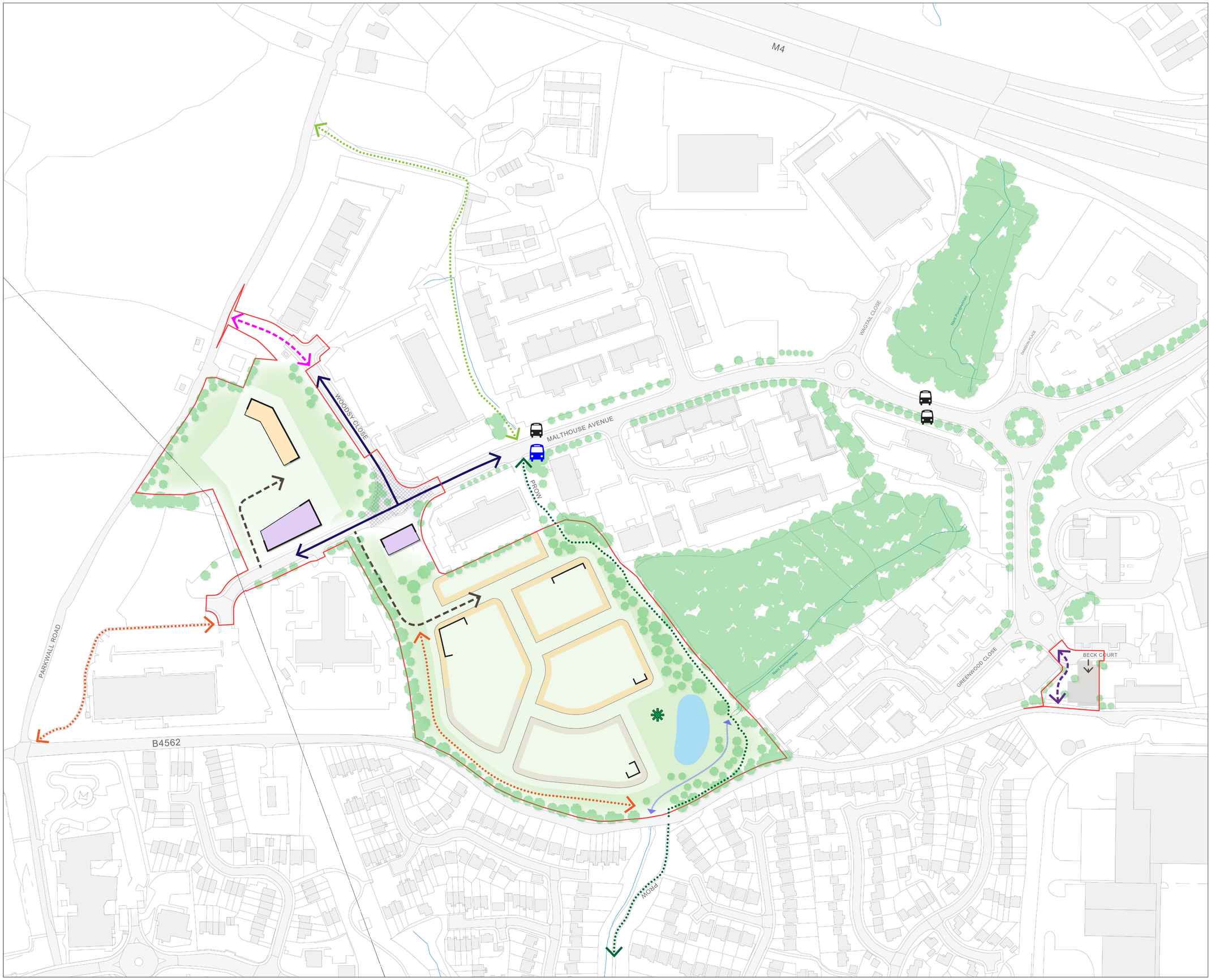
Appendix B



The scaling of this drawing cannot be assured

Revision	Date	Drn	Ckd
-	-	-	-

- Site Boundary
- Boundary of Strategic Site F (SSF)
- Public Right of Way (Llanedern No.14)
- Strategic pedestrian/cycle path
- Informal leisure route
- Bus/Pedestrian/Cycle access to SSF
- Bus egress through Becks Court
  including improvements to adjacent public realm and parking
- Indicative improved route/junction
- Indicative built form - Residential
- Indicative built form - Commercial
- Indicative residential development (higher density)
- Indicative residential development (lower density)
- Key frontage
- Existing bus stop
- Additional bus stop
- Main vehicular access to development
- Indicative formal play area location
- Indicative attenuation location
- De-culverted watercourse
  including Ecotone provided to woodland edge

N

0 25 50 100m

PROJECT
Cardiff Gate

DRAWING TITLE
Illustrative Masterplan

DATE	SCALE	DRAWN BY	CHECK BY
21.10.21	1:1250@A1	GR	-

PROJECT NO	DRAWING NO	REVISION
21674	9311	-

DRAFT

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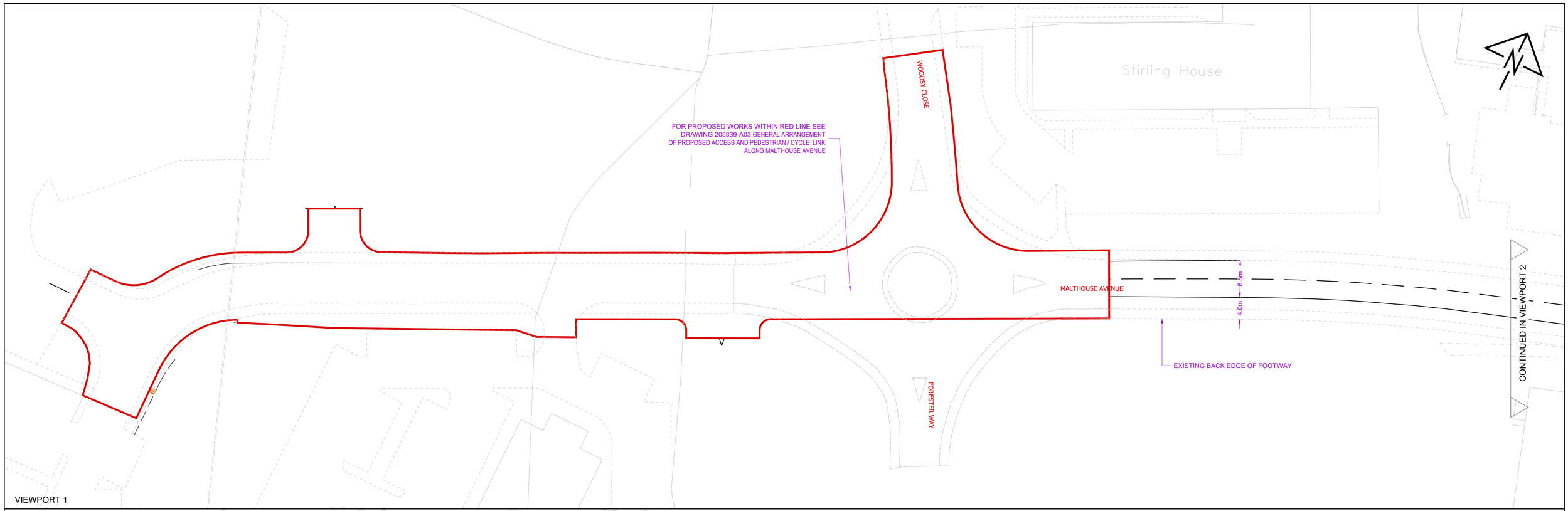
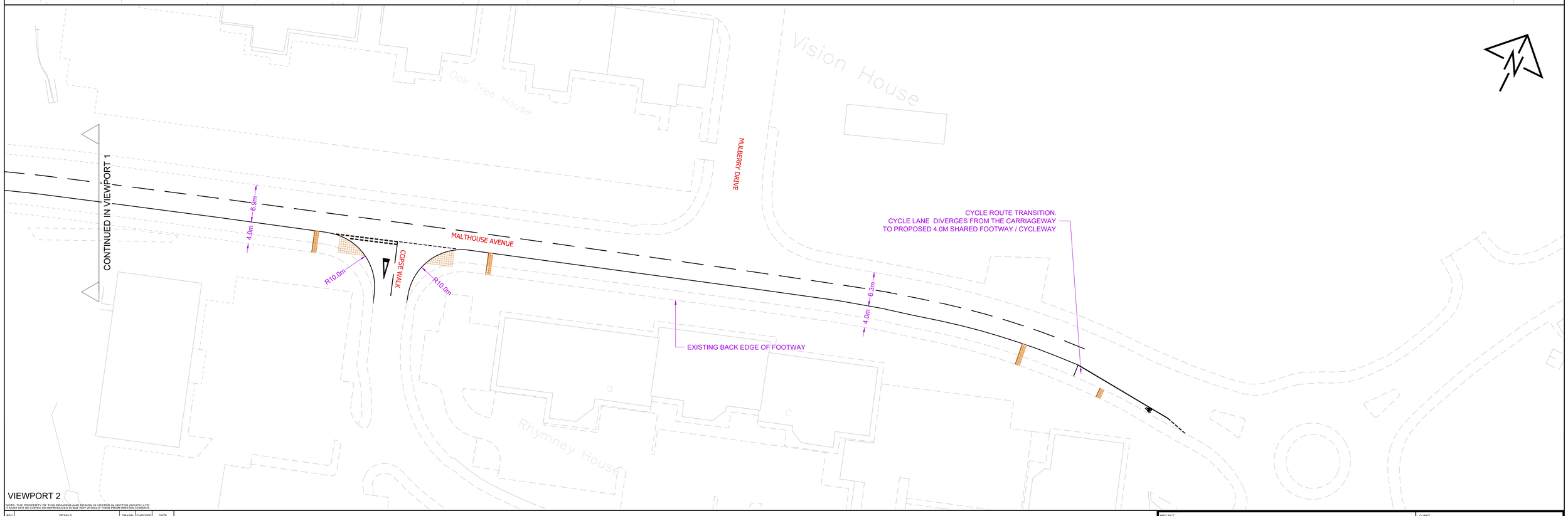
Appendix C





REV	DETAILS	DRAWN	CHECKED	DATE

STATUS: INFORMATION ONLY

THIS IS DRAWING IS FOR COMMENT ONLY
SUBJECT TO:
- ROAD SAFETY AUDIT
- COUNCIL REVIEW / APPROVAL
- FULL VERTICAL ALIGNMENT
- FINAL DESIGN CHECK / REVIEW

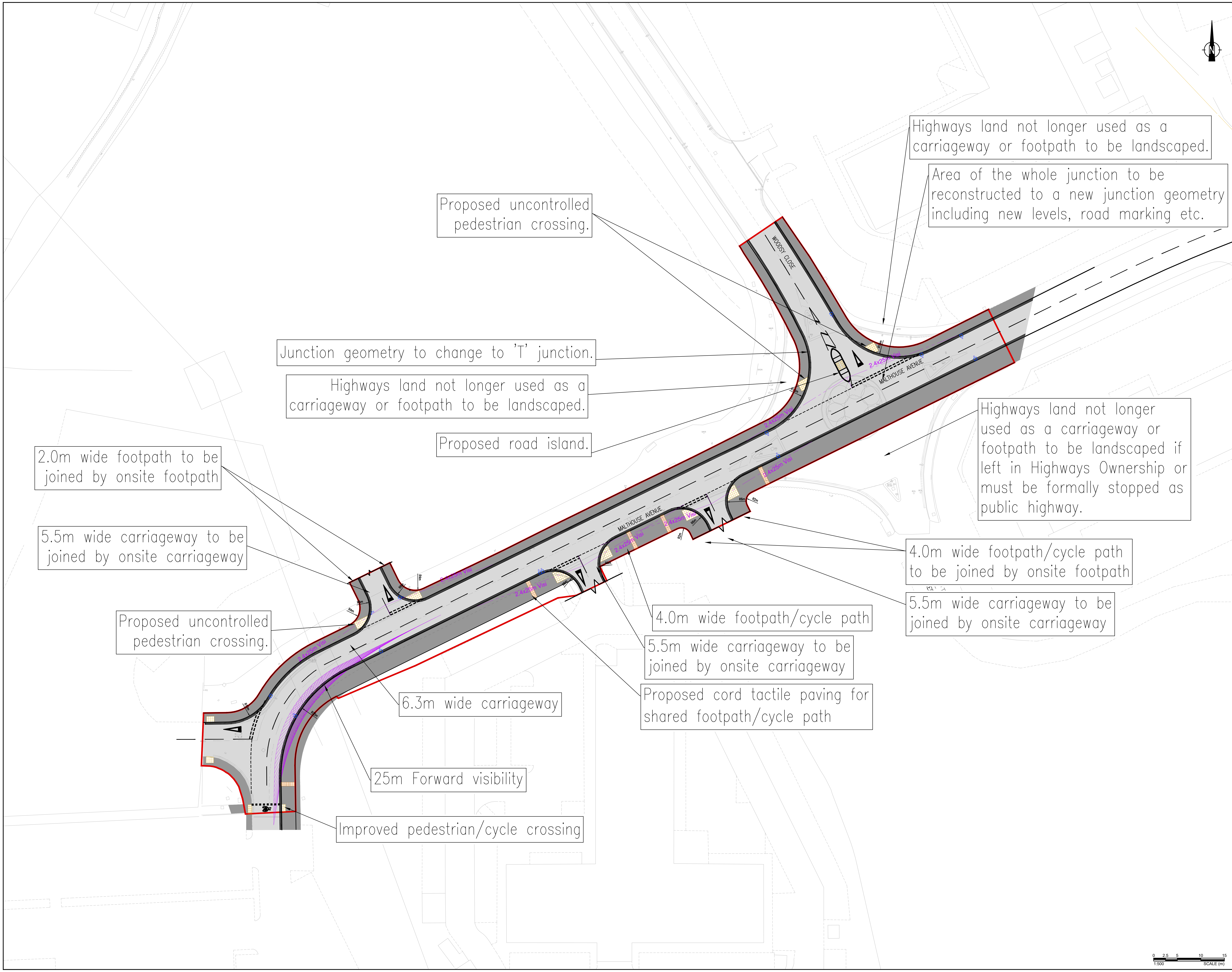
PROJECT: Cardiff Gate International Business Park

CLIENT: Cardiff Gate International Business Park

DRAWING TITLE:
GENERAL ARRANGEMENT
OF PROPOSED PEDESTRIAN / CYCLE LINK ALONG
MALTHOUSE AVENUE
(OUT SIDE PROPOSED HIGHWAY WORKS BOUNDARY)

vectos.
5th Floor, 4 Colston Avenue, Bristol, BS1 4ST
t: 0117 203 5240 e: enquiries@vectos.co.uk

DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
SCJ	IS	26/10/21	1:250 @ A0	205339-A04	-



KEY

HIGHWAY WORKS BOUNDARY

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

PLEASE REFER TO THE HEALTH AND SAFETY FILE FOR A FULL LIST OF THE HAZARDS ASSOCIATED WITH THIS WORK - THE FOLLOWING ARE THE MOST SIGNIFICANT ITEMS TO BE AWARE OF.

CONSTRUCTION
1. OPERATIVES TO TAKE PRECAUTIONS WHEN WORKING ADJACENT TO OR WITHIN DEEP EXCAVATIONS. METHOD STATEMENT TO BE PRODUCED BY CONTRACTOR PRIOR TO WORKS COMMENCING.
2. ATTENTION IS DRAWN TO THE EXISTENCE OF BOTH EXISTING UNDERGROUND AND OVERHEAD UTILITIES.

ENVIRONMENTAL
1. EXISTING WATERCOURSES IN CLOSE PROXIMITY TO WORKS, A POLLUTION PREVENTION STRATEGY AND WORKING METHOD STATEMENTS TO BE PRODUCED BY THE CONTRACTOR FOR ALL WORKS.
2. CONSIDERATION GIVEN TO NOISE LEVELS GIVEN PROXIMITY TO EXISTING PROPERTIES.
3. CONSIDERATION GIVEN TO GROUND CONDITIONS. CONTRACTOR TO REVIEW GEOTECHNICAL REPORT PRIOR TO UNDERTAKEN EXCAVATION WORKS.

WORK CAN ONLY BE CARRIED OUT BY SUITABLY TRAINED AND BRIEFED PERSONNEL.

REV	DETAILS	DRAWN	CHECKED	DATE
A	UPDATED TO THE LATEST LAYOUT	PB	JAK	18.10.21

PRELIMINARY

CLIENT:
CARDIFF GATE INTERNATIONAL BUSINESS PARK

PROJECT:
CARDIFF GATE INTERNATIONAL BUSINESS PARK

DRAWING TITLE:
ROAD GENERAL ARRANGEMENT DAS

SCALE:
1:500 @ A2

DRAWN:	CHECKED:	DATE:
PB	JAK	20.08.2021

vectos.
5th Floor, 4 Colston Avenue, Bristol, BS1 4ST
0117 2035240 e: vectos@vectos.co.uk

DRAWING NUMBER: VD21493-131
REVISION: A

Appendix D

Future two way bus only link to NE Cardiff

All vehicles prohibited except buses (Diag.617)

Except buses

4.0m wide bus link

2.0m wide footpath

Retractable bollards.

2.4x25m Visi

PARKWALL ROAD

BUS LANE

R7.5m

Proposed uncontrolled pedestrian crossing.

Proposed connection to existing manhole.

Part of the existing road to be resurfaced to new levels.

Double yellow lanes to remain.

1m wide rain garden to be located adjacent to the proposed carriageway

Retractable bollards.

All vehicles prohibited except buses (Diag.617)

Except buses

BUS LANE

SLR3 R7.43

WOODSY CLOSE

0 1 2 4 6
1:200 SCALE (m)

KEY

HIGHWAY WORKS BOUNDARY

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

PLEASE REFER TO THE HEALTH AND SAFETY FILE FOR A FULL LIST OF THE HAZARDS ASSOCIATED WITH THIS WORK - THE FOLLOWING ARE THE MOST SIGNIFICANT ITEMS TO BE AWARE OF.

CONSTRUCTION

1. OPERATIVES TO TAKE PRECAUTIONS WHEN WORKING ADJACENT TO OR WITHIN DEEP EXCAVATIONS. METHOD STATEMENT TO BE PRODUCED BY CONTRACTOR PRIOR TO WORKS COMMENCING.
2. ATTENTION IS DRAWN TO THE EXISTENCE OF BOTH EXISTING UNDERGROUND AND OVERHEAD UTILITIES.

ENVIRONMENTAL

1. EXISTING WATERCOURSES IN CLOSE PROXIMITY TO WORKS. A POLLUTION PREVENTION STRATEGY AND WORKING METHOD STATEMENTS TO BE PRODUCED BY THE CONTRACTOR FOR ALL WORKS.
2. CONSIDERATION GIVEN TO NOISE LEVELS GIVEN PROXIMITY TO EXISTING PROPERTIES.
3. CONSIDERATION GIVEN TO GROUND CONDITIONS. CONTRACTOR TO REVIEW GEOTECHNICAL REPORT PRIOR TO UNDERTAKEN EXCAVATION WORKS.

WORK CAN ONLY BE CARRIED OUT BY SUITABLY TRAINED AND BRIEFED PERSONNEL.

REV	DETAILS	DRAWN	CHECKED	DATE
A	UPDATED TO THE LATEST LAYOUT	PB	JAK	18.10.21

PRELIMINARY

CLIENT:
CARDIFF GATE INTERNATIONAL BUSINESS PARK

PROJECT:
CARDIFF GATE INTERNATIONAL BUSINESS PARK

DRAWING TITLE:
ROAD GENERAL ARRANGEMENT DAS

SCALE:
1:200 @ A2

DRAWN:	CHECKED:	DATE:
PB	JAK	28.06.2021

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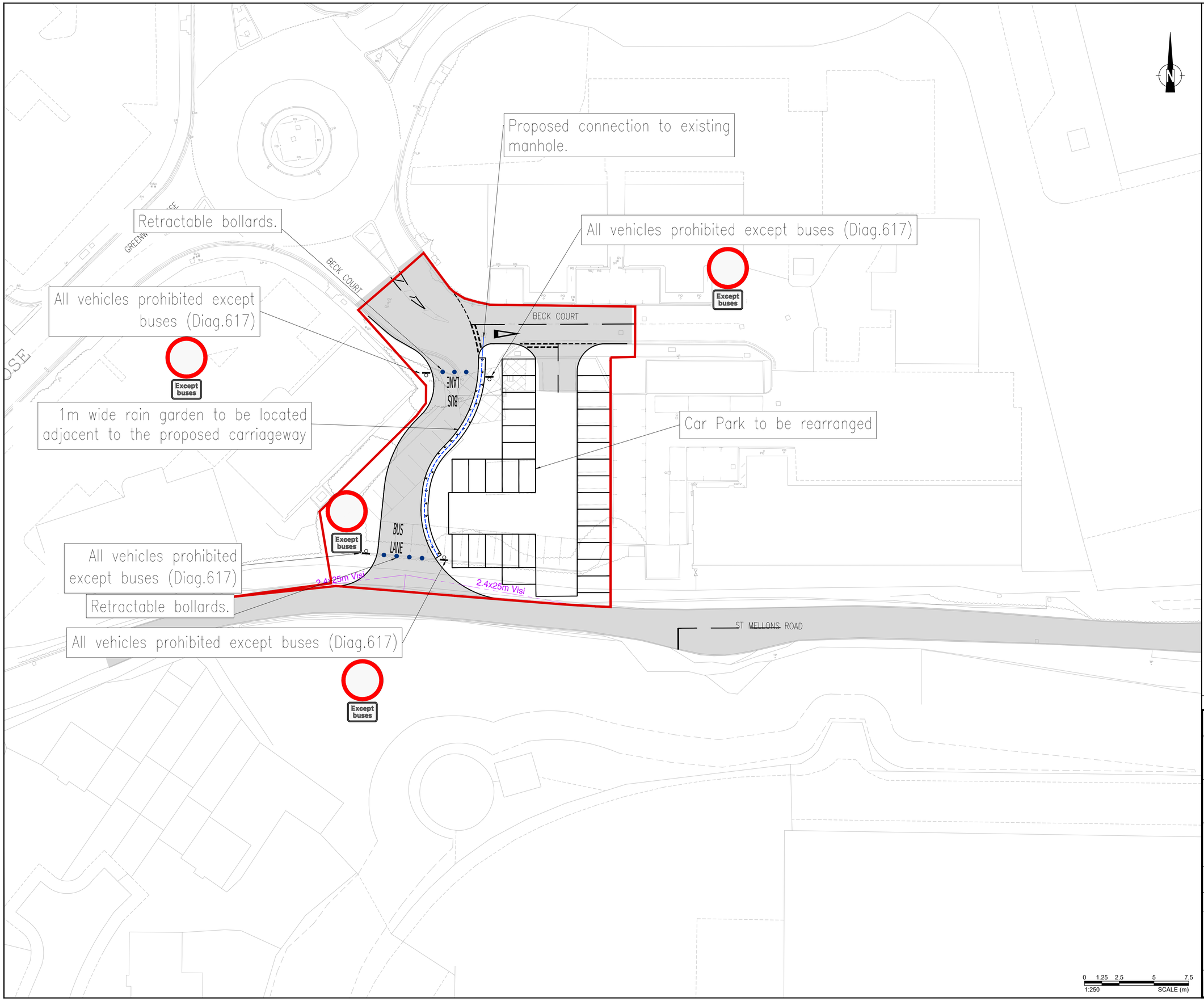
5th Floor, 4 Colston Avenue, Bristol, BS1 4ST
0117 2035240 e: vectos@vectos.co.uk

DRAWING NUMBER: VD21493-130

REVISION: A

Appendix E



KEY

HIGHWAY WORKS BOUNDARY

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

PLEASE REFER TO THE HEALTH AND SAFETY FILE FOR A FULL LIST OF THE HAZARDS ASSOCIATED WITH THIS WORK - THE FOLLOWING ARE THE MOST SIGNIFICANT ITEMS TO BE AWARE OF.

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1. OPERATIVES TO TAKE PRECAUTIONS WHEN WORKING ADJACENT TO OR WITHIN DEEP EXCAVATIONS. METHOD STATEMENT TO BE PRODUCED BY CONTRACTOR PRIOR TO WORKS COMMENCING.
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WORK CAN ONLY BE CARRIED OUT BY SUITABLY TRAINED AND BRIEFED PERSONNEL.

REV	DETAILS	DRAWN	CHECKED	DATE
A	UPDATED TO THE LATEST LAYOUT	PB	JAK	18.10.21

PRELIMINARY

CLIENT:
CARDIFF GATE INTERNATIONAL BUSINESS PARK

PROJECT:
CARDIFF GATE INTERNATIONAL BUSINESS PARK

DRAWING TITLE:
ROAD GENERAL ARRANGEMENT (DAS)

SCALE:
1:250 @ A1

DRAWN:	CHECKED:	DATE:
JF	JAK	20.08.2021

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4th Floor Oxford Place, 61 Oxford Street, Manchester, M1 6EQ
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CfA ISO 9001 17/0945 UKAS 0120

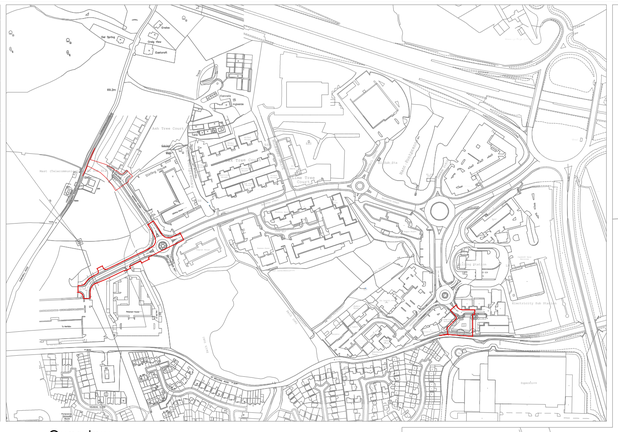
DRAWING NUMBER: VD21493-132

REVISION: A

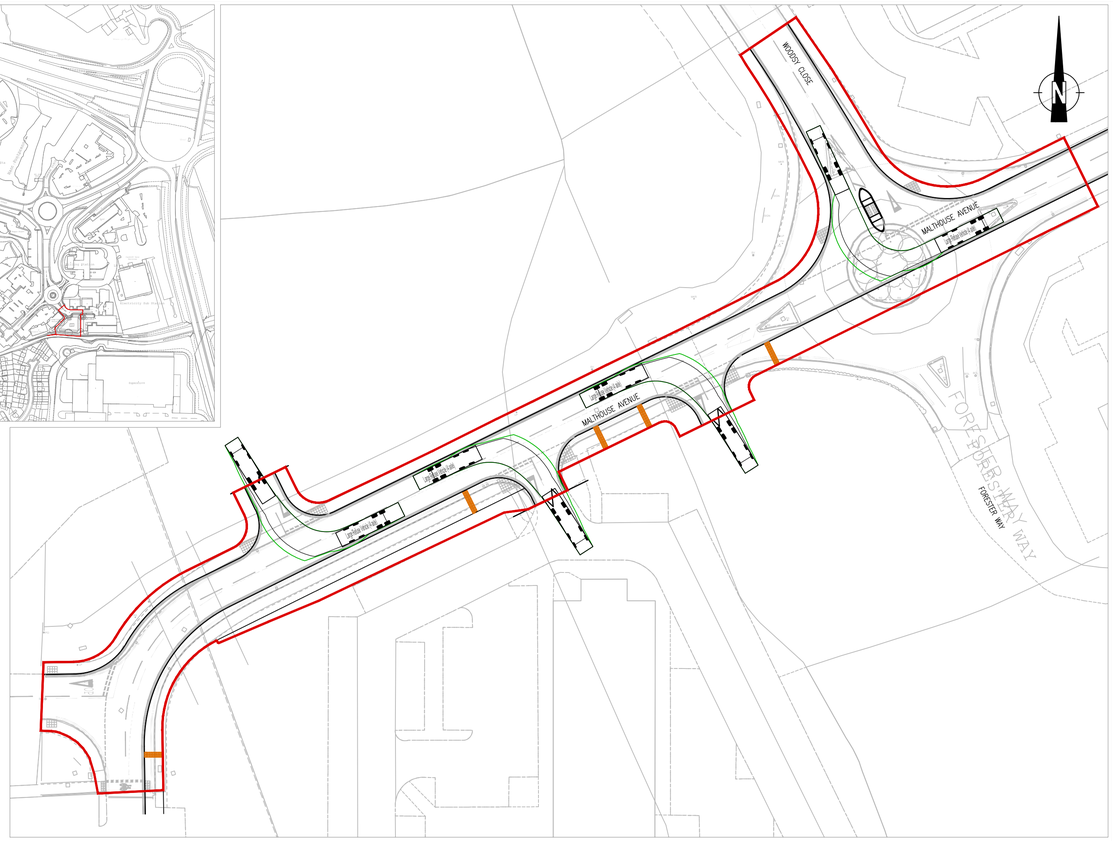
0 1.25 2.5 5 7.5
1:250 SCALE (m)

Appendix F

Standard Rigid Bus



Overview



Large Refuse Vehicle

Standard Rigid Bus

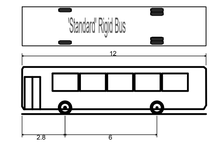
Standard Rigid Bus

Standard Rigid Bus

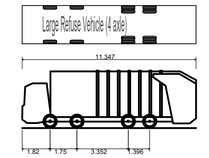
Standard Rigid Bus

Large Refuse Vehicle

0 5 10 20 30
1:500 SCALE (m)



'Standard' Rigid Bus	
Overall Length	12.000m
Overall Width	2.550m
Overall Body Height	3.069m
Min Body Ground Clearance	0.309m
Track Width	2.350m
Lock to lock time	4.00s
Wall to Wall Turning Radius	10.771m



Large Refuse Vehicle (4 axle)	
Overall Length	11.347m
Overall Width	2.500m
Overall Body Height	3.751m
Min Body Ground Clearance	0.304m
Track Width	2.500m
Lock to lock time	6.00s
Wall to Wall Turning Radius	11.330m

REV	DETAILS	DRAWN	CHECKED	DATE
-	-	-	-	-- -- ----

PRELIMINARY

CLIENT:
CARDIFF GATE
INTERNATIONAL BUSINESS PARK

PROJECT:
CARDIFF GATE
INTERNATIONAL BUSINESS PARK

DRAWING TITLE:
SWEPT PATH ANALYSIS

SCALE:
1:500 @ A1

DRAWN:	CHECKED:	DATE:
PB	JAK	11.10.2021

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DRAWING NUMBER: VD21493-150

REVISION: #

Appendix G

vectos.

FRAMEWORK TRAVEL PLAN

Cardiff Gate International Business Park

Plot 12 and 14 Redevelopment

November 2021

Framework Residential Travel Plan

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Figure 2.3 – Local Cycle Links
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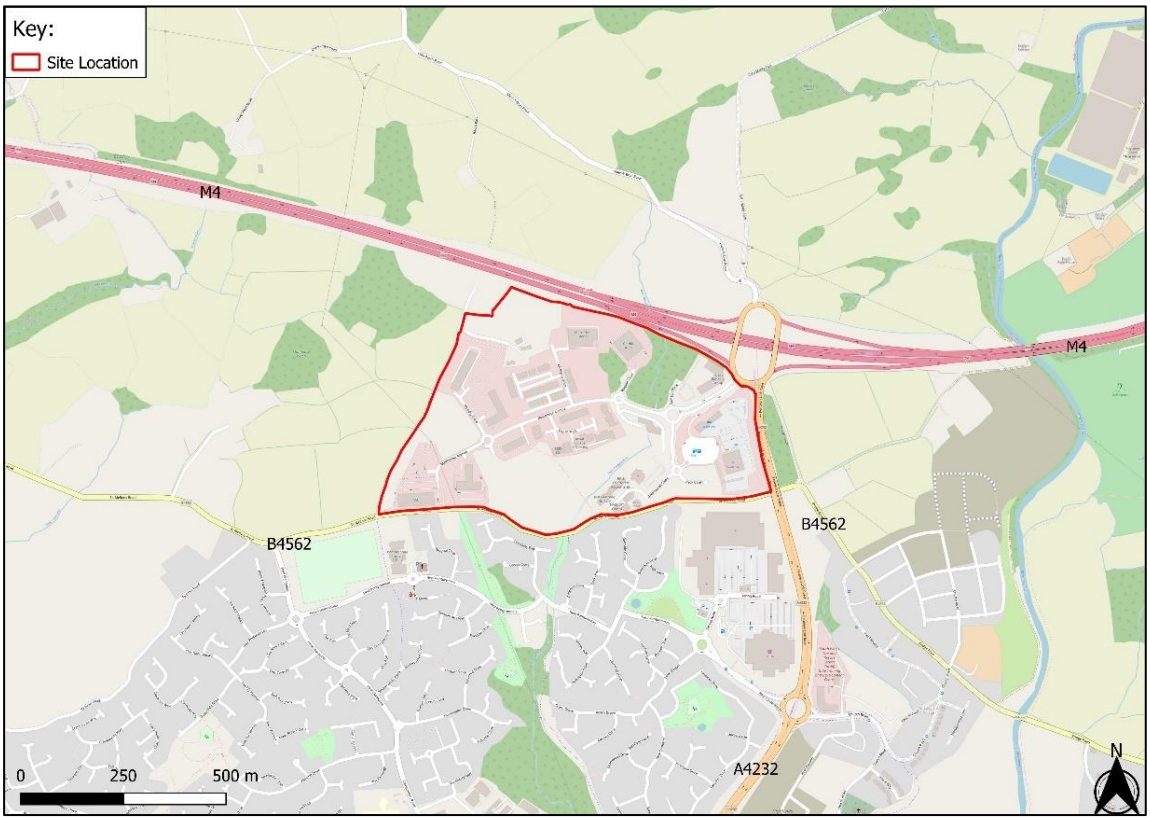
1 Introduction

1.1 Vectos is retained by Cardiff Gate International Business Park (CGIBP) to provide transport and highways advice in relation to a proposed development of Plots 12 and 14 and associated infrastructure works at Cardiff Gate International Business Park (the Site), Pontprennau.

1.2 The Site is bound to the north by the M4, to the east by Pentwyn Link Road, to the south by St Mellons Road and to the west by Strategic Site F (SSF) of the Local Plan. The location is shown in **Figure 1.1**.

Figure 1.1 – Site Location Plan



1.3 The proposals are for the development of CGIBP to provide a better balance of complimentary land uses. The application is an outline application for the following elements;

- Plot 12: Residential development of 120 units and 1,200 sqm of commercial floorspace;
- Plot 14: Mixed-use residential development of 25 units and 3,550 sqm of commercial floorspace;
- Bus, pedestrian and cycle connection to the Deposit Local Development Plan (LDP) for Strategic Site F (SSF) to the west;
- Pedestrian / cycleway along Malthouse Avenue;
- Alteration of Malthouse Avenue / Woodsy Close Roundabout; and

— Bus egress through Beck Court.

1.4 This Framework Travel Plan (FTP) is one of a series of documents that have been prepared on behalf of the Applicant to support a planning application for the redevelopment of the Site. The FTP sets out the overarching principles to be adopted to promote sustainable travel by future residents to/from the site.

1.5 The predominant aim of this FTP is to put in place the management tools deemed necessary to enable future residents to make more informed decisions about their travel, which at the same time minimises the adverse impacts of the development on the environment. This is achieved by setting out a strategy for eliminating the barriers keeping people from using sustainable modes which in effect self manages single-occupancy vehicle use.

1.6 This report has been written as a stand-alone document and contains all the relevant information needed to effectively implement and monitor the final Travel Plan itself.

1.7 The remainder of this document is structured as follows:

- Section 2 – outlines the options for accessing the site by sustainable modes;
- Section 3 – outlines the baseline travel patterns for future residents;
- Section 4 – sets out the objectives and targets of the FTP;
- Section 5 – sets out the measures and initiatives;
- Section 6 – outlines the FTP strategy including how it will be managed;
- Section 7 – outlines the monitoring and review programme; and
- Section 8 – presents the Action Plan.

2 Site Assessment

Site Location

2.1 The Site is located in Pontprennau, Cardiff (to the north of the city). The location of both Plot 12 and Plot 14 within the wider CGIBP Site is shown in **Figure 2.1**.

Figure 2.1 – Plot 12 and 14 Location Plan

2.2 The Site is bound to the north by the M4, to the east by Pentwyn Link Road Road, to the south by St Mellons Road and to the west by Strategic Site F (SSF) of the Local Plan.

Accessibility

Walking

2.3 Malthouse Avenue, which is lit and equipped with pedestrian footways on both sides of the carriageway, serves CGIBP, and provides direct and continuous walking routes between Plots 12 and Plot 14 to the west of the Site.

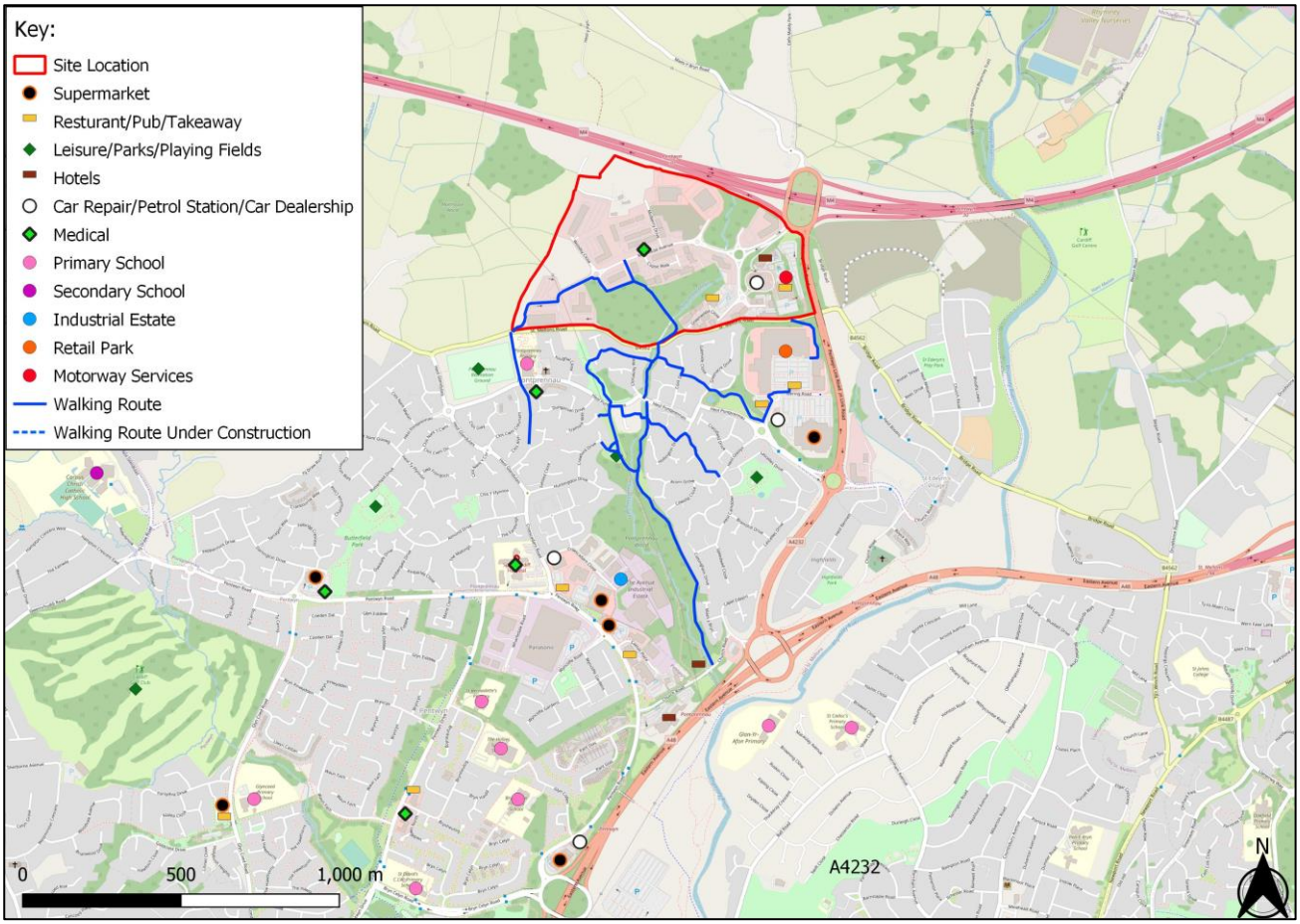
2.4 Malthouse Avenue in turn provides access to a pedestrian and cycle link between CGIBP and Cardiff Gate Retail Park, and provides access to a shared footway / cycleway (Croescadarn Road) which connects CGIBP to Pontprennau, via the primary school. Malthouse Avenue, via Greenwood Close,

also provides pedestrian access to the Toby Carvery, as well as facilitating access to the remainder of CGIBP (although there is currently no pedestrian access to the motorway services).

2.5 In addition, a PRoW, which connects St Mellons Road to CGIBP, routes along the western boundary of the Site, and provides access between the Site and Pontprennau to the south.

2.6 The location of the Site and key services and facilities, together with the available walking routes, is shown in **Figure 2.2**.

Figure 2.2 – Local Amenities



2.7 **Figure 2.2** demonstrates there is a range of services and facilities within walking distance of the Site, including employment, retail and health services, and education facilities.

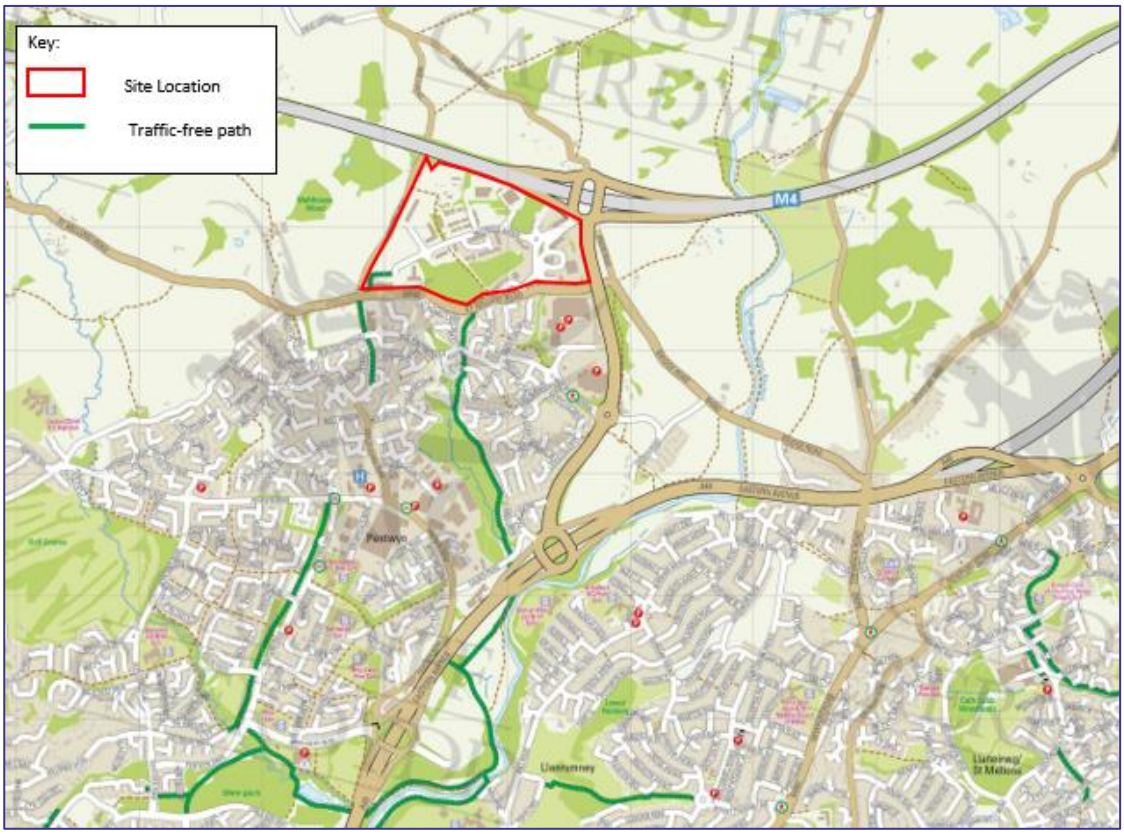
2.8 SSF is to the immediate west of CGIBP. There is the potential for walking, cycling and public transport links between SSF and CGIBP. The provision of walking, cycling and public transport links in this way would connect the Site directly to local centres, district centres and education facilities anticipated to come forward as part of SSF, and would further enhance the ability of future users of the Site to walk, cycle or use public transport for a significant proportion of everyday journeys.

Cycling

2.9 Malthouse Avenue is a lightly trafficked route, subject to a 30-mph speed limit, and is appropriate for cycling in the vicinity of the Site (at the western end of CGIBP). In addition, Croescadarn Road is a traffic free footway / cycleway, which connects directly to the wider cycle network, and the Rhymney Trail, a traffic free route providing access towards the city centre from the north-east of Cardiff, terminates to the immediate south of the Site.

2.10 The location of the Site in the context of the existing local cycle network, as described on Cardiff Council's Cycle Map, is shown in **Figure 2.3**.

Figure 2.3 – Local Cycle Links



Public Transport

Bus

2.11 The Site is accessible by bus, with a bus stop located within walking distance of the Site on Malthouse Avenue and Heol Pontprennau.

2.12 The Malthouse Avenue stop, known as 'Malthouse Avenue', is equipped with a shelter, seating and real time information, as shown in **Photograph 2.1**. The Heol Pontprennau stops, known as 'Youghal Close (eastbound)' and 'Youghal Close (westbound)', approximately 300m to the south of Plot 14.

Both stops benefit from safe and convenient walking routes and are equipped with shelters, seating and real time information, as shown in **Photograph 2.2** and **Photograph 2.3**.

Photograph 2.1 – Malthouse Avenue Bus Stop

Photograph 2.2 – Youghal Close (e/bound)

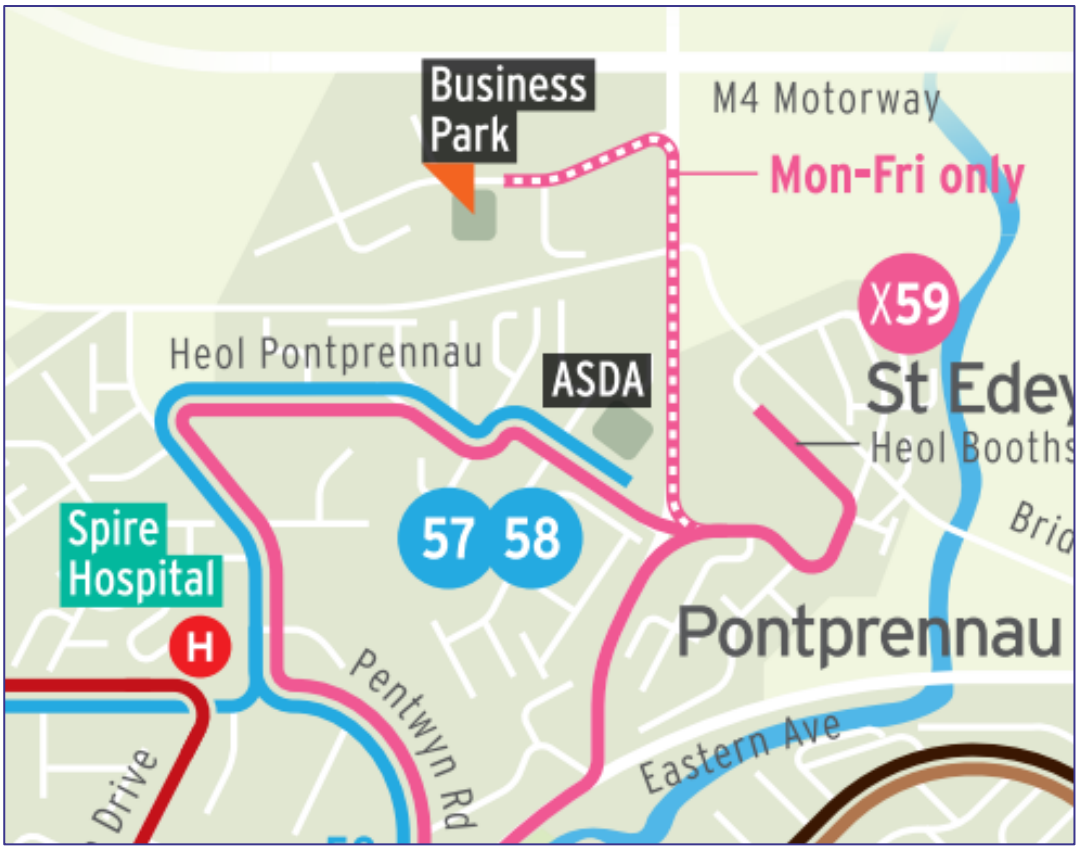
Photograph 2.3 – Youghal Close (w/bound)

2.13 A summary of the bus services which call at the Malthouse Avenue and Heol Pontprennau bus stops is provided in **Table 2.1**. An extract of Cardiff Bus's Route Map, which illustrates the route of these services, is contained at **Figure 2.4**. It is worth noting that the X59 which serves the Malthouse Avenue bus stop and Heol Pontprennau bus stops only routes to the Malthouse Avenue bus stop Mon-Fri.

Table 2.1 Summary of Local Bus Services

Service	Route	Average Frequency (bus per hour)		
		Weekday	Saturday	Sunday
X59	City Centre-Cardiff East P&R-CGIBP	2	2	-
X59	CGIBP-Cardiff East P&R-City Centre	2	2	-
57	City Centre-Pontprennau	2	2	2
57	Pontprennau-City Centre	2	2	2
58	City Centre-Pontprennau	2	2	2
58	Pontprennau-City Centre	2	2	2

Figure 2.4 – Local Bus Service Map



2.14 In total, there are approximately 2 buses per hour which serve the Malthouse Avenue stops on a weekday. The Heol Pontprennau stops are served by 8 buses per hour on weekdays, reducing to 6

buses per hour on weekends. The Heol Pontprennau bus stops are easily accessible from the site on foot, pedestrians will depart the site through the footpath to the south west of CGIBP and cross the B4562 to access the shared pedestrian cycleway (Croescadarn Road). The eastbound bus stop can be accessed from this point entirely through pedestrian footways, whilst the zebra crossing on Heol Pontprennau can be used for access to the westbound bus stop.

2.15 The approximate bus journey time between the Site and the city centre is between 35-40 minutes. This is comparable to car journey times to the same destination, particularly during peak hours, with bus services benefitting from significant bus priority measures on the A48 and Newport Road.

Train Services

2.16 The Site is located 4.2km east of Lisvane and Thornhill rail station and 11.2km north-east of Cardiff Central rail station. Therefore, whilst accessible to the rail network, any rail journeys will form part of a multi-modal journey, with the connection to the rail station forming a key part of this journey.

Summary of Accessibility

2.17 This Site is located in a highly accessible location in terms of the high quality, extensive pedestrian routes in its vicinity, as well as the good provision of cycling infrastructure. Furthermore, its proximity to local bus stops and provide accessibility from destinations further afield. This will provide a genuine choice in travel for future residents and employees of the Site.

3 Baseline Travel Patterns

3.1 This section sets out the initial modal split for the residential aspect of the Site and identifies how the baseline modal split will be established.

3.2 The starting point was method of travel to work data from the Census 2011 Journey to Work database. The initial modal split is set out in **Table 3.1** below.

Table 3.1 – Initial Modal Split for Residents

Travel Mode	Percentage Mode Share
Train	1%
Bus, minibus or coach	9%
Taxi	0%
Motorcycle, scooter or moped	1%
Driving a car or van	77%
Passenger in a car or van	6%
Bicycle	1%
On foot	4%
Other	0%
Total	**100%**

3.3 In order to establish the baseline modal split, a questionnaire survey of travel patterns will be carried out once the site is occupied. It should be noted that this is defined as when 75% of the residential units are occupied.

3.4 The results of the survey will provide information on the established travel choices of residents and hence will provide a basis for ratifying and adjusting the targets set out within this FTP. They will replace the initial mode share presented in **Table 3.1** as the baseline and will represent all journeys to/ from the Site, rather than just journeys to work.

3.5 The survey will aim to:

- Identify which modes of transport could be promoted in light of the survey findings; and

- Establish the popular alternative modes of travel to the Site, i.e. what do people want to use but currently do not/ cannot.

4 Objectives and targets

4.1 This section sets out the overarching objectives for the FTP, as well as targets for the short and medium term. It includes indicators through which progress towards meeting the targets will be measured. Further information on monitoring and review of the FTP can be found in **Section 7**.

- **Objectives** are the high-level aims of the Travel Plan. They help to give the Travel Plan direction and provide a clear focus.
- **Targets** are the measurable goals by which progress will be assessed. The Travel Plan sets out targets which should be reached within the period covered by this FTP. In addition, interim targets have been set.

Objectives

4.2 The objectives of this FTP are two-fold. Firstly, to increase awareness of sustainable travel modes available to residents and secondly to reduce the dependence of residents on travelling by car to and from the development. Therefore, more specifically, the objectives of this FTP are to:

- Increase resident awareness of the advantages and availability of sustainable modes of transport over the car;
- Introduce a package of physical and management measures that will facilitate resident travel by sustainable modes; and therefore,
- Limit unnecessary or unsustainable use of the car for journeys to and from the Site by residents.

4.3 The objectives will assist in reducing CO2 emissions produced by residents of the Site and therefore mitigate against the impact of the proposed development. In addition, should residents be encouraged to travel by active modes, such as walking and cycling, this will contribute to a healthier population.

Targets

4.4 Travel Plan targets are measurable goals by which progress can be assessed. These targets should be reviewed through a programme of monitoring (outlined in Section 7) to ensure they remain SMART (Specific, Measurable, Achievable, Realistic and Timed).

4.5 Targets come in two forms – Action Targets and Aim Targets:

- **Action Targets** are non-quantifiable actions that need to be achieved by a certain time.
- **Aim Targets** are quantifiable and in the case of this FTP relate to the degree of modal shift the plan is seeking to achieve.

Action Targets

4.6 The Action Targets for this FTP are:

- To appoint a Travel Plan Coordinator (*see Travel Plan Strategy, Section 5*)
- To coordinate baseline travel surveys (*see Monitoring and Review, Section 7*)

Aim Targets

4.7 **Table 4.1** outlines the Aim targets set out for the Site. These are set to measure progress towards the main objectives over five years. As discussed previously, in the absence of existing data for the development, the 2011 Census Journey to Work data (WP703EW) for the area surrounding the site (Middle Super Output Area Cardiff 003) has been used to inform the pre-occupation baseline.

4.8 A baseline residential travel survey will subsequently be undertaken upon reaching 75% occupancy. This will form the results of the Year 0 survey, representing all types of journeys to/ from the Site.

4.9 This FTP recognises that it is not possible to set out accurate targets for the future, even when based on actual mode share data (i.e. once the baseline survey has been undertaken). Given this, it should be acknowledged that the targets will change over time as results from on-going monitoring become available. Targets will be finalised and written into the Travel Plan once the travel surveys have been completed, the results analysed, and discussions have been held with Cardiff Council Travel Plan Officers.

Table 4.1 – Assumed Development Modal Split and Post Travel Plan Implementation Target Split

Mode	Baseline (Year 0)	Residential Target Split		
		Year 1	Year 3	Year 5
Active Travel Modes*	16%	16%	20%	25%

**Includes walking and cycling travel modes*

4.10 This Travel Plan concentrates on increasing the Active Travel mode share i.e. walking and cycling and encouraging users not to rely on private vehicle use.

5 Measures and Initiatives

Introduction

5.1 This section of the FTP outlines the specific physical and management measures to be implemented as part of the Travel Plan. The implementation of these measures, including both 'hard' and 'soft' measures, is considered to be the core of the Plan.

Measures

Travel Plan Management and Promotion

5.2 A Travel Plan Coordinator (TPC) will be appointed who will be responsible for overseeing the implementation of the Travel Plan. The TPC will provide personalised travel planning advice to residents should they require this service, as well as providing a Welcome Pack to all new residents.

5.3 This Welcome Pack will contain information regarding:

- Walking and cycling routes;
- Public transport timetables and routes;
- Public transport interchange locations;
- Public transport fare and season ticket information;
- Journey Planner tools;
- Car Club locations;
- Contact details for the TPC;
- Brief overview of the Travel Plan.

5.4 The TPC will investigate the possibility of providing incentives within the Welcome Pack such as discount vouchers for local bicycle retailers. The TPC will be required to liaise with local retailers and Cardiff Council regarding these incentives.

5.5 In addition to providing travel information in Welcome Packs, the same information will be uploaded to the development online portal. The TPC will be responsible for ensuring the online portal remain up-to-date and will remove information which is no longer accurate.

5.6 The TPC will continuously promote the Travel Plan and its initiatives and will be responsible for investigating new ways for residents to become involved. An example could be holding a promotional event where residents can sign up for bicycle training, social bike rides/ walks and receive information regarding public transport etc. The TPC will also publicise the on-going progress and successes of the Travel Plan, in order to encourage residents to start to travel or continue to travel sustainably.

Walking and Cycling

5.7 As part of the proposed development, the permeability through the site will be improved by creating a new pedestrian / cycleway. These internal routes will allow pedestrians and cyclists to travel through the site and exit onto the wider pedestrian network, which will benefit existing residents in the area and any future potential residents.

5.8 The site will fully accord with the Cardiff SPG cycle parking standards allowing all residents a safe place to park their bicycle on site.

Promotion

5.9 The TPC will be responsible for promoting the benefits of walking to residents of the Site. As well as providing information regarding local walking routes on the notice boards and in Welcome Packs, the TPC will promote public health campaigns such as Change for Life, which highlight the health benefits associated with active travel.

5.10 The TPC will regularly check local walking routes to ensure they are properly maintained and will liaise with Cardiff Council should the need for maintenance be required. They will also assess the provision of way-finding to ensure this is appropriate.

5.11 As described previously, information regarding local cycle routes will be provided on the online portal and within Welcome Packs provided to residents upon occupation. The TPC will regularly check local cycle routes to ensure that they are properly maintained and will liaise with Cardiff Council should any issues be identified.

5.12 The TPC will also liaise with Travel Awareness officers at Cardiff Council to discuss ideas for awareness raising events and initiatives. Participation in national and local events for specific campaigns such as National Bike Week will also form a central role in raising awareness of travel options.

5.13 The TPC will investigate cycle training for residents, including local training schemes through the Bikeability initiative. The aim is to make cyclists more confident and comfortable cycling on the road, therefore encouraging them to cycle to/from the Site on a regular basis. The training sessions will either be organised on an individual or group basis, depending on the number and ability of participants and the availability of trainers.

5.14 The provision of bicycle maintenance and repair events on-Site will also be investigated. These could be provided on a quarterly basis to ensure that residents are consistently able to access these services, therefore encouraging them to cycle on a regular basis.

5.15 As described previously, the TPC will liaise with local bicycle retailers regarding the potential for providing residents with discounts for cycle equipment.

Public Transport

5.16 As described previously, information regarding public transport timetables, interchange locations and fares will be provided on the online portal and within Welcome Packs provided to residents upon

occupation. The TPC will regularly check bus stops and stations to ensure that they are properly maintained and will liaise with Cardiff Council should any issues be identified.

Car Parking

5.17 The site will provide a parking provision in line with the Cardiff SPG parking standards.

5.18 The TPC will also promote the use of Car Clubs, such as Zip Car.

5.19 In addition, the TPC will investigate the possibility of implementing a car-sharing scheme for residents of the Site, should demand be sufficient. The TPC will also promote existing databases such as Liftshare alongside this.

6 Travel Plan Strategy

Management

6.1 It is expected that a single management company, or similar management entity, will be put in place to manage the Site.

6.2 Under this scenario, the Management Company will appoint a TPC who will manage the day to day running of the Travel Plan for its duration. The contact details for the TPC will be provided to Cardiff Council upon their appointment and prior to the occupation of the Site.

6.3 The role of the TPC will be part time and will vary throughout the year in response to campaigns/ sustainable transport events/ monitoring surveys etc. taking place. The TPC will be allocated enough time to effectively manage and implement the Travel Plan as agreed.

Funding

6.4 The Travel Plan, its accompanying measures and initiatives and the TPC role will be funded by the developer throughout the five year period. The developer will ensure that the TPC has sufficient funding to effectively implement the Plan.

TPC Responsibilities

6.5 The TPC will be responsible for the administration of the Travel Plan, the implementation of measures, and for the on-going monitoring and review of the Travel Plan. They will have overall responsibility for ensuring that said measures are successfully delivered on time and to budget.

6.6 The TPC will report to the management company and other involved stakeholders such as resident's associations (if applicable) and Cardiff Council, regarding the implementation and progression of the Travel Plan. The formation of resident's associations will be encouraged by the TPC in order to understand their view and needs regarding sustainable travel, therefore enabling them to tailor the Travel Plan accordingly. The TPC will meet with said resident's groups on a semi-regular basis.

6.7 The duties of the Travel Plan Co-ordinator will therefore include:

- To provide guidance to, and be the main point of contact for residents within the development site requiring travel information;
- To communicate information to residents regarding relevant national and local initiatives related to the promotion of sustainable travel;
- Undertake the Travel Surveys over the five year period and supply evidence of this to Cardiff Council;
- Take responsibility for data collection and review of the Travel Plan;
- Design and implement effective marketing and awareness-raising campaigns to promote the Travel Plan;

- Liaise with external organisations, e.g. local authorities;
- Co-ordinate the monitoring programme for the Travel Plan, including target setting (in agreement with Cardiff Council) and make necessary changes if the targets are not being met; and
- Establish and maintain a filing system for recording all correspondence relating to the Travel Plan.

Reporting

6.8 The TPC will prepare a full monitoring report on an annual basis on the progress of the Travel Plan. The reports will include the following:

- Progress on the implementation of measures and initiatives to promote sustainable transport use;
- Latest survey results (if a survey year); and
- Any revisions to targets and measures.

6.9 The report will be provided to Cardiff Council Travel Plan Officers.

Marketing Strategy

6.10 An essential element of the strategy identified in this FTP, and one which largely determines its success, is the promotion of the Travel Plan. In order to promote and increase awareness of the Travel Plan, the following measures will be adopted:

- Distribution of travel information packs to all future residents of the development. This will include maps, public transport routes and frequencies and details of local amenities;
- Display of key Travel Plan information on the online portal, including uploading posters and/ or leaflets;
- Mail drops can be used to disseminate new information or promote events;
- Arrange Q&A sessions and offer a personalised travel planning service if demand is identified;
- Promote national travel initiatives and organise Site-wide events such as organised cycle rides;
- Developer will arrange for the display and distribution of sustainable travel information at the marketing suite for the development and on the marketing website; and
- TPC will attend Residents' Meetings to promote the Travel Plan.

6.11 The types of information to be provided include:

- Public transport timetables, infrastructure locations and telephone enquiry lines;
- Local taxi numbers;
- Walking and cycling routes;

- Car club information;
- Community guides about facilities and services near to the development; and
- Information on home shopping sites.

6.12 The travel packs will be distributed to all households upon initial occupation.

7 Monitoring and Review

Monitoring

7.1 The Travel Plan will be monitored for a period of five years. Questionnaire monitoring surveys will be undertaken at Years 1, 3 and 5, on the first, third and fifth anniversary of the initial baseline questionnaire travel survey.

7.2 As noted in Section 3, the baseline travel survey will be undertaken when 75% of the residential units are occupied or within six months of the first occupation (whichever is soonest). The surveys will be iTRACE compliant.

7.3 The TPC is responsible for ensuring a suitable response rate, which will be agreed with Cardiff Council upon the finalisation of the Travel Plan from this FTP.

7.4 This baseline survey represents the start of the Travel Plan for monitoring purposes and is known as Year 0. Following this, the Year 1 travel survey will be taken on the one year anniversary of the baseline survey.

7.5 Information gathered through the monitoring process will be recorded for input to the annual review (outlined below). The information will be made available to Cardiff Council.

Reporting

7.6 The TPC will compile an annual Review Report outlining the progress of the Travel Plan and its initiatives, as well as an assessment of the survey results (if a survey year) and any updates to the targets and initiatives that may subsequently be required. If targets are not being delivered, then the Travel Plan measures will be adjusted or added to, instead of simply revising down the target.

7.7 It should be noted that any proposed changes to the Travel Plan, including targets and action plans will be discussed and agreed with the Travel Plan officers.

7.8 The report will also incorporate the results of on-going monitoring by the TPC such as cycle parking observations, the uptake of TPC travel planning sessions and any comments received from residents, throughout the preceding period. The report will be issued to Cardiff Council.

8 Action Plan

8.1 The Action Plan outlined below in **Table 8.1** sets out the measures included within the Travel Plan that are directed at influencing residents' travel.

Table 8.1 – Action Plan

Action Type	Action	Responsibility	Timeframe
Management	Appointment of Travel Plan Coordinators (TPC)	Site Management Company	Three months prior to first residential occupation
Travel Plan Document Progression	Baseline questionnaire travel survey	TPC	Undertaken upon 75% occupation
	Target setting	TPC and Cardiff Council Travel Plan Officers	Within 3 months of the completion the baseline survey
	Finalisation of measures to be implemented	TPC and Planning Authority officers	Within 3 months of the baseline survey
	Travel Plan document completion	TPC	Within 3 months of the completion of the baseline survey Revised at Year 3 after full review
Monitoring, Review and Reporting	Monitoring of measures and initiative take-up	TPC	On-going
	First questionnaire monitoring survey	TPC	At Year 1
	Review and reporting	TPC and Cardiff Council Travel Plan Officers	Following Year 1 snapshot survey result analysis

	Second questionnaire monitoring survey	TPC	At Year 3
	Review and reporting	TPC and Cardiff Council Travel Plan Officers	Following Year 3 monitoring survey results analysis
	Third questionnaire monitoring survey	TPC	At Year 5
	Full review and reporting	TPC and Cardiff Council Travel Plan Officers	Following Year 5 monitoring survey results analysis
Implementation	Implementation of measures	TPC with liaison with Management Company	From the start of construction and on-going
	Provision of Travel Packs to all residents	TPC	Upon occupation of each unit
	Online Portal	As part of development and TPC	Within construction period and information prior to occupation to be reviewed by TPC at least every 6 months
	Personal Travel Planning Service	TPC	On-going
	Cycle Parking located on-site	As part of development and TPC to monitor maintenance/ uptake	Within construction period and TPC to monitor uptake to ensure provision is sufficient
	Explore possibility of discounts at cycle retailers	TPC	On-going (dependent on

			interest from local residents)
	Promote cycling through awareness campaigns	TPC	On-going
	Promote walking through awareness campaigns	TPC	On-going

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Contact

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Manchester M1 6EQ.
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Appendix H

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : A - HOUSES PRIVATELY OWNED
MULTI-MODAL VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	EX	ESSEX	1 days
04	EAST ANGLIA		
	SF	SUFFOLK	1 days
05	EAST MIDLANDS		
	LN	LINCOLNSHIRE	2 days
06	WEST MIDLANDS		
	SH	SHROPSHIRE	1 days
07	YORKSHIRE & NORTH LINCOLNSHIRE		
	NY	NORTH YORKSHIRE	1 days
08	NORTH WEST		
	CH	CHESHIRE	1 days
10	WALES		
	CF	CARDIFF	1 days
11	SCOTLAND		
	FI	FIFE	1 days
	SR	STIRLING	1 days

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

Filtering Stage 2 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 dwellings
Actual Range: 108 to 237 (units:)
Range Selected by User: 100 to 491 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/07 to 22/09/12

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

Selected survey days:

Monday	3 days
Tuesday	3 days
Thursday	2 days
Friday	2 days

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

Selected survey types:

Manual count	10 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)	5
Edge of Town	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	8
No Sub Category	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.

Filtering Stage 3 selection:

Use Class:

C3	10 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
10,001 to 15,000	1 days
15,001 to 20,000	6 days
20,001 to 25,000	2 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
50,001 to 75,000	1 days
75,001 to 100,000	2 days
100,001 to 125,000	3 days
125,001 to 250,000	3 days

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

Car ownership within 5 miles:

0.6 to 1.0	2 days
1.1 to 1.5	8 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	10 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.

LIST OF SITES relevant to selection parameters

1 CF-03-A-02 MIXED HOUSES, CARDIFF CARDIFF
DROPE ROAD

CARDIFF
Edge of Town
Residential Zone
Total Number of dwellings: 196
Survey date: FRIDAY 05/10/07 Survey Type: MANUAL

2 CH-03-A-06 SEMI-DET./BUNGALOWS,CREWE CHESHIRE
CREWE ROAD

CREWE
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Number of dwellings: 129
Survey date: TUESDAY 14/10/08 Survey Type: MANUAL

3 EX-03-A-01 SEMI-DET., STANFORD-LE-HOPE ESSEX
MILTON ROAD
CORRINGHAM
STANFORD-LE-HOPE
Edge of Town
Residential Zone
Total Number of dwellings: 237
Survey date: TUESDAY 13/05/08 Survey Type: MANUAL

4 FI-03-A-03 MIXED HOUSES, DUNFERMLINE FIFE
WOODMILL ROAD

DUNFERMLINE
Edge of Town
Residential Zone
Total Number of dwellings: 155
Survey date: MONDAY 30/04/07 Survey Type: MANUAL

5 LN-03-A-01 MIXED HOUSES, LINCOLN LINCOLNSHIRE
BRANT ROAD
BRACEBRIDGE
LINCOLN
Edge of Town
Residential Zone
Total Number of dwellings: 150
Survey date: TUESDAY 15/05/07 Survey Type: MANUAL

6 LN-03-A-02 MIXED HOUSES, LINCOLN LINCOLNSHIRE
HYKEHAM ROAD

LINCOLN
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 186
Survey date: MONDAY 14/05/07 Survey Type: MANUAL

7 NY-03-A-06 BUNGALOWS/SEMI DET., BBDGE NORTH YORKSHIRE
HORSEFAIR

BOROUGHBRIDGE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 115
Survey date: FRIDAY 14/10/11 Survey Type: MANUAL

LIST OF SITES relevant to selection parameters (Cont.)

8 SF-03-A-02 SEMI DET./TERRACED, IPSWICH SUFFOLK
STOKE PARK DRIVE
MAIDENHALL
IPSWICH
Edge of Town
Residential Zone
Total Number of dwellings: 230
Survey date: THURSDAY 24/05/07 Survey Type: MANUAL

9 SH-03-A-04 TERRACED, SHREWSBURY SHROPSHIRE
ST MICHAEL'S STREET

SHREWSBURY
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Number of dwellings: 108
Survey date: THURSDAY 11/06/09 Survey Type: MANUAL

10 SR-03-A-01 DETACHED, STIRLING STIRLING
BENVIEW

STIRLING
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 115
Survey date: MONDAY 23/04/07 Survey Type: MANUAL

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

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL VEHICLES
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	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	10	162	0.095	10	162	0.304	10	162	0.399
08:00 - 09:00	10	162	0.179	10	162	0.464	10	162	0.643
09:00 - 10:00	10	162	0.181	10	162	0.223	10	162	0.404
10:00 - 11:00	10	162	0.157	10	162	0.200	10	162	0.357
11:00 - 12:00	10	162	0.184	10	162	0.173	10	162	0.357
12:00 - 13:00	10	162	0.201	10	162	0.194	10	162	0.395
13:00 - 14:00	10	162	0.201	10	162	0.179	10	162	0.380
14:00 - 15:00	10	162	0.182	10	162	0.188	10	162	0.370
15:00 - 16:00	10	162	0.311	10	162	0.212	10	162	0.523
16:00 - 17:00	10	162	0.347	10	162	0.205	10	162	0.552
17:00 - 18:00	10	162	0.419	10	162	0.250	10	162	0.669
18:00 - 19:00	10	162	0.266	10	162	0.218	10	162	0.484
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.723			2.810			5.533

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

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

Parameter summary

Trip rate parameter range selected:	108 - 237 (units:)
Survey date date range:	01/01/07 - 22/09/12
Number of weekdays (Monday-Friday):	10
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

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

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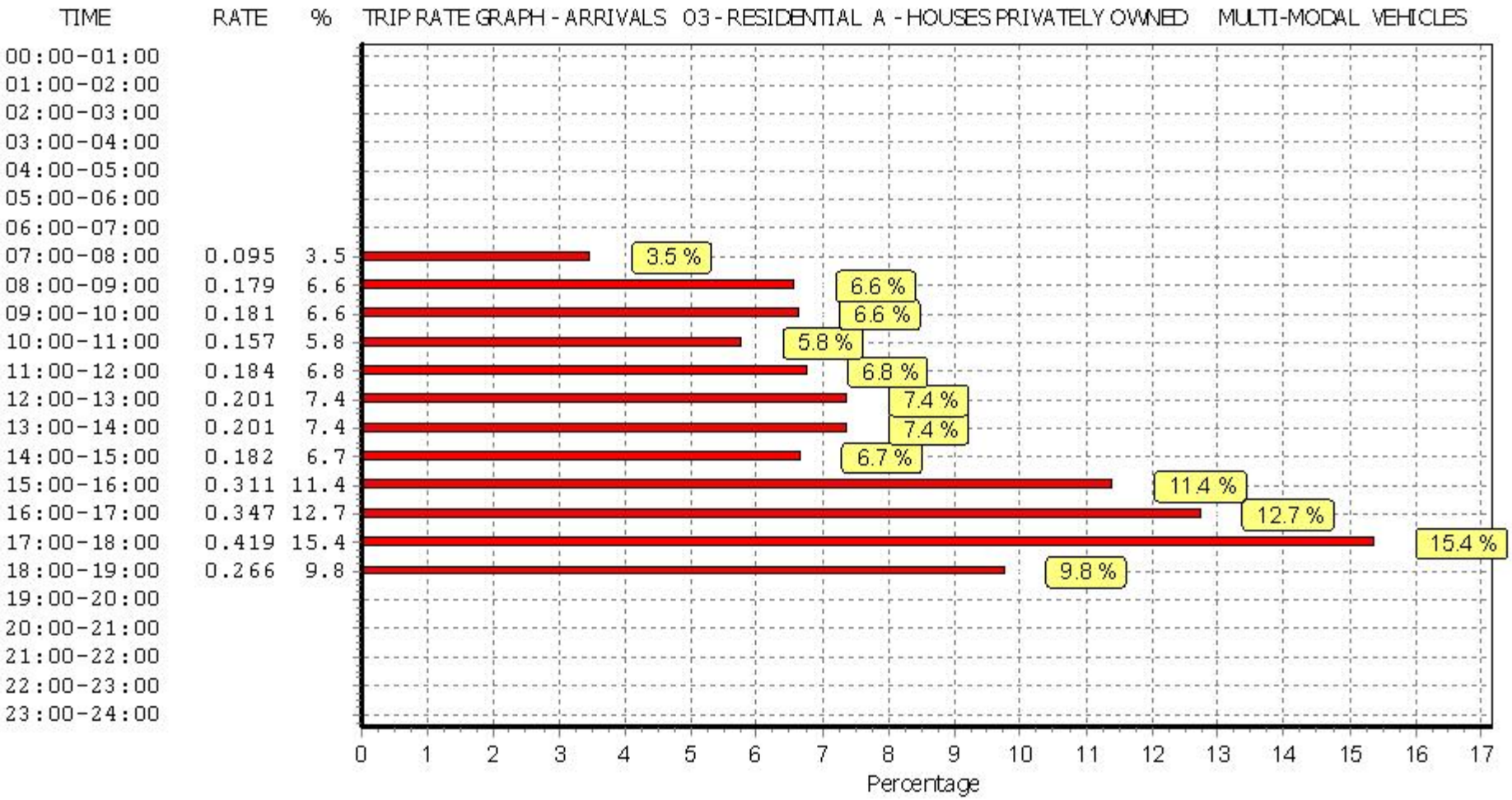

This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.

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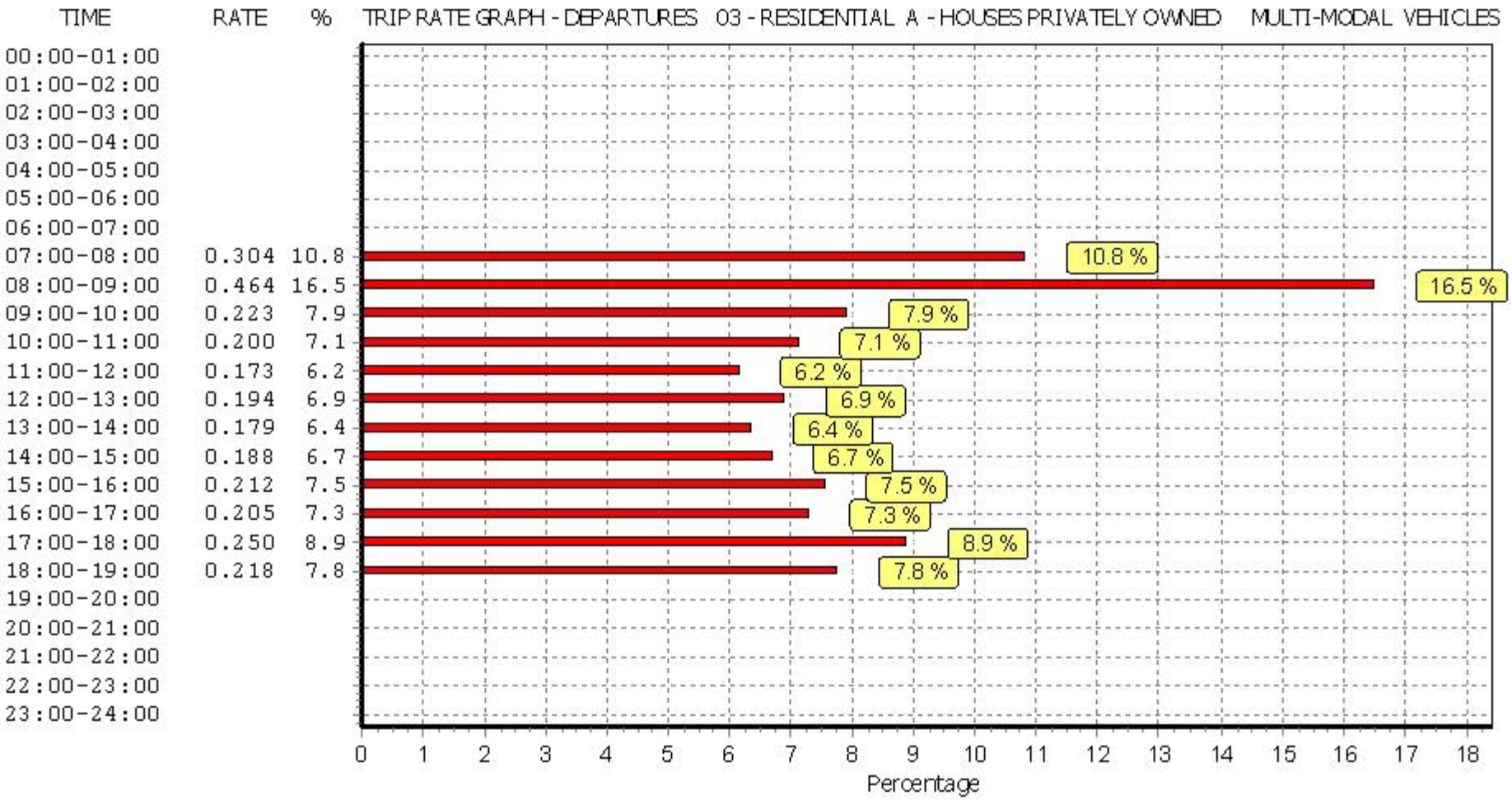

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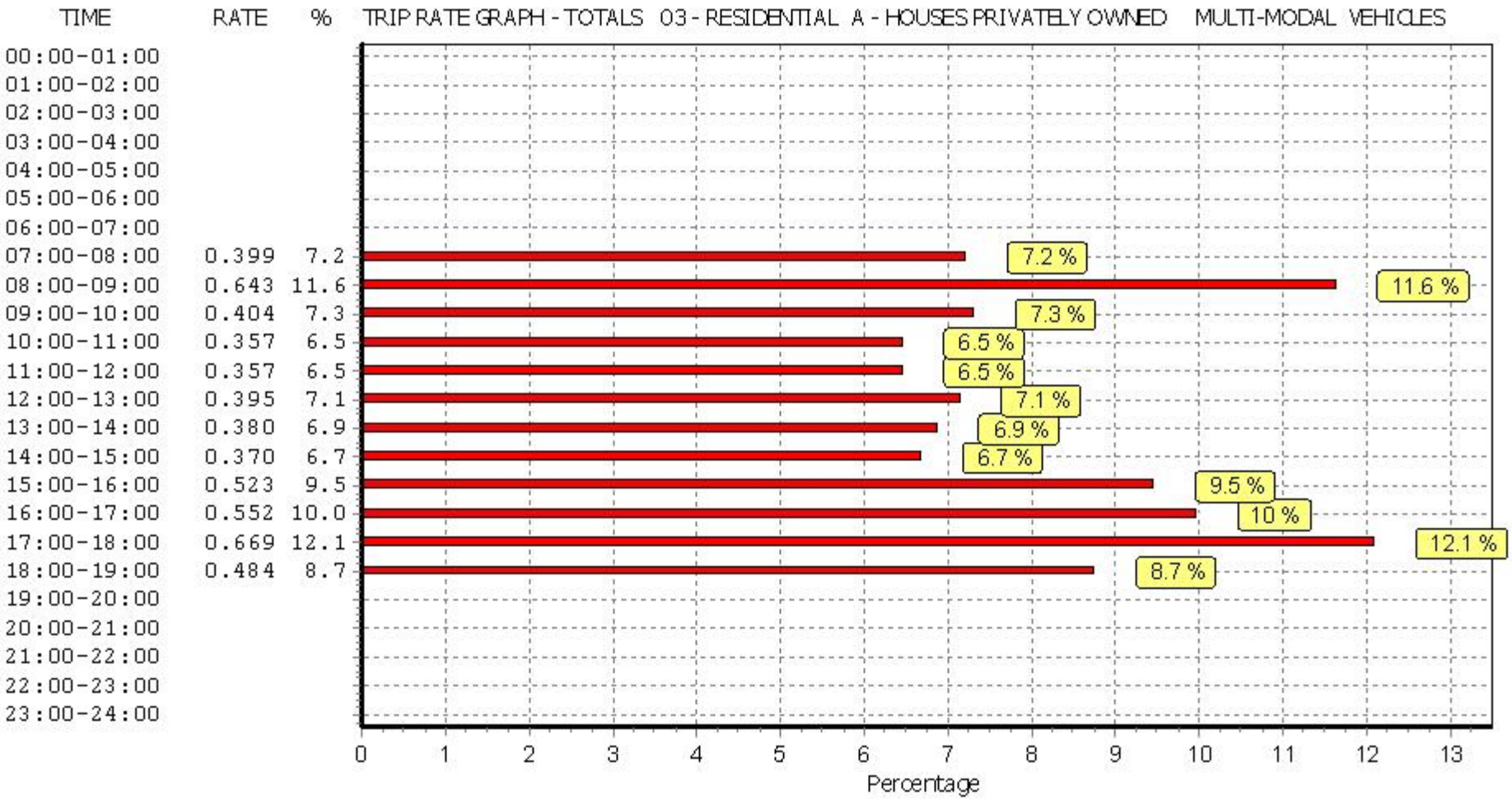

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TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL CYCLISTS
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	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	10	162	0.006	10	162	0.007	10	162	0.013
08:00 - 09:00	10	162	0.007	10	162	0.019	10	162	0.026
09:00 - 10:00	10	162	0.006	10	162	0.005	10	162	0.011
10:00 - 11:00	10	162	0.001	10	162	0.006	10	162	0.007
11:00 - 12:00	10	162	0.005	10	162	0.003	10	162	0.008
12:00 - 13:00	10	162	0.006	10	162	0.006	10	162	0.012
13:00 - 14:00	10	162	0.004	10	162	0.004	10	162	0.008
14:00 - 15:00	10	162	0.003	10	162	0.003	10	162	0.006
15:00 - 16:00	10	162	0.024	10	162	0.015	10	162	0.039
16:00 - 17:00	10	162	0.014	10	162	0.006	10	162	0.020
17:00 - 18:00	10	162	0.014	10	162	0.015	10	162	0.029
18:00 - 19:00	10	162	0.014	10	162	0.008	10	162	0.022
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.104			0.097			0.201

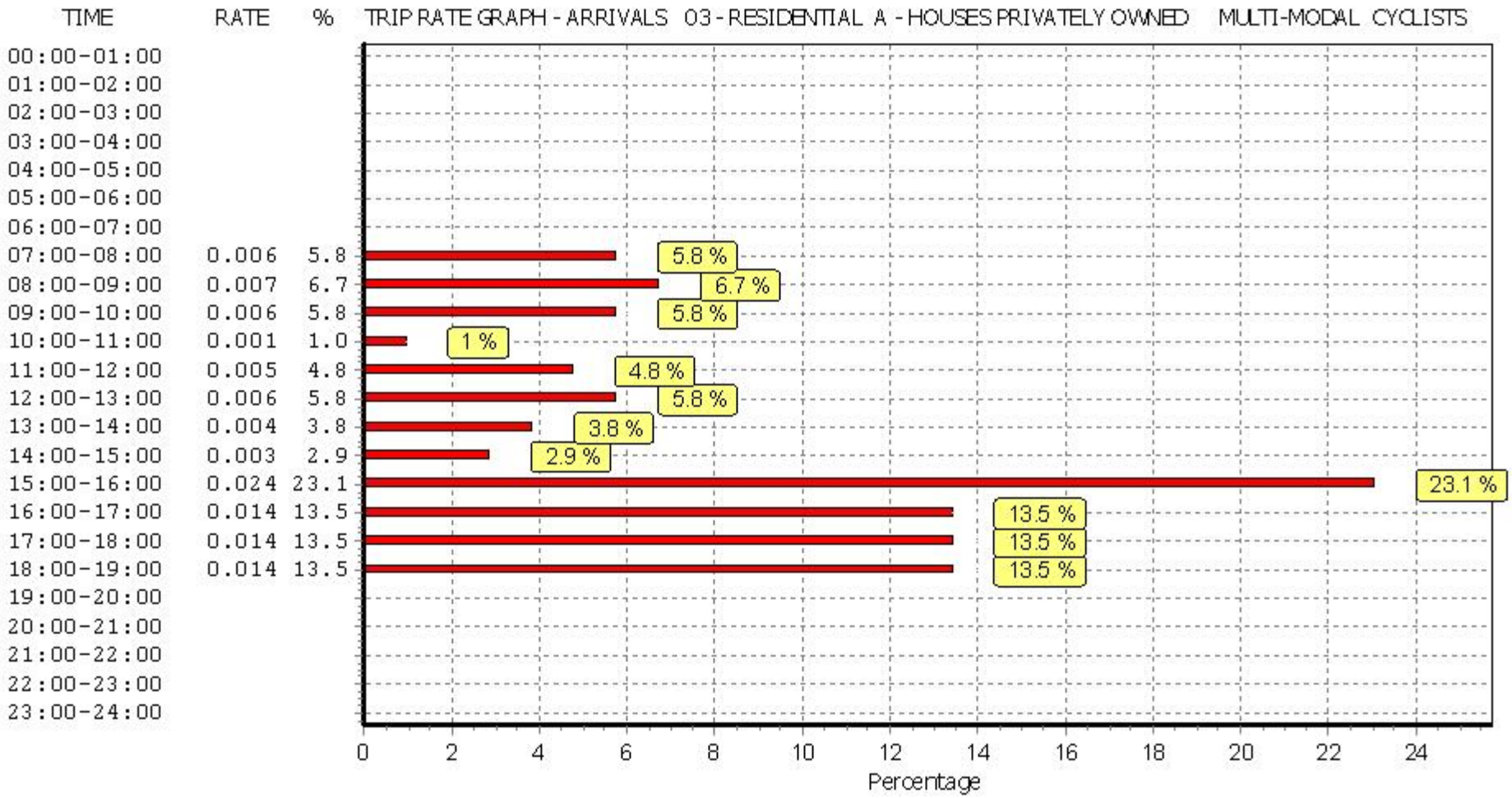
This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are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

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

Parameter summary

Trip rate parameter range selected:	108 - 237 (units:)
Survey date date range:	01/01/07 - 22/09/12
Number of weekdays (Monday-Friday):	10
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

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



This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.

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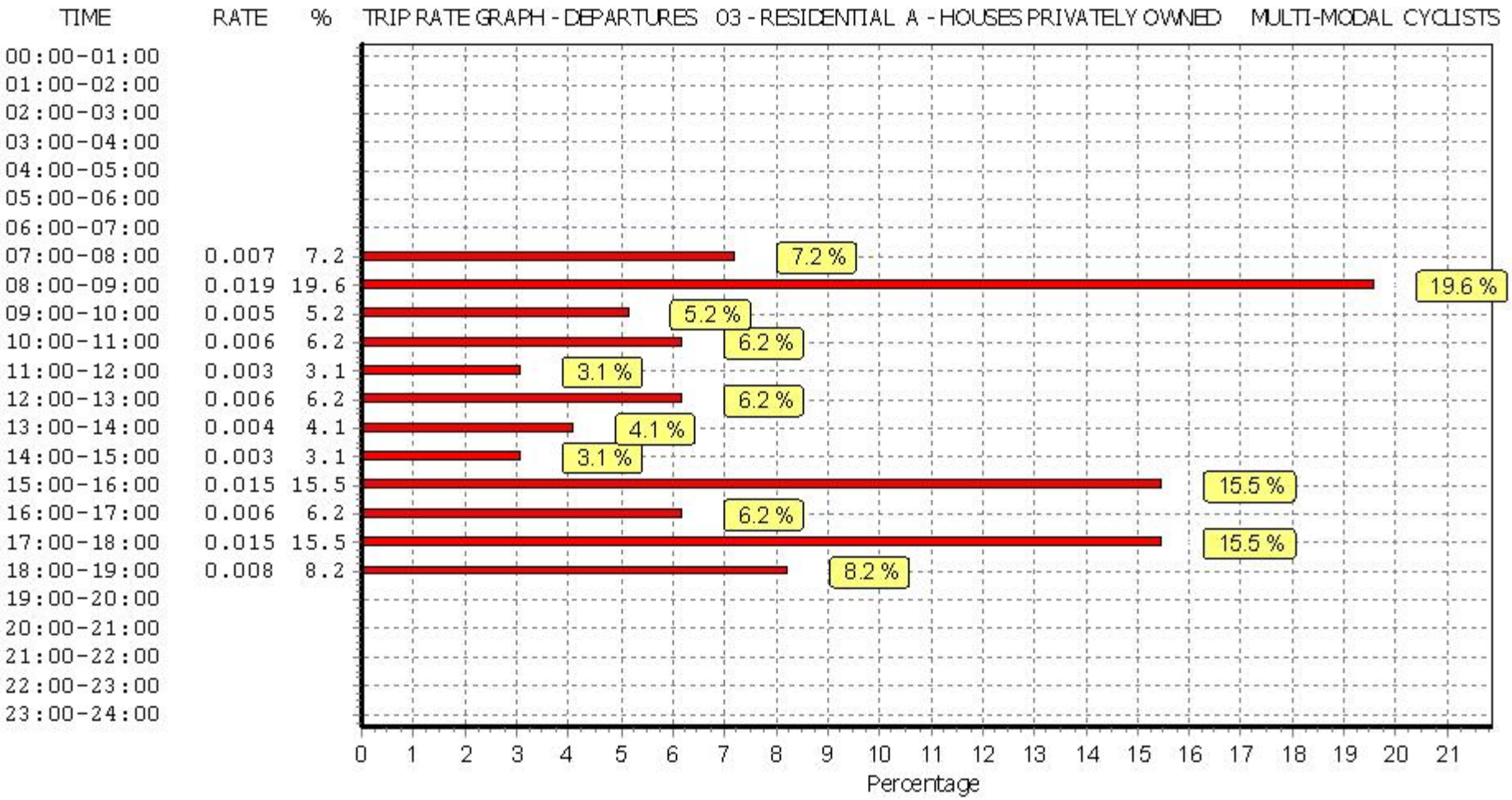

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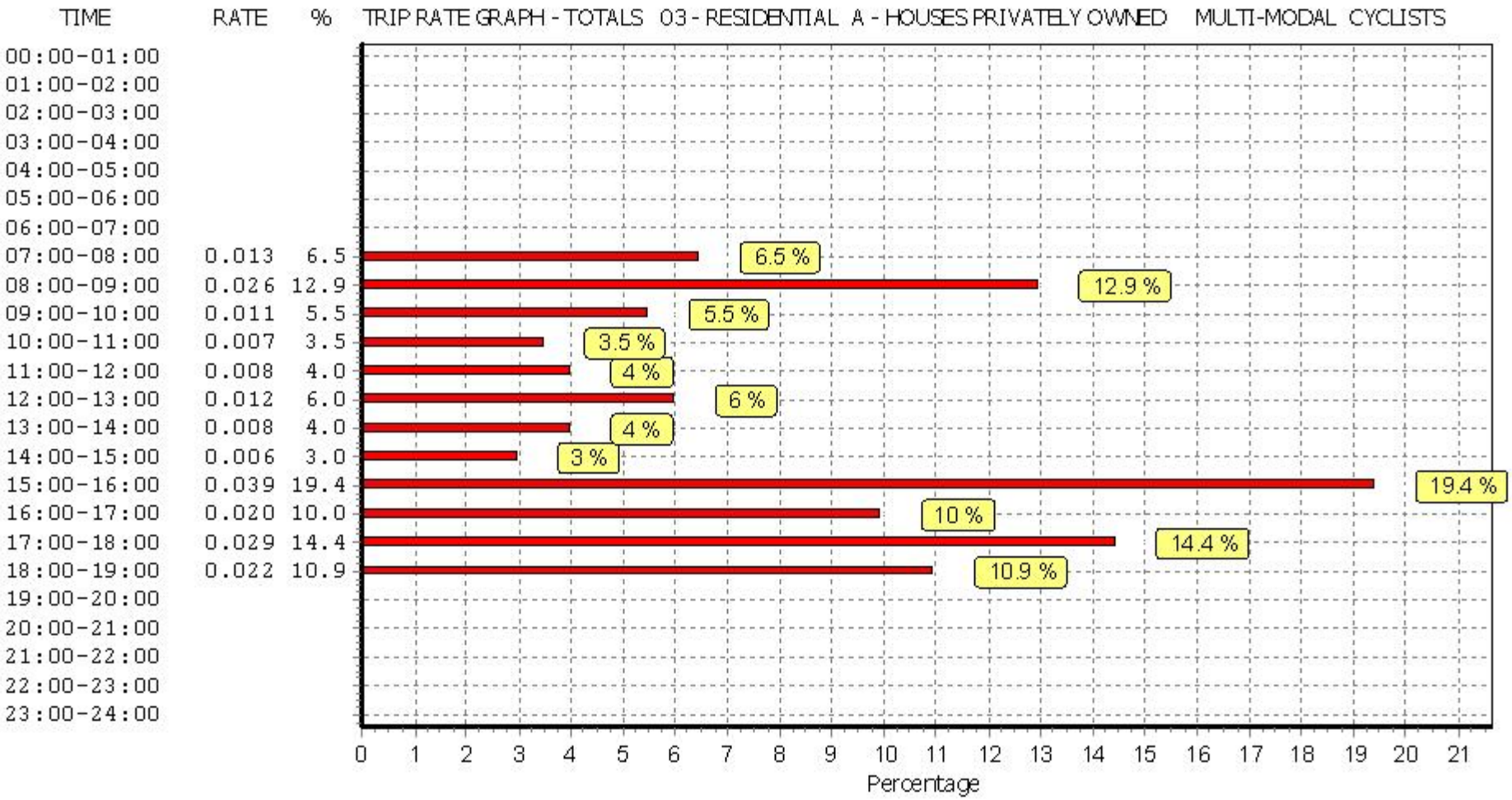


This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL PEDESTRIANS
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	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	10	162	0.039	10	162	0.065	10	162	0.104
08:00 - 09:00	10	162	0.048	10	162	0.167	10	162	0.215
09:00 - 10:00	10	162	0.054	10	162	0.066	10	162	0.120
10:00 - 11:00	10	162	0.044	10	162	0.046	10	162	0.090
11:00 - 12:00	10	162	0.037	10	162	0.044	10	162	0.081
12:00 - 13:00	10	162	0.033	10	162	0.035	10	162	0.068
13:00 - 14:00	10	162	0.032	10	162	0.038	10	162	0.070
14:00 - 15:00	10	162	0.044	10	162	0.041	10	162	0.085
15:00 - 16:00	10	162	0.204	10	162	0.081	10	162	0.285
16:00 - 17:00	10	162	0.087	10	162	0.059	10	162	0.146
17:00 - 18:00	10	162	0.061	10	162	0.058	10	162	0.119
18:00 - 19:00	10	162	0.071	10	162	0.067	10	162	0.138
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.754			0.767			1.521

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

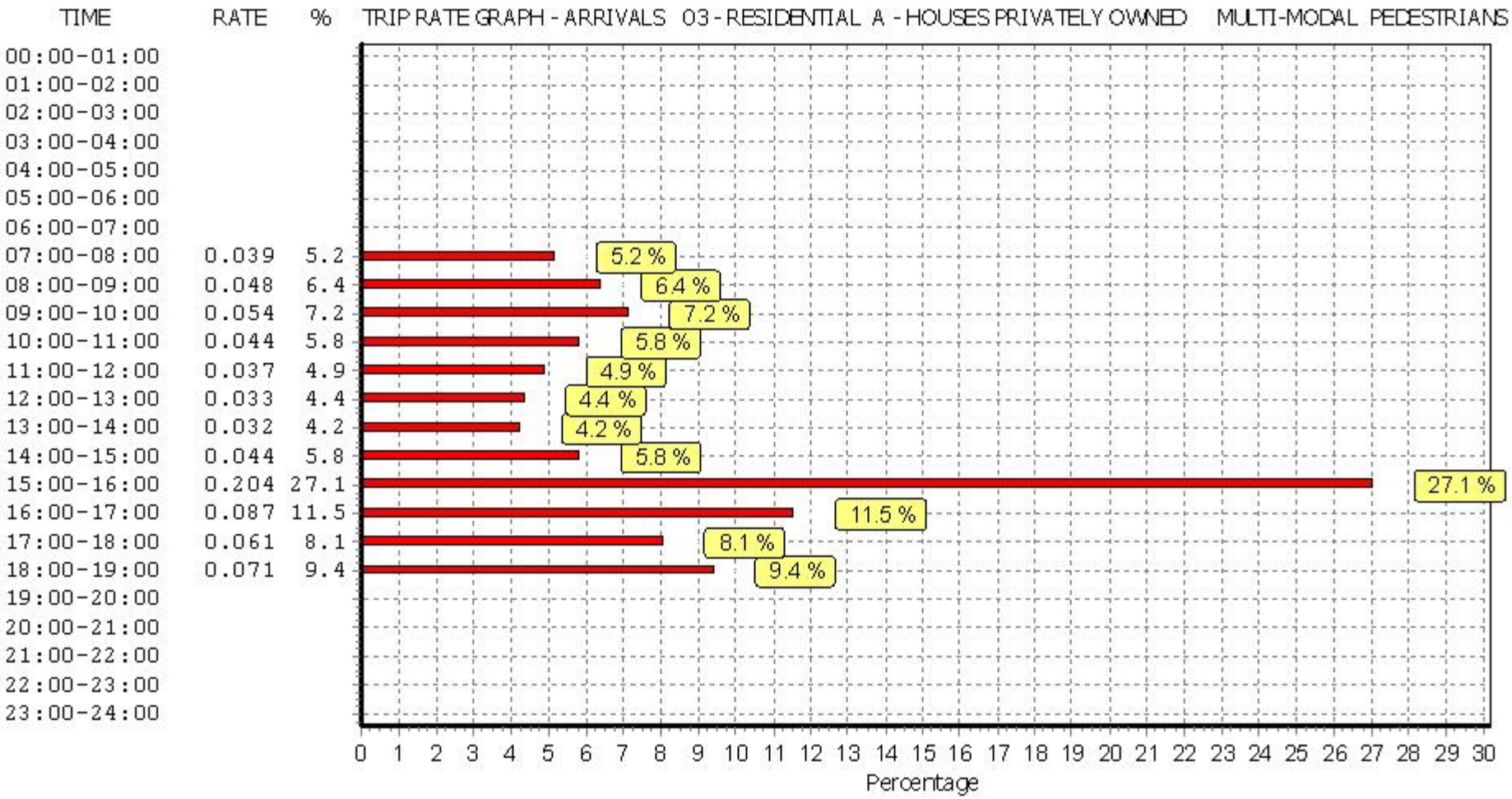
To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected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

Parameter summary

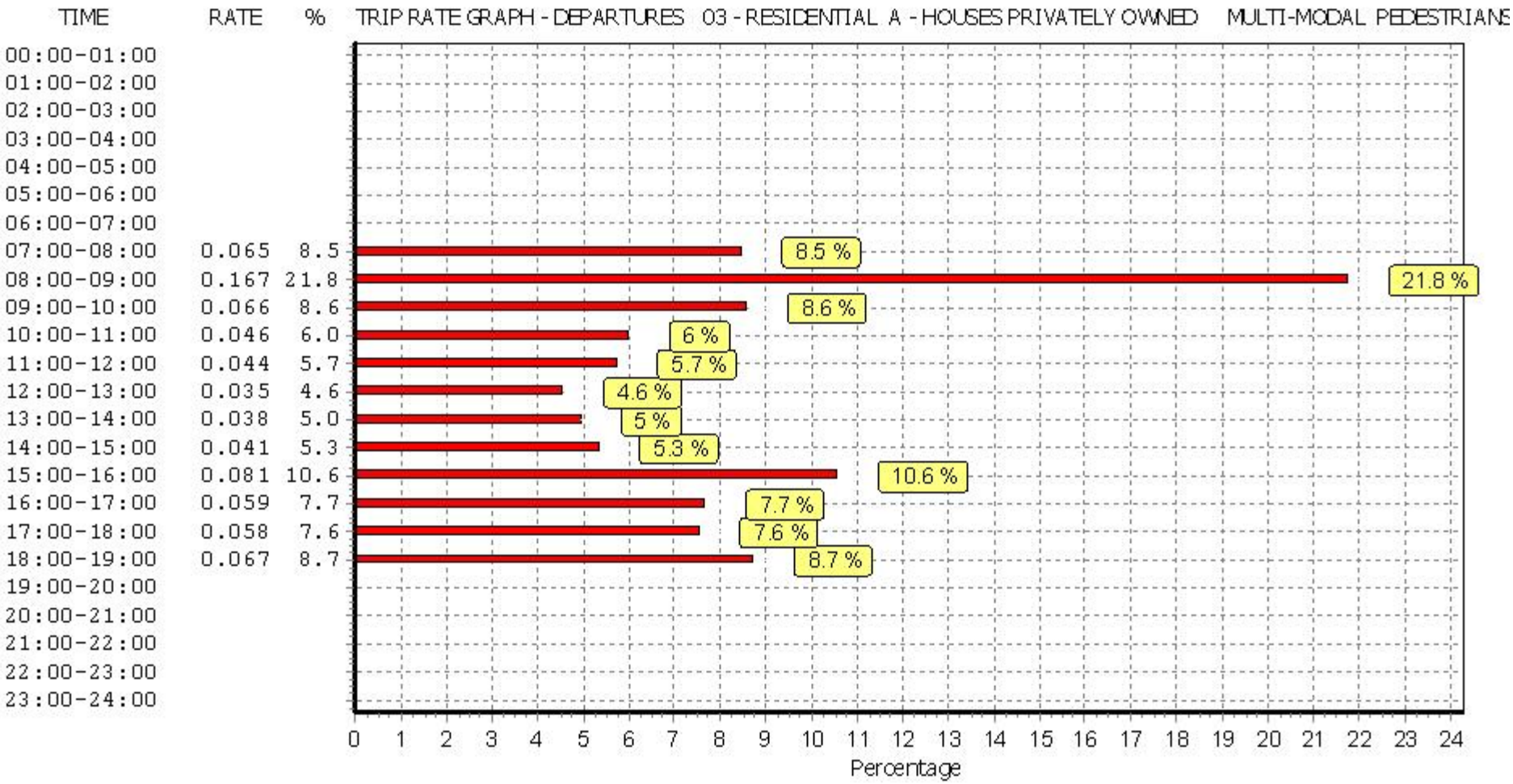
Trip rate parameter range selected:	108 - 237 (units:)
Survey date date range:	01/01/07 - 22/09/12
Number of weekdays (Monday-Friday):	10
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

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

Vectos Churchill Way Cardiff Licence No: 152302



This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.



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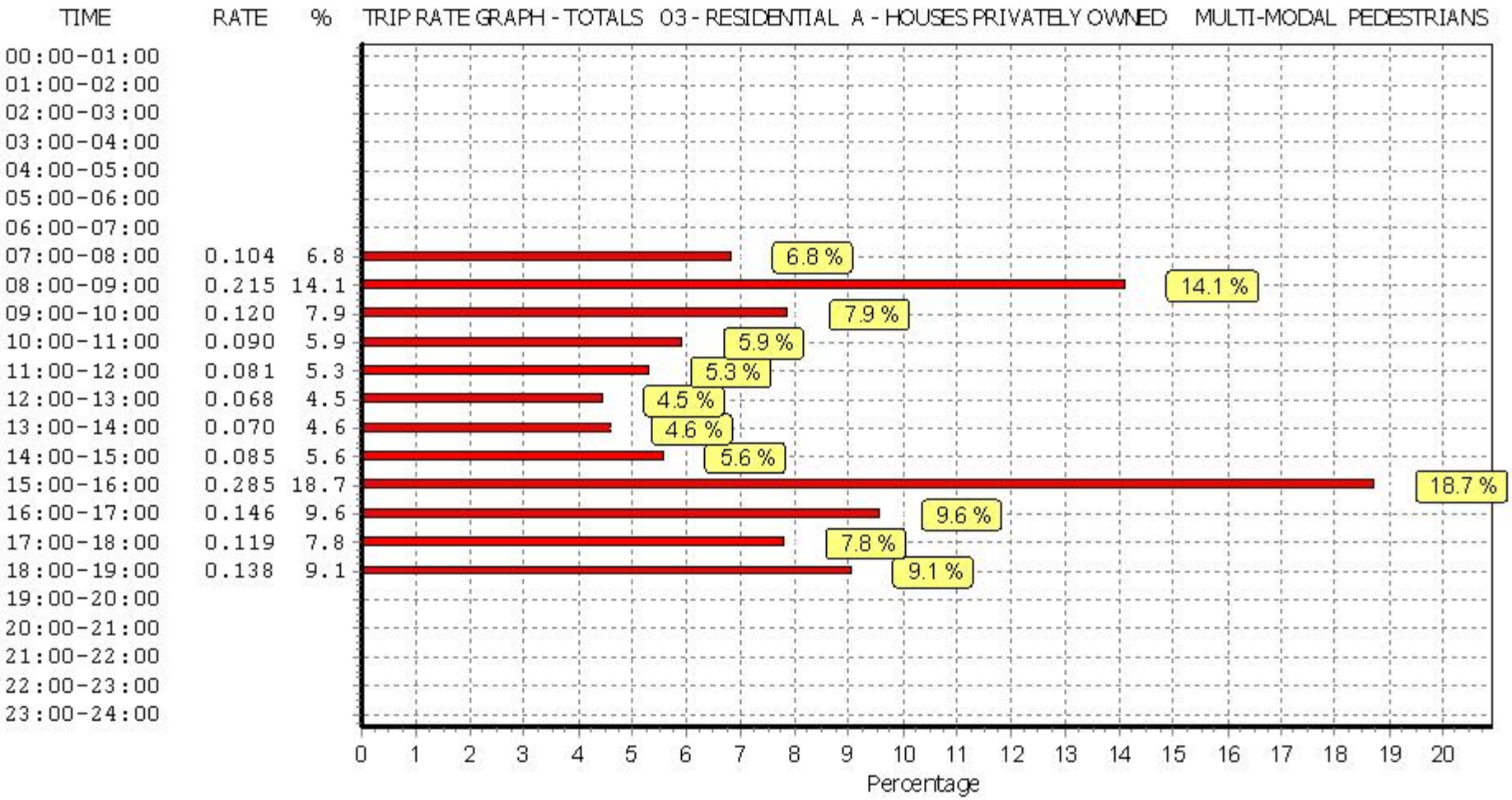
Vectos Churchill Way Cardiff Licence No: 152302



This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL PUBLIC TRANSPORT USERS
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	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	10	162	0.000	10	162	0.012	10	162	0.012
08:00 - 09:00	10	162	0.004	10	162	0.022	10	162	0.026
09:00 - 10:00	10	162	0.003	10	162	0.012	10	162	0.015
10:00 - 11:00	10	162	0.004	10	162	0.008	10	162	0.012
11:00 - 12:00	10	162	0.005	10	162	0.010	10	162	0.015
12:00 - 13:00	10	162	0.008	10	162	0.007	10	162	0.015
13:00 - 14:00	10	162	0.010	10	162	0.004	10	162	0.014
14:00 - 15:00	10	162	0.006	10	162	0.002	10	162	0.008
15:00 - 16:00	10	162	0.009	10	162	0.008	10	162	0.017
16:00 - 17:00	10	162	0.014	10	162	0.002	10	162	0.016
17:00 - 18:00	10	162	0.020	10	162	0.007	10	162	0.027
18:00 - 19:00	10	162	0.012	10	162	0.001	10	162	0.013
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.095			0.095			0.190

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

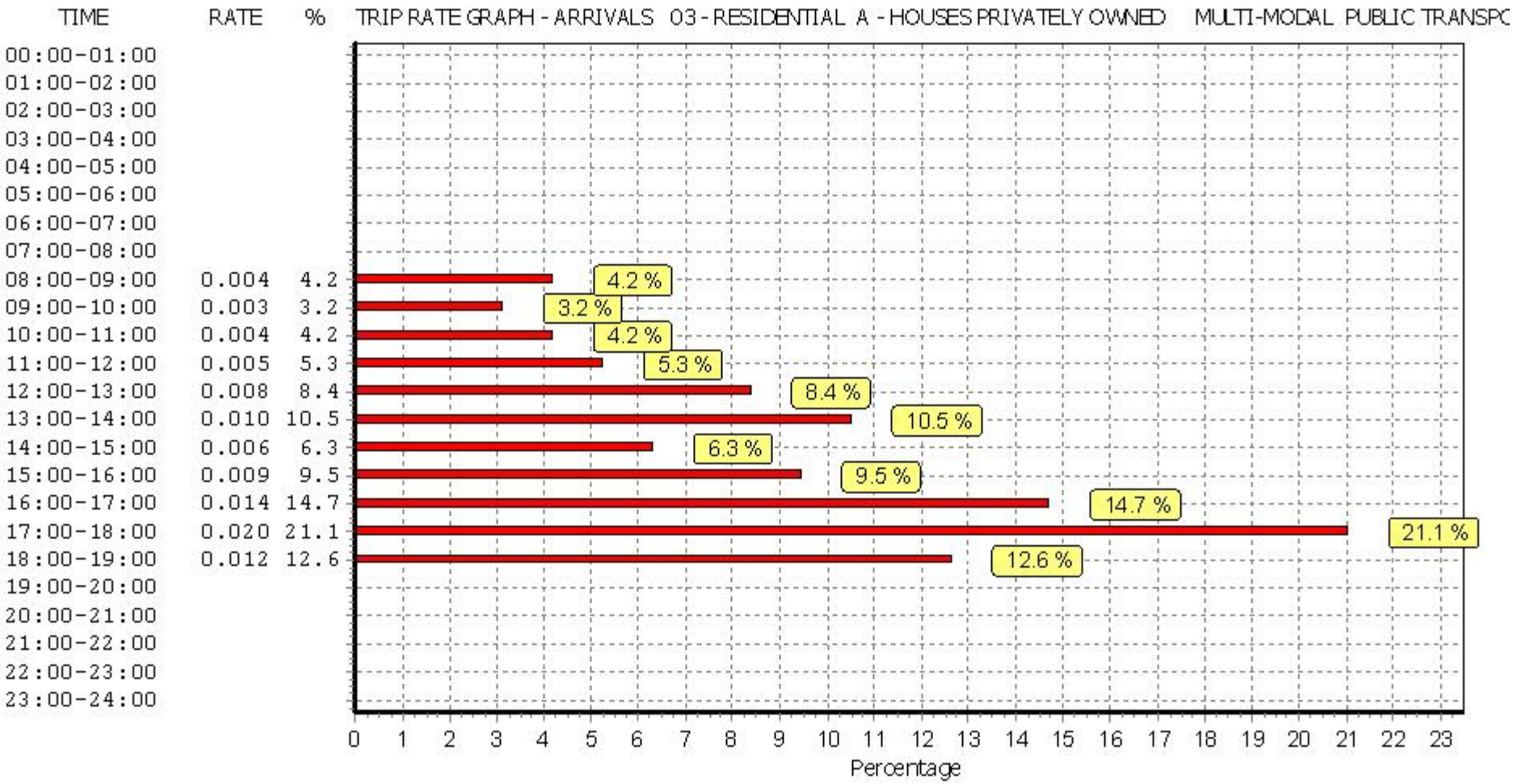
To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected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

Parameter summary

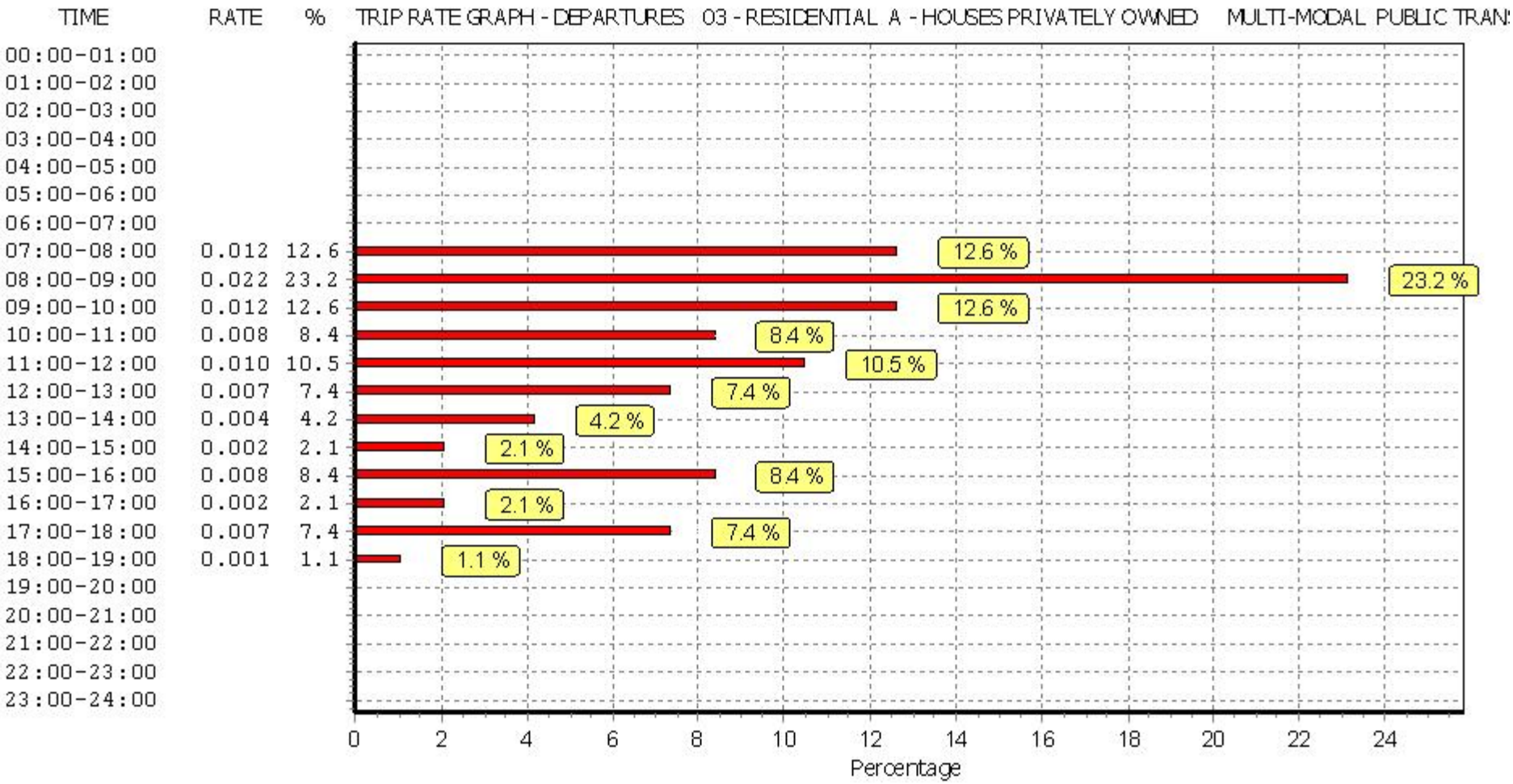
Trip rate parameter range selected:	108 - 237 (units:)
Survey date date range:	01/01/07 - 22/09/12
Number of weekdays (Monday-Friday):	10
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

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

Vectos Churchill Way Cardiff Licence No: 152302



This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.



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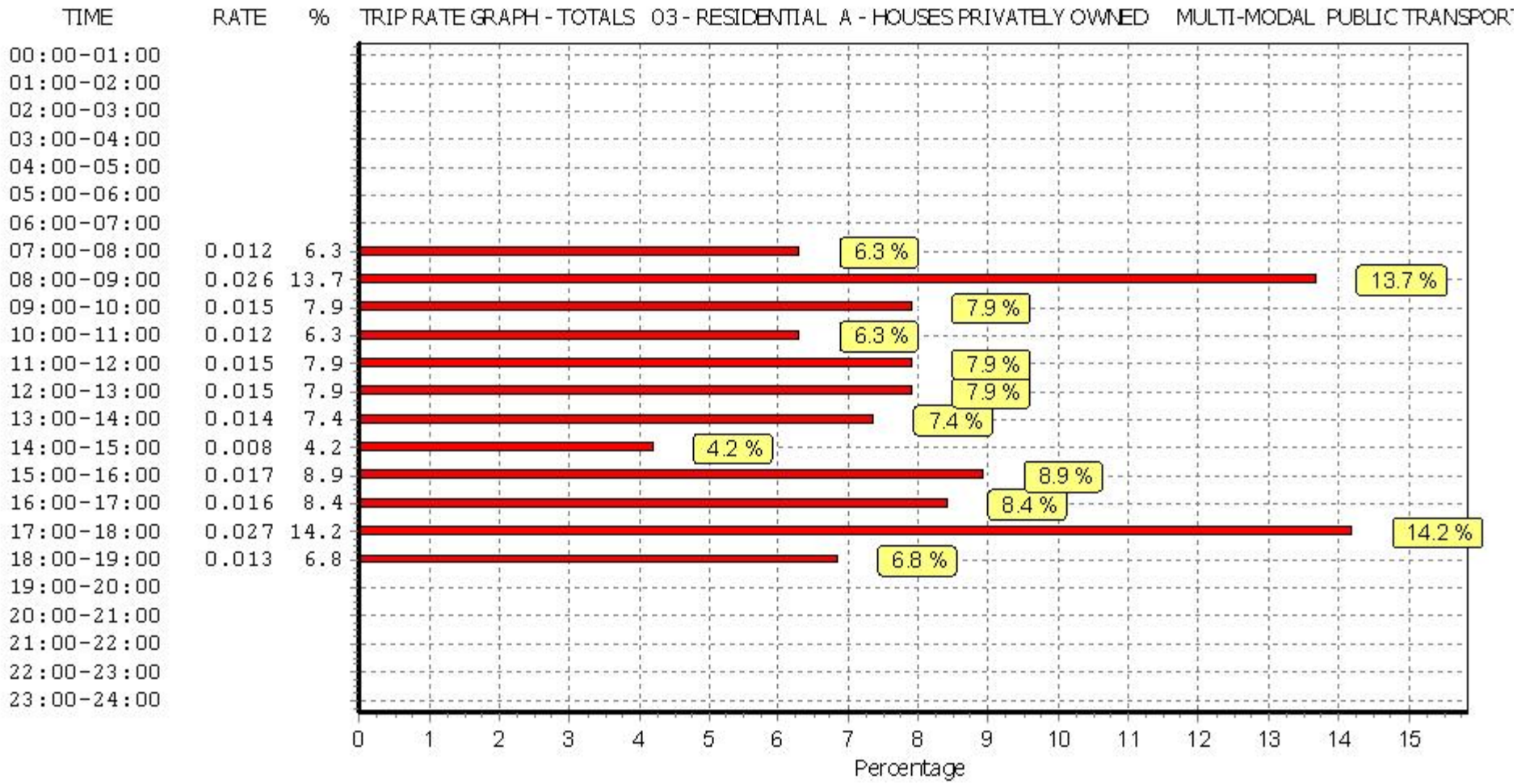

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TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL TOTAL PEOPLE
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	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	10	162	0.154	10	162	0.443	10	162	0.597
08:00 - 09:00	10	162	0.286	10	162	0.914	10	162	1.200
09:00 - 10:00	10	162	0.275	10	162	0.370	10	162	0.645
10:00 - 11:00	10	162	0.243	10	162	0.321	10	162	0.564
11:00 - 12:00	10	162	0.270	10	162	0.275	10	162	0.545
12:00 - 13:00	10	162	0.301	10	162	0.296	10	162	0.597
13:00 - 14:00	10	162	0.299	10	162	0.276	10	162	0.575
14:00 - 15:00	10	162	0.280	10	162	0.289	10	162	0.569
15:00 - 16:00	10	162	0.729	10	162	0.405	10	162	1.134
16:00 - 17:00	10	162	0.590	10	162	0.365	10	162	0.955
17:00 - 18:00	10	162	0.642	10	162	0.419	10	162	1.061
18:00 - 19:00	10	162	0.456	10	162	0.399	10	162	0.855
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			4.525			4.772			9.297

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.

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Parameter summary

Trip rate parameter range selected:	108 - 237 (units:)
Survey date date range:	01/01/07 - 22/09/12
Number of weekdays (Monday-Friday):	10
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

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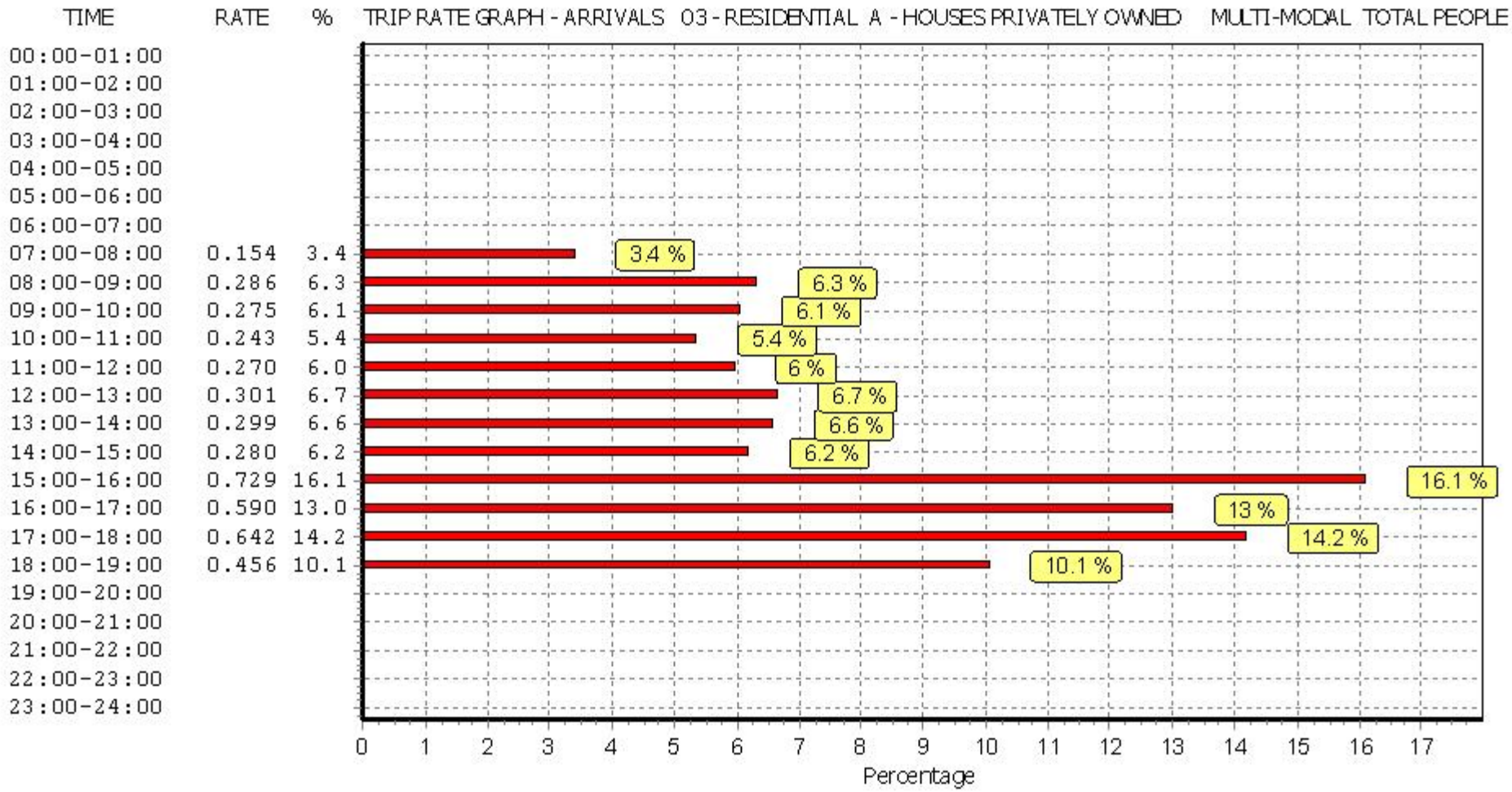
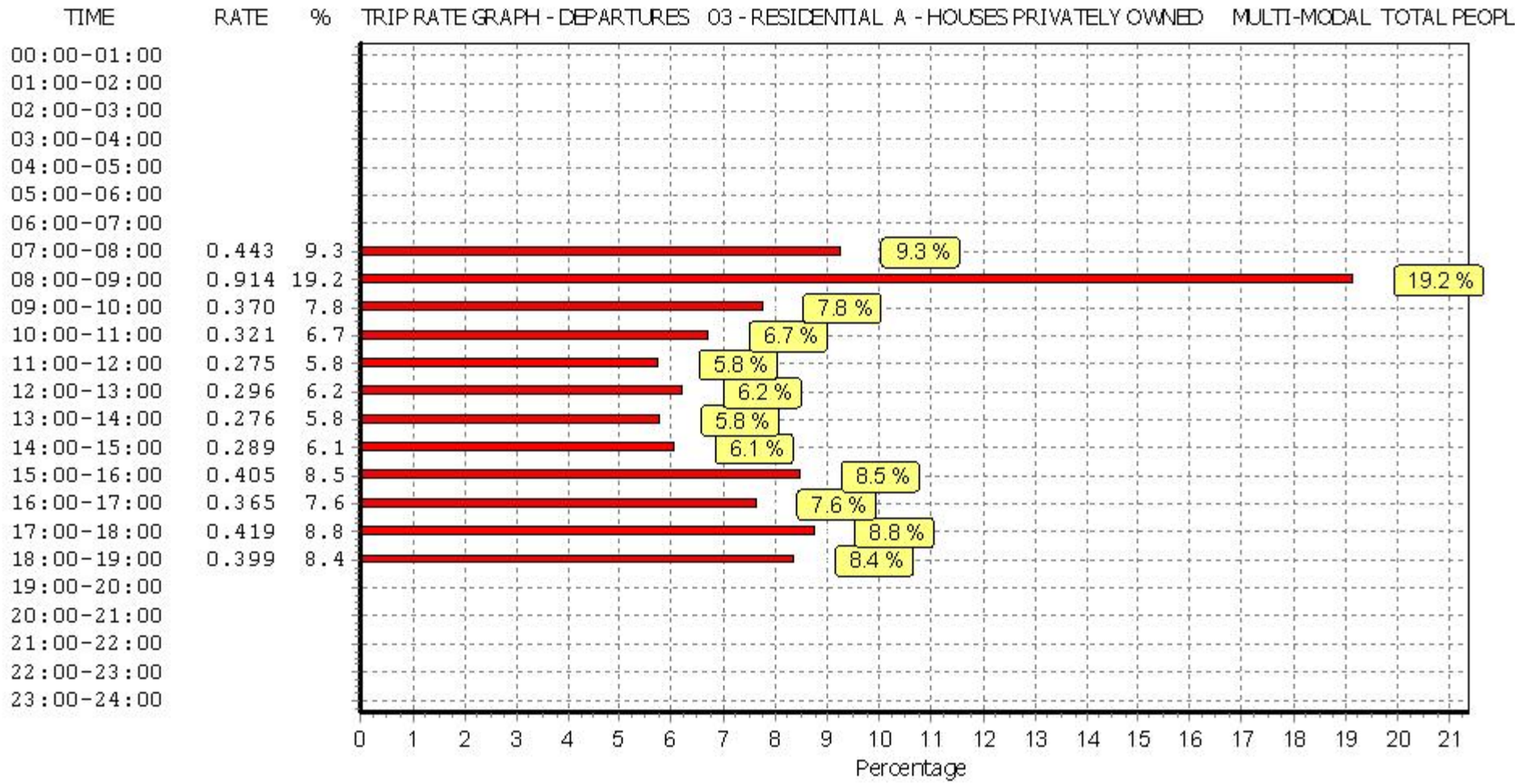
Vectos Churchill Way Cardiff Licence No: 152302



This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.



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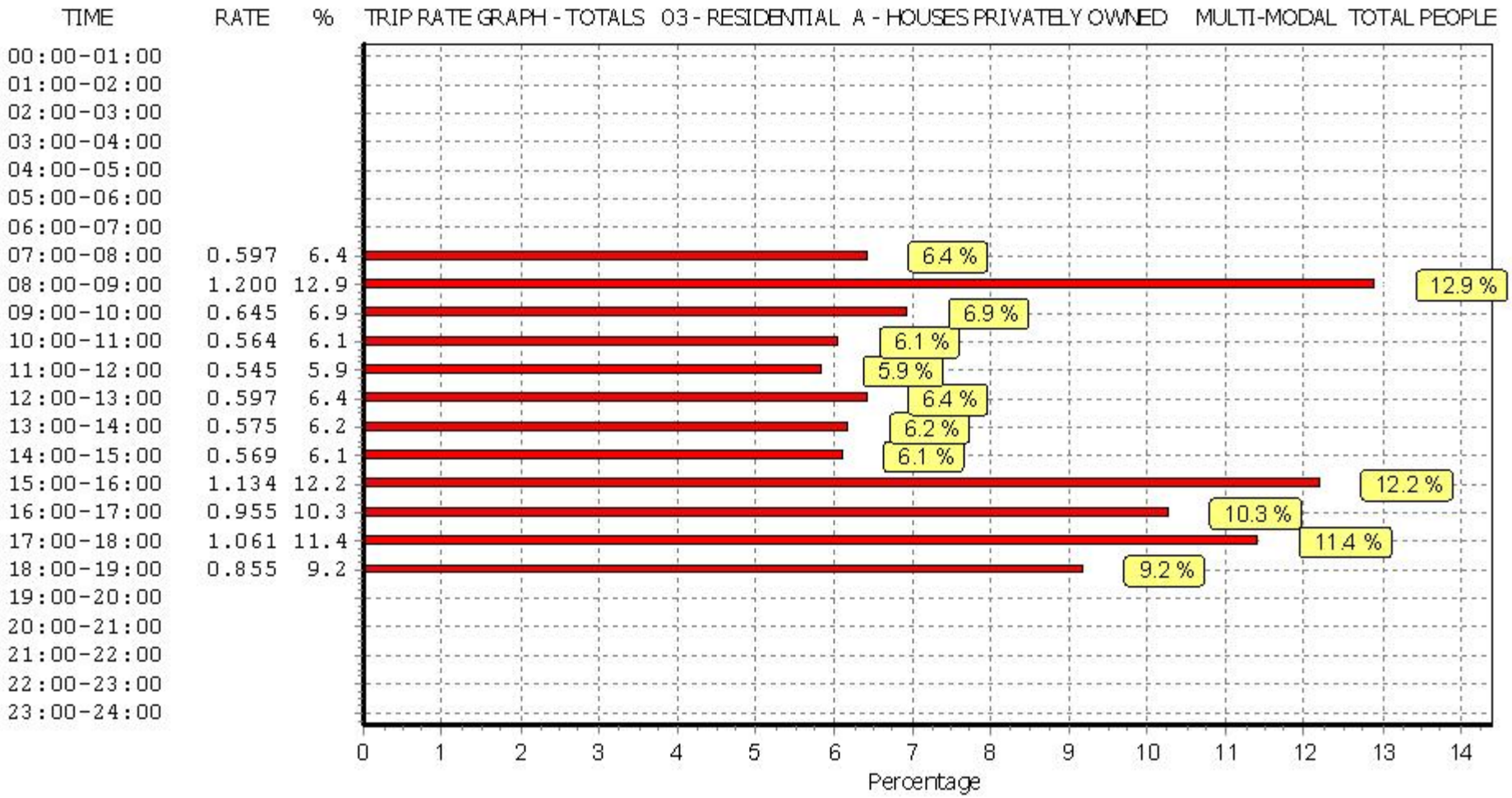

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Appendix I

Calculation Reference: AUDIT-152303-200619-0640

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : B - BUSINESS PARK
MULTI-MODAL VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	EX	ESSEX	2 days
	HC	HAMPSHIRE	1 days
	SC	SURREY	1 days
03	SOUTH WEST		
	DV	DEVON	1 days
04	EAST ANGLIA		
	CA	CAMBRIDGESHIRE	1 days
05	EAST MIDLANDS		
	LN	LINCOLNSHIRE	1 days
06	WEST MIDLANDS		
	SH	SHROPSHIRE	1 days
	ST	STAFFORDSHIRE	1 days
10	WALES		
	CF	CARDIFF	4 days

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

Primary Filtering selection:

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

Parameter: Gross floor area
Actual Range: 1500 to 142687 (units: sqm)
Range Selected by User: 975 to 142687 (units: sqm)

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/12 to 14/10/19

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	2 days
Tuesday	2 days
Wednesday	2 days
Thursday	2 days
Friday	5 days

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

Selected survey types:

Manual count	13 days
Directional ATC Count	0 days

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

Selected Locations:

Edge of Town Centre	2
Suburban Area (PPS6 Out of Centre)	2
Edge of Town	9

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	5
Commercial Zone	3
Development Zone	1
No Sub Category	4

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

Secondary Filtering selection:

Use Class:

B1	13 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	3 days
10,001 to 15,000	5 days
15,001 to 20,000	3 days
20,001 to 25,000	1 days
25,001 to 50,000	1 days

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

Population within 5 miles:

25,001 to 50,000	1 days
50,001 to 75,000	1 days
125,001 to 250,000	6 days
250,001 to 500,000	5 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	6 days
1.1 to 1.5	7 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	11 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	13 days

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

LIST OF SITES relevant to selection parameters

1 CA-02-B-03 SCIENCE PARK CAMBRIDGESHIRE
MILTON ROAD
CAMBRIDGE

Edge of Town
No Sub Category
Total Gross floor area: 142687 sqm
Survey date: FRIDAY *06/10/17* *Survey Type: MANUAL*

2 CF-02-B-04 BUSINESS PARK CARDIFF
RHYMNEY RIVER BRIDGE RD
CARDIFF

Edge of Town
Development Zone
Total Gross floor area: 5300 sqm
Survey date: FRIDAY *05/05/17* *Survey Type: MANUAL*

3 CF-02-B-06 BUSINESS PARK CARDIFF
MALTHOUSE AVENUE
CARDIFF
PONTPRENNAU
Edge of Town
No Sub Category
Total Gross floor area: 1642 sqm
Survey date: MONDAY *12/03/18* *Survey Type: MANUAL*

4 CF-02-B-07 BUSINESS PARK CARDIFF
MALTHOUSE AVENUE
CARDIFF
PONTPRENNAU
Edge of Town
Commercial Zone
Total Gross floor area: 15930 sqm
Survey date: TUESDAY *13/03/18* *Survey Type: MANUAL*

5 CF-02-B-08 BUSINESS PARK CARDIFF
VANGUARD WAY
CARDIFF
ATLANTIC WHARF
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 14312 sqm
Survey date: MONDAY *14/10/19* *Survey Type: MANUAL*

6 DV-02-B-01 BUSINESS PARK DEVON
MANATON CLOSE
EXETER
MATFORD BUSINESS PARK
Edge of Town
Commercial Zone
Total Gross floor area: 1500 sqm
Survey date: WEDNESDAY *05/07/17* *Survey Type: MANUAL*

7 EX-02-B-01 BUSINESS PARK ESSEX
BRUNEL COURT
COLCHESTER
SEVERALLS INDUSTRIAL PK
Edge of Town
Industrial Zone
Total Gross floor area: 2900 sqm
Survey date: FRIDAY *18/05/18* *Survey Type: MANUAL*

8 EX-02-B-02 BUSINESS PARK ESSEX
WYNCOLLS ROAD
COLCHESTER
SEVERALLS INDUSTRIAL PK
Edge of Town
Industrial Zone
Total Gross floor area: 4083 sqm
Survey date: FRIDAY *18/05/18* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

9	HC-02-B-02 WESTERN ROAD PORTSMOUTH	BUSINESS PARK		HAMPSHIRE
	Suburban Area (PPS6 Out of Centre) No Sub Category Total Gross floor area:		55000 sqm	
	Survey date: FRIDAY		*18/10/13*	*Survey Type: MANUAL*
10	LN-02-B-02 CARDINAL CLOSE LINCOLN	BUSINESS PARK		LINCOLNSHIRE
	Edge of Town Industrial Zone Total Gross floor area:		5000 sqm	
	Survey date: THURSDAY		*25/06/15*	*Survey Type: MANUAL*
11	SC-02-B-03 A331 FRIMLEY	BUSINESS PARK		SURREY
	Edge of Town Centre No Sub Category Total Gross floor area:		20160 sqm	
	Survey date: TUESDAY		*27/11/12*	*Survey Type: MANUAL*
12	SH-02-B-04 STAFFORD COURT TELFORD	BUSINESS PARK		SHROPSHIRE
	Edge of Town Centre Commercial Zone Total Gross floor area:		10175 sqm	
	Survey date: THURSDAY		*24/10/13*	*Survey Type: MANUAL*
13	ST-02-B-04 STONE ROAD STAFFORD	BUSINESS PARK		STAFFORDSHIRE
	Edge of Town Industrial Zone Total Gross floor area:		20760 sqm	
	Survey date: WEDNESDAY		*22/11/17*	*Survey Type: MANUAL*

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

TRIP RATE for Land Use 02 - EMPLOYMENT/B - BUSINESS PARK
MULTI-MODAL 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	13	23035	0.524	13	23035	0.071	13	23035	0.595
08:00 - 09:00	13	23035	1.136	13	23035	0.127	13	23035	1.263
09:00 - 10:00	13	23035	0.438	13	23035	0.136	13	23035	0.574
10:00 - 11:00	13	23035	0.160	13	23035	0.105	13	23035	0.265
11:00 - 12:00	13	23035	0.145	13	23035	0.133	13	23035	0.278
12:00 - 13:00	13	23035	0.172	13	23035	0.233	13	23035	0.405
13:00 - 14:00	13	23035	0.197	13	23035	0.177	13	23035	0.374
14:00 - 15:00	13	23035	0.148	13	23035	0.172	13	23035	0.320
15:00 - 16:00	13	23035	0.102	13	23035	0.240	13	23035	0.342
16:00 - 17:00	13	23035	0.102	13	23035	0.412	13	23035	0.514
17:00 - 18:00	13	23035	0.081	13	23035	0.831	13	23035	0.912
18:00 - 19:00	13	23035	0.043	13	23035	0.542	13	23035	0.585
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			3.248			3.179			6.427

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

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

Parameter summary

Trip rate parameter range selected:	1500 - 142687 (units: sqm)
Survey date date range:	01/01/12 - 14/10/19
Number of weekdays (Monday-Friday):	13
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

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

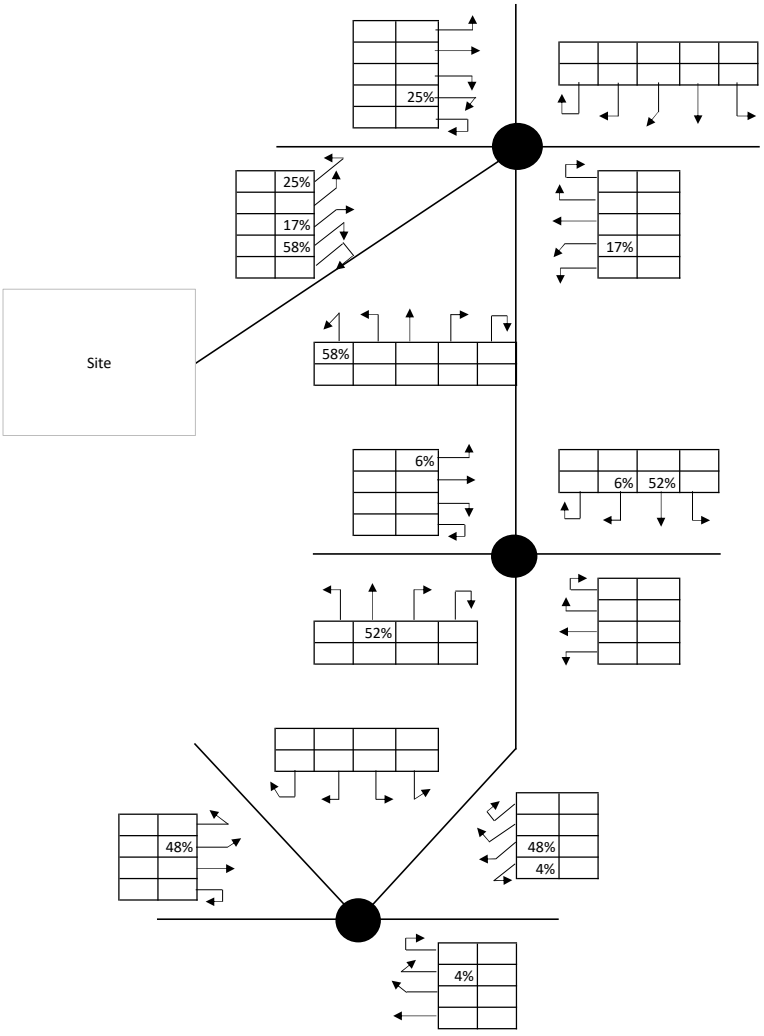
TRIP RATE for Land Use 02 - EMPLOYMENT/B - BUSINESS PARK
MULTI-MODAL TOTAL PEOPLE
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	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	13	23035	0.730	13	23035	0.092	13	23035	0.822
08:00 - 09:00	13	23035	1.665	13	23035	0.210	13	23035	1.875
09:00 - 10:00	13	23035	0.735	13	23035	0.204	13	23035	0.939
10:00 - 11:00	13	23035	0.287	13	23035	0.181	13	23035	0.468
11:00 - 12:00	13	23035	0.245	13	23035	0.228	13	23035	0.473
12:00 - 13:00	13	23035	0.318	13	23035	0.423	13	23035	0.741
13:00 - 14:00	13	23035	0.377	13	23035	0.325	13	23035	0.702
14:00 - 15:00	13	23035	0.243	13	23035	0.278	13	23035	0.521
15:00 - 16:00	13	23035	0.175	13	23035	0.394	13	23035	0.569
16:00 - 17:00	13	23035	0.180	13	23035	0.709	13	23035	0.889
17:00 - 18:00	13	23035	0.148	13	23035	1.294	13	23035	1.442
18:00 - 19:00	13	23035	0.083	13	23035	0.757	13	23035	0.840
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			5.186			5.095			10.281

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.

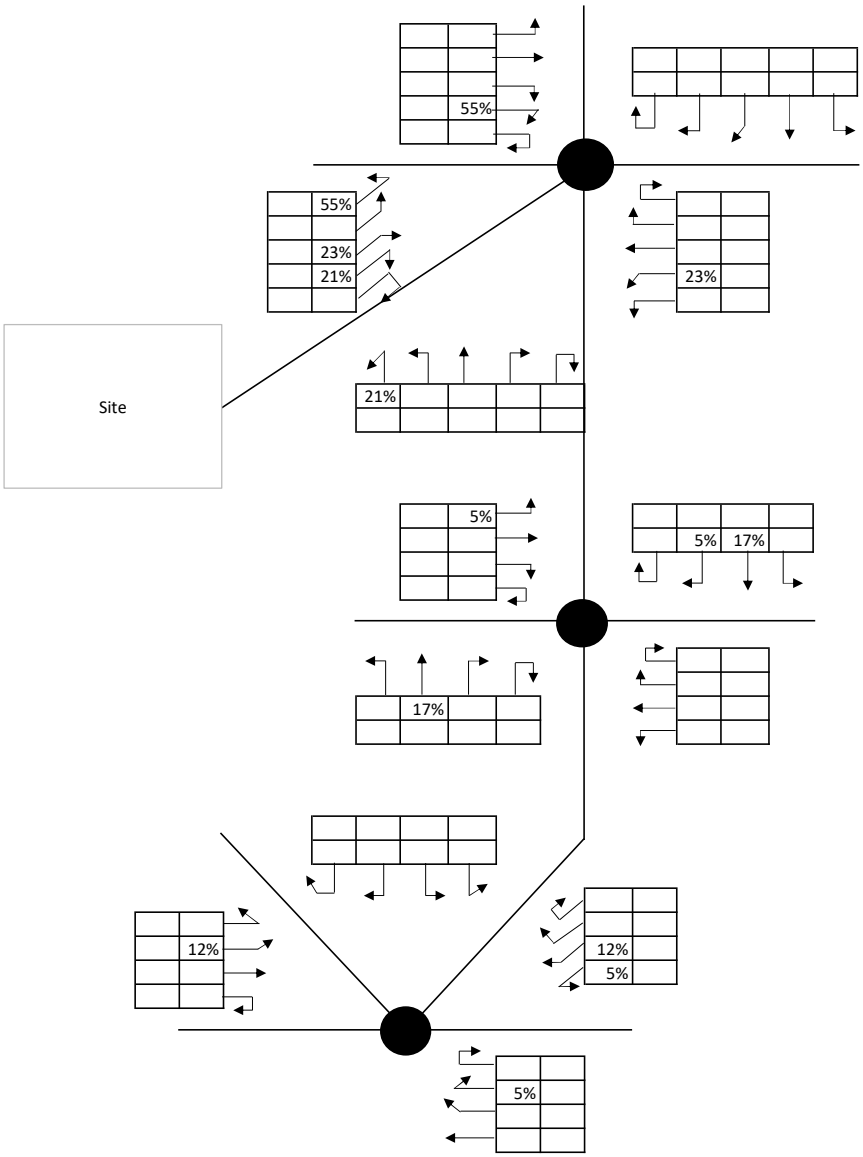
*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected 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 J



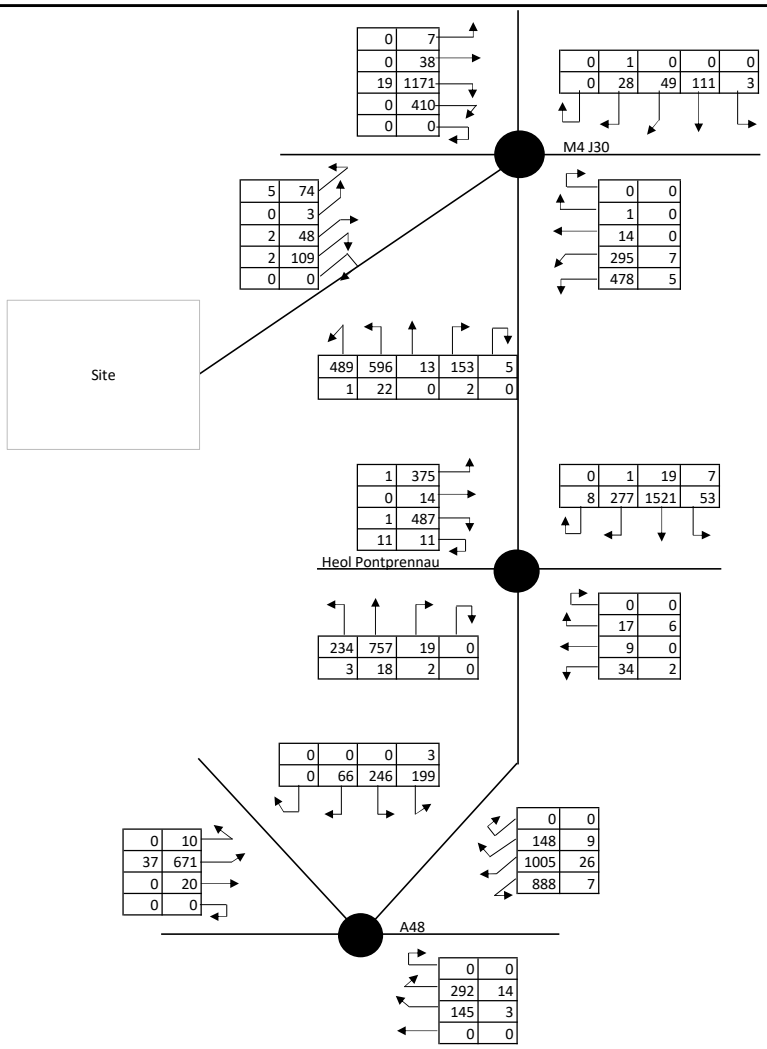
vectos.	Project Title: Plot 8, 12 and 14 Redevelopment	Drawn: DS	Date: 18/11/2021	Checked: IS	Rev:
Client: Cardiff Gate International Business Park		Figure Resi Distribution			Appenidx: J

Appendix K

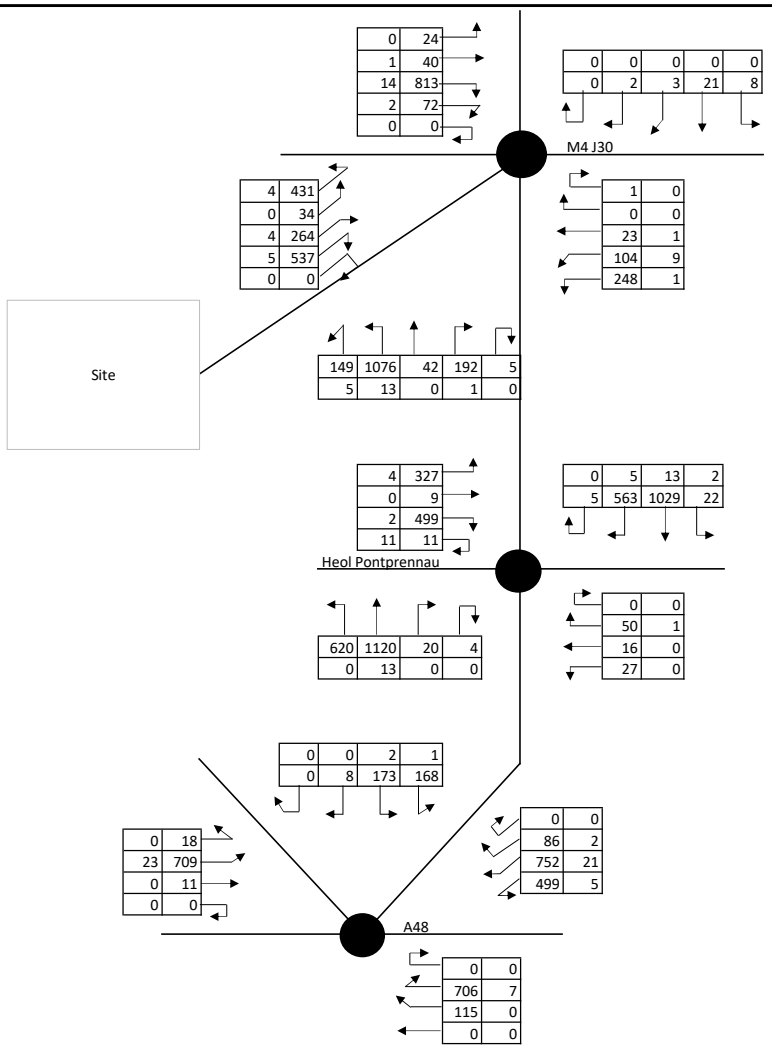


vectos.	Project Title: Plot 8, 12 and 14 Redevelopment	Drawn: DS	Date: 18/11/2021	Checked: IS	Rev:
Client: Cardiff Gate International Business Park		Figure Office Distribution			Appendix: K

Appendix L

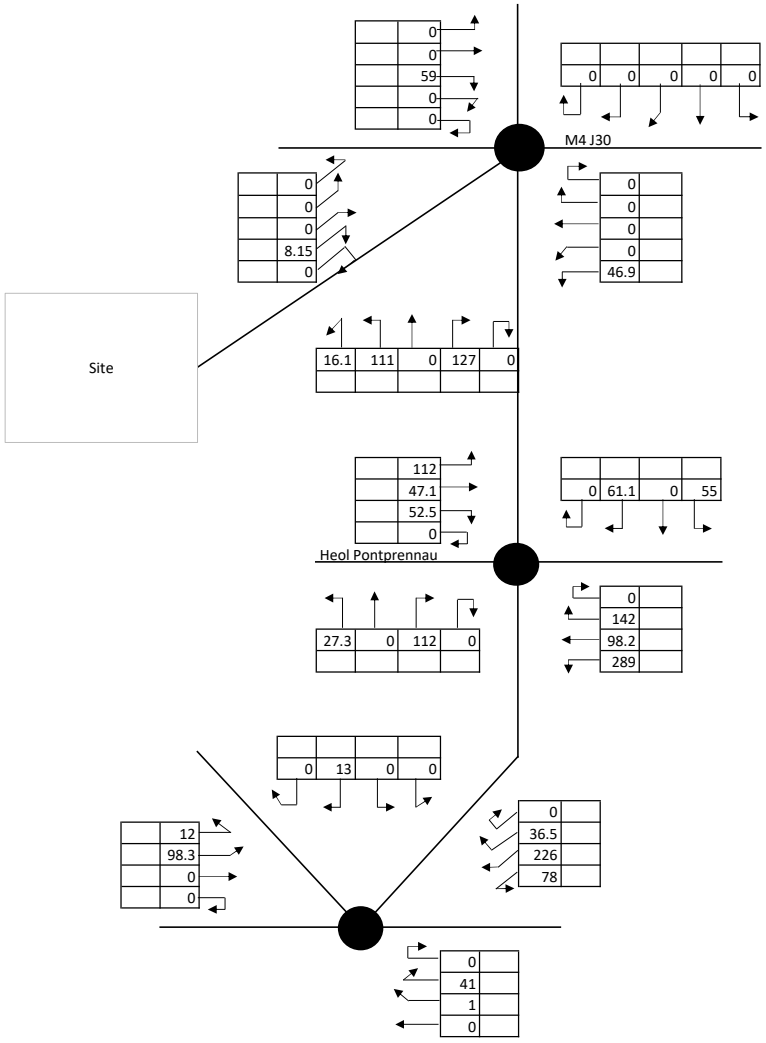


vectos.	Project Title: Plot 8, 12 and 14 Redevelopment	Drawn: DS	Date: 18/11/2021	Checked: IS	Rev:
Client: Cardiff Gate International Business Park		Figure: Base AM Peak			Appendix: L

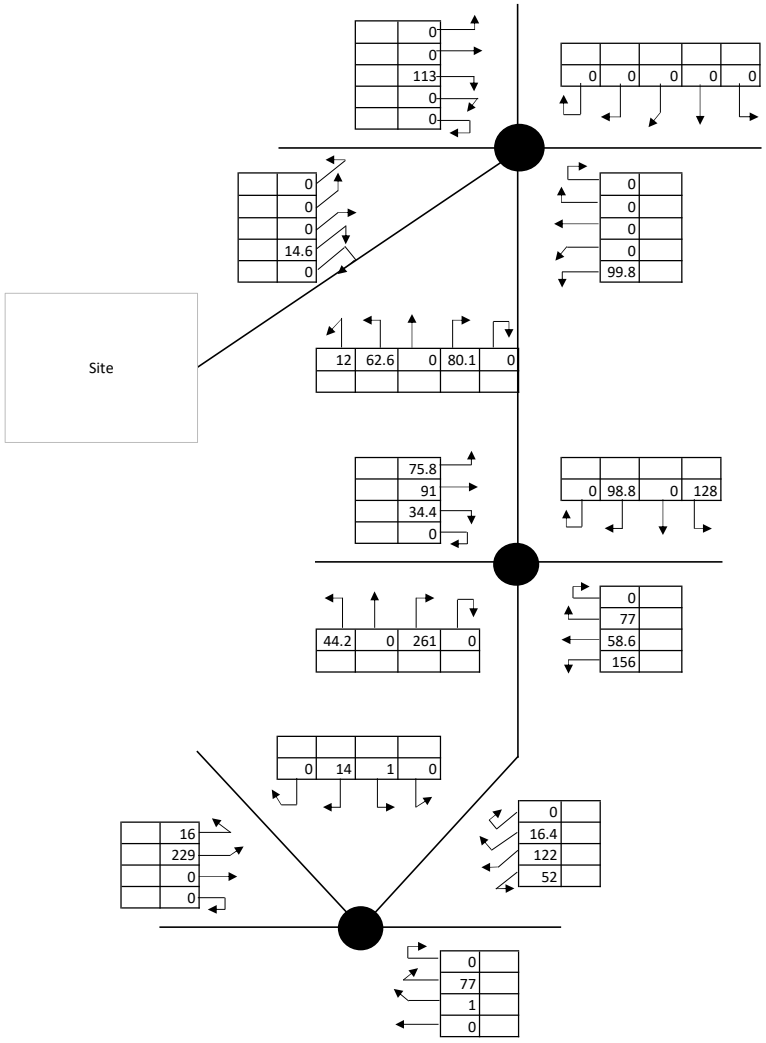


vectos.	Project Title: Plot 8, 12 and 14 Redevelopment	Drawn: DS	Date: 18/11/2021	Checked: IS	Rev:
Client: Cardiff Gate International Business Park		Figure: Base PM Peak			Appenidx: L

Appendix M



vectos.	Project Title: Plot 8, 12 and 14 Redevelopment	Drawn: DS	Date: 18/11/2021	Checked: IS	Rev:
Client: Cardiff Gate International Business Park		Figure: Commited Dev Flows AM Peak			Appendix: M



vectos.	Project Title: Plot 8, 12 and 14 Redevelopment	Drawn: DS	Date: 18/11/2021	Checked: IS	Rev:
Client: Cardiff Gate International Business Park		Figure: Committed Dev Flows PM Peak			Appendix: M

Appendix N

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.5.1.7462

For sales and distribution information, program advice and maintenance, contact TRL:
+44 (0)1344 379777 software@trl.co.uk www.trlsoftware.co.uk

Filename: 205339-Site Access 2 PICADY-V1.j9
Path: P:\Projects\200000\205339 - Cardiff Gate Development\Technical\B - Transport Assessment\Modelling
Report generation date: 07/09/2021 13:52:57

»Base, AM
»Base, PM
»Base+CD, AM
»Base+CD, PM
»Base+CD+Dev, AM
»Base+CD+Dev, PM

Summary of junction performance

	AM					PM				
	Set ID	Queue (Veh)	Delay (s)	RFC	LOS	Set ID	Queue (Veh)	Delay (s)	RFC	LOS
Base										
Stream B-C	D13	0.0	0.00	0.00	A	D14	0.0	0.00	0.00	A
Stream B-A		0.0	0.00	0.00	A		0.0	0.00	0.00	A
Stream C-AB		0.0	0.00	0.00	A		0.0	0.00	0.00	A
Base+CD										
Stream B-C	D15	0.0	0.00	0.00	A	D16	0.0	0.00	0.00	A
Stream B-A		0.0	0.00	0.00	A		0.0	0.00	0.00	A
Stream C-AB		0.0	0.00	0.00	A		0.0	0.00	0.00	A
Base+CD+Dev										
Stream B-C	D17	0.0	0.00	0.00	A	D18	0.0	0.00	0.00	A
Stream B-A		0.1	9.08	0.13	A		0.1	8.84	0.09	A
Stream C-AB		0.0	0.00	0.00	A		0.0	0.00	0.00	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	
Location	
Site number	
Date	07/09/2021
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	VECTOS\taylor.davis
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	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				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)	Run automatically	Relationship type	Relationship
D1	Churchlands CD	AM	ONE HOUR	07:45	09:15	15			
D2	Churchlands CD	PM	ONE HOUR	16:45	18:15	15			
D3	Taylor Wimpey CD	AM	ONE HOUR	07:45	09:15	15			
D4	Taylor Wimpey CD	PM	ONE HOUR	16:45	18:15	15			
D5	Committed Dev	AM	ONE HOUR	07:45	09:15	15		Simple	D1+D3+D19
D6	Committed Dev	PM	ONE HOUR	16:45	18:15	15		Simple	D2+D4+D20
D7	Dev (Office Land Use)	AM	ONE HOUR	07:45	09:15	15			
D8	Dev (Office Land Use)	PM	ONE HOUR	16:45	18:15	15			
D9	Dev (Resi Land Use)	AM	ONE HOUR	07:45	09:15	15			
D10	Dev (Resi Land Use)	PM	ONE HOUR	16:45	18:15	15			
D11	Full Dev	AM	ONE HOUR	07:45	09:15	15		Simple	D7+D9
D12	Full Dev	PM	ONE HOUR	16:45	18:15	15		Simple	D8+D10
D13	Base	AM	ONE HOUR	07:45	09:15	15	✓		
D14	Base	PM	ONE HOUR	16:45	18:15	15	✓		
D15	Base+CD	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D13+D5
D16	Base+CD	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D14+D6
D17	Base+CD+Dev	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D13+D5+D11
D18	Base+CD+Dev	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D14+D6+D12
D19	St Edeyrn's CD	AM	ONE HOUR	07:45	09:15	15			
D20	St Edeyrn's CD	PM	ONE HOUR	16:45	18:15	15			

Analysis Set Details

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

Base, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Minor arm flare	B - Site Access 2 - Minor arm geometry	Is flare very short? Estimated flare length is zero but has been increased to 1 because a zero flare length is not allowed.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.
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	untitled	T-Junction	Two-way		0.00	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	Malthouse Avenue (E)		Major
B	Site Access 2		Minor
C	Malthouse Avenue (W)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C - Malthouse Avenue (W)	6.30			187.0	✓	0.00

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

Minor Arm Geometry

Arm	Minor arm type	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate flare length	Flare length (PCU)	Visibility to left (m)	Visibility to right (m)
B - Site Access 2	One lane plus flare	8.74	2.83	2.75	2.75	2.75	✓	1.00	22	22

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	500	0.090	0.227	0.143	0.325
B-C	725	0.110	0.277	-	-
C-B	682	0.261	0.261	-	-

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)	Run automatically
D13	Base	AM	ONE HOUR	07:45	09:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - Malthouse Avenue (E)		ONE HOUR	✓	15	100.000
B - Site Access 2		ONE HOUR	✓	0	100.000
C - Malthouse Avenue (W)		ONE HOUR	✓	193	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - Malthouse Avenue (E)	B - Site Access 2	C - Malthouse Avenue (W)
From	A - Malthouse Avenue (E)	0	0	15
	B - Site Access 2	0	0	0
	C - Malthouse Avenue (W)	193	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A - Malthouse Avenue (E)	B - Site Access 2	C - Malthouse Avenue (W)
From	A - Malthouse Avenue (E)	0	0	0
	B - Site Access 2	0	0	0
	C - Malthouse Avenue (W)	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.00	0.00	0.0	A	0	0
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.00	0.00	0.0	A	0	0
C-A					177	266
A-B					0	0
A-C					14	21

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	722	0.000	0	0.0	0.0	0.000	A
B-A	0	0	477	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	679	0.000	0	0.0	0.0	0.000	A
C-A	145	36			145				
A-B	0	0			0				
A-C	11	3			11				

08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	722	0.000	0	0.0	0.0	0.000	A
B-A	0	0	472	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	679	0.000	0	0.0	0.0	0.000	A
C-A	174	43			174				
A-B	0	0			0				
A-C	13	3			13				

08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	721	0.000	0	0.0	0.0	0.000	A
B-A	0	0	466	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	678	0.000	0	0.0	0.0	0.000	A
C-A	212	53			212				
A-B	0	0			0				
A-C	17	4			17				

08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	721	0.000	0	0.0	0.0	0.000	A
B-A	0	0	466	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	678	0.000	0	0.0	0.0	0.000	A
C-A	212	53			212				
A-B	0	0			0				
A-C	17	4			17				

08:45 - 09:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	722	0.000	0	0.0	0.0	0.000	A
B-A	0	0	472	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	679	0.000	0	0.0	0.0	0.000	A
C-A	174	43			174				
A-B	0	0			0				
A-C	13	3			13				

09:00 - 09:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	722	0.000	0	0.0	0.0	0.000	A
B-A	0	0	477	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	679	0.000	0	0.0	0.0	0.000	A
C-A	145	36			145				
A-B	0	0			0				
A-C	11	3			11				

Base, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Minor arm flare	B - Site Access 2 - Minor arm geometry	Is flare very short? Estimated flare length is zero but has been increased to 1 because a zero flare length is not allowed.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.
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	untitled	T-Junction	Two-way		0.00	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)	Run automatically
D14	Base	PM	ONE HOUR	16:45	18:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - Malthouse Avenue (E)		ONE HOUR	✓	161	100.000
B - Site Access 2		ONE HOUR	✓	0	100.000
C - Malthouse Avenue (W)		ONE HOUR	✓	16	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - Malthouse Avenue (E)	B - Site Access 2	C - Malthouse Avenue (W)
From	A - Malthouse Avenue (E)	0	0	161
	B - Site Access 2	0	0	0
	C - Malthouse Avenue (W)	16	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A - Malthouse Avenue (E)	B - Site Access 2	C - Malthouse Avenue (W)
From	A - Malthouse Avenue (E)	0	0	0
	B - Site Access 2	0	0	0
	C - Malthouse Avenue (W)	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.00	0.00	0.0	A	0	0
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.00	0.00	0.0	A	0	0
C-A					15	22
A-B					0	0
A-C					148	222

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	692	0.000	0	0.0	0.0	0.000	A
B-A	0	0	471	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	651	0.000	0	0.0	0.0	0.000	A
C-A	12	3			12				
A-B	0	0			0				
A-C	121	30			121				

17:00 - 17:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	685	0.000	0	0.0	0.0	0.000	A
B-A	0	0	465	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	644	0.000	0	0.0	0.0	0.000	A
C-A	14	4			14				
A-B	0	0			0				
A-C	145	36			145				

17:15 - 17:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	676	0.000	0	0.0	0.0	0.000	A
B-A	0	0	457	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	636	0.000	0	0.0	0.0	0.000	A
C-A	18	4			18				
A-B	0	0			0				
A-C	177	44			177				

17:30 - 17:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	676	0.000	0	0.0	0.0	0.000	A
B-A	0	0	457	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	636	0.000	0	0.0	0.0	0.000	A
C-A	18	4			18				
A-B	0	0			0				
A-C	177	44			177				

17:45 - 18:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	685	0.000	0	0.0	0.0	0.000	A
B-A	0	0	465	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	644	0.000	0	0.0	0.0	0.000	A
C-A	14	4			14				
A-B	0	0			0				
A-C	145	36			145				

18:00 - 18:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	692	0.000	0	0.0	0.0	0.000	A
B-A	0	0	471	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	651	0.000	0	0.0	0.0	0.000	A
C-A	12	3			12				
A-B	0	0			0				
A-C	121	30			121				

Base+CD, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Minor arm flare	B - Site Access 2 - Minor arm geometry	Is flare very short? Estimated flare length is zero but has been increased to 1 because a zero flare length is not allowed.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.
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	untitled	T-Junction	Two-way		0.00	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)	Run automatically	Relationship type	Relationship
D15	Base+CD	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D13+D5

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - Malthouse Avenue (E)		ONE HOUR	✓	15	100.000
B - Site Access 2		ONE HOUR	✓	0	100.000
C - Malthouse Avenue (W)		ONE HOUR	✓	193	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - Malthouse Avenue (E)	B - Site Access 2	C - Malthouse Avenue (W)
From	A - Malthouse Avenue (E)	0	0	15
	B - Site Access 2	0	0	0
	C - Malthouse Avenue (W)	193	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A - Malthouse Avenue (E)	B - Site Access 2	C - Malthouse Avenue (W)
From	A - Malthouse Avenue (E)	0	0	0
	B - Site Access 2	0	0	0
	C - Malthouse Avenue (W)	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.00	0.00	0.0	A	0	0
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.00	0.00	0.0	A	0	0
C-A					177	266
A-B					0	0
A-C					14	21

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	722	0.000	0	0.0	0.0	0.000	A
B-A	0	0	477	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	679	0.000	0	0.0	0.0	0.000	A
C-A	145	36			145				
A-B	0	0			0				
A-C	11	3			11				

08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	722	0.000	0	0.0	0.0	0.000	A
B-A	0	0	472	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	679	0.000	0	0.0	0.0	0.000	A
C-A	174	43			174				
A-B	0	0			0				
A-C	13	3			13				

08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	721	0.000	0	0.0	0.0	0.000	A
B-A	0	0	466	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	678	0.000	0	0.0	0.0	0.000	A
C-A	212	53			212				
A-B	0	0			0				
A-C	17	4			17				

08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	721	0.000	0	0.0	0.0	0.000	A
B-A	0	0	466	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	678	0.000	0	0.0	0.0	0.000	A
C-A	212	53			212				
A-B	0	0			0				
A-C	17	4			17				

08:45 - 09:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	722	0.000	0	0.0	0.0	0.000	A
B-A	0	0	472	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	679	0.000	0	0.0	0.0	0.000	A
C-A	174	43			174				
A-B	0	0			0				
A-C	13	3			13				

09:00 - 09:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	722	0.000	0	0.0	0.0	0.000	A
B-A	0	0	477	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	679	0.000	0	0.0	0.0	0.000	A
C-A	145	36			145				
A-B	0	0			0				
A-C	11	3			11				

Base+CD, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Minor arm flare	B - Site Access 2 - Minor arm geometry	Is flare very short? Estimated flare length is zero but has been increased to 1 because a zero flare length is not allowed.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.
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	untitled	T-Junction	Two-way		0.00	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)	Run automatically	Relationship type	Relationship
D16	Base+CD	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D14+D6

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - Malthouse Avenue (E)		ONE HOUR	✓	161	100.000
B - Site Access 2		ONE HOUR	✓	0	100.000
C - Malthouse Avenue (W)		ONE HOUR	✓	16	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - Malthouse Avenue (E)	B - Site Access 2	C - Malthouse Avenue (W)
From	A - Malthouse Avenue (E)	0	0	161
	B - Site Access 2	0	0	0
	C - Malthouse Avenue (W)	16	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A - Malthouse Avenue (E)	B - Site Access 2	C - Malthouse Avenue (W)
From	A - Malthouse Avenue (E)	0	0	0
	B - Site Access 2	0	0	0
	C - Malthouse Avenue (W)	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.00	0.00	0.0	A	0	0
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.00	0.00	0.0	A	0	0
C-A					15	22
A-B					0	0
A-C					148	222

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	692	0.000	0	0.0	0.0	0.000	A
B-A	0	0	471	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	651	0.000	0	0.0	0.0	0.000	A
C-A	12	3			12				
A-B	0	0			0				
A-C	121	30			121				

17:00 - 17:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	685	0.000	0	0.0	0.0	0.000	A
B-A	0	0	465	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	644	0.000	0	0.0	0.0	0.000	A
C-A	14	4			14				
A-B	0	0			0				
A-C	145	36			145				

17:15 - 17:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	676	0.000	0	0.0	0.0	0.000	A
B-A	0	0	457	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	636	0.000	0	0.0	0.0	0.000	A
C-A	18	4			18				
A-B	0	0			0				
A-C	177	44			177				

17:30 - 17:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	676	0.000	0	0.0	0.0	0.000	A
B-A	0	0	457	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	636	0.000	0	0.0	0.0	0.000	A
C-A	18	4			18				
A-B	0	0			0				
A-C	177	44			177				

17:45 - 18:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	685	0.000	0	0.0	0.0	0.000	A
B-A	0	0	465	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	644	0.000	0	0.0	0.0	0.000	A
C-A	14	4			14				
A-B	0	0			0				
A-C	145	36			145				

18:00 - 18:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	692	0.000	0	0.0	0.0	0.000	A
B-A	0	0	471	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	651	0.000	0	0.0	0.0	0.000	A
C-A	12	3			12				
A-B	0	0			0				
A-C	121	30			121				

Base+CD+Dev, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Minor arm flare	B - Site Access 2 - Minor arm geometry	Is flare very short? Estimated flare length is zero but has been increased to 1 because a zero flare length is not allowed.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.
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	untitled	T-Junction	Two-way		1.33	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)	Run automatically	Relationship type	Relationship
D17	Base+CD+Dev	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D13+D5+D11

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - Malthouse Avenue (E)		ONE HOUR	✓	94	100.000
B - Site Access 2		ONE HOUR	✓	52	100.000
C - Malthouse Avenue (W)		ONE HOUR	✓	210	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - Malthouse Avenue (E)	B - Site Access 2	C - Malthouse Avenue (W)
From	A - Malthouse Avenue (E)	0	31	63
	B - Site Access 2	52	0	0
	C - Malthouse Avenue (W)	210	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A - Malthouse Avenue (E)	B - Site Access 2	C - Malthouse Avenue (W)
From	A - Malthouse Avenue (E)	0	0	0
	B - Site Access 2	0	0	0
	C - Malthouse Avenue (W)	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.00	0.00	0.0	A	0	0
B-A	0.13	9.08	0.1	A	48	72
C-AB	0.00	0.00	0.0	A	0	0
C-A					193	289
A-B					28	43
A-C					58	87

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	656	0.000	0	0.0	0.0	0.000	A
B-A	39	10	470	0.083	39	0.0	0.1	8.334	A
C-AB	0	0	664	0.000	0	0.0	0.0	0.000	A
C-A	158	40			158				
A-B	23	6			23				
A-C	47	12			47				

08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	651	0.000	0	0.0	0.0	0.000	A
B-A	47	12	463	0.101	47	0.1	0.1	8.636	A
C-AB	0	0	660	0.000	0	0.0	0.0	0.000	A
C-A	189	47			189				
A-B	28	7			28				
A-C	57	14			57				

08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	642	0.000	0	0.0	0.0	0.000	A
B-A	57	14	454	0.126	57	0.1	0.1	9.073	A
C-AB	0	0	655	0.000	0	0.0	0.0	0.000	A
C-A	231	58			231				
A-B	34	9			34				
A-C	69	17			69				

08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	642	0.000	0	0.0	0.0	0.000	A
B-A	57	14	454	0.126	57	0.1	0.1	9.078	A
C-AB	0	0	655	0.000	0	0.0	0.0	0.000	A
C-A	231	58			231				
A-B	34	9			34				
A-C	69	17			69				

08:45 - 09:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	650	0.000	0	0.0	0.0	0.000	A
B-A	47	12	463	0.101	47	0.1	0.1	8.646	A
C-AB	0	0	660	0.000	0	0.0	0.0	0.000	A
C-A	189	47			189				
A-B	28	7			28				
A-C	57	14			57				

09:00 - 09:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	656	0.000	0	0.0	0.0	0.000	A
B-A	39	10	470	0.083	39	0.1	0.1	8.351	A
C-AB	0	0	664	0.000	0	0.0	0.0	0.000	A
C-A	158	40			158				
A-B	23	6			23				
A-C	47	12			47				

Base+CD+Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Minor arm flare	B - Site Access 2 - Minor arm geometry	Is flare very short? Estimated flare length is zero but has been increased to 1 because a zero flare length is not allowed.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.
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	untitled	T-Junction	Two-way		1.08	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)	Run automatically	Relationship type	Relationship
D18	Base+CD+Dev	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D14+D6+D12

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - Malthouse Avenue (E)		ONE HOUR	✓	215	100.000
B - Site Access 2		ONE HOUR	✓	38	100.000
C - Malthouse Avenue (W)		ONE HOUR	✓	57	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - Malthouse Avenue (E)	B - Site Access 2	C - Malthouse Avenue (W)
From	A - Malthouse Avenue (E)	0	42	173
	B - Site Access 2	38	0	0
	C - Malthouse Avenue (W)	57	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A - Malthouse Avenue (E)	B - Site Access 2	C - Malthouse Avenue (W)
From	A - Malthouse Avenue (E)	0	0	0
	B - Site Access 2	0	0	0
	C - Malthouse Avenue (W)	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.00	0.00	0.0	A	0	0
B-A	0.09	8.84	0.1	A	35	52
C-AB	0.00	0.00	0.0	A	0	0
C-A					52	78
A-B					39	58
A-C					159	238

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	638	0.000	0	0.0	0.0	0.000	A
B-A	29	7	467	0.061	28	0.0	0.1	8.199	A
C-AB	0	0	640	0.000	0	0.0	0.0	0.000	A
C-A	43	11			43				
A-B	32	8			32				
A-C	130	33			130				

17:00 - 17:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	629	0.000	0	0.0	0.0	0.000	A
B-A	34	9	460	0.074	34	0.1	0.1	8.458	A
C-AB	0	0	632	0.000	0	0.0	0.0	0.000	A
C-A	51	13			51				
A-B	38	9			38				
A-C	156	39			156				

17:15 - 17:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	616	0.000	0	0.0	0.0	0.000	A
B-A	42	10	449	0.093	42	0.1	0.1	8.833	A
C-AB	0	0	620	0.000	0	0.0	0.0	0.000	A
C-A	63	16			63				
A-B	46	12			46				
A-C	190	48			190				

17:30 - 17:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	616	0.000	0	0.0	0.0	0.000	A
B-A	42	10	449	0.093	42	0.1	0.1	8.836	A
C-AB	0	0	620	0.000	0	0.0	0.0	0.000	A
C-A	63	16			63				
A-B	46	12			46				
A-C	190	48			190				

17:45 - 18:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	629	0.000	0	0.0	0.0	0.000	A
B-A	34	9	460	0.074	34	0.1	0.1	8.463	A
C-AB	0	0	632	0.000	0	0.0	0.0	0.000	A
C-A	51	13			51				
A-B	38	9			38				
A-C	156	39			156				

18:00 - 18:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	638	0.000	0	0.0	0.0	0.000	A
B-A	29	7	467	0.061	29	0.1	0.1	8.210	A
C-AB	0	0	640	0.000	0	0.0	0.0	0.000	A
C-A	43	11			43				
A-B	32	8			32				
A-C	130	33			130				

Appendix O

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.5.1.7462

For sales and distribution information, program advice and maintenance, contact TRL:
+44 (0)1344 379777 software@trl.co.uk www.trlsoftware.co.uk

Filename: 205339-Site Access 1 PICADY-V1.j9
Path: P:\Projects\200000\205339 - Cardiff Gate Development\Technical\B - Transport Assessment\Modelling
Report generation date: 07/09/2021 13:43:23

»Base, AM
»Base, PM
»Base+CD, AM
»Base+CD, PM
»Base+CD+Dev, AM
»Base+CD+Dev, PM

Summary of junction performance

	AM					PM				
	Set ID	Queue (Veh)	Delay (s)	RFC	LOS	Set ID	Queue (Veh)	Delay (s)	RFC	LOS
Base										
Stream B-C	D13	0.0	0.00	0.00	A	D14	0.0	0.00	0.00	A
Stream B-A		0.0	0.00	0.00	A		0.0	0.00	0.00	A
Stream C-AB		0.0	0.00	0.00	A		0.0	0.00	0.00	A
Base+CD										
Stream B-C	D15	0.0	0.00	0.00	A	D16	0.0	0.00	0.00	A
Stream B-A		0.0	0.00	0.00	A		0.0	0.00	0.00	A
Stream C-AB		0.0	0.00	0.00	A		0.0	0.00	0.00	A
Base+CD+Dev										
Stream B-C	D17	0.0	5.75	0.03	A	D18	0.1	6.43	0.07	A
Stream B-A		0.0	0.00	0.00	A		0.0	0.00	0.00	A
Stream C-AB		0.2	5.56	0.10	A		0.0	6.46	0.02	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	
Location	
Site number	
Date	07/09/2021
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	VECTOS\taylor.davis
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	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				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)	Run automatically	Relationship type	Relationship
D1	Churchlands CD	AM	ONE HOUR	07:45	09:15	15			
D2	Churchlands CD	PM	ONE HOUR	16:45	18:15	15			
D3	Taylor Wimpey CD	AM	ONE HOUR	07:45	09:15	15			
D4	Taylor Wimpey CD	PM	ONE HOUR	16:45	18:15	15			
D5	Committed Dev	AM	ONE HOUR	07:45	09:15	15		Simple	D1+D3+D19
D6	Committed Dev	PM	ONE HOUR	16:45	18:15	15		Simple	D2+D4+D20
D7	Dev (Office Land Use)	AM	ONE HOUR	07:45	09:15	15			
D8	Dev (Office Land Use)	PM	ONE HOUR	16:45	18:15	15			
D9	Dev (Resi Land Use)	AM	ONE HOUR	07:45	09:15	15			
D10	Dev (Resi Land Use)	PM	ONE HOUR	16:45	18:15	15			
D11	Full Dev	AM	ONE HOUR	07:45	09:15	15		Simple	D7+D9
D12	Full Dev	PM	ONE HOUR	16:45	18:15	15		Simple	D8+D10
D13	Base	AM	ONE HOUR	07:45	09:15	15	✓		
D14	Base	PM	ONE HOUR	16:45	18:15	15	✓		
D15	Base+CD	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D13+D5
D16	Base+CD	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D14+D6
D17	Base+CD+Dev	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D13+D5+D11
D18	Base+CD+Dev	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D14+D6+D12
D19	St Edeyrn's CD	AM	ONE HOUR	07:45	09:15	15			
D20	St Edeyrn's CD	PM	ONE HOUR	16:45	18:15	15			

Analysis Set Details

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

Base, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Minor arm flare	B - Site Access 1 - Minor arm geometry	Is flare very short? Estimated flare length is zero but has been increased to 1 because a zero flare length is not allowed.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.
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	untitled	T-Junction	Two-way		0.00	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	Malthouse Avenue (W)		Major
B	Site Access 1		Minor
C	Malthouse Avenue (E)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C - Malthouse Avenue (E)	6.75			43.1	✓	0.00

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

Minor Arm Geometry

Arm	Minor arm type	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate flare length	Flare length (PCU)	Visibility to left (m)	Visibility to right (m)
B - Site Access 1	One lane plus flare	8.76	2.83	2.75	2.75	2.75	✓	1.00	18	17

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	496	0.087	0.221	0.139	0.316
B-C	722	0.107	0.271	-	-
C-B	599	0.224	0.224	-	-

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)	Run automatically
D13	Base	AM	ONE HOUR	07:45	09:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - Malthouse Avenue (W)		ONE HOUR	✓	15	100.000
B - Site Access 1		ONE HOUR	✓	0	100.000
C - Malthouse Avenue (E)		ONE HOUR	✓	193	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - Malthouse Avenue (W)	B - Site Access 1	C - Malthouse Avenue (E)
From	A - Malthouse Avenue (W)	0	0	15
	B - Site Access 1	0	0	0
	C - Malthouse Avenue (E)	193	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A - Malthouse Avenue (W)	B - Site Access 1	C - Malthouse Avenue (E)
From	A - Malthouse Avenue (W)	0	0	0
	B - Site Access 1	0	0	0
	C - Malthouse Avenue (E)	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.00	0.00	0.0	A	0	0
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.00	0.00	0.0	A	0	0
C-A					177	266
A-B					0	0
A-C					14	21

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	719	0.000	0	0.0	0.0	0.000	A
B-A	0	0	474	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	596	0.000	0	0.0	0.0	0.000	A
C-A	145	36			145				
A-B	0	0			0				
A-C	11	3			11				

08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	719	0.000	0	0.0	0.0	0.000	A
B-A	0	0	469	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	596	0.000	0	0.0	0.0	0.000	A
C-A	174	43			174				
A-B	0	0			0				
A-C	13	3			13				

08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	718	0.000	0	0.0	0.0	0.000	A
B-A	0	0	463	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	595	0.000	0	0.0	0.0	0.000	A
C-A	212	53			212				
A-B	0	0			0				
A-C	17	4			17				

08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	718	0.000	0	0.0	0.0	0.000	A
B-A	0	0	463	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	595	0.000	0	0.0	0.0	0.000	A
C-A	212	53			212				
A-B	0	0			0				
A-C	17	4			17				

08:45 - 09:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	719	0.000	0	0.0	0.0	0.000	A
B-A	0	0	469	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	596	0.000	0	0.0	0.0	0.000	A
C-A	174	43			174				
A-B	0	0			0				
A-C	13	3			13				

09:00 - 09:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	719	0.000	0	0.0	0.0	0.000	A
B-A	0	0	474	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	596	0.000	0	0.0	0.0	0.000	A
C-A	145	36			145				
A-B	0	0			0				
A-C	11	3			11				

Base, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Minor arm flare	B - Site Access 1 - Minor arm geometry	Is flare very short? Estimated flare length is zero but has been increased to 1 because a zero flare length is not allowed.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.
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	untitled	T-Junction	Two-way		0.00	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)	Run automatically
D14	Base	PM	ONE HOUR	16:45	18:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - Malthouse Avenue (W)		ONE HOUR	✓	161	100.000
B - Site Access 1		ONE HOUR	✓	0	100.000
C - Malthouse Avenue (E)		ONE HOUR	✓	16	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - Malthouse Avenue (W)	B - Site Access 1	C - Malthouse Avenue (E)
From	A - Malthouse Avenue (W)	0	0	161
	B - Site Access 1	0	0	0
	C - Malthouse Avenue (E)	16	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A - Malthouse Avenue (W)	B - Site Access 1	C - Malthouse Avenue (E)
From	A - Malthouse Avenue (W)	0	0	0
	B - Site Access 1	0	0	0
	C - Malthouse Avenue (E)	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.00	0.00	0.0	A	0	0
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.00	0.00	0.0	A	0	0
C-A					15	22
A-B					0	0
A-C					148	222

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	690	0.000	0	0.0	0.0	0.000	A
B-A	0	0	468	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	572	0.000	0	0.0	0.0	0.000	A
C-A	12	3			12				
A-B	0	0			0				
A-C	121	30			121				

17:00 - 17:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	683	0.000	0	0.0	0.0	0.000	A
B-A	0	0	462	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	566	0.000	0	0.0	0.0	0.000	A
C-A	14	4			14				
A-B	0	0			0				
A-C	145	36			145				

17:15 - 17:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	674	0.000	0	0.0	0.0	0.000	A
B-A	0	0	455	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	559	0.000	0	0.0	0.0	0.000	A
C-A	18	4			18				
A-B	0	0			0				
A-C	177	44			177				

17:30 - 17:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	674	0.000	0	0.0	0.0	0.000	A
B-A	0	0	455	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	559	0.000	0	0.0	0.0	0.000	A
C-A	18	4			18				
A-B	0	0			0				
A-C	177	44			177				

17:45 - 18:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	683	0.000	0	0.0	0.0	0.000	A
B-A	0	0	462	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	566	0.000	0	0.0	0.0	0.000	A
C-A	14	4			14				
A-B	0	0			0				
A-C	145	36			145				

18:00 - 18:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	690	0.000	0	0.0	0.0	0.000	A
B-A	0	0	468	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	572	0.000	0	0.0	0.0	0.000	A
C-A	12	3			12				
A-B	0	0			0				
A-C	121	30			121				

Base+CD, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Minor arm flare	B - Site Access 1 - Minor arm geometry	Is flare very short? Estimated flare length is zero but has been increased to 1 because a zero flare length is not allowed.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.
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	untitled	T-Junction	Two-way		0.00	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)	Run automatically	Relationship type	Relationship
D15	Base+CD	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D13+D5

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - Malthouse Avenue (W)		ONE HOUR	✓	15	100.000
B - Site Access 1		ONE HOUR	✓	0	100.000
C - Malthouse Avenue (E)		ONE HOUR	✓	193	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - Malthouse Avenue (W)	B - Site Access 1	C - Malthouse Avenue (E)
From	A - Malthouse Avenue (W)	0	0	15
	B - Site Access 1	0	0	0
	C - Malthouse Avenue (E)	193	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A - Malthouse Avenue (W)	B - Site Access 1	C - Malthouse Avenue (E)
From	A - Malthouse Avenue (W)	0	0	0
	B - Site Access 1	0	0	0
	C - Malthouse Avenue (E)	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.00	0.00	0.0	A	0	0
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.00	0.00	0.0	A	0	0
C-A					177	266
A-B					0	0
A-C					14	21

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	719	0.000	0	0.0	0.0	0.000	A
B-A	0	0	474	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	596	0.000	0	0.0	0.0	0.000	A
C-A	145	36			145				
A-B	0	0			0				
A-C	11	3			11				

08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	719	0.000	0	0.0	0.0	0.000	A
B-A	0	0	469	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	596	0.000	0	0.0	0.0	0.000	A
C-A	174	43			174				
A-B	0	0			0				
A-C	13	3			13				

08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	718	0.000	0	0.0	0.0	0.000	A
B-A	0	0	463	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	595	0.000	0	0.0	0.0	0.000	A
C-A	212	53			212				
A-B	0	0			0				
A-C	17	4			17				

08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	718	0.000	0	0.0	0.0	0.000	A
B-A	0	0	463	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	595	0.000	0	0.0	0.0	0.000	A
C-A	212	53			212				
A-B	0	0			0				
A-C	17	4			17				

08:45 - 09:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	719	0.000	0	0.0	0.0	0.000	A
B-A	0	0	469	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	596	0.000	0	0.0	0.0	0.000	A
C-A	174	43			174				
A-B	0	0			0				
A-C	13	3			13				

09:00 - 09:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	719	0.000	0	0.0	0.0	0.000	A
B-A	0	0	474	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	596	0.000	0	0.0	0.0	0.000	A
C-A	145	36			145				
A-B	0	0			0				
A-C	11	3			11				

Base+CD, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Minor arm flare	B - Site Access 1 - Minor arm geometry	Is flare very short? Estimated flare length is zero but has been increased to 1 because a zero flare length is not allowed.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.
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	untitled	T-Junction	Two-way		0.00	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)	Run automatically	Relationship type	Relationship
D16	Base+CD	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D14+D6

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - Malthouse Avenue (W)		ONE HOUR	✓	161	100.000
B - Site Access 1		ONE HOUR	✓	0	100.000
C - Malthouse Avenue (E)		ONE HOUR	✓	16	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - Malthouse Avenue (W)	B - Site Access 1	C - Malthouse Avenue (E)
From	A - Malthouse Avenue (W)	0	0	161
	B - Site Access 1	0	0	0
	C - Malthouse Avenue (E)	16	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A - Malthouse Avenue (W)	B - Site Access 1	C - Malthouse Avenue (E)
From	A - Malthouse Avenue (W)	0	0	0
	B - Site Access 1	0	0	0
	C - Malthouse Avenue (E)	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.00	0.00	0.0	A	0	0
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.00	0.00	0.0	A	0	0
C-A					15	22
A-B					0	0
A-C					148	222

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	690	0.000	0	0.0	0.0	0.000	A
B-A	0	0	468	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	572	0.000	0	0.0	0.0	0.000	A
C-A	12	3			12				
A-B	0	0			0				
A-C	121	30			121				

17:00 - 17:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	683	0.000	0	0.0	0.0	0.000	A
B-A	0	0	462	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	566	0.000	0	0.0	0.0	0.000	A
C-A	14	4			14				
A-B	0	0			0				
A-C	145	36			145				

17:15 - 17:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	674	0.000	0	0.0	0.0	0.000	A
B-A	0	0	455	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	559	0.000	0	0.0	0.0	0.000	A
C-A	18	4			18				
A-B	0	0			0				
A-C	177	44			177				

17:30 - 17:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	674	0.000	0	0.0	0.0	0.000	A
B-A	0	0	455	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	559	0.000	0	0.0	0.0	0.000	A
C-A	18	4			18				
A-B	0	0			0				
A-C	177	44			177				

17:45 - 18:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	683	0.000	0	0.0	0.0	0.000	A
B-A	0	0	462	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	566	0.000	0	0.0	0.0	0.000	A
C-A	14	4			14				
A-B	0	0			0				
A-C	145	36			145				

18:00 - 18:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	690	0.000	0	0.0	0.0	0.000	A
B-A	0	0	468	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	572	0.000	0	0.0	0.0	0.000	A
C-A	12	3			12				
A-B	0	0			0				
A-C	121	30			121				

Base+CD+Dev, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Minor arm flare	B - Site Access 1 - Minor arm geometry	Is flare very short? Estimated flare length is zero but has been increased to 1 because a zero flare length is not allowed.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.
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	untitled	T-Junction	Two-way		1.67	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)	Run automatically	Relationship type	Relationship
D17	Base+CD+Dev	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D13+D5+D11

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - Malthouse Avenue (W)		ONE HOUR	✓	15	100.000
B - Site Access 1		ONE HOUR	✓	17	100.000
C - Malthouse Avenue (E)		ONE HOUR	✓	241	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - Malthouse Avenue (W)	B - Site Access 1	C - Malthouse Avenue (E)
From	A - Malthouse Avenue (W)	0	0	15
	B - Site Access 1	0	0	17
	C - Malthouse Avenue (E)	193	48	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A - Malthouse Avenue (W)	B - Site Access 1	C - Malthouse Avenue (E)
From	A - Malthouse Avenue (W)	0	0	0
	B - Site Access 1	0	0	0
	C - Malthouse Avenue (E)	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.03	5.75	0.0	A	16	23
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.10	5.56	0.2	A	59	89
C-A					162	243
A-B					0	0
A-C					14	21

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	13	3	646	0.020	13	0.0	0.0	5.688	A
B-A	0	0	493	0.000	0	0.0	0.0	0.000	A
C-AB	46	11	694	0.066	45	0.0	0.1	5.552	A
C-A	136	34			136				
A-B	0	0			0				
A-C	11	3			11				

08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	15	4	645	0.024	15	0.0	0.0	5.715	A
B-A	0	0	486	0.000	0	0.0	0.0	0.000	A
C-AB	57	14	712	0.080	57	0.1	0.1	5.499	A
C-A	160	40			160				
A-B	0	0			0				
A-C	13	3			13				

08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	19	5	644	0.029	19	0.0	0.0	5.753	A
B-A	0	0	476	0.000	0	0.0	0.0	0.000	A
C-AB	74	19	738	0.101	74	0.1	0.2	5.430	A
C-A	191	48			191				
A-B	0	0			0				
A-C	17	4			17				

08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	19	5	644	0.029	19	0.0	0.0	5.753	A
B-A	0	0	476	0.000	0	0.0	0.0	0.000	A
C-AB	74	19	738	0.101	74	0.2	0.2	5.431	A
C-A	191	48			191				
A-B	0	0			0				
A-C	17	4			17				

08:45 - 09:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	15	4	645	0.024	15	0.0	0.0	5.718	A
B-A	0	0	485	0.000	0	0.0	0.0	0.000	A
C-AB	57	14	712	0.080	57	0.2	0.1	5.501	A
C-A	159	40			159				
A-B	0	0			0				
A-C	13	3			13				

09:00 - 09:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	13	3	646	0.020	13	0.0	0.0	5.688	A
B-A	0	0	493	0.000	0	0.0	0.0	0.000	A
C-AB	46	11	694	0.066	46	0.1	0.1	5.562	A
C-A	136	34			136				
A-B	0	0			0				
A-C	11	3			11				

Base+CD+Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Minor arm flare	B - Site Access 1 - Minor arm geometry	Is flare very short? Estimated flare length is zero but has been increased to 1 because a zero flare length is not allowed.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.
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	untitled	T-Junction	Two-way		1.49	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)	Run automatically	Relationship type	Relationship
D18	Base+CD+Dev	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D14+D6+D12

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - Malthouse Avenue (W)		ONE HOUR	✓	161	100.000
B - Site Access 1		ONE HOUR	✓	41	100.000
C - Malthouse Avenue (E)		ONE HOUR	✓	28	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - Malthouse Avenue (W)	B - Site Access 1	C - Malthouse Avenue (E)
From	A - Malthouse Avenue (W)	0	0	161
	B - Site Access 1	0	0	41
	C - Malthouse Avenue (E)	16	12	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A - Malthouse Avenue (W)	B - Site Access 1	C - Malthouse Avenue (E)
From	A - Malthouse Avenue (W)	0	0	0
	B - Site Access 1	0	0	0
	C - Malthouse Avenue (E)	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.07	6.43	0.1	A	38	56
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.02	6.46	0.0	A	11	17
C-A					14	22
A-B					0	0
A-C					148	222

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	31	8	619	0.050	31	0.0	0.1	6.118	A
B-A	0	0	496	0.000	0	0.0	0.0	0.000	A
C-AB	9	2	580	0.016	9	0.0	0.0	6.307	A
C-A	12	3			12				
A-B	0	0			0				
A-C	121	30			121				

17:00 - 17:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	37	9	613	0.060	37	0.1	0.1	6.245	A
B-A	0	0	489	0.000	0	0.0	0.0	0.000	A
C-AB	11	3	576	0.019	11	0.0	0.0	6.368	A
C-A	14	4			14				
A-B	0	0			0				
A-C	145	36			145				

17:15 - 17:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	45	11	605	0.075	45	0.1	0.1	6.426	A
B-A	0	0	480	0.000	0	0.0	0.0	0.000	A
C-AB	14	3	571	0.024	14	0.0	0.0	6.455	A
C-A	17	4			17				
A-B	0	0			0				
A-C	177	44			177				

17:30 - 17:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	45	11	605	0.075	45	0.1	0.1	6.426	A
B-A	0	0	480	0.000	0	0.0	0.0	0.000	A
C-AB	14	3	571	0.024	14	0.0	0.0	6.457	A
C-A	17	4			17				
A-B	0	0			0				
A-C	177	44			177				

17:45 - 18:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	37	9	613	0.060	37	0.1	0.1	6.249	A
B-A	0	0	489	0.000	0	0.0	0.0	0.000	A
C-AB	11	3	576	0.019	11	0.0	0.0	6.371	A
C-A	14	4			14				
A-B	0	0			0				
A-C	145	36			145				

18:00 - 18:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	31	8	619	0.050	31	0.1	0.1	6.124	A
B-A	0	0	496	0.000	0	0.0	0.0	0.000	A
C-AB	9	2	580	0.016	9	0.0	0.0	6.310	A
C-A	12	3			12				
A-B	0	0			0				
A-C	121	30			121				

Appendix P

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462

Filename: M4 J30 (Existing) v1.1.j9
Path: P:\Projects\200000\205339 - Cardiff Gate Development\Technical\B - Transport Assessment\Modelling\M4 Junction 30
Report generation date: 30/06/2021 11:09:11

»Base, AM
»Base+CD, AM
»Base+CD+Dev, AM

Summary of junction performance

	AM		
	Queue (Veh)	Delay (s)	RFC
	Base		
2 - Maes-Y-Bryn	0.2	7.69	0.18
3 - M4 (East)	2.5	10.60	0.72
4 - A4232	1.3	3.42	0.57
5 - Malthouse Avenue	0.2	2.12	0.13
1 - M4 (West)	1.4	2.79	0.58
	Base+CD		
2 - Maes-Y-Bryn	0.3	9.71	0.21
3 - M4 (East)	3.9	15.75	0.80
4 - A4232	2.1	4.60	0.68
5 - Malthouse Avenue	0.2	2.47	0.15
1 - M4 (West)	1.8	3.49	0.64
	Base+CD+Dev		
2 - Maes-Y-Bryn	0.3	10.21	0.22
3 - M4 (East)	4.6	18.68	0.83
4 - A4232	2.3	4.95	0.70
5 - Malthouse Avenue	0.2	2.52	0.17
1 - M4 (West)	1.9	3.65	0.66

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	Cardiff Gate
Location	M4 Junction 30
Site number	
Date	26/06/2021
Version	
Status	Existing Junction Layout
Identifier	
Client	
Jobnumber	
Enumerator	David Noyce
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	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				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)	Run automatically
D1	Base	AM	ONE HOUR	07:45	09:15	15	✓
D2	Base	PM	ONE HOUR	16:45	18:15	15	
D3	Base+CD	AM	ONE HOUR	07:45	09:15	15	✓
D4	Base+CD	PM	ONE HOUR	16:45	18:15	15	
D5	Base+CD+Dev	AM	ONE HOUR	07:45	09:15	15	✓
D6	Base+CD+Dev	PM	ONE HOUR	16:45	18:15	15	

Analysis Set Details

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

Base, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - M4 (West) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	M4 Junction 30	Large Roundabout		2, 3, 4, 5, 1	4.59	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
2	Maes-Y-Bryn	
3	M4 (East)	
4	A4232	
5	Malthouse Avenue	
1	M4 (West)	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
2 - Maes-Y-Bryn	3.30	6.30	8.3	15.4	100.7	50.0	
3 - M4 (East)	6.30	9.00	27.4	70.0	105.7	11.0	
4 - A4232	7.50	10.40	10.9	25.0	105.7	21.0	
5 - Malthouse Avenue	6.30	8.00	8.1	23.0	105.7	17.0	
1 - M4 (West)	7.40	10.10	33.1	90.0	100.7	15.5	

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Entry-to-exit separation (m)
2 - Maes-Y-Bryn	2429	19.50
3 - M4 (East)	2114	135.00
4 - A4232	907	27.00
5 - Malthouse Avenue	1182	22.00
1 - M4 (West)	549	128.00

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
2 - Maes-Y-Bryn	0.454	1562
3 - M4 (East)	0.825	2876
4 - A4232	1.108	3463
5 - Malthouse Avenue	0.922	2880
1 - M4 (West)	1.293	3616

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

Traffic Demand

Demand Set Details

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

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
2 - Maes-Y-Bryn		ONE HOUR	✓	91	100.000
3 - M4 (East)		ONE HOUR	✓	788	100.000
4 - A4232		ONE HOUR	✓	1256	100.000
5 - Malthouse Avenue		ONE HOUR	✓	234	100.000
1 - M4 (West)		ONE HOUR	✓	1636	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		2 - Maes-Y-Bryn	3 - M4 (East)	4 - A4232	5 - Malthouse Avenue	1 - M4 (West)
From	2 - Maes-Y-Bryn	0	3	11	49	28
	3 - M4 (East)	1	0	478	295	14
	4 - A4232	13	153	5	489	596
	5 - Malthouse Avenue	3	48	109	0	74
	1 - M4 (West)	7	38	1181	410	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		2 - Maes-Y-Bryn	3 - M4 (East)	4 - A4232	5 - Malthouse Avenue	1 - M4 (West)
From	2 - Maes-Y-Bryn	0	0	0	0	4
	3 - M4 (East)	0	0	1	2	0
	4 - A4232	0	1	0	0	4
	5 - Malthouse Avenue	0	4	2	0	7
	1 - M4 (West)	0	0	2	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
2 - Maes-Y-Bryn	0.18	7.69	0.2	A	84	125
3 - M4 (East)	0.72	10.60	2.5	B	723	1085
4 - A4232	0.57	3.42	1.3	A	1153	1729
5 - Malthouse Avenue	0.13	2.12	0.2	A	215	322
1 - M4 (West)	0.58	2.79	1.4	A	1501	2252

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
2 - Maes-Y-Bryn	69	17	1461	878	0.078	68	18	0.0	0.1	4.443	A
3 - M4 (East)	593	148	1347	1725	0.344	591	182	0.0	0.5	3.170	A
4 - A4232	946	236	598	2739	0.345	943	1340	0.0	0.5	2.003	A
5 - Malthouse Avenue	176	44	608	2213	0.080	176	933	0.0	0.1	1.766	A
1 - M4 (West)	1232	308	249	3241	0.380	1229	535	0.0	0.6	1.787	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
2 - Maes-Y-Bryn	82	20	1746	748	0.109	82	22	0.1	0.1	5.404	A
3 - M4 (East)	708	177	1611	1507	0.470	707	217	0.5	0.9	4.492	A
4 - A4232	1129	282	716	2611	0.432	1128	1602	0.5	0.8	2.427	A
5 - Malthouse Avenue	210	53	728	2103	0.100	210	1116	0.1	0.1	1.900	A
1 - M4 (West)	1471	368	298	3178	0.463	1470	640	0.6	0.9	2.106	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
2 - Maes-Y-Bryn	100	25	2138	569	0.176	100	26	0.1	0.2	7.664	A
3 - M4 (East)	868	217	1972	1209	0.718	861	266	0.9	2.4	10.192	B
4 - A4232	1383	346	874	2437	0.567	1381	1959	0.8	1.3	3.400	A
5 - Malthouse Avenue	258	64	890	1954	0.132	257	1365	0.1	0.2	2.121	A
1 - M4 (West)	1801	450	365	3091	0.583	1799	783	0.9	1.4	2.781	A

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
2 - Maes-Y-Bryn	100	25	2140	568	0.176	100	26	0.2	0.2	7.692	A
3 - M4 (East)	868	217	1974	1206	0.719	867	266	2.4	2.5	10.597	B
4 - A4232	1383	346	877	2434	0.568	1383	1964	1.3	1.3	3.425	A
5 - Malthouse Avenue	258	64	892	1953	0.132	258	1368	0.2	0.2	2.123	A
1 - M4 (West)	1801	450	366	3091	0.583	1801	784	1.4	1.4	2.791	A

08:45 - 09:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
2 - Maes-Y-Bryn	82	20	1750	746	0.110	82	22	0.2	0.1	5.425	A
3 - M4 (East)	708	177	1614	1504	0.471	715	218	2.5	0.9	4.598	A
4 - A4232	1129	282	720	2606	0.433	1131	1609	1.3	0.8	2.443	A
5 - Malthouse Avenue	210	53	730	2101	0.100	211	1121	0.2	0.1	1.903	A
1 - M4 (West)	1471	368	299	3177	0.463	1473	641	1.4	0.9	2.114	A

09:00 - 09:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
2 - Maes-Y-Bryn	69	17	1465	876	0.078	69	18	0.1	0.1	4.459	A
3 - M4 (East)	593	148	1351	1721	0.345	595	182	0.9	0.5	3.201	A
4 - A4232	946	236	601	2736	0.346	947	1345	0.8	0.5	2.013	A
5 - Malthouse Avenue	176	44	610	2211	0.080	176	937	0.1	0.1	1.768	A
1 - M4 (West)	1232	308	250	3240	0.380	1233	537	0.9	0.6	1.793	A

Base+CD, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - M4 (West) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	M4 Junction 30	Large Roundabout		2, 3, 4, 5, 1	6.28	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Entry-to-exit separation (m)
2 - Maes-Y-Bryn	2429	19.50
3 - M4 (East)	2114	135.00
4 - A4232	907	27.00
5 - Malthouse Avenue	1182	22.00
1 - M4 (West)	549	128.00

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

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

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
2 - Maes-Y-Bryn		ONE HOUR	✓	91	100.000
3 - M4 (East)		ONE HOUR	✓	835	100.000
4 - A4232		ONE HOUR	✓	1510	100.000
5 - Malthouse Avenue		ONE HOUR	✓	242	100.000
1 - M4 (West)		ONE HOUR	✓	1695	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		2 - Maes-Y-Bryn	3 - M4 (East)	4 - A4232	5 - Malthouse Avenue	1 - M4 (West)
From	2 - Maes-Y-Bryn	0	3	11	49	28
	3 - M4 (East)	1	0	525	295	14
	4 - A4232	13	280	5	505	707
	5 - Malthouse Avenue	3	48	117	0	74
	1 - M4 (West)	7	38	1240	410	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		2 - Maes-Y-Bryn	3 - M4 (East)	4 - A4232	5 - Malthouse Avenue	1 - M4 (West)
From	2 - Maes-Y-Bryn	0	0	0	0	4
	3 - M4 (East)	0	0	1	2	0
	4 - A4232	0	1	0	0	3
	5 - Malthouse Avenue	0	4	2	0	7
	1 - M4 (West)	0	0	2	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
2 - Maes-Y-Bryn	0.21	9.71	0.3	A	84	125
3 - M4 (East)	0.80	15.75	3.9	C	766	1149
4 - A4232	0.68	4.60	2.1	A	1386	2078
5 - Malthouse Avenue	0.15	2.47	0.2	A	222	333
1 - M4 (West)	0.64	3.49	1.8	A	1555	2333

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
2 - Maes-Y-Bryn	69	17	1606	812	0.084	68	18	0.0	0.1	4.839	A
3 - M4 (East)	629	157	1397	1683	0.373	626	277	0.0	0.6	3.398	A
4 - A4232	1137	284	598	2751	0.413	1134	1425	0.0	0.7	2.222	A
5 - Malthouse Avenue	182	46	787	2056	0.089	182	945	0.0	0.1	1.920	A
1 - M4 (West)	1276	319	351	3110	0.410	1273	618	0.0	0.7	1.958	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
2 - Maes-Y-Bryn	82	20	1920	669	0.122	82	22	0.1	0.1	6.132	A
3 - M4 (East)	751	188	1671	1457	0.515	749	331	0.6	1.1	5.067	A
4 - A4232	1357	339	715	2622	0.518	1356	1704	0.7	1.1	2.841	A
5 - Malthouse Avenue	218	54	941	1916	0.114	217	1130	0.1	0.1	2.118	A
1 - M4 (West)	1524	381	419	3021	0.504	1522	739	0.7	1.0	2.399	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
2 - Maes-Y-Bryn	100	25	2350	473	0.212	100	26	0.1	0.3	9.638	A
3 - M4 (East)	919	230	2044	1148	0.801	909	405	1.1	3.7	14.428	B
4 - A4232	1663	416	872	2449	0.679	1658	2081	1.1	2.1	4.527	A
5 - Malthouse Avenue	266	67	1151	1726	0.154	266	1380	0.1	0.2	2.466	A
1 - M4 (West)	1866	467	513	2900	0.644	1863	904	1.0	1.8	3.462	A

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
2 - Maes-Y-Bryn	100	25	2354	471	0.213	100	26	0.3	0.3	9.708	A
3 - M4 (East)	919	230	2048	1145	0.803	919	406	3.7	3.9	15.753	C
4 - A4232	1663	416	877	2444	0.680	1662	2089	2.1	2.1	4.603	A
5 - Malthouse Avenue	266	67	1154	1723	0.155	266	1386	0.2	0.2	2.471	A
1 - M4 (West)	1866	467	514	2899	0.644	1866	906	1.8	1.8	3.485	A

08:45 - 09:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
2 - Maes-Y-Bryn	82	20	1926	666	0.123	82	22	0.3	0.1	6.172	A
3 - M4 (East)	751	188	1676	1453	0.517	762	333	3.9	1.1	5.292	A
4 - A4232	1357	339	722	2615	0.519	1362	1716	2.1	1.1	2.882	A
5 - Malthouse Avenue	218	54	945	1913	0.114	218	1138	0.2	0.1	2.124	A
1 - M4 (West)	1524	381	421	3019	0.505	1527	742	1.8	1.0	2.418	A

09:00 - 09:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
2 - Maes-Y-Bryn	69	17	1611	809	0.085	69	18	0.1	0.1	4.861	A
3 - M4 (East)	629	157	1402	1680	0.374	631	278	1.1	0.6	3.437	A
4 - A4232	1137	284	601	2748	0.414	1138	1431	1.1	0.7	2.238	A
5 - Malthouse Avenue	182	46	790	2054	0.089	182	949	0.1	0.1	1.925	A
1 - M4 (West)	1276	319	352	3109	0.411	1277	620	1.0	0.7	1.967	A

Base+CD+Dev, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - M4 (West) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	M4 Junction 30	Large Roundabout		2, 3, 4, 5, 1	7.00	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Entry-to-exit separation (m)
2 - Maes-Y-Bryn	2429	19.50
3 - M4 (East)	2114	135.00
4 - A4232	907	27.00
5 - Malthouse Avenue	1182	22.00
1 - M4 (West)	549	128.00

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

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

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
2 - Maes-Y-Bryn		ONE HOUR	✓	91	100.000
3 - M4 (East)		ONE HOUR	✓	843	100.000
4 - A4232		ONE HOUR	✓	1538	100.000
5 - Malthouse Avenue		ONE HOUR	✓	274	100.000
1 - M4 (West)		ONE HOUR	✓	1707	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		2 - Maes-Y-Bryn	3 - M4 (East)	4 - A4232	5 - Malthouse Avenue	1 - M4 (West)
From	2 - Maes-Y-Bryn	0	3	11	49	28
	3 - M4 (East)	1	0	525	303	14
	4 - A4232	13	280	5	533	707
	5 - Malthouse Avenue	3	53	136	0	82
	1 - M4 (West)	7	38	1240	422	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		2 - Maes-Y-Bryn	3 - M4 (East)	4 - A4232	5 - Malthouse Avenue	1 - M4 (West)
From	2 - Maes-Y-Bryn	0	0	0	0	4
	3 - M4 (East)	0	0	1	2	0
	4 - A4232	0	1	0	0	3
	5 - Malthouse Avenue	0	4	2	0	6
	1 - M4 (West)	0	0	2	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
2 - Maes-Y-Bryn	0.22	10.21	0.3	B	84	125
3 - M4 (East)	0.83	18.68	4.6	C	774	1160
4 - A4232	0.70	4.95	2.3	A	1411	2117
5 - Malthouse Avenue	0.17	2.52	0.2	A	251	377
1 - M4 (West)	0.66	3.65	1.9	A	1566	2350

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
2 - Maes-Y-Bryn	69	17	1633	799	0.086	68	18	0.0	0.1	4.921	A
3 - M4 (East)	635	159	1420	1664	0.381	632	281	0.0	0.6	3.479	A
4 - A4232	1158	289	613	2735	0.423	1155	1439	0.0	0.7	2.274	A
5 - Malthouse Avenue	206	52	787	2063	0.100	206	981	0.0	0.1	1.938	A
1 - M4 (West)	1285	321	369	3087	0.416	1282	624	0.0	0.7	1.989	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
2 - Maes-Y-Bryn	82	20	1953	654	0.125	82	22	0.1	0.1	6.290	A
3 - M4 (East)	758	189	1698	1434	0.528	756	336	0.6	1.1	5.291	A
4 - A4232	1383	346	733	2603	0.531	1381	1721	0.7	1.1	2.941	A
5 - Malthouse Avenue	246	62	941	1923	0.128	246	1173	0.1	0.1	2.147	A
1 - M4 (West)	1535	384	441	2993	0.513	1533	746	0.7	1.0	2.463	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
2 - Maes-Y-Bryn	100	25	2389	455	0.220	100	26	0.1	0.3	10.119	B
3 - M4 (East)	928	232	2078	1120	0.828	915	411	1.1	4.3	16.605	C
4 - A4232	1693	423	893	2427	0.698	1689	2100	1.1	2.3	4.846	A
5 - Malthouse Avenue	302	75	1150	1732	0.174	301	1432	0.1	0.2	2.517	A
1 - M4 (West)	1879	470	540	2866	0.656	1876	912	1.0	1.9	3.625	A

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
2 - Maes-Y-Bryn	100	25	2394	453	0.221	100	26	0.3	0.3	10.205	B
3 - M4 (East)	928	232	2082	1117	0.831	927	412	4.3	4.6	18.681	C
4 - A4232	1693	423	899	2421	0.700	1693	2110	2.3	2.3	4.946	A
5 - Malthouse Avenue	302	75	1154	1729	0.175	302	1439	0.2	0.2	2.522	A
1 - M4 (West)	1879	470	541	2864	0.656	1879	915	1.9	1.9	3.653	A

08:45 - 09:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
2 - Maes-Y-Bryn	82	20	1959	651	0.126	82	22	0.3	0.1	6.335	A
3 - M4 (East)	758	189	1704	1430	0.530	772	337	4.6	1.1	5.584	A
4 - A4232	1383	346	741	2595	0.533	1387	1735	2.3	1.1	2.994	A
5 - Malthouse Avenue	246	62	946	1918	0.128	247	1183	0.2	0.1	2.153	A
1 - M4 (West)	1535	384	442	2991	0.513	1538	750	1.9	1.1	2.483	A

09:00 - 09:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
2 - Maes-Y-Bryn	69	17	1638	797	0.086	69	18	0.1	0.1	4.944	A
3 - M4 (East)	635	159	1425	1660	0.382	637	282	1.1	0.6	3.523	A
4 - A4232	1158	289	616	2732	0.424	1160	1446	1.1	0.7	2.293	A
5 - Malthouse Avenue	206	52	790	2060	0.100	206	986	0.1	0.1	1.943	A
1 - M4 (West)	1285	321	370	3085	0.417	1286	627	1.1	0.7	2.002	A

Appendix Q

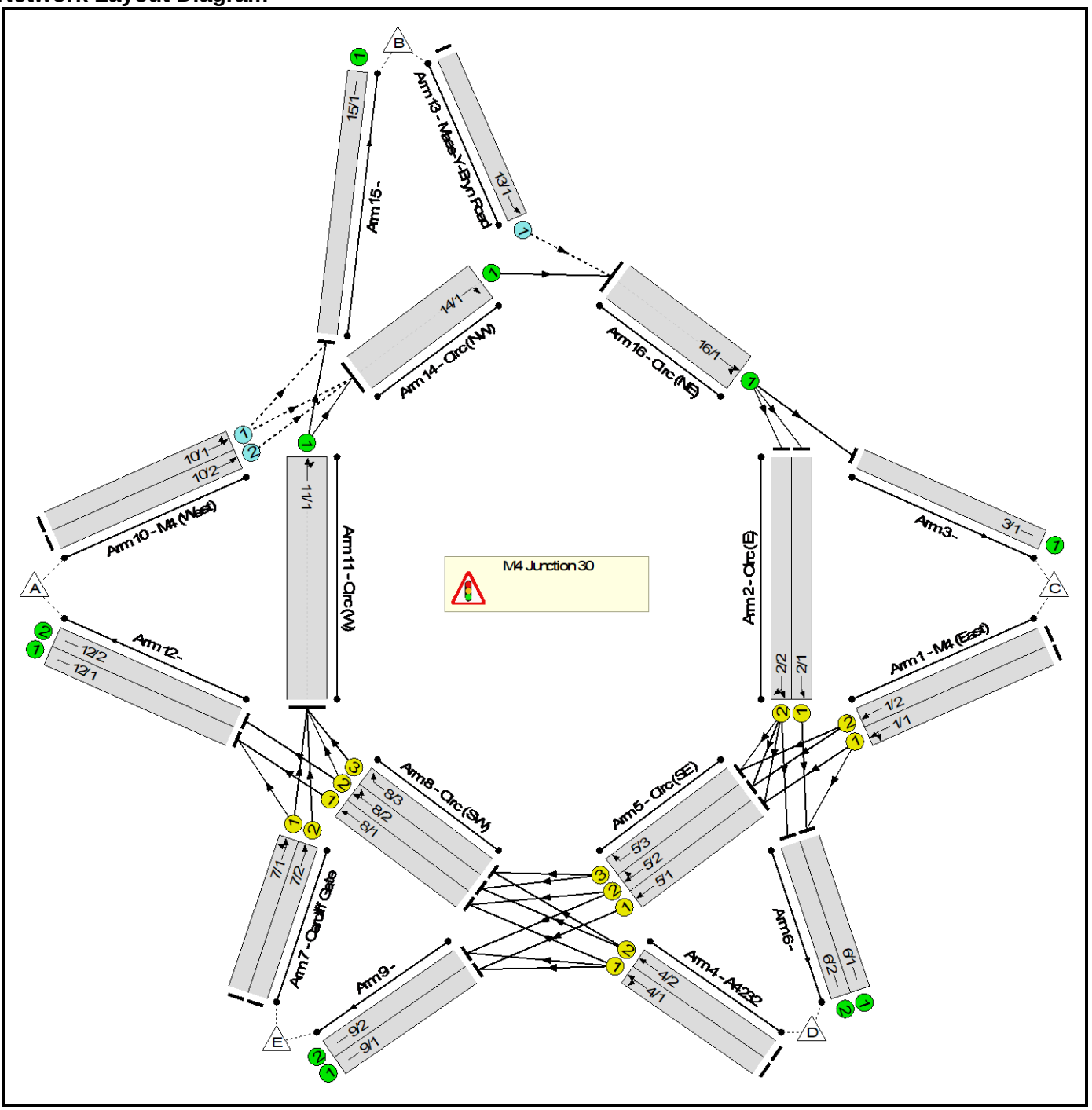
Full Input Data And Results

User and Project Details

Project:	
Title:	**M4 Junction 30**
Location:	
Design Layout Ref:	Existing Junction Layout
Additional detail:	
File name:	M4 J30 (Existing) v1.1
Author:	David Noyce
Company:	Vectos
Address:	Network Building, 97 Tottenham Court Road, London W1T 4TP

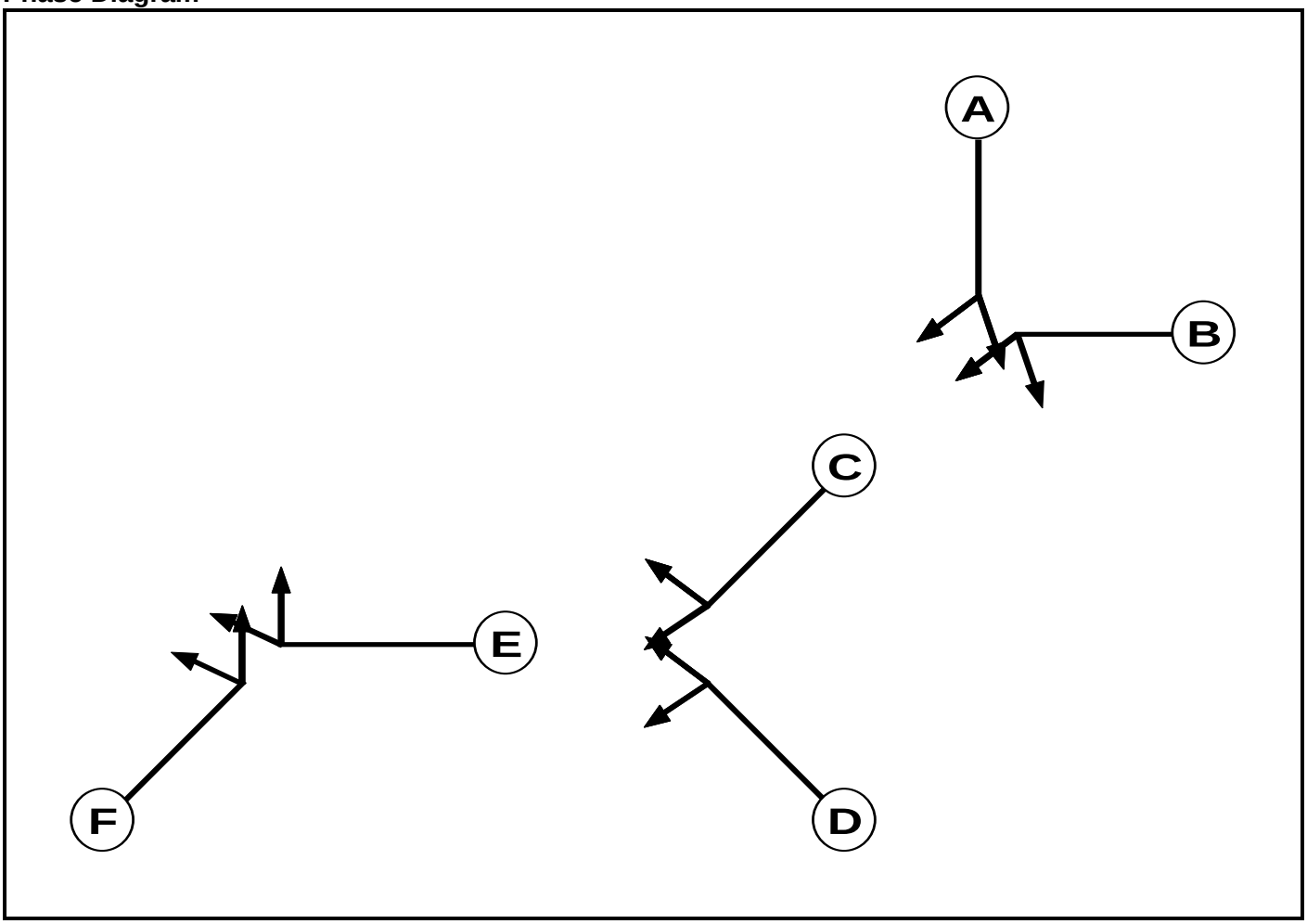
Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Traffic		7	7
D	Traffic		7	7
E	Traffic		7	7
F	Traffic		7	7

Full Input Data And Results

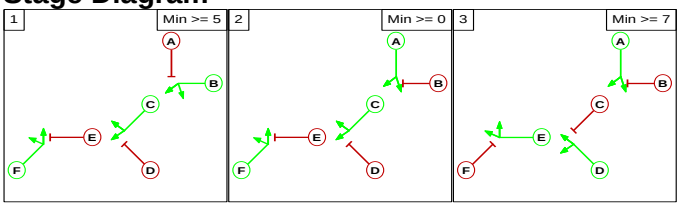
Phase Intergreens Matrix

Terminating Phase	Starting Phase						
		A	B	C	D	E	F
	A		7	-	-	-	-
	B	5		-	-	-	-
	C	-	-		7	-	-
	D	-	-	5		-	-
	E	-	-	-	-		7
	F	-	-	-	-	6	

Phases in Stage

Stage No.	Phases in Stage
1	B C F
2	A C F
3	A D E

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
3	1	A	Losing	4	4
3	1	E	Losing	6	6

Prohibited Stage Change

From Stage	To Stage		
	1	2	3
1		5	7
2	7		7
3	13	7	

Full Input Data And Results

Give-Way Lane Input Data

Junction: M4 Junction 30											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
10/1 (M4 (West))	14/1 (Ahead)	1621	0	11/1	0.46	All	-	-	-	-	-
	15/1 (Left)	1621	0	11/1	0.46	All					
10/2 (M4 (West))	14/1 (Ahead)	1508	0	11/1	0.43	All	-	-	-	-	-
13/1 (Maes-Y-Bryn Road)	16/1 (Ahead)	1384	0	14/1	0.40	All	-	-	-	-	-

Full Input Data And Results

Lane Input Data

Junction: M4 Junction 30

Lane	Lane Type	Phases	Start Disp.	End Disp.	Physical Length (PCU)	Sat Flow Type	Def User Saturation Flow (PCU/Hr)	Lane Width (m)	Gradient	Nearside Lane	Turns	Turning Radius (m)
1/1 (M4 (East))	U	B	2	3	60.0	User	2099	-	-	-	-	-
1/2 (M4 (East))	U	B	2	3	60.0	User	1922	-	-	-	-	-
2/1 (Circ (E))	U	A	2	3	20.0	User	2058	-	-	-	-	-
2/2 (Circ (E))	U	A	2	3	21.0	User	1930	-	-	-	-	-
3/1	U		2	3	60.0	Inf	-	-	-	-	-	-
4/1 (A4232)	U	D	2	3	60.0	User	1961	-	-	-	-	-
4/2 (A4232)	U	D	2	3	60.0	User	1947	-	-	-	-	-
5/1 (Circ (SE))	U	C	2	3	2.0	Geom	-	3.50	0.00	Y	Arm 9 Ahead	53.50
5/2 (Circ (SE))	U	C	2	3	2.0	Geom	-	3.50	0.00	N	Arm 8 Right	50.00
											Arm 9 Ahead	50.00
5/3 (Circ (SE))	U	C	2	3	3.0	Geom	-	3.50	0.00	N	Arm 8 Right	46.50
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/2	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (Cardiff Gate)	U	F	2	3	60.0	Geom	-	3.65	0.00	Y	Arm 11 Ahead	21.50
											Arm 12 Left	21.50
7/2 (Cardiff Gate)	U	F	2	3	60.0	Geom	-	3.65	0.00	N	Arm 11 Ahead	27.50
8/1 (Circ (SW))	U	E	2	3	2.0	Geom	-	3.50	0.00	Y	Arm 12 Ahead	53.50
8/2 (Circ (SW))	U	E	2	3	3.0	Geom	-	3.50	0.00	N	Arm 11 Right	50.00
											Arm 12 Ahead	50.00
8/3 (Circ (SW))	U	E	2	3	5.0	Geom	-	3.50	0.00	N	Arm 11 Right	46.50
9/1	U		2	3	60.0	Inf	-	-	-	-	-	-
9/2	U		2	3	60.0	Inf	-	-	-	-	-	-
10/1 (M4 (West))	O		2	3	60.0	Inf	-	-	-	-	-	-
10/2 (M4 (West))	O		2	3	60.0	Inf	-	-	-	-	-	-
11/1 (Circ (W))	U		2	3	1.0	Inf	-	-	-	-	-	-

12/1	U		2	3	60.0	Inf	-	-	-	-	-	-
12/2	U		2	3	60.0	Inf	-	-	-	-	-	-
13/1 (Maes-Y-Bryn Road)	O		2	3	60.0	Inf	-	-	-	-	-	-
14/1 (Circ (NW))	U		2	3	1.0	Inf	-	-	-	-	-	-
15/1	U		2	3	60.0	Inf	-	-	-	-	-	-
16/1 (Circ (NE))	U		2	3	1.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'Base, PM'	17:00	18:00	01:00	
2: 'Base+CD, PM'	17:00	18:00	01:00	
3: 'Base+CD+Dev, PM'	17:00	18:00	01:00	

Scenario 1: 'Base, PM' (FG1: 'Base, PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination					
		A	B	C	D	E	Tot.
Origin	A	0	24	41	827	74	966
	B	2	0	8	21	3	34
	C	24	0	1	249	113	387
	D	1089	42	193	5	154	1483
	E	435	34	268	542	0	1279
	Tot.	1550	100	511	1644	344	4149

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 1: Base, PM
Junction: M4 Junction 30	
1/1	278
1/2	109
2/1	795
2/2	679
3/1	511
4/1	766
4/2	717
5/1	66
5/2	131
5/3	20
6/1	1044
6/2	600
7/1	608
7/2	671
8/1	619
8/2	501
8/3	236
9/1	143
9/2	201
10/1	514
10/2	452
11/1	1085
12/1	1054
12/2	496
13/1	34
14/1	1951
15/1	100
16/1	1985

Full Input Data And Results

Lane Saturation Flows

Junction: M4 Junction 30								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (M4 (East) Lane 1)	This lane uses a directly entered Saturation Flow						2099	2099
1/2 (M4 (East) Lane 2)	This lane uses a directly entered Saturation Flow						1922	1922
2/1 (Circ (E) Lane 1)	This lane uses a directly entered Saturation Flow						2058	2058
2/2 (Circ (E) Lane 2)	This lane uses a directly entered Saturation Flow						1930	1930
3/1	Infinite Saturation Flow						Inf	Inf
4/1 (A4232 Lane 1)	This lane uses a directly entered Saturation Flow						1961	1961
4/2 (A4232 Lane 2)	This lane uses a directly entered Saturation Flow						1947	1947
5/1 (Circ (SE))	3.50	0.00	Y	Arm 9 Ahead	53.50	100.0 %	1911	1911
5/2 (Circ (SE))	3.50	0.00	N	Arm 8 Right	50.00	5.3 %	2044	2044
				Arm 9 Ahead	50.00	94.7 %		
5/3 (Circ (SE))	3.50	0.00	N	Arm 8 Right	46.50	100.0 %	2039	2039
6/1	Infinite Saturation Flow						Inf	Inf
6/2	Infinite Saturation Flow						Inf	Inf
7/1 (Cardiff Gate)	3.65	0.00	Y	Arm 11 Ahead	21.50	28.5 %	1851	1851
				Arm 12 Left	21.50	71.5 %		
7/2 (Cardiff Gate)	3.65	0.00	N	Arm 11 Ahead	27.50	100.0 %	2010	2010
8/1 (Circ (SW))	3.50	0.00	Y	Arm 12 Ahead	53.50	100.0 %	1911	1911
8/2 (Circ (SW))	3.50	0.00	N	Arm 11 Right	50.00	1.0 %	2044	2044
				Arm 12 Ahead	50.00	99.0 %		
8/3 (Circ (SW))	3.50	0.00	N	Arm 11 Right	46.50	100.0 %	2039	2039
9/1	Infinite Saturation Flow						Inf	Inf
9/2	Infinite Saturation Flow						Inf	Inf
10/1 (M4 (West) Lane 1)	Infinite Saturation Flow						Inf	Inf
10/2 (M4 (West) Lane 2)	Infinite Saturation Flow						Inf	Inf
11/1 (Circ (W) Lane 1)	Infinite Saturation Flow						Inf	Inf
12/1	Infinite Saturation Flow						Inf	Inf
12/2	Infinite Saturation Flow						Inf	Inf
13/1 (Maes-Y-Bryn Road Lane 1)	Infinite Saturation Flow						Inf	Inf

14/1 (Circ (NW) Lane 1)	Infinite Saturation Flow	Inf	Inf
15/1	Infinite Saturation Flow	Inf	Inf
16/1 (Circ (NE) Lane 1)	Infinite Saturation Flow	Inf	Inf

Scenario 2: 'Base+CD, PM' (FG2: 'Base+CD, PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination					
		A	B	C	D	E	Tot.
Origin	A	0	24	41	940	74	1079
	B	2	0	8	21	3	34
	C	24	0	1	349	113	487
	D	1152	42	273	5	166	1638
	E	435	34	268	557	0	1294
	Tot.	1613	100	591	1872	356	4532

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: Base+CD, PM
Junction: M4 Junction 30	
1/1	349
1/2	138
2/1	848
2/2	754
3/1	591
4/1	823
4/2	815
5/1	37
5/2	161
5/3	19
6/1	1197
6/2	675
7/1	615
7/2	679
8/1	665
8/2	520
8/3	314
9/1	120
9/2	236
10/1	571
10/2	508
11/1	1180
12/1	1100
12/2	513
13/1	34
14/1	2159
15/1	100
16/1	2193

Full Input Data And Results

Lane Saturation Flows

Junction: M4 Junction 30								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (M4 (East) Lane 1)	This lane uses a directly entered Saturation Flow						2099	2099
1/2 (M4 (East) Lane 2)	This lane uses a directly entered Saturation Flow						1922	1922
2/1 (Circ (E) Lane 1)	This lane uses a directly entered Saturation Flow						2058	2058
2/2 (Circ (E) Lane 2)	This lane uses a directly entered Saturation Flow						1930	1930
3/1	Infinite Saturation Flow						Inf	Inf
4/1 (A4232 Lane 1)	This lane uses a directly entered Saturation Flow						1961	1961
4/2 (A4232 Lane 2)	This lane uses a directly entered Saturation Flow						1947	1947
5/1 (Circ (SE))	3.50	0.00	Y	Arm 9 Ahead	53.50	100.0 %	1911	1911
5/2 (Circ (SE))	3.50	0.00	N	Arm 8 Right	50.00	5.0 %	2044	2044
				Arm 9 Ahead	50.00	95.0 %		
5/3 (Circ (SE))	3.50	0.00	N	Arm 8 Right	46.50	100.0 %	2039	2039
6/1	Infinite Saturation Flow						Inf	Inf
6/2	Infinite Saturation Flow						Inf	Inf
7/1 (Cardiff Gate)	3.65	0.00	Y	Arm 11 Ahead	21.50	29.3 %	1851	1851
				Arm 12 Left	21.50	70.7 %		
7/2 (Cardiff Gate)	3.65	0.00	N	Arm 11 Ahead	27.50	100.0 %	2010	2010
8/1 (Circ (SW))	3.50	0.00	Y	Arm 12 Ahead	53.50	100.0 %	1911	1911
8/2 (Circ (SW))	3.50	0.00	N	Arm 11 Right	50.00	1.3 %	2044	2044
				Arm 12 Ahead	50.00	98.7 %		
8/3 (Circ (SW))	3.50	0.00	N	Arm 11 Right	46.50	100.0 %	2039	2039
9/1	Infinite Saturation Flow						Inf	Inf
9/2	Infinite Saturation Flow						Inf	Inf
10/1 (M4 (West) Lane 1)	Infinite Saturation Flow						Inf	Inf
10/2 (M4 (West) Lane 2)	Infinite Saturation Flow						Inf	Inf
11/1 (Circ (W) Lane 1)	Infinite Saturation Flow						Inf	Inf
12/1	Infinite Saturation Flow						Inf	Inf
12/2	Infinite Saturation Flow						Inf	Inf
13/1 (Maes-Y-Bryn Road Lane 1)	Infinite Saturation Flow						Inf	Inf

14/1 (Circ (NW) Lane 1)	Infinite Saturation Flow	Inf	Inf
15/1	Infinite Saturation Flow	Inf	Inf
16/1 (Circ (NE) Lane 1)	Infinite Saturation Flow	Inf	Inf

Scenario 3: 'Base+CD+Dev, PM' (FG3: 'Base+CD+Dev, PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination					
		A	B	C	D	E	Tot.
Origin	A	0	24	41	940	89	1094
	B	2	0	8	21	3	34
	C	24	0	1	349	122	496
	D	1152	42	273	5	196	1668
	E	469	34	284	585	0	1372
	Tot.	1647	100	607	1900	410	4664

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 3: Base+CD+Dev, PM
Junction: M4 Junction 30	
1/1	349
1/2	147
2/1	878
2/2	767
3/1	607
4/1	837
4/2	831
5/1	46
5/2	176
5/3	19
6/1	1227
6/2	673
7/1	653
7/2	719
8/1	649
8/2	540
8/3	310
9/1	144
9/2	266
10/1	577
10/2	517
11/1	1224
12/1	1118
12/2	529
13/1	34
14/1	2218
15/1	100
16/1	2252

Full Input Data And Results

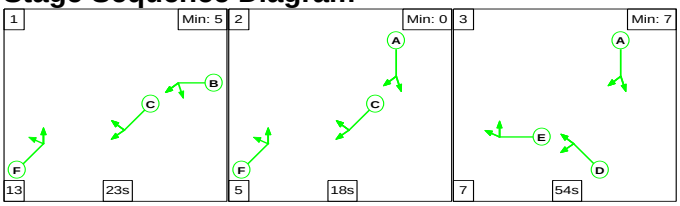
Lane Saturation Flows

Junction: M4 Junction 30								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (M4 (East) Lane 1)	This lane uses a directly entered Saturation Flow						2099	2099
1/2 (M4 (East) Lane 2)	This lane uses a directly entered Saturation Flow						1922	1922
2/1 (Circ (E) Lane 1)	This lane uses a directly entered Saturation Flow						2058	2058
2/2 (Circ (E) Lane 2)	This lane uses a directly entered Saturation Flow						1930	1930
3/1	Infinite Saturation Flow						Inf	Inf
4/1 (A4232 Lane 1)	This lane uses a directly entered Saturation Flow						1961	1961
4/2 (A4232 Lane 2)	This lane uses a directly entered Saturation Flow						1947	1947
5/1 (Circ (SE))	3.50	0.00	Y	Arm 9 Ahead	53.50	100.0 %	1911	1911
5/2 (Circ (SE))	3.50	0.00	N	Arm 8 Right	50.00	4.5 %	2044	2044
				Arm 9 Ahead	50.00	95.5 %		
5/3 (Circ (SE))	3.50	0.00	N	Arm 8 Right	46.50	100.0 %	2039	2039
6/1	Infinite Saturation Flow						Inf	Inf
6/2	Infinite Saturation Flow						Inf	Inf
7/1 (Cardiff Gate)	3.65	0.00	Y	Arm 11 Ahead	21.50	28.2 %	1851	1851
				Arm 12 Left	21.50	71.8 %		
7/2 (Cardiff Gate)	3.65	0.00	N	Arm 11 Ahead	27.50	100.0 %	2010	2010
8/1 (Circ (SW))	3.50	0.00	Y	Arm 12 Ahead	53.50	100.0 %	1911	1911
8/2 (Circ (SW))	3.50	0.00	N	Arm 11 Right	50.00	2.0 %	2044	2044
				Arm 12 Ahead	50.00	98.0 %		
8/3 (Circ (SW))	3.50	0.00	N	Arm 11 Right	46.50	100.0 %	2039	2039
9/1	Infinite Saturation Flow						Inf	Inf
9/2	Infinite Saturation Flow						Inf	Inf
10/1 (M4 (West) Lane 1)	Infinite Saturation Flow						Inf	Inf
10/2 (M4 (West) Lane 2)	Infinite Saturation Flow						Inf	Inf
11/1 (Circ (W) Lane 1)	Infinite Saturation Flow						Inf	Inf
12/1	Infinite Saturation Flow						Inf	Inf
12/2	Infinite Saturation Flow						Inf	Inf
13/1 (Maes-Y-Bryn Road Lane 1)	Infinite Saturation Flow						Inf	Inf

14/1 (Circ (NW) Lane 1)	Infinite Saturation Flow	Inf	Inf
15/1	Infinite Saturation Flow	Inf	Inf
16/1 (Circ (NE) Lane 1)	Infinite Saturation Flow	Inf	Inf

Scenario 1: 'Base, PM' (FG1: 'Base, PM', Plan 1: 'Network Control Plan 1')

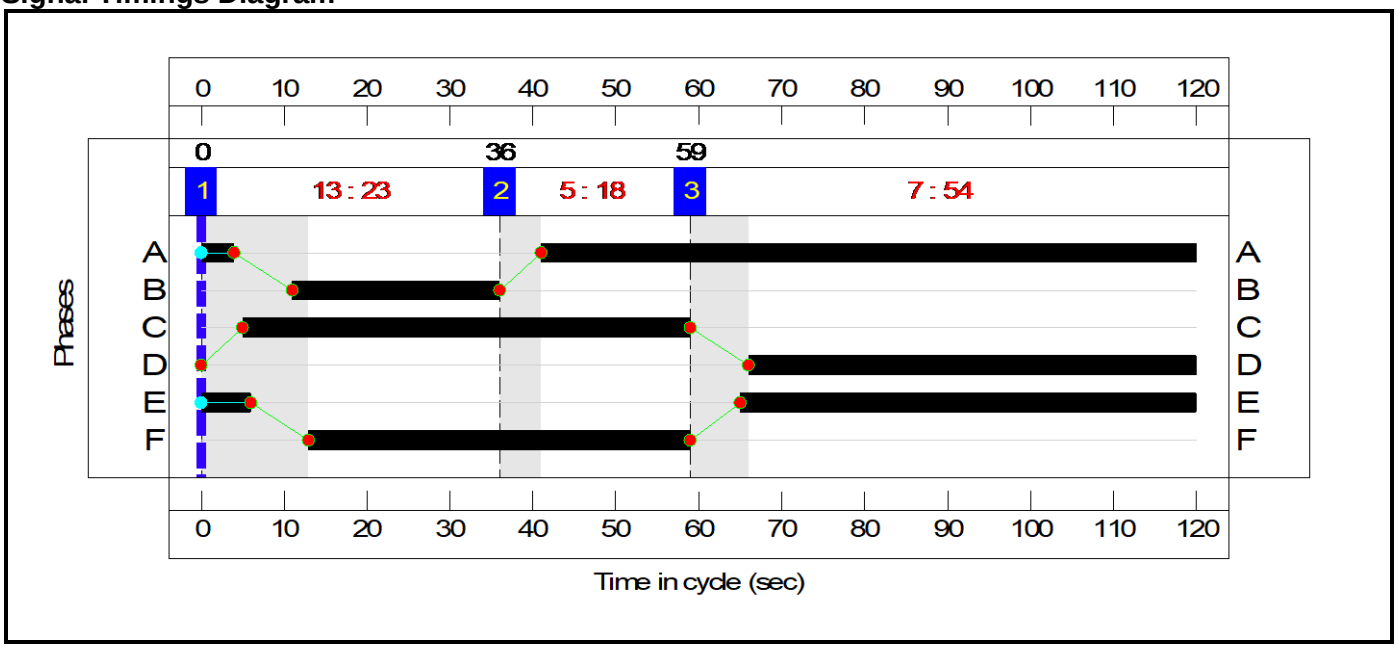
Stage Sequence Diagram



Stage Timings

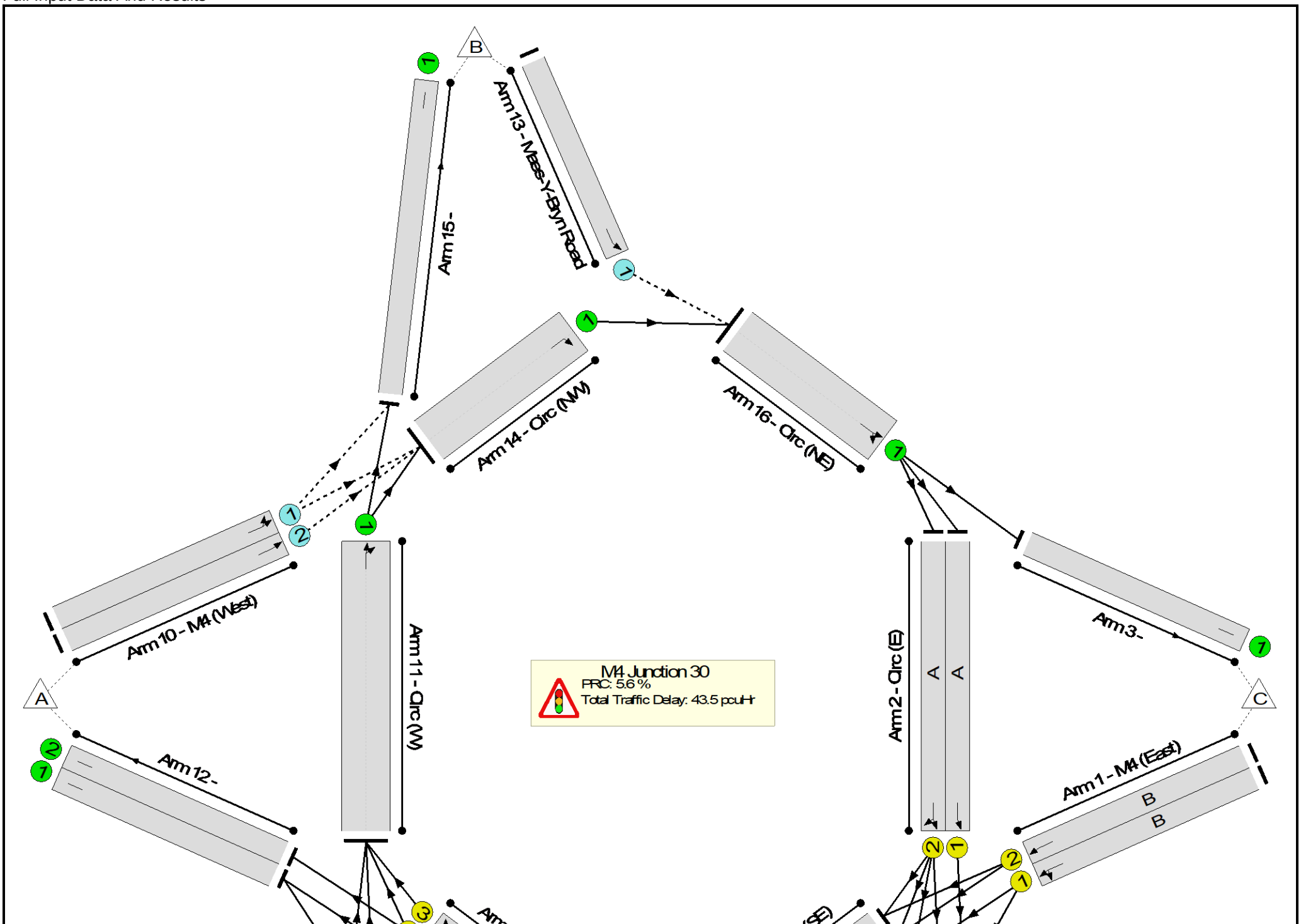
Stage	1	2	3
Duration	23	18	54
Change Point	0	36	59

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


B
Arm 13 - Mass-Y-Bryn Road
Arm 15 -
Arm 14 - Circ (NW)
Arm 16 - Circ (NE)
Arm 10 - M4 (West)
Arm 11 - Circ (W)
Arm 2 - Circ (E)
Arm 3 -
A
C
Arm 12 -
Arm 1 - M4 (East)
M4 Junction 30
PRC: 5.6 %
Total Traffic Delay: 43.5 pcuHr

Full Input Data And Results

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: M4 Junction 30	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**85.2%**
M4 Junction 30	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**85.2%**
1/1	M4 (East) Ahead Left	U	N/A	N/A	B		1	25	-	278	2099	455	61.1%
1/2	M4 (East) Ahead	U	N/A	N/A	B		1	25	-	109	1922	416	26.2%
2/1	Circ (E) Ahead	U	N/A	N/A	A		1	83	-	795	2058	1441	55.2%
2/2	Circ (E) Right Ahead	U	N/A	N/A	A		1	83	-	679	1930	1351	50.3%
3/1		U	N/A	N/A	-		-	-	-	511	Inf	Inf	0.0%
4/1	A4232 Ahead Left	U	N/A	N/A	D		1	54	-	766	1961	899	85.2%
4/2	A4232 Ahead	U	N/A	N/A	D		1	54	-	717	1947	892	80.3%
5/1	Circ (SE) Ahead	U	N/A	N/A	C		1	54	-	66	1911	876	7.5%
5/2	Circ (SE) Right Ahead	U	N/A	N/A	C		1	54	-	131	2044	937	14.0%
5/3	Circ (SE) Right	U	N/A	N/A	C		1	54	-	20	2039	935	2.1%
6/1		U	N/A	N/A	-		-	-	-	1044	Inf	Inf	0.0%
6/2		U	N/A	N/A	-		-	-	-	600	Inf	Inf	0.0%
7/1	Cardiff Gate Ahead Left	U	N/A	N/A	F		1	46	-	608	1851	725	83.9%
7/2	Cardiff Gate Ahead	U	N/A	N/A	F		1	46	-	671	2010	787	85.2%
8/1	Circ (SW) Ahead	U	N/A	N/A	E		1	61	-	619	1911	987	62.7%
8/2	Circ (SW) Right Ahead	U	N/A	N/A	E		1	61	-	501	2044	1056	47.4%
8/3	Circ (SW) Right	U	N/A	N/A	E		1	61	-	236	2039	1053	22.4%
9/1		U	N/A	N/A	-		-	-	-	143	Inf	Inf	0.0%

Full Input Data And Results

9/2		U	N/A	N/A	-		-	-	-	201	Inf	Inf	0.0%
10/1	M4 (West) Ahead Left	O	N/A	N/A	-		-	-	-	514	Inf	1122	45.8%
10/2	M4 (West) Ahead	O	N/A	N/A	-		-	-	-	452	Inf	1041	43.4%
11/1	Circ (W) Right Ahead	U	N/A	N/A	-		-	-	-	1085	Inf	Inf	0.0%
12/1		U	N/A	N/A	-		-	-	-	1054	Inf	Inf	0.0%
12/2		U	N/A	N/A	-		-	-	-	496	Inf	Inf	0.0%
13/1	Maes-Y-Bryn Road Ahead	O	N/A	N/A	-		-	-	-	34	Inf	603	5.6%
14/1	Circ (NW) Right	U	N/A	N/A	-		-	-	-	1951	Inf	Inf	0.0%
15/1		U	N/A	N/A	-		-	-	-	100	Inf	Inf	0.0%
16/1	Circ (NE) Right Ahead	U	N/A	N/A	-		-	-	-	1985	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: M4 Junction 30	**-**	**-**	**1000**	**0**	**0**	**30.6**	**12.9**	**0.0**	**43.5**	**-**	**-**	**-**	**-**
M4 Junction 30	**-**	**-**	**1000**	**0**	**0**	**30.6**	**12.9**	**0.0**	**43.5**	**-**	**-**	**-**	**-**
1/1	278	278	-	-	-	3.3	0.8	-	4.1	52.5	8.3	0.8	9.1
1/2	109	109	-	-	-	1.2	0.2	-	1.4	44.9	3.0	0.2	3.2
2/1	795	795	-	-	-	0.9	0.6	-	1.5	6.9	7.5	0.6	8.1
2/2	679	679	-	-	-	1.0	0.5	-	1.5	7.9	7.6	0.5	8.1
3/1	511	511	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/1	766	766	-	-	-	6.1	2.8	-	8.9	41.9	22.6	2.8	25.3
4/2	717	717	-	-	-	5.6	2.0	-	7.5	37.9	20.3	2.0	22.3
5/1	66	66	-	-	-	0.2	0.0	-	0.2	10.0	0.7	0.0	0.7
5/2	131	131	-	-	-	0.2	0.0	-	0.2	5.6	0.8	0.0	0.8
5/3	20	20	-	-	-	0.0	0.0	-	0.0	0.9	0.0	0.0	0.0
6/1	1044	1044	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	600	600	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	608	608	-	-	-	5.6	2.5	-	8.1	47.8	18.2	2.5	20.7
7/2	671	671	-	-	-	6.2	2.8	-	9.0	48.1	20.3	2.8	23.1
8/1	619	619	-	-	-	0.1	0.0	-	0.1	0.4	0.2	0.0	0.2
8/2	501	501	-	-	-	0.2	0.0	-	0.2	1.5	0.6	0.0	0.6
8/3	236	236	-	-	-	0.0	0.0	-	0.0	0.2	0.0	0.0	0.0
9/1	143	143	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
9/2	201	201	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	514	514	514	0	0	0.0	0.4	-	0.5	3.2	4.0	0.4	4.4
10/2	452	452	452	0	0	0.0	0.4	-	0.4	3.2	3.1	0.4	3.5
11/1	1085	1085	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/1	1054	1054	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

Full Input Data And Results

12/2	496	496	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	34	34	34	0	0	0.0	0.0	-	0.0	3.2	0.0	0.0	0.0
14/1	1951	1951	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
15/1	100	100	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
16/1	1985	1985	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 - M4 J30

PRC for Signalled Lanes (%): 5.6
PRC Over All Lanes (%): 5.6

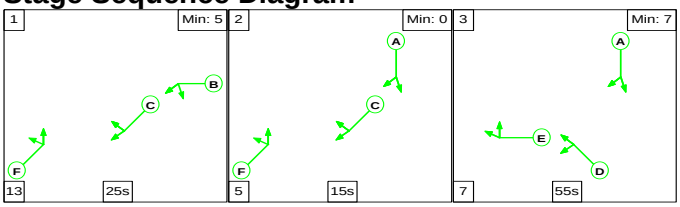
Total Delay for Signalled Lanes (pcuHr): 42.63
Total Delay Over All Lanes(pcuHr): 43.52

Cycle Time (s): 120

Full Input Data And Results

Scenario 2: 'Base+CD, PM' (FG2: 'Base+CD, PM', Plan 1: 'Network Control Plan 1')

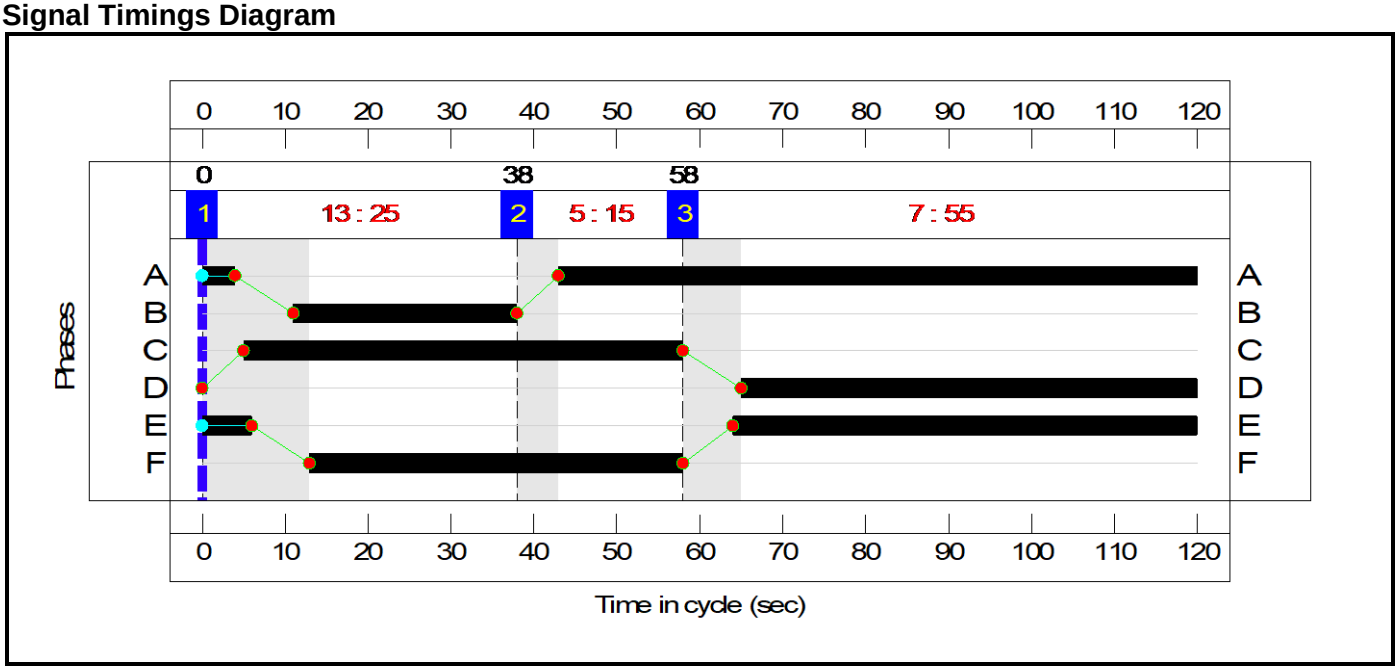
Stage Sequence Diagram



Stage Timings

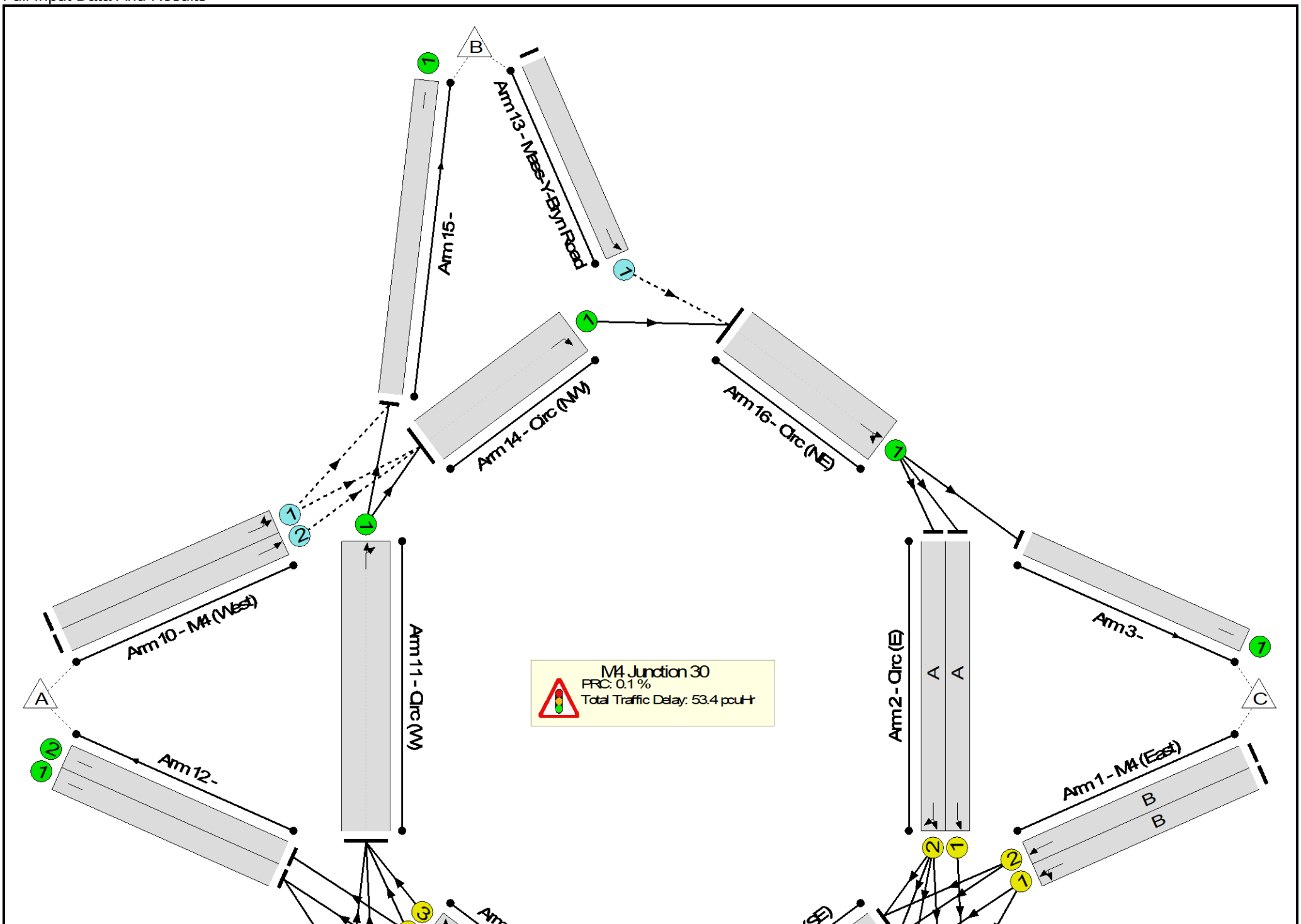
Stage	1	2	3
Duration	25	15	55
Change Point	0	38	58

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


B
Arm 13 - Mass-Y-Bym Road
Arm 15 -
Arm 14 - Circ (NW)
Arm 16 - Circ (NE)
Arm 10 - M4 (West)
Arm 11 - Circ (W)
Arm 2 - Circ (E)
Arm 3 -
A
C
Arm 12 -
Arm 1 - M4 (East)
M4 Junction 30
PRC: 0.1 %
Total Traffic Delay: 53.4 pcuHr

Full Input Data And Results

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: M4 Junction 30	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.9%**
M4 Junction 30	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.9%**
1/1	M4 (East) Ahead Left	U	N/A	N/A	B		1	27	-	349	2099	490	71.3%
1/2	M4 (East) Ahead	U	N/A	N/A	B		1	27	-	138	1922	448	30.8%
2/1	Circ (E) Ahead	U	N/A	N/A	A		1	81	-	848	2058	1406	60.3%
2/2	Circ (E) Right Ahead	U	N/A	N/A	A		1	81	-	754	1930	1319	57.2%
3/1		U	N/A	N/A	-		-	-	-	591	Inf	Inf	0.0%
4/1	A4232 Ahead Left	U	N/A	N/A	D		1	55	-	823	1961	915	89.9%
4/2	A4232 Ahead	U	N/A	N/A	D		1	55	-	815	1947	909	89.7%
5/1	Circ (SE) Ahead	U	N/A	N/A	C		1	53	-	37	1911	860	4.3%
5/2	Circ (SE) Right Ahead	U	N/A	N/A	C		1	53	-	161	2044	920	17.5%
5/3	Circ (SE) Right	U	N/A	N/A	C		1	53	-	19	2039	918	2.1%
6/1		U	N/A	N/A	-		-	-	-	1197	Inf	Inf	0.0%
6/2		U	N/A	N/A	-		-	-	-	675	Inf	Inf	0.0%
7/1	Cardiff Gate Ahead Left	U	N/A	N/A	F		1	45	-	615	1851	710	86.7%
7/2	Cardiff Gate Ahead	U	N/A	N/A	F		1	45	-	679	2010	771	88.1%
8/1	Circ (SW) Ahead	U	N/A	N/A	E		1	62	-	665	1911	1003	66.3%
8/2	Circ (SW) Right Ahead	U	N/A	N/A	E		1	62	-	520	2044	1073	48.5%
8/3	Circ (SW) Right	U	N/A	N/A	E		1	62	-	314	2039	1070	29.3%
9/1		U	N/A	N/A	-		-	-	-	120	Inf	Inf	0.0%

Full Input Data And Results

9/2		U	N/A	N/A	-		-	-	-	236	Inf	Inf	0.0%
10/1	M4 (West) Ahead Left	O	N/A	N/A	-		-	-	-	571	Inf	1078	53.0%
10/2	M4 (West) Ahead	O	N/A	N/A	-		-	-	-	508	Inf	1000	50.8%
11/1	Circ (W) Right Ahead	U	N/A	N/A	-		-	-	-	1180	Inf	Inf	0.0%
12/1		U	N/A	N/A	-		-	-	-	1100	Inf	Inf	0.0%
12/2		U	N/A	N/A	-		-	-	-	513	Inf	Inf	0.0%
13/1	Maes-Y-Bryn Road Ahead	O	N/A	N/A	-		-	-	-	34	Inf	520	6.5%
14/1	Circ (NW) Right	U	N/A	N/A	-		-	-	-	2159	Inf	Inf	0.0%
15/1		U	N/A	N/A	-		-	-	-	100	Inf	Inf	0.0%
16/1	Circ (NE) Right Ahead	U	N/A	N/A	-		-	-	-	2193	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: M4 Junction 30	**-**	**-**	**1113**	**0**	**0**	**34.8**	**18.6**	**0.0**	**53.4**	**-**	**-**	**-**	**-**
M4 Junction 30	**-**	**-**	**1113**	**0**	**0**	**34.8**	**18.6**	**0.0**	**53.4**	**-**	**-**	**-**	**-**
1/1	349	349	-	-	-	4.1	1.2	-	5.3	54.9	10.7	1.2	11.9
1/2	138	138	-	-	-	1.5	0.2	-	1.7	43.8	3.8	0.2	4.0
2/1	848	848	-	-	-	1.3	0.8	-	2.1	8.9	12.1	0.8	12.9
2/2	754	754	-	-	-	1.3	0.7	-	1.9	9.2	10.3	0.7	11.0
3/1	591	591	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/1	823	823	-	-	-	6.7	4.1	-	10.8	47.4	25.1	4.1	29.2
4/2	815	815	-	-	-	6.6	4.0	-	10.7	47.1	24.9	4.0	28.9
5/1	37	37	-	-	-	0.2	0.0	-	0.2	22.2	0.8	0.0	0.8
5/2	161	161	-	-	-	0.3	0.0	-	0.3	5.6	0.9	0.0	0.9
5/3	19	19	-	-	-	0.0	0.0	-	0.0	1.2	0.0	0.0	0.0
6/1	1197	1197	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	675	675	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	615	615	-	-	-	5.8	3.1	-	8.9	52.1	18.8	3.1	21.8
7/2	679	679	-	-	-	6.5	3.5	-	9.9	52.8	20.9	3.5	24.4
8/1	665	665	-	-	-	0.1	0.0	-	0.1	0.5	0.3	0.0	0.3
8/2	520	520	-	-	-	0.2	0.0	-	0.2	1.3	0.6	0.0	0.6
8/3	314	314	-	-	-	0.0	0.0	-	0.0	0.1	0.0	0.0	0.0
9/1	120	120	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
9/2	236	236	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	571	571	571	0	0	0.1	0.6	-	0.7	4.3	5.9	0.6	6.4
10/2	508	508	508	0	0	0.1	0.5	-	0.6	4.3	4.8	0.5	5.3
11/1	1180	1180	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/1	1100	1100	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

Full Input Data And Results

12/2	513	513	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	34	34	34	0	0	0.0	0.0	-	0.0	3.7	0.0	0.0	0.0
14/1	2159	2159	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
15/1	100	100	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
16/1	2193	2193	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 - M4 J30

PRC for Signalled Lanes (%): 0.1
PRC Over All Lanes (%): 0.1

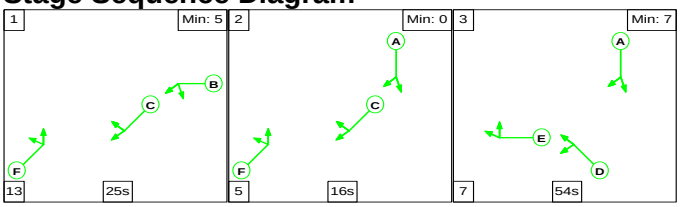
Total Delay for Signalled Lanes (pcuHr): 52.11
Total Delay Over All Lanes(pcuHr): 53.43

Cycle Time (s): 120

Full Input Data And Results

Scenario 3: 'Base+CD+Dev, PM' (FG3: 'Base+CD+Dev, PM', Plan 1: 'Network Control Plan 1')

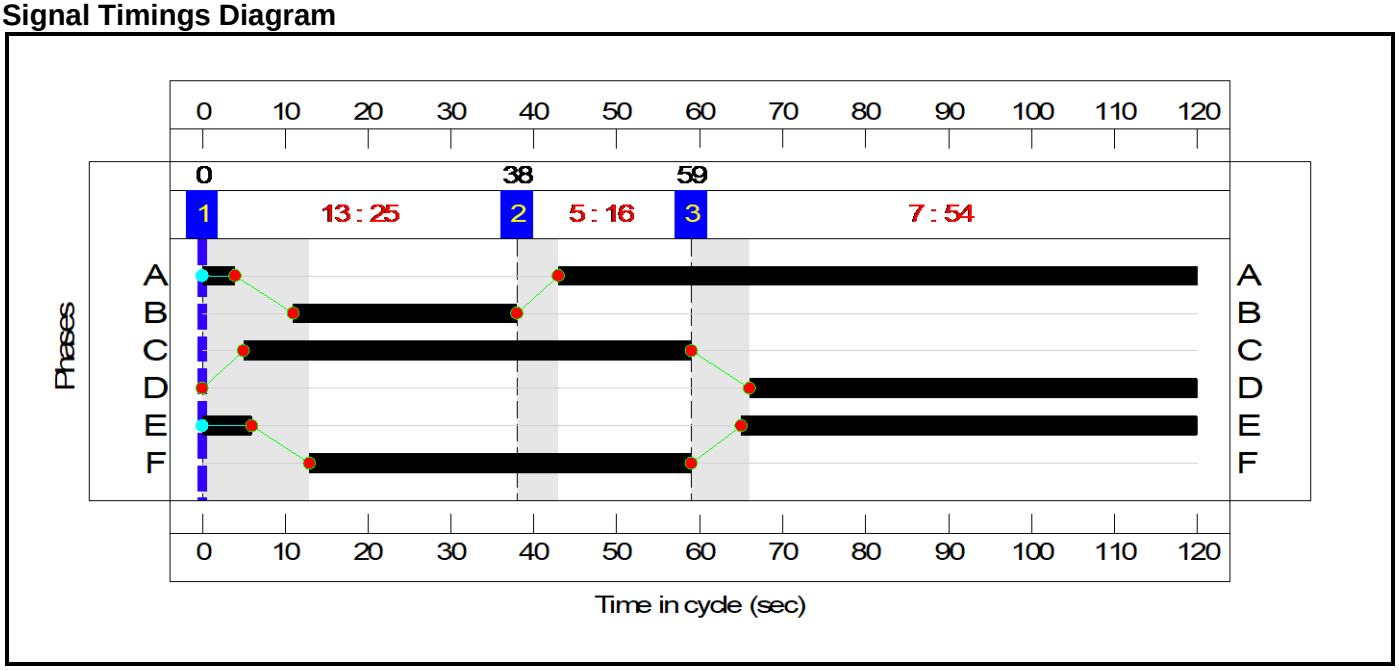
Stage Sequence Diagram



Stage Timings

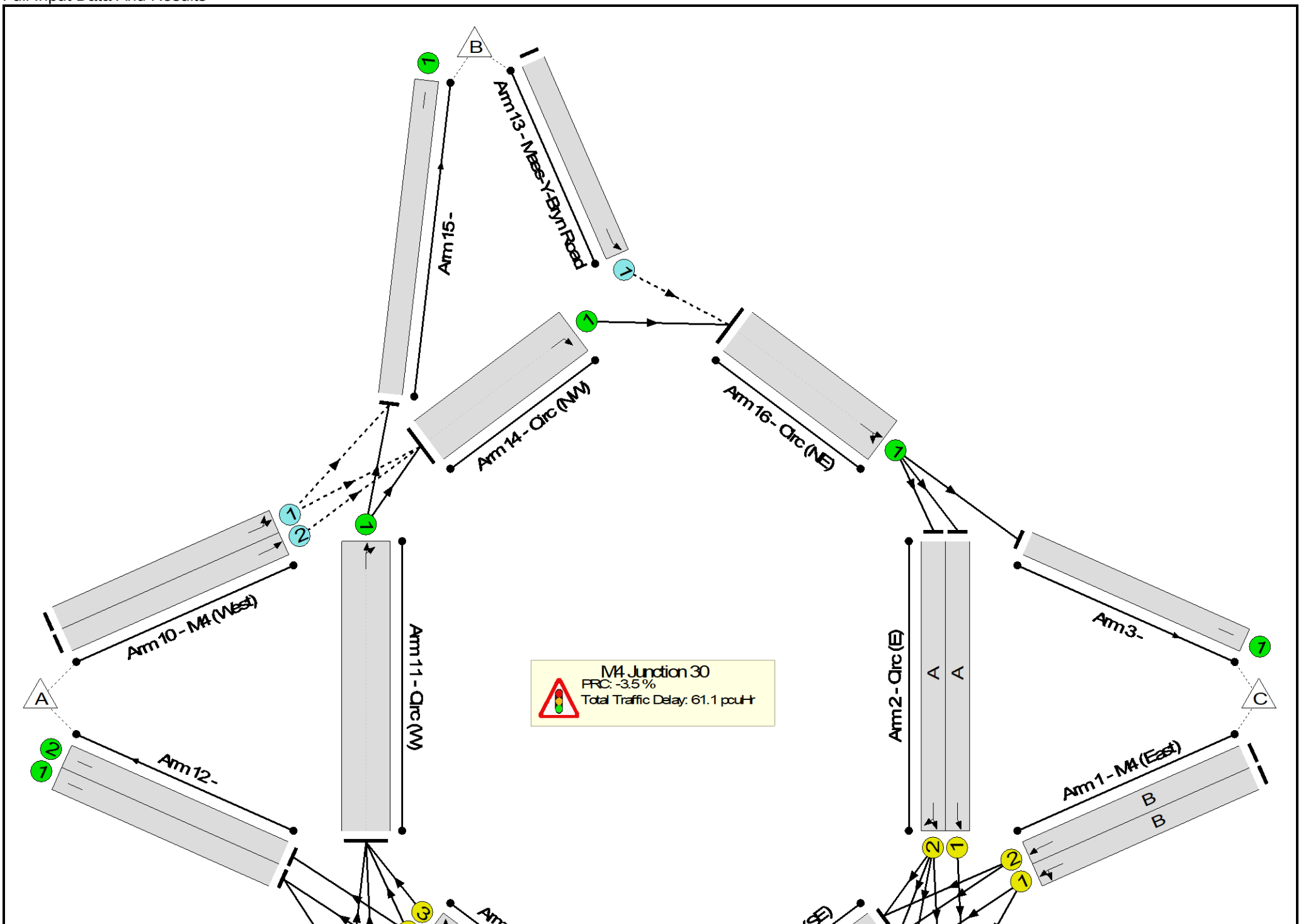
Stage	1	2	3
Duration	25	16	54
Change Point	0	38	59

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


B
Arm 13 - Mess-Y-Bryn Road
Arm 15 -
Arm 14 - Circ (NW)
Arm 16 - Circ (NE)
Arm 10 - M4 (West)
Arm 11 - Circ (W)
Arm 2 - Circ (E)
A
A
Arm 3 -
A
C
Arm 12 -
Arm 1 - M4 (East)
B
B
M4 Junction 30
PRC: -3.5 %
Total Traffic Delay: 61.1 pcuHr

Full Input Data And Results

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: M4 Junction 30	-	-	**N/A**	-	-		-	-	-	-	-	-	**93.1%**
M4 Junction 30	-	-	**N/A**	-	-		-	-	-	-	-	-	**93.1%**
1/1	M4 (East) Ahead Left	U	N/A	N/A	B		1	27	-	349	2099	490	71.3%
1/2	M4 (East) Ahead	U	N/A	N/A	B		1	27	-	147	1922	448	32.8%
2/1	Circ (E) Ahead	U	N/A	N/A	A		1	81	-	878	2058	1406	62.4%
2/2	Circ (E) Right Ahead	U	N/A	N/A	A		1	81	-	767	1930	1319	58.2%
3/1		U	N/A	N/A	-		-	-	-	607	Inf	Inf	0.0%
4/1	A4232 Ahead Left	U	N/A	N/A	D		1	54	-	837	1961	899	93.1%
4/2	A4232 Ahead	U	N/A	N/A	D		1	54	-	831	1947	892	93.1%
5/1	Circ (SE) Ahead	U	N/A	N/A	C		1	54	-	46	1911	876	5.3%
5/2	Circ (SE) Right Ahead	U	N/A	N/A	C		1	54	-	176	2044	937	18.8%
5/3	Circ (SE) Right	U	N/A	N/A	C		1	54	-	19	2039	935	2.0%
6/1		U	N/A	N/A	-		-	-	-	1227	Inf	Inf	0.0%
6/2		U	N/A	N/A	-		-	-	-	673	Inf	Inf	0.0%
7/1	Cardiff Gate Ahead Left	U	N/A	N/A	F		1	46	-	653	1851	725	90.1%
7/2	Cardiff Gate Ahead	U	N/A	N/A	F		1	46	-	719	2010	787	91.3%
8/1	Circ (SW) Ahead	U	N/A	N/A	E		1	61	-	649	1911	987	65.7%
8/2	Circ (SW) Right Ahead	U	N/A	N/A	E		1	61	-	540	2044	1056	51.1%
8/3	Circ (SW) Right	U	N/A	N/A	E		1	61	-	310	2039	1053	29.4%
9/1		U	N/A	N/A	-		-	-	-	144	Inf	Inf	0.0%

Full Input Data And Results

9/2		U	N/A	N/A	-		-	-	-	266	Inf	Inf	0.0%
10/1	M4 (West) Ahead Left	O	N/A	N/A	-		-	-	-	577	Inf	1058	54.6%
10/2	M4 (West) Ahead	O	N/A	N/A	-		-	-	-	517	Inf	981	52.7%
11/1	Circ (W) Right Ahead	U	N/A	N/A	-		-	-	-	1224	Inf	Inf	0.0%
12/1		U	N/A	N/A	-		-	-	-	1118	Inf	Inf	0.0%
12/2		U	N/A	N/A	-		-	-	-	529	Inf	Inf	0.0%
13/1	Maes-Y-Bryn Road Ahead	O	N/A	N/A	-		-	-	-	34	Inf	497	6.8%
14/1	Circ (NW) Right	U	N/A	N/A	-		-	-	-	2218	Inf	Inf	0.0%
15/1		U	N/A	N/A	-		-	-	-	100	Inf	Inf	0.0%
16/1	Circ (NE) Right Ahead	U	N/A	N/A	-		-	-	-	2252	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: M4 Junction 30	**-**	**-**	**1128**	**0**	**0**	**36.8**	**24.3**	**0.0**	**61.1**	**-**	**-**	**-**	**-**
M4 Junction 30	**-**	**-**	**1128**	**0**	**0**	**36.8**	**24.3**	**0.0**	**61.1**	**-**	**-**	**-**	**-**
1/1	349	349	-	-	-	4.1	1.2	-	5.3	54.9	10.7	1.2	11.9
1/2	147	147	-	-	-	1.6	0.2	-	1.8	44.2	4.0	0.2	4.3
2/1	878	878	-	-	-	1.3	0.8	-	2.2	8.9	12.6	0.8	13.5
2/2	767	767	-	-	-	1.3	0.7	-	2.0	9.4	10.8	0.7	11.5
3/1	607	607	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/1	837	837	-	-	-	7.1	5.7	-	12.9	55.3	26.3	5.7	32.0
4/2	831	831	-	-	-	7.1	5.7	-	12.8	55.4	26.1	5.7	31.8
5/1	46	46	-	-	-	0.3	0.0	-	0.3	21.1	0.9	0.0	0.9
5/2	176	176	-	-	-	0.3	0.0	-	0.3	5.6	1.0	0.0	1.0
5/3	19	19	-	-	-	0.0	0.0	-	0.0	1.1	0.0	0.0	0.0
6/1	1227	1227	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	673	673	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	653	653	-	-	-	6.2	4.1	-	10.3	56.8	20.3	4.1	24.4
7/2	719	719	-	-	-	6.9	4.6	-	11.5	57.8	22.6	4.6	27.2
8/1	649	649	-	-	-	0.1	0.0	-	0.1	0.5	0.3	0.0	0.3
8/2	540	540	-	-	-	0.2	0.0	-	0.2	1.3	0.6	0.0	0.6
8/3	310	310	-	-	-	0.0	0.0	-	0.0	0.1	0.0	0.0	0.0
9/1	144	144	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
9/2	266	266	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	577	577	577	0	0	0.1	0.6	-	0.7	4.7	6.4	0.6	7.0
10/2	517	517	517	0	0	0.1	0.6	-	0.7	4.6	5.5	0.6	6.0
11/1	1224	1224	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/1	1118	1118	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

Full Input Data And Results

12/2	529	529	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	34	34	34	0	0	0.0	0.0	-	0.0	3.9	0.0	0.0	0.0
14/1	2218	2218	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
15/1	100	100	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
16/1	2252	2252	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 - M4 J30

PRC for Signalled Lanes (%): -3.5
PRC Over All Lanes (%): -3.5

Total Delay for Signalled Lanes (pcuHr): 59.63
Total Delay Over All Lanes(pcuHr): 61.08

Cycle Time (s): 120

Appendix R

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462

Filename: 205339-A4232 Church Road ARCADY-V1.j9
Path: P:\Projects\200000\205339 - Cardiff Gate Development\Technical\B - Transport Assessment\Modelling
Report generation date: 29/06/2021 15:11:20

»Base, AM
»Base, PM
»Base+CD, AM
»Base+CD, PM
»Base+CD+Dev, AM
»Base+CD+Dev, PM

Summary of junction performance

	AM			PM		
	Queue (Veh)	Delay (s)	RFC	Queue (Veh)	Delay (s)	RFC
	Base					
1 - A4232 Pentwyn Link Road (E)	2.0	3.48	0.66	1.4	2.78	0.58
2 - Church Road	0.1	3.64	0.06	0.1	2.91	0.08
3 - A4232 Pentwyn Link Road (W)	0.5	2.28	0.35	1.3	3.73	0.57
4 - Heol Pontprennau	0.7	2.61	0.42	0.8	3.25	0.46
	Base+CD					
1 - A4232 Pentwyn Link Road (E)	3.0	4.98	0.75	2.8	5.10	0.74
2 - Church Road	1.5	8.18	0.60	0.5	4.41	0.34
3 - A4232 Pentwyn Link Road (W)	0.8	2.90	0.44	3.0	7.07	0.75
4 - Heol Pontprennau	1.3	3.80	0.56	1.8	5.74	0.65
	Base+CD+Dev					
1 - A4232 Pentwyn Link Road (E)	3.1	5.13	0.76	3.1	5.41	0.76
2 - Church Road	1.5	8.48	0.60	0.5	4.57	0.35
3 - A4232 Pentwyn Link Road (W)	0.8	2.96	0.45	3.2	7.43	0.76
4 - Heol Pontprennau	1.3	3.89	0.57	1.9	5.93	0.66

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	
Location	
Site number	
Date	09/06/2021
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	VECTOS\taylor.davis
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	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				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)	Run automatically	Relationship type	Relationship
D1	Churchlands CD	AM	ONE HOUR	07:45	09:15	15			
D2	Churchlands CD	PM	ONE HOUR	16:45	18:15	15			
D3	Taylor Wimpey CD	AM	ONE HOUR	07:45	09:15	15			
D4	Taylor Wimpey CD	PM	ONE HOUR	16:45	18:15	15			
D5	Committed Dev	AM	ONE HOUR	07:45	09:15	15		Simple	D1+D3+D19
D6	Committed Dev	PM	ONE HOUR	16:45	18:15	15		Simple	D2+D4+D20
D7	Dev (Office Land Use)	AM	ONE HOUR	07:45	09:15	15			
D8	Dev (Office Land Use)	PM	ONE HOUR	16:45	18:15	15			
D9	Dev (Resi Land Use)	AM	ONE HOUR	07:45	09:15	15			
D10	Dev (Resi Land Use)	PM	ONE HOUR	16:45	18:15	15			
D11	Full Dev	AM	ONE HOUR	07:45	09:15	15		Simple	D7+D9
D12	Full Dev	PM	ONE HOUR	16:45	18:15	15		Simple	D8+D10
D13	Base	AM	ONE HOUR	07:45	09:15	15	✓		
D14	Base	PM	ONE HOUR	16:45	18:15	15	✓		
D15	Base+CD	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D5+D13
D16	Base+CD	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D6+D14
D17	Base+CD+Dev	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D5+D13+D10
D18	Base+CD+Dev	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D6+D14+D11
D19	St Edeyrn's CD	AM	ONE HOUR	07:45	09:15	15			
D20	St Edeyrn's CD	PM	ONE HOUR	16:45	18:15	15			

Analysis Set Details

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

Base, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A4232 Pentwyn Link Road (E) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Heol Pontprennau - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.

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	2.96	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	A4232 Pentwyn Link Road (E)	
2	Church Road	
3	A4232 Pentwyn Link Road (W)	
4	Heol Pontprennau	

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 - A4232 Pentwyn Link Road (E)	7.20	12.10	52.1	54.6	72.0	14.5	
2 - Church Road	6.30	11.70	19.3	78.1	72.0	7.0	
3 - A4232 Pentwyn Link Road (W)	7.50	9.30	5.7	52.8	72.0	16.5	
4 - Heol Pontprennau	6.30	10.10	41.2	49.4	72.0	13.5	

Bypass

Arm	Arm has bypass	Bypass utilisation (%)
1 - A4232 Pentwyn Link Road (E)		
2 - Church Road		
3 - A4232 Pentwyn Link Road (W)	✓	100
4 - Heol Pontprennau		

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - A4232 Pentwyn Link Road (E)	0.812	3605
2 - Church Road	0.740	3094
3 - A4232 Pentwyn Link Road (W)	0.676	2740
4 - Heol Pontprennau	0.725	3040

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D13	Base	AM	ONE HOUR	07:45	09:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - A4232 Pentwyn Link Road (E)		ONE HOUR	✓	1859	100.000
2 - Church Road		ONE HOUR	✓	60	100.000
3 - A4232 Pentwyn Link Road (W)		ONE HOUR	✓	1010	100.000
4 - Heol Pontprennau		ONE HOUR	✓	887	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - A4232 Pentwyn Link Road (E)	2 - Church Road	3 - A4232 Pentwyn Link Road (W)	4 - Heol Pontprennau
From	1 - A4232 Pentwyn Link Road (E)	8	53	1521	277
	2 - Church Road	17	0	34	9
	3 - A4232 Pentwyn Link Road (W)	757	19	0	234
	4 - Heol Pontprennau	375	14	487	11

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - A4232 Pentwyn Link Road (E)	2 - Church Road	3 - A4232 Pentwyn Link Road (W)	4 - Heol Pontprennau
From	1 - A4232 Pentwyn Link Road (E)	0	13	1	0
	2 - Church Road	35	0	6	0
	3 - A4232 Pentwyn Link Road (W)	2	11	0	1
	4 - Heol Pontprennau	0	0	0	100

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - A4232 Pentwyn Link Road (E)	0.66	3.48	2.0	A	1706	2559
2 - Church Road	0.06	3.64	0.1	A	55	83
3 - A4232 Pentwyn Link Road (W)	0.35	2.28	0.5	A	924	1068
4 - Heol Pontprennau	0.42	2.61	0.7	A	814	1221

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1400	1400	350	0	0	399	3234	0.433	1397	869	0.0	0.8	1.
2 - Church Road	45	45	11	0	0	1731	1587	0.028	45	65	0.0	0.0	2.
3 - A4232 Pentwyn Link Road (W)	758	584	146	176	0	242	2512	0.233	583	1534	0.0	0.3	1.
4 - Heol Pontprennau	668	668	167	0	176	602	2559	0.261	666	223	0.0	0.4	1.

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1671	1671	418	0	0	477	3170	0.527	1670	1040	0.8	1.1	2.
2 - Church Road	54	54	13	0	0	2070	1364	0.040	54	77	0.0	0.0	2.
3 - A4232 Pentwyn Link Road (W)	905	698	174	210	0	289	2479	0.281	697	1834	0.3	0.4	2.
4 - Heol Pontprennau	797	797	199	0	210	720	2472	0.323	797	267	0.4	0.5	2.

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	2047	2047	512	0	0	584	3082	0.664	2043	1273	1.1	2.0	3.
2 - Church Road	66	66	17	0	0	2533	1058	0.062	66	95	0.0	0.1	3.
3 - A4232 Pentwyn Link Road (W)	1109	854	214	258	0	354	2434	0.351	854	2245	0.4	0.5	2.
4 - Heol Pontprennau	977	977	244	0	258	881	2353	0.415	976	326	0.5	0.7	2.

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	2047	2047	512	0	0	585	3082	0.664	2047	1274	2.0	2.0	3.
2 - Church Road	66	66	17	0	0	2537	1055	0.063	66	95	0.1	0.1	3.
3 - A4232 Pentwyn Link Road (W)	1109	854	214	258	0	355	2434	0.351	854	2248	0.5	0.5	2.
4 - Heol Pontprennau	977	977	244	0	258	882	2353	0.415	977	327	0.7	0.7	2.

08:45 - 09:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1671	1671	418	0	0	478	3169	0.527	1675	1041	2.0	1.1	2.
2 - Church Road	54	54	13	0	0	2075	1360	0.040	54	77	0.1	0.0	2.
3 - A4232 Pentwyn Link Road (W)	905	698	174	210	0	290	2479	0.281	698	1839	0.5	0.4	2.
4 - Heol Pontprennau	797	797	199	0	210	721	2472	0.323	798	268	0.7	0.5	2.

09:00 - 09:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1400	1400	350	0	0	400	3233	0.433	1401	872	1.1	0.8	1.
2 - Church Road	45	45	11	0	0	1736	1584	0.029	45	65	0.0	0.0	2.
3 - A4232 Pentwyn Link Road (W)	758	584	146	176	0	243	2512	0.233	585	1539	0.4	0.3	1.
4 - Heol Pontprennau	668	668	167	0	176	603	2558	0.261	668	224	0.5	0.4	1.

Base, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A4232 Pentwyn Link Road (E) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Heol Pontprennau - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.

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)	Run automatically
D14	Base	PM	ONE HOUR	16:45	18:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - A4232 Pentwyn Link Road (E)		ONE HOUR	✓	1619	100.000
2 - Church Road		ONE HOUR	✓	93	100.000
3 - A4232 Pentwyn Link Road (W)		ONE HOUR	✓	1764	100.000
4 - Heol Pontprennau		ONE HOUR	✓	846	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - A4232 Pentwyn Link Road (E)	2 - Church Road	3 - A4232 Pentwyn Link Road (W)	4 - Heol Pontprennau
From	1 - A4232 Pentwyn Link Road (E)	5	22	1029	563
	2 - Church Road	50	0	27	16
	3 - A4232 Pentwyn Link Road (W)	1120	20	4	620
	4 - Heol Pontprennau	327	9	499	11

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - A4232 Pentwyn Link Road (E)	2 - Church Road	3 - A4232 Pentwyn Link Road (W)	4 - Heol Pontprennau
From	1 - A4232 Pentwyn Link Road (E)	0	9	1	1
	2 - Church Road	2	0	0	0
	3 - A4232 Pentwyn Link Road (W)	1	0	0	0
	4 - Heol Pontprennau	1	0	0	100

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - A4232 Pentwyn Link Road (E)	0.58	2.78	1.4	A	1486	2228
2 - Church Road	0.08	2.91	0.1	A	85	128
3 - A4232 Pentwyn Link Road (W)	0.57	3.73	1.3	A	1613	1575
4 - Heol Pontprennau	0.46	3.25	0.8	A	776	1164

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1219	1219	305	0	0	408	3231	0.377	1216	1128	0.0	0.6	1.
2 - Church Road	70	70	18	0	0	1586	1885	0.037	70	38	0.0	0.0	1.
3 - A4232 Pentwyn Link Road (W)	1324	861	215	467	0	485	2380	0.362	859	1171	0.0	0.6	2.
4 - Heol Pontprennau	637	637	159	0	467	900	2341	0.272	635	443	0.0	0.4	2.

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1455	1455	364	0	0	488	3166	0.460	1454	1349	0.6	0.8	2.
2 - Church Road	84	84	21	0	0	1896	1655	0.051	84	46	0.0	0.1	2.
3 - A4232 Pentwyn Link Road (W)	1580	1028	257	557	0	579	2315	0.444	1028	1401	0.6	0.8	2.
4 - Heol Pontprennau	761	761	190	0	557	1077	2214	0.344	760	530	0.4	0.5	2.

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1783	1783	446	0	0	597	3076	0.579	1780	1651	0.8	1.4	2.
2 - Church Road	102	102	26	0	0	2321	1340	0.076	102	56	0.1	0.1	2.
3 - A4232 Pentwyn Link Road (W)	1936	1260	315	683	0	709	2226	0.566	1258	1714	0.8	1.3	3.
4 - Heol Pontprennau	931	931	233	0	683	1318	2040	0.457	930	649	0.5	0.8	3.

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1783	1783	446	0	0	598	3075	0.580	1783	1654	1.4	1.4	2.
2 - Church Road	102	102	26	0	0	2324	1338	0.077	102	56	0.1	0.1	2.
3 - A4232 Pentwyn Link Road (W)	1936	1260	315	683	0	710	2225	0.566	1260	1716	1.3	1.3	3.
4 - Heol Pontprennau	931	931	233	0	683	1320	2039	0.457	931	650	0.8	0.8	3.

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1455	1455	364	0	0	489	3165	0.460	1458	1353	1.4	0.9	2.
2 - Church Road	84	84	21	0	0	1901	1652	0.051	84	46	0.1	0.1	2.
3 - A4232 Pentwyn Link Road (W)	1580	1028	257	557	0	581	2314	0.444	1030	1404	1.3	0.8	2.
4 - Heol Pontprennau	761	761	190	0	557	1080	2212	0.344	762	531	0.8	0.5	2.

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1219	1219	305	0	0	409	3230	0.377	1220	1132	0.9	0.6	1.
2 - Church Road	70	70	18	0	0	1591	1882	0.037	70	38	0.1	0.0	1.
3 - A4232 Pentwyn Link Road (W)	1324	861	215	467	0	486	2379	0.362	862	1175	0.8	0.6	2.
4 - Heol Pontprennau	637	637	159	0	467	904	2339	0.272	638	445	0.5	0.4	2.

Base+CD, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A4232 Pentwyn Link Road (E) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Heol Pontprennau - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4	4.60	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)	Run automatically	Relationship type	Relationship
D15	Base+CD	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D5+D13

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - A4232 Pentwyn Link Road (E)		ONE HOUR	✓	1975	100.000
2 - Church Road		ONE HOUR	✓	589	100.000
3 - A4232 Pentwyn Link Road (W)		ONE HOUR	✓	1149	100.000
4 - Heol Pontprennau		ONE HOUR	✓	1099	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - A4232 Pentwyn Link Road (E)	2 - Church Road	3 - A4232 Pentwyn Link Road (W)	4 - Heol Pontprennau
From	1 - A4232 Pentwyn Link Road (E)	8	108	1521	338
	2 - Church Road	159	0	323	107
	3 - A4232 Pentwyn Link Road (W)	757	131	0	261
	4 - Heol Pontprennau	487	61	540	11

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - A4232 Pentwyn Link Road (E)	2 - Church Road	3 - A4232 Pentwyn Link Road (W)	4 - Heol Pontprennau
From	1 - A4232 Pentwyn Link Road (E)	0	6	1	0
	2 - Church Road	4	0	1	0
	3 - A4232 Pentwyn Link Road (W)	2	2	0	1
	4 - Heol Pontprennau	0	0	0	100

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - A4232 Pentwyn Link Road (E)	0.75	4.98	3.0	A	1812	2718
2 - Church Road	0.60	8.18	1.5	A	540	811
3 - A4232 Pentwyn Link Road (W)	0.44	2.90	0.8	A	1052	1222
4 - Heol Pontprennau	0.56	3.80	1.3	A	1008	1513

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1487	1487	372	0	0	558	3109	0.478	1483	1060	0.0	0.9	2.
2 - Church Road	443	443	111	0	0	1816	1713	0.259	442	225	0.0	0.3	2.
3 - A4232 Pentwyn Link Road (W)	863	669	167	196	0	468	2369	0.282	667	1790	0.0	0.4	2.
4 - Heol Pontprennau	827	827	207	0	196	792	2428	0.341	825	342	0.0	0.5	2.

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1775	1775	444	0	0	667	3020	0.588	1773	1267	0.9	1.4	2.
2 - Church Road	529	529	132	0	0	2171	1450	0.365	529	269	0.3	0.6	3.
3 - A4232 Pentwyn Link Road (W)	1031	798	200	235	0	559	2307	0.346	798	2141	0.4	0.5	2.
4 - Heol Pontprennau	988	988	247	0	235	948	2315	0.427	987	409	0.5	0.7	2.

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	2175	2175	544	0	0	817	2898	0.750	2168	1551	1.4	2.9	4.
2 - Church Road	648	648	162	0	0	2655	1093	0.593	645	330	0.6	1.4	7.
3 - A4232 Pentwyn Link Road (W)	1262	978	244	287	0	683	2222	0.440	977	2617	0.5	0.8	2.
4 - Heol Pontprennau	1210	1210	303	0	287	1160	2159	0.560	1208	500	0.7	1.3	3.

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	2175	2175	544	0	0	818	2896	0.751	2174	1553	2.9	3.0	4.
2 - Church Road	648	648	162	0	0	2662	1088	0.596	648	330	1.4	1.5	8.
3 - A4232 Pentwyn Link Road (W)	1262	978	244	287	0	686	2221	0.440	978	2625	0.8	0.8	2.
4 - Heol Pontprennau	1210	1210	303	0	287	1162	2158	0.561	1210	502	1.3	1.3	3.

08:45 - 09:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1775	1775	444	0	0	669	3018	0.588	1782	1271	3.0	1.4	2.
2 - Church Road	529	529	132	0	0	2181	1443	0.367	533	270	1.5	0.6	3.
3 - A4232 Pentwyn Link Road (W)	1031	798	200	235	0	563	2305	0.346	799	2151	0.8	0.5	2.
4 - Heol Pontprennau	988	988	247	0	235	950	2313	0.427	990	412	1.3	0.7	2.

09:00 - 09:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1487	1487	372	0	0	560	3107	0.479	1489	1063	1.4	0.9	2.
2 - Church Road	443	443	111	0	0	1823	1707	0.260	444	226	0.6	0.4	2.
3 - A4232 Pentwyn Link Road (W)	863	669	167	196	0	470	2368	0.282	669	1797	0.5	0.4	2.
4 - Heol Pontprennau	827	827	207	0	196	795	2426	0.341	828	344	0.7	0.5	2.

Base+CD, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A4232 Pentwyn Link Road (E) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Heol Pontprennau - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4	5.94	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)	Run automatically	Relationship type	Relationship
D16	Base+CD	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D6+D14

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - A4232 Pentwyn Link Road (E)		ONE HOUR	✓	1846	100.000
2 - Church Road		ONE HOUR	✓	385	100.000
3 - A4232 Pentwyn Link Road (W)		ONE HOUR	✓	2069	100.000
4 - Heol Pontprennau		ONE HOUR	✓	1047	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - A4232 Pentwyn Link Road (E)	2 - Church Road	3 - A4232 Pentwyn Link Road (W)	4 - Heol Pontprennau
From	1 - A4232 Pentwyn Link Road (E)	5	150	1029	662
	2 - Church Road	127	0	183	75
	3 - A4232 Pentwyn Link Road (W)	1120	281	4	664
	4 - Heol Pontprennau	403	100	533	11

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - A4232 Pentwyn Link Road (E)	2 - Church Road	3 - A4232 Pentwyn Link Road (W)	4 - Heol Pontprennau
From	1 - A4232 Pentwyn Link Road (E)	0	1	1	1
	2 - Church Road	1	0	0	0
	3 - A4232 Pentwyn Link Road (W)	1	0	0	0
	4 - Heol Pontprennau	1	0	0	100

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - A4232 Pentwyn Link Road (E)	0.74	5.10	2.8	A	1694	2541
2 - Church Road	0.34	4.41	0.5	A	353	530
3 - A4232 Pentwyn Link Road (W)	0.75	7.07	3.0	A	1894	1934
4 - Heol Pontprennau	0.65	5.74	1.8	A	961	1441

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1390	1390	347	0	0	697	3003	0.463	1386	1242	0.0	0.9	2.
2 - Church Road	290	290	72	0	0	1685	1827	0.159	289	399	0.0	0.2	2.
3 - A4232 Pentwyn Link Road (W)	1554	1058	264	500	0	661	2266	0.467	1054	1313	0.0	0.9	2.
4 - Heol Pontprennau	788	788	197	0	500	1153	2168	0.364	786	562	0.0	0.6	2.

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1660	1660	415	0	0	834	2892	0.574	1658	1486	0.9	1.3	2.
2 - Church Road	346	346	87	0	0	2015	1581	0.219	346	477	0.2	0.3	2.
3 - A4232 Pentwyn Link Road (W)	1855	1263	316	597	0	790	2178	0.580	1261	1570	0.9	1.4	3.
4 - Heol Pontprennau	941	941	235	0	597	1380	2005	0.470	940	672	0.6	0.9	3.

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	2032	2032	508	0	0	1019	2741	0.742	2027	1815	1.3	2.8	5.
2 - Church Road	424	424	106	0	0	2463	1246	0.340	423	583	0.3	0.5	4.
3 - A4232 Pentwyn Link Road (W)	2272	1547	387	731	0	966	2057	0.752	1541	1920	1.4	2.9	6.
4 - Heol Pontprennau	1153	1153	288	0	731	1686	1784	0.646	1149	821	0.9	1.8	5.

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	2032	2032	508	0	0	1023	2738	0.742	2032	1822	2.8	2.8	5.
2 - Church Road	424	424	106	0	0	2470	1241	0.342	424	585	0.5	0.5	4.
3 - A4232 Pentwyn Link Road (W)	2272	1547	387	731	0	969	2056	0.753	1547	1926	2.9	3.0	7.
4 - Heol Pontprennau	1153	1153	288	0	731	1692	1779	0.648	1153	824	1.8	1.8	5.

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1660	1660	415	0	0	839	2888	0.575	1665	1495	2.8	1.4	2.
2 - Church Road	346	346	87	0	0	2025	1574	0.220	347	479	0.5	0.3	2.
3 - A4232 Pentwyn Link Road (W)	1855	1263	316	597	0	794	2175	0.581	1269	1578	3.0	1.4	4.
4 - Heol Pontprennau	941	941	235	0	597	1388	1998	0.471	945	675	1.8	0.9	3.

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1390	1390	347	0	0	701	3000	0.463	1392	1248	1.4	0.9	2.
2 - Church Road	290	290	72	0	0	1692	1822	0.159	290	400	0.3	0.2	2.
3 - A4232 Pentwyn Link Road (W)	1554	1058	264	500	0	663	2265	0.467	1060	1319	1.4	0.9	2.
4 - Heol Pontprennau	788	788	197	0	500	1159	2163	0.364	790	564	0.9	0.6	2.

Base+CD+Dev, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A4232 Pentwyn Link Road (E) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Heol Pontprennau - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4	4.73	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)	Run automatically	Relationship type	Relationship
D17	Base+CD+Dev	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D5+D13+D10

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - A4232 Pentwyn Link Road (E)		ONE HOUR	✓	1994	100.000
2 - Church Road		ONE HOUR	✓	589	100.000
3 - A4232 Pentwyn Link Road (W)		ONE HOUR	✓	1174	100.000
4 - Heol Pontprennau		ONE HOUR	✓	1102	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - A4232 Pentwyn Link Road (E)	2 - Church Road	3 - A4232 Pentwyn Link Road (W)	4 - Heol Pontprennau
From	1 - A4232 Pentwyn Link Road (E)	8	108	1538	340
	2 - Church Road	159	0	323	107
	3 - A4232 Pentwyn Link Road (W)	782	131	0	261
	4 - Heol Pontprennau	490	61	540	11

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - A4232 Pentwyn Link Road (E)	2 - Church Road	3 - A4232 Pentwyn Link Road (W)	4 - Heol Pontprennau
From	1 - A4232 Pentwyn Link Road (E)	0	6	1	0
	2 - Church Road	4	0	1	0
	3 - A4232 Pentwyn Link Road (W)	2	2	0	1
	4 - Heol Pontprennau	0	0	0	100

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - A4232 Pentwyn Link Road (E)	0.76	5.13	3.1	A	1830	2745
2 - Church Road	0.60	8.48	1.5	A	540	811
3 - A4232 Pentwyn Link Road (W)	0.45	2.96	0.8	A	1075	1257
4 - Heol Pontprennau	0.57	3.89	1.3	A	1011	1517

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1501	1501	375	0	0	558	3109	0.483	1497	1081	0.0	0.9	2.
2 - Church Road	443	443	111	0	0	1830	1702	0.261	442	225	0.0	0.4	2.
3 - A4232 Pentwyn Link Road (W)	882	687	172	196	0	469	2370	0.290	686	1803	0.0	0.4	2.
4 - Heol Pontprennau	830	830	207	0	196	811	2415	0.344	828	344	0.0	0.5	2.

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1793	1793	448	0	0	667	3020	0.594	1790	1292	0.9	1.4	2.
2 - Church Road	529	529	132	0	0	2188	1438	0.368	529	269	0.4	0.6	3.
3 - A4232 Pentwyn Link Road (W)	1053	821	205	235	0	561	2307	0.356	820	2156	0.4	0.5	2.
4 - Heol Pontprennau	991	991	248	0	235	970	2299	0.431	990	411	0.5	0.8	2.

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	2195	2195	549	0	0	817	2898	0.758	2189	1581	1.4	3.1	5.
2 - Church Road	648	648	162	0	0	2676	1078	0.602	645	330	0.6	1.5	8.
3 - A4232 Pentwyn Link Road (W)	1290	1005	251	287	0	685	2222	0.452	1004	2636	0.5	0.8	2.
4 - Heol Pontprennau	1213	1213	303	0	287	1187	2140	0.567	1211	502	0.8	1.3	3.

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	2195	2195	549	0	0	818	2897	0.758	2195	1584	3.1	3.1	5.
2 - Church Road	648	648	162	0	0	2683	1073	0.605	648	330	1.5	1.5	8.
3 - A4232 Pentwyn Link Road (W)	1290	1005	251	287	0	688	2220	0.453	1005	2643	0.8	0.8	2.
4 - Heol Pontprennau	1213	1213	303	0	287	1189	2138	0.567	1213	504	1.3	1.3	3.

08:45 - 09:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1793	1793	448	0	0	669	3018	0.594	1799	1297	3.1	1.5	2.
2 - Church Road	529	529	132	0	0	2198	1431	0.370	533	270	1.5	0.6	4.
3 - A4232 Pentwyn Link Road (W)	1053	821	205	235	0	565	2305	0.356	822	2167	0.8	0.6	2.
4 - Heol Pontprennau	991	991	248	0	235	973	2296	0.431	993	414	1.3	0.8	2.

09:00 - 09:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1501	1501	375	0	0	560	3108	0.483	1503	1085	1.5	0.9	2.
2 - Church Road	443	443	111	0	0	1837	1697	0.261	444	226	0.6	0.4	2.
3 - A4232 Pentwyn Link Road (W)	882	687	172	196	0	471	2368	0.290	688	1810	0.6	0.4	2.
4 - Heol Pontprennau	830	830	207	0	196	814	2413	0.344	831	345	0.8	0.5	2.

Base+CD+Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A4232 Pentwyn Link Road (E) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Heol Pontprennau - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4	6.23	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)	Run automatically	Relationship type	Relationship
D18	Base+CD+Dev	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D6+D14+D11

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - A4232 Pentwyn Link Road (E)		ONE HOUR	✓	1883	100.000
2 - Church Road		ONE HOUR	✓	385	100.000
3 - A4232 Pentwyn Link Road (W)		ONE HOUR	✓	2089	100.000
4 - Heol Pontprennau		ONE HOUR	✓	1051	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - A4232 Pentwyn Link Road (E)	2 - Church Road	3 - A4232 Pentwyn Link Road (W)	4 - Heol Pontprennau
From	1 - A4232 Pentwyn Link Road (E)	5	150	1062	666
	2 - Church Road	127	0	183	75
	3 - A4232 Pentwyn Link Road (W)	1140	281	4	664
	4 - Heol Pontprennau	407	100	533	11

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - A4232 Pentwyn Link Road (E)	2 - Church Road	3 - A4232 Pentwyn Link Road (W)	4 - Heol Pontprennau
From	1 - A4232 Pentwyn Link Road (E)	0	1	1	1
	2 - Church Road	1	0	0	0
	3 - A4232 Pentwyn Link Road (W)	1	0	0	0
	4 - Heol Pontprennau	1	0	0	100

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - A4232 Pentwyn Link Road (E)	0.76	5.41	3.1	A	1728	2592
2 - Church Road	0.35	4.57	0.5	A	353	530
3 - A4232 Pentwyn Link Road (W)	0.76	7.43	3.2	A	1912	1961
4 - Heol Pontprennau	0.66	5.93	1.9	A	964	1447

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1418	1418	354	0	0	697	3003	0.472	1414	1260	0.0	0.9	2.
2 - Church Road	290	290	72	0	0	1713	1807	0.160	289	399	0.0	0.2	2.
3 - A4232 Pentwyn Link Road (W)	1569	1073	268	500	0	664	2265	0.474	1069	1338	0.0	0.9	3.
4 - Heol Pontprennau	791	791	198	0	500	1168	2157	0.367	789	565	0.0	0.6	2.

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1693	1693	423	0	0	834	2892	0.585	1691	1507	0.9	1.4	2.
2 - Church Road	346	346	87	0	0	2048	1557	0.222	346	477	0.2	0.3	2.
3 - A4232 Pentwyn Link Road (W)	1873	1281	320	597	0	794	2176	0.589	1279	1600	0.9	1.4	4.
4 - Heol Pontprennau	945	945	236	0	597	1397	1992	0.474	944	675	0.6	0.9	3.

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	2073	2073	518	0	0	1019	2741	0.756	2067	1841	1.4	3.0	5.
2 - Church Road	424	424	106	0	0	2503	1217	0.348	423	582	0.3	0.5	4.
3 - A4232 Pentwyn Link Road (W)	2294	1569	392	731	0	970	2055	0.764	1562	1956	1.4	3.1	7.
4 - Heol Pontprennau	1157	1157	289	0	731	1707	1769	0.654	1153	825	0.9	1.9	5.

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	2073	2073	518	0	0	1023	2739	0.757	2073	1848	3.0	3.1	5.
2 - Church Road	424	424	106	0	0	2511	1211	0.350	424	585	0.5	0.5	4.
3 - A4232 Pentwyn Link Road (W)	2294	1569	392	731	0	973	2053	0.764	1569	1962	3.1	3.2	7.
4 - Heol Pontprennau	1157	1157	289	0	731	1714	1764	0.656	1157	828	1.9	1.9	5.

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1693	1693	423	0	0	839	2888	0.586	1699	1517	3.1	1.4	3.
2 - Church Road	346	346	87	0	0	2059	1549	0.223	347	480	0.5	0.3	2.
3 - A4232 Pentwyn Link Road (W)	1873	1281	320	597	0	798	2173	0.590	1288	1608	3.2	1.5	4.
4 - Heol Pontprennau	945	945	236	0	597	1407	1985	0.476	949	679	1.9	0.9	3.

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	D
1 - A4232 Pentwyn Link Road (E)	1418	1418	354	0	0	701	3001	0.472	1420	1266	1.4	0.9	2.
2 - Church Road	290	290	72	0	0	1720	1802	0.161	290	400	0.3	0.2	2.
3 - A4232 Pentwyn Link Road (W)	1569	1073	268	500	0	666	2263	0.474	1075	1344	1.5	0.9	3.
4 - Heol Pontprennau	791	791	198	0	500	1174	2153	0.368	793	567	0.9	0.6	2.

Appendix S

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462

Filename: 205339-A48 Pentwyn Link Road ARCADY-V1.j9
Path: P:\Projects\200000\205339 - Cardiff Gate Development\Technical\B - Transport Assessment\Modelling
Report generation date: 30/06/2021 11:00:24

»Base, AM
»Base, PM
»Base+CD, AM
»Base+CD, PM
»Base+CD+Dev, AM
»Base+CD+Dev, PM

Summary of junction performance

	AM			PM		
	Queue (Veh)	Delay (s)	RFC	Queue (Veh)	Delay (s)	RFC
	Base					
1 - Pentwyn Link Road	1.2	3.45	0.55	0.6	2.31	0.37
2 - A48 Westbound Off-Slip	0.3	2.49	0.25	0.6	2.45	0.38
3 - A48 Eastbound Off-Slip	0.4	1.87	0.29	0.5	2.24	0.34
4 - Capel Edeyrn	0.9	5.57	0.47	0.7	6.56	0.41
	Base+CD					
1 - Pentwyn Link Road	2.0	4.77	0.67	0.8	2.57	0.43
2 - A48 Westbound Off-Slip	0.5	3.16	0.32	0.8	2.91	0.44
3 - A48 Eastbound Off-Slip	0.5	2.08	0.34	0.9	2.89	0.47
4 - Capel Edeyrn	1.1	6.67	0.52	1.2	10.91	0.55
	Base+CD+Dev					
1 - Pentwyn Link Road	2.2	4.98	0.69	0.8	2.61	0.44
2 - A48 Westbound Off-Slip	0.5	3.26	0.32	0.8	2.97	0.45
3 - A48 Eastbound Off-Slip	0.5	2.10	0.35	0.9	2.96	0.48
4 - Capel Edeyrn	1.1	6.84	0.52	1.3	11.51	0.56

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	
Location	
Site number	
Date	09/06/2021
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	VECTOS\taylor.davis
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	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				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)	Run automatically	Relationship type	Relationship
D1	Churchlands CD	AM	ONE HOUR	07:45	09:15	15			
D2	Churchlands CD	PM	ONE HOUR	16:45	18:15	15			
D3	Taylor Wimpey CD	AM	ONE HOUR	07:45	09:15	15			
D4	Taylor Wimpey CD	PM	ONE HOUR	16:45	18:15	15			
D5	Committed Dev	AM	ONE HOUR	07:45	09:15	15		Simple	D1+D3+D19
D6	Committed Dev	PM	ONE HOUR	16:45	18:15	15		Simple	D2+D4+D20
D7	Dev (Office Land Use)	AM	ONE HOUR	07:45	09:15	15			
D8	Dev (Office Land Use)	PM	ONE HOUR	16:45	18:15	15			
D9	Dev (Resi Land Use)	AM	ONE HOUR	07:45	09:15	15			
D10	Dev (Resi Land Use)	PM	ONE HOUR	16:45	18:15	15			
D11	Full Dev	AM	ONE HOUR	07:45	09:15	15		Simple	D7+D9
D12	Full Dev	PM	ONE HOUR	16:45	18:15	15		Simple	D8+D10
D13	Base	AM	ONE HOUR	07:45	09:15	15	✓		
D14	Base	PM	ONE HOUR	16:45	18:15	15	✓		
D15	Base+CD	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D13+D5
D16	Base+CD	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D14+D6
D17	Base+CD+Dev	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D13+D5+D11
D18	Base+CD+Dev	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D14+D6+D12
D19	St Edeyrn's CD	AM	ONE HOUR	07:45	09:15	15			
D20	St Edeyrn's CD	PM	ONE HOUR	16:45	18:15	15			

Analysis Set Details

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

Base, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Pentwyn Link Road - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Large Roundabout		1, 2, 3, 4	3.31	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Pentwyn Link Road	
2	A48 Westbound Off-Slip	
3	A48 Eastbound Off-Slip	
4	Capel Edeyrn	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - Pentwyn Link Road	3.70	6.10	94.8	40.6	128.1	12.0	
2 - A48 Westbound Off-Slip	6.50	9.40	15.1	49.8	124.4	5.0	
3 - A48 Eastbound Off-Slip	6.80	9.90	28.4	46.6	128.1	15.0	
4 - Capel Edeyrn	3.10	5.00	18.1	30.9	128.1	11.0	

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Entry-to-exit separation (m)
1 - Pentwyn Link Road	228	0.00
2 - A48 Westbound Off-Slip	1762	0.00
3 - A48 Eastbound Off-Slip	1174	0.00
4 - Capel Edeyrn	1967	0.00

Bypass

Arm	Arm has bypass	Bypass utilisation (%)
1 - Pentwyn Link Road	✓	100
2 - A48 Westbound Off-Slip		
3 - A48 Eastbound Off-Slip		
4 - Capel Edeyrn		

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - Pentwyn Link Road	1.024	2766
2 - A48 Westbound Off-Slip	0.913	3269
3 - A48 Eastbound Off-Slip	1.081	3578
4 - Capel Edeyrn	0.601	1895

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D13	Base	AM	ONE HOUR	07:45	09:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Pentwyn Link Road		ONE HOUR	✓	2041	100.000
2 - A48 Westbound Off-Slip		ONE HOUR	✓	437	100.000
3 - A48 Eastbound Off-Slip		ONE HOUR	✓	701	100.000
4 - Capel Edeyrn		ONE HOUR	✓	511	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Pentwyn Link Road	2 - A48 Westbound Off-Slip	3 - A48 Eastbound Off-Slip	4 - Capel Edeyrn
From	1 - Pentwyn Link Road	0	888	1005	148
	2 - A48 Westbound Off-Slip	292	0	0	145
	3 - A48 Eastbound Off-Slip	671	20	0	10
	4 - Capel Edeyrn	199	246	66	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - Pentwyn Link Road	2 - A48 Westbound Off-Slip	3 - A48 Eastbound Off-Slip	4 - Capel Edeyrn
From	1 - Pentwyn Link Road	0	1	3	6
	2 - A48 Westbound Off-Slip	5	0	0	2
	3 - A48 Eastbound Off-Slip	6	0	0	0
	4 - Capel Edeyrn	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - Pentwyn Link Road	0.55	3.45	1.2	A	1854	1587
2 - A48 Westbound Off-Slip	0.25	2.49	0.3	A	401	601
3 - A48 Eastbound Off-Slip	0.29	1.87	0.4	A	643	965
4 - Capel Edeyrn	0.47	5.57	0.9	A	469	703

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1521	868	217	669	0	249	2429	0.357	866	873	0.0	0.6	2.300
2 - A48 Westbound Off-Slip	329	329	82	0	669	915	2313	0.142	328	200	0.0	0.2	1.813
3 - A48 Eastbound Off-Slip	528	528	132	0	0	439	2914	0.181	527	804	0.0	0.2	1.508
4 - Capel Edeyrn	385	385	96	0	0	739	1426	0.270	383	228	0.0	0.4	3.447

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1816	1037	259	798	0	298	2380	0.435	1036	1044	0.6	0.8	2.676
2 - A48 Westbound Off-Slip	393	393	98	0	798	1095	2150	0.183	393	239	0.2	0.2	2.047
3 - A48 Eastbound Off-Slip	630	630	158	0	0	526	2822	0.223	630	962	0.2	0.3	1.641
4 - Capel Edeyrn	459	459	115	0	0	883	1335	0.344	459	272	0.4	0.5	4.108

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	2225	1269	317	978	0	365	2314	0.549	1268	1278	0.8	1.2	3.433
2 - A48 Westbound Off-Slip	481	481	120	0	978	1340	1928	0.250	481	292	0.2	0.3	2.487
3 - A48 Eastbound Off-Slip	772	772	193	0	0	643	2696	0.286	771	1177	0.3	0.4	1.870
4 - Capel Edeyrn	563	563	141	0	0	1082	1209	0.465	561	333	0.5	0.9	5.548

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	2225	1269	317	978	0	366	2314	0.549	1269	1279	1.2	1.2	3.447
2 - A48 Westbound Off-Slip	481	481	120	0	978	1342	1926	0.250	481	293	0.3	0.3	2.490
3 - A48 Eastbound Off-Slip	772	772	193	0	0	644	2695	0.286	772	1179	0.4	0.4	1.871
4 - Capel Edeyrn	563	563	141	0	0	1082	1208	0.466	563	334	0.9	0.9	5.574

08:45 - 09:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1816	1037	259	798	0	299	2379	0.436	1038	1046	1.2	0.8	2.687
2 - A48 Westbound Off-Slip	393	393	98	0	798	1098	2148	0.183	393	240	0.3	0.2	2.053
3 - A48 Eastbound Off-Slip	630	630	158	0	0	527	2821	0.223	631	964	0.4	0.3	1.646
4 - Capel Edeyrn	459	459	115	0	0	884	1334	0.344	461	273	0.9	0.5	4.130

09:00 - 09:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1521	868	217	669	0	250	2428	0.358	869	875	0.8	0.6	2.312
2 - A48 Westbound Off-Slip	329	329	82	0	669	919	2310	0.142	329	201	0.2	0.2	1.819
3 - A48 Eastbound Off-Slip	528	528	132	0	0	441	2912	0.181	528	807	0.3	0.2	1.509
4 - Capel Edeyrn	385	385	96	0	0	740	1425	0.270	385	228	0.5	0.4	3.463

Base, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Pentwyn Link Road - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Large Roundabout		1, 2, 3, 4	2.78	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Entry-to-exit separation (m)
1 - Pentwyn Link Road	228	0.00
2 - A48 Westbound Off-Slip	1762	0.00
3 - A48 Eastbound Off-Slip	1174	0.00
4 - Capel Edeyrn	1967	0.00

Bypass

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D14	Base	PM	ONE HOUR	16:45	18:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Pentwyn Link Road		ONE HOUR	✓	1337	100.000
2 - A48 Westbound Off-Slip		ONE HOUR	✓	821	100.000
3 - A48 Eastbound Off-Slip		ONE HOUR	✓	738	100.000
4 - Capel Edeyrn		ONE HOUR	✓	349	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Pentwyn Link Road	2 - A48 Westbound Off-Slip	3 - A48 Eastbound Off-Slip	4 - Capel Edeyrn
From	1 - Pentwyn Link Road	0	499	752	86
	2 - A48 Westbound Off-Slip	706	0	0	115
	3 - A48 Eastbound Off-Slip	709	11	0	18
	4 - Capel Edeyrn	168	173	8	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - Pentwyn Link Road	2 - A48 Westbound Off-Slip	3 - A48 Eastbound Off-Slip	4 - Capel Edeyrn
From	1 - Pentwyn Link Road	0	1	3	0
	2 - A48 Westbound Off-Slip	1	0	0	0
	3 - A48 Eastbound Off-Slip	3	0	0	0
	4 - Capel Edeyrn	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - Pentwyn Link Road	0.37	2.31	0.6	A	1219	1153
2 - A48 Westbound Off-Slip	0.38	2.45	0.6	A	753	1130
3 - A48 Eastbound Off-Slip	0.34	2.24	0.5	A	677	1016
4 - Capel Edeyrn	0.41	6.56	0.7	A	320	480

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1000	631	158	376	0	144	2550	0.247	630	1189	0.0	0.3	1.874
2 - A48 Westbound Off-Slip	618	618	155	0	376	636	2650	0.233	617	138	0.0	0.3	1.770
3 - A48 Eastbound Off-Slip	556	556	139	0	0	681	2756	0.202	555	571	0.0	0.3	1.635
4 - Capel Edeyrn	263	263	66	0	0	1072	1238	0.212	262	165	0.0	0.3	3.683

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1195	753	188	449	0	172	2522	0.299	753	1422	0.3	0.4	2.035
2 - A48 Westbound Off-Slip	738	738	185	0	449	760	2534	0.291	738	165	0.3	0.4	2.004
3 - A48 Eastbound Off-Slip	663	663	166	0	0	815	2614	0.254	663	683	0.3	0.3	1.844
4 - Capel Edeyrn	314	314	78	0	0	1281	1110	0.283	313	197	0.3	0.4	4.516

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1463	923	231	549	0	211	2484	0.372	922	1741	0.4	0.6	2.304
2 - A48 Westbound Off-Slip	904	904	226	0	549	931	2375	0.381	903	202	0.4	0.6	2.444
3 - A48 Eastbound Off-Slip	813	813	203	0	0	998	2421	0.336	812	836	0.3	0.5	2.236
4 - Capel Edeyrn	384	384	96	0	0	1569	934	0.412	383	241	0.4	0.7	6.523

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1463	923	231	549	0	211	2483	0.372	923	1743	0.6	0.6	2.306
2 - A48 Westbound Off-Slip	904	904	226	0	549	931	2375	0.381	904	203	0.6	0.6	2.447
3 - A48 Eastbound Off-Slip	813	813	203	0	0	999	2420	0.336	813	837	0.5	0.5	2.239
4 - Capel Edeyrn	384	384	96	0	0	1570	933	0.412	384	241	0.7	0.7	6.561

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1195	753	188	449	0	173	2521	0.299	754	1425	0.6	0.4	2.037
2 - A48 Westbound Off-Slip	738	738	185	0	449	761	2533	0.291	739	166	0.6	0.4	2.007
3 - A48 Eastbound Off-Slip	663	663	166	0	0	816	2613	0.254	664	684	0.5	0.3	1.849
4 - Capel Edeyrn	314	314	78	0	0	1283	1109	0.283	315	197	0.7	0.4	4.542

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1000	631	158	376	0	145	2549	0.247	631	1193	0.4	0.3	1.876
2 - A48 Westbound Off-Slip	618	618	155	0	376	637	2648	0.233	619	139	0.4	0.3	1.775
3 - A48 Eastbound Off-Slip	556	556	139	0	0	683	2754	0.202	556	573	0.3	0.3	1.637
4 - Capel Edeyrn	263	263	66	0	0	1074	1237	0.212	263	165	0.4	0.3	3.702

Base+CD, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Pentwyn Link Road - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Large Roundabout		1, 2, 3, 4	4.28	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Entry-to-exit separation (m)
1 - Pentwyn Link Road	228	0.00
2 - A48 Westbound Off-Slip	1762	0.00
3 - A48 Eastbound Off-Slip	1174	0.00
4 - Capel Edeyrn	1967	0.00

Bypass

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D15	Base+CD	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D13+D5

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Pentwyn Link Road		ONE HOUR	✓	2382	100.000
2 - A48 Westbound Off-Slip		ONE HOUR	✓	479	100.000
3 - A48 Eastbound Off-Slip		ONE HOUR	✓	811	100.000
4 - Capel Edeyrn		ONE HOUR	✓	524	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Pentwyn Link Road	2 - A48 Westbound Off-Slip	3 - A48 Eastbound Off-Slip	4 - Capel Edeyrn
From	1 - Pentwyn Link Road	0	966	1231	185
	2 - A48 Westbound Off-Slip	333	0	0	146
	3 - A48 Eastbound Off-Slip	769	20	0	22
	4 - Capel Edeyrn	199	246	79	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - Pentwyn Link Road	2 - A48 Westbound Off-Slip	3 - A48 Eastbound Off-Slip	4 - Capel Edeyrn
From	1 - Pentwyn Link Road	0	1	2	5
	2 - A48 Westbound Off-Slip	4	0	0	2
	3 - A48 Eastbound Off-Slip	5	0	0	0
	4 - Capel Edeyrn	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - Pentwyn Link Road	0.67	4.77	2.0	A	2170	1949
2 - A48 Westbound Off-Slip	0.32	3.16	0.5	A	440	659
3 - A48 Eastbound Off-Slip	0.34	2.08	0.5	A	744	1116
4 - Capel Edeyrn	0.52	6.67	1.1	A	481	721

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1780	1066	267	727	0	259	2434	0.438	1063	977	0.0	0.8	2.620
2 - A48 Westbound Off-Slip	361	361	90	0	727	1122	2139	0.169	360	199	0.0	0.2	2.022
3 - A48 Eastbound Off-Slip	611	611	153	0	0	499	2874	0.212	609	983	0.0	0.3	1.589
4 - Capel Edeyrn	394	394	99	0	0	843	1364	0.289	393	265	0.0	0.4	3.702

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	2126	1273	318	868	0	310	2383	0.534	1272	1169	0.8	1.1	3.233
2 - A48 Westbound Off-Slip	431	431	108	0	868	1342	1940	0.222	430	239	0.2	0.3	2.385
3 - A48 Eastbound Off-Slip	729	729	182	0	0	596	2770	0.263	729	1176	0.3	0.4	1.763
4 - Capel Edeyrn	471	471	118	0	0	1008	1260	0.374	470	317	0.4	0.6	4.557

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	2604	1559	390	1064	0	379	2315	0.674	1555	1431	1.1	2.0	4.719
2 - A48 Westbound Off-Slip	527	527	132	0	1064	1642	1669	0.316	527	292	0.3	0.5	3.151
3 - A48 Eastbound Off-Slip	893	893	223	0	0	730	2627	0.340	892	1439	0.4	0.5	2.076
4 - Capel Edeyrn	577	577	144	0	0	1234	1117	0.516	575	388	0.6	1.1	6.619

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	2604	1559	390	1064	0	380	2314	0.674	1559	1432	2.0	2.0	4.771
2 - A48 Westbound Off-Slip	527	527	132	0	1064	1646	1665	0.317	527	293	0.5	0.5	3.163
3 - A48 Eastbound Off-Slip	893	893	223	0	0	731	2625	0.340	893	1442	0.5	0.5	2.077
4 - Capel Edeyrn	577	577	144	0	0	1235	1116	0.517	577	389	1.1	1.1	6.672

08:45 - 09:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	2126	1273	318	868	0	311	2382	0.534	1277	1171	2.0	1.2	3.269
2 - A48 Westbound Off-Slip	431	431	108	0	868	1348	1935	0.223	431	240	0.5	0.3	2.397
3 - A48 Eastbound Off-Slip	729	729	182	0	0	598	2768	0.263	730	1181	0.5	0.4	1.768
4 - Capel Edeyrn	471	471	118	0	0	1010	1259	0.374	473	318	1.1	0.6	4.592

09:00 - 09:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1780	1066	267	727	0	260	2433	0.438	1068	980	1.2	0.8	2.641
2 - A48 Westbound Off-Slip	361	361	90	0	727	1127	2134	0.169	361	201	0.3	0.2	2.030
3 - A48 Eastbound Off-Slip	611	611	153	0	0	500	2872	0.213	611	988	0.4	0.3	1.593
4 - Capel Edeyrn	394	394	99	0	0	845	1362	0.290	395	266	0.6	0.4	3.728

Base+CD, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Pentwyn Link Road - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Large Roundabout		1, 2, 3, 4	3.53	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Entry-to-exit separation (m)
1 - Pentwyn Link Road	228	0.00
2 - A48 Westbound Off-Slip	1762	0.00
3 - A48 Eastbound Off-Slip	1174	0.00
4 - Capel Edeyrn	1967	0.00

Bypass

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D16	Base+CD	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D14+D6

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Pentwyn Link Road		ONE HOUR	✓	1527	100.000
2 - A48 Westbound Off-Slip		ONE HOUR	✓	899	100.000
3 - A48 Eastbound Off-Slip		ONE HOUR	✓	983	100.000
4 - Capel Edeyrn		ONE HOUR	✓	364	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Pentwyn Link Road	2 - A48 Westbound Off-Slip	3 - A48 Eastbound Off-Slip	4 - Capel Edeyrn
From	1 - Pentwyn Link Road	0	551	874	102
	2 - A48 Westbound Off-Slip	783	0	0	116
	3 - A48 Eastbound Off-Slip	938	11	0	34
	4 - Capel Edeyrn	168	174	22	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - Pentwyn Link Road	2 - A48 Westbound Off-Slip	3 - A48 Eastbound Off-Slip	4 - Capel Edeyrn
From	1 - Pentwyn Link Road	0	1	3	0
	2 - A48 Westbound Off-Slip	1	0	0	0
	3 - A48 Eastbound Off-Slip	2	0	0	0
	4 - Capel Edeyrn	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - Pentwyn Link Road	0.43	2.57	0.8	A	1394	1343
2 - A48 Westbound Off-Slip	0.44	2.91	0.8	A	825	1237
3 - A48 Eastbound Off-Slip	0.47	2.89	0.9	A	902	1353
4 - Capel Edeyrn	0.55	10.91	1.2	B	334	501

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1144	735	184	415	0	155	2549	0.288	733	1419	0.0	0.4	1.981
2 - A48 Westbound Off-Slip	677	677	169	0	415	750	2549	0.266	675	139	0.0	0.4	1.921
3 - A48 Eastbound Off-Slip	740	740	185	0	0	752	2700	0.274	739	673	0.0	0.4	1.835
4 - Capel Edeyrn	274	274	69	0	0	1301	1100	0.249	273	189	0.0	0.3	4.342

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1366	877	219	495	0	186	2518	0.348	877	1697	0.4	0.5	2.194
2 - A48 Westbound Off-Slip	808	808	202	0	495	897	2412	0.335	808	166	0.4	0.5	2.243
3 - A48 Eastbound Off-Slip	884	884	221	0	0	899	2543	0.347	883	805	0.4	0.5	2.168
4 - Capel Edeyrn	327	327	82	0	0	1556	945	0.346	326	226	0.3	0.5	5.815

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1673	1075	269	607	0	226	2477	0.434	1074	2076	0.5	0.8	2.564
2 - A48 Westbound Off-Slip	990	990	247	0	607	1098	2226	0.445	989	202	0.5	0.8	2.907
3 - A48 Eastbound Off-Slip	1082	1082	271	0	0	1101	2328	0.465	1081	986	0.5	0.9	2.883
4 - Capel Edeyrn	401	401	100	0	0	1905	732	0.548	398	277	0.5	1.2	10.704

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1673	1075	269	607	0	228	2476	0.434	1075	2080	0.8	0.8	2.568
2 - A48 Westbound Off-Slip	990	990	247	0	607	1099	2225	0.445	990	204	0.8	0.8	2.914
3 - A48 Eastbound Off-Slip	1082	1082	271	0	0	1102	2327	0.465	1082	986	0.9	0.9	2.891
4 - Capel Edeyrn	401	401	100	0	0	1907	730	0.549	401	277	1.2	1.2	10.910

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1366	877	219	495	0	188	2516	0.349	878	1702	0.8	0.5	2.200
2 - A48 Westbound Off-Slip	808	808	202	0	495	898	2411	0.335	809	168	0.8	0.5	2.251
3 - A48 Eastbound Off-Slip	884	884	221	0	0	901	2541	0.348	885	806	0.9	0.5	2.176
4 - Capel Edeyrn	327	327	82	0	0	1559	943	0.347	330	227	1.2	0.5	5.898

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1144	735	184	415	0	156	2547	0.288	735	1424	0.5	0.4	1.987
2 - A48 Westbound Off-Slip	677	677	169	0	415	752	2546	0.266	677	140	0.5	0.4	1.926
3 - A48 Eastbound Off-Slip	740	740	185	0	0	754	2698	0.274	741	675	0.5	0.4	1.841
4 - Capel Edeyrn	274	274	69	0	0	1305	1098	0.250	275	190	0.5	0.3	4.379

Base+CD+Dev, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Pentwyn Link Road - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Large Roundabout		1, 2, 3, 4	4.43	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Entry-to-exit separation (m)
1 - Pentwyn Link Road	228	0.00
2 - A48 Westbound Off-Slip	1762	0.00
3 - A48 Eastbound Off-Slip	1174	0.00
4 - Capel Edeyrn	1967	0.00

Bypass

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D17	Base+CD+Dev	AM	ONE HOUR	07:45	09:15	15	✓	Simple	D13+D5+D11

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Pentwyn Link Road		ONE HOUR	✓	2414	100.000
2 - A48 Westbound Off-Slip		ONE HOUR	✓	483	100.000
3 - A48 Eastbound Off-Slip		ONE HOUR	✓	827	100.000
4 - Capel Edeyrn		ONE HOUR	✓	524	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Pentwyn Link Road	2 - A48 Westbound Off-Slip	3 - A48 Eastbound Off-Slip	4 - Capel Edeyrn
From	1 - Pentwyn Link Road	0	968	1261	185
	2 - A48 Westbound Off-Slip	337	0	0	146
	3 - A48 Eastbound Off-Slip	785	20	0	22
	4 - Capel Edeyrn	199	246	79	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - Pentwyn Link Road	2 - A48 Westbound Off-Slip	3 - A48 Eastbound Off-Slip	4 - Capel Edeyrn
From	1 - Pentwyn Link Road	0	1	2	5
	2 - A48 Westbound Off-Slip	4	0	0	2
	3 - A48 Eastbound Off-Slip	5	0	0	0
	4 - Capel Edeyrn	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - Pentwyn Link Road	0.69	4.98	2.2	A	2200	1990
2 - A48 Westbound Off-Slip	0.32	3.26	0.5	A	443	665
3 - A48 Eastbound Off-Slip	0.35	2.10	0.5	A	759	1138
4 - Capel Edeyrn	0.52	6.84	1.1	A	481	721

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1805	1089	272	729	0	259	2436	0.447	1085	992	0.0	0.8	2.659
2 - A48 Westbound Off-Slip	364	364	91	0	729	1145	2120	0.172	363	199	0.0	0.2	2.048
3 - A48 Eastbound Off-Slip	623	623	156	0	0	502	2874	0.217	622	1006	0.0	0.3	1.598
4 - Capel Edeyrn	394	394	99	0	0	858	1355	0.291	393	265	0.0	0.4	3.737

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	2155	1300	325	870	0	310	2385	0.545	1298	1187	0.8	1.2	3.309
2 - A48 Westbound Off-Slip	434	434	109	0	870	1369	1917	0.227	434	239	0.2	0.3	2.428
3 - A48 Eastbound Off-Slip	743	743	186	0	0	600	2768	0.269	743	1203	0.3	0.4	1.776
4 - Capel Edeyrn	471	471	118	0	0	1026	1249	0.377	470	317	0.4	0.6	4.619

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	2639	1592	398	1066	0	379	2316	0.687	1588	1453	1.2	2.2	4.920
2 - A48 Westbound Off-Slip	532	532	133	0	1066	1675	1640	0.324	531	292	0.3	0.5	3.244
3 - A48 Eastbound Off-Slip	911	911	228	0	0	734	2625	0.347	910	1472	0.4	0.5	2.100
4 - Capel Edeyrn	577	577	144	0	0	1256	1104	0.523	575	388	0.6	1.1	6.782

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	2639	1592	398	1066	0	380	2315	0.688	1592	1454	2.2	2.2	4.978
2 - A48 Westbound Off-Slip	532	532	133	0	1066	1679	1637	0.325	532	293	0.5	0.5	3.257
3 - A48 Eastbound Off-Slip	911	911	228	0	0	735	2623	0.347	911	1475	0.5	0.5	2.101
4 - Capel Edeyrn	577	577	144	0	0	1257	1103	0.523	577	389	1.1	1.1	6.840

08:45 - 09:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	2155	1300	325	870	0	311	2383	0.545	1304	1189	2.2	1.2	3.346
2 - A48 Westbound Off-Slip	434	434	109	0	870	1375	1911	0.227	435	240	0.5	0.3	2.441
3 - A48 Eastbound Off-Slip	743	743	186	0	0	602	2767	0.269	744	1208	0.5	0.4	1.779
4 - Capel Edeyrn	471	471	118	0	0	1028	1248	0.378	473	318	1.1	0.6	4.659

09:00 - 09:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1805	1089	272	729	0	260	2434	0.447	1090	995	1.2	0.8	2.683
2 - A48 Westbound Off-Slip	364	364	91	0	729	1150	2115	0.172	364	201	0.3	0.2	2.056
3 - A48 Eastbound Off-Slip	623	623	156	0	0	503	2872	0.217	623	1010	0.4	0.3	1.602
4 - Capel Edeyrn	394	394	99	0	0	860	1353	0.292	395	266	0.6	0.4	3.760

Base+CD+Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Pentwyn Link Road - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Set Relationship	D15 - Base+CD, AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Large Roundabout		1, 2, 3, 4	3.62	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Entry-to-exit separation (m)
1 - Pentwyn Link Road	228	0.00
2 - A48 Westbound Off-Slip	1762	0.00
3 - A48 Eastbound Off-Slip	1174	0.00
4 - Capel Edeyrn	1967	0.00

Bypass

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D18	Base+CD+Dev	PM	ONE HOUR	16:45	18:15	15	✓	Simple	D14+D6+D12

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Pentwyn Link Road		ONE HOUR	✓	1551	100.000
2 - A48 Westbound Off-Slip		ONE HOUR	✓	901	100.000
3 - A48 Eastbound Off-Slip		ONE HOUR	✓	1007	100.000
4 - Capel Edeyrn		ONE HOUR	✓	364	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Pentwyn Link Road	2 - A48 Westbound Off-Slip	3 - A48 Eastbound Off-Slip	4 - Capel Edeyrn
From	1 - Pentwyn Link Road	0	554	895	102
	2 - A48 Westbound Off-Slip	785	0	0	116
	3 - A48 Eastbound Off-Slip	962	11	0	34
	4 - Capel Edeyrn	168	174	22	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - Pentwyn Link Road	2 - A48 Westbound Off-Slip	3 - A48 Eastbound Off-Slip	4 - Capel Edeyrn
From	1 - Pentwyn Link Road	0	1	3	0
	2 - A48 Westbound Off-Slip	1	0	0	0
	3 - A48 Eastbound Off-Slip	2	0	0	0
	4 - Capel Edeyrn	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - Pentwyn Link Road	0.44	2.61	0.8	A	1416	1372
2 - A48 Westbound Off-Slip	0.45	2.97	0.8	A	827	1240
3 - A48 Eastbound Off-Slip	0.48	2.96	0.9	A	924	1386
4 - Capel Edeyrn	0.56	11.51	1.3	B	334	501

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1162	751	188	417	0	155	2550	0.294	749	1438	0.0	0.4	1.997
2 - A48 Westbound Off-Slip	678	678	170	0	417	765	2534	0.268	677	139	0.0	0.4	1.935
3 - A48 Eastbound Off-Slip	758	758	190	0	0	753	2700	0.281	757	689	0.0	0.4	1.849
4 - Capel Edeyrn	274	274	69	0	0	1321	1089	0.252	273	189	0.0	0.3	4.405

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1388	896	224	498	0	186	2519	0.356	896	1720	0.4	0.6	2.217
2 - A48 Westbound Off-Slip	810	810	202	0	498	915	2395	0.338	809	166	0.4	0.5	2.270
3 - A48 Eastbound Off-Slip	905	905	226	0	0	901	2543	0.356	905	824	0.4	0.6	2.196
4 - Capel Edeyrn	327	327	82	0	0	1579	931	0.352	326	226	0.3	0.5	5.950

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1700	1098	274	610	0	226	2478	0.443	1097	2105	0.6	0.8	2.604
2 - A48 Westbound Off-Slip	992	992	248	0	610	1121	2205	0.450	991	202	0.5	0.8	2.962
3 - A48 Eastbound Off-Slip	1109	1109	277	0	0	1103	2327	0.476	1107	1009	0.6	0.9	2.948
4 - Capel Edeyrn	401	401	100	0	0	1933	715	0.561	398	277	0.5	1.2	11.266

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1700	1098	274	610	0	228	2477	0.443	1098	2108	0.8	0.8	2.609
2 - A48 Westbound Off-Slip	992	992	248	0	610	1122	2204	0.450	992	204	0.8	0.8	2.969
3 - A48 Eastbound Off-Slip	1109	1109	277	0	0	1104	2326	0.477	1109	1010	0.9	0.9	2.956
4 - Capel Edeyrn	401	401	100	0	0	1936	713	0.562	401	277	1.2	1.3	11.508

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1388	896	224	498	0	188	2517	0.356	897	1725	0.8	0.6	2.223
2 - A48 Westbound Off-Slip	810	810	202	0	498	917	2394	0.338	811	168	0.8	0.5	2.276
3 - A48 Eastbound Off-Slip	905	905	226	0	0	903	2541	0.356	907	825	0.9	0.6	2.206
4 - Capel Edeyrn	327	327	82	0	0	1583	929	0.352	330	227	1.3	0.5	6.044

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Junction demand (Veh/hr)	Junction Arrivals (Veh)	Bypass demand (Veh/hr)	Bypass exit flow (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)
1 - Pentwyn Link Road	1162	751	188	417	0	156	2549	0.295	751	1443	0.6	0.4	2.004
2 - A48 Westbound Off-Slip	678	678	170	0	417	768	2532	0.268	679	140	0.5	0.4	1.944
3 - A48 Eastbound Off-Slip	758	758	190	0	0	756	2698	0.281	759	691	0.6	0.4	1.859
4 - Capel Edeyrn	274	274	69	0	0	1325	1086	0.252	275	190	0.5	0.3	4.441

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