

P / 2014 / 0480

1520-01-TA01a
June 2014

**Proposed Residential Development,
Llay New Road, Rhosrobin, Wrexham**

Transport Assessment

Prepared on behalf of:



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1.0 INTRODUCTION

1.1 Summary

1.1.1 This Transport Assessment has been prepared by Axis on behalf of Castlemead Group Ltd in support of a planning application related to proposals for a new residential development at land off Llay New Road, Rhosrobin, Wrexham.

1.1.2 The purpose of this report is to appraise the Local Planning and Highway Authority Wrexham County Borough Council (WCBC), of the anticipated highway and transport related effects associated with the proposed residential development scheme.

1.1.3 The project would see the development of up to 117 residential dwellings served from the route of the B5425 Llay New Road. This report will include an assessment of the proposed site access strategy and an analysis of the impact of development related traffic over the immediate local highway network. In addition, the report will consider the sustainability of the site, its accessibility to existing local services and the opportunity to encourage trips from the site to be undertaken by alternative travel modes to the private car.

1.1.4 The principle of new residential development at this location has previously been discussed with WCBC highways officers. The scope and nature of this assessment therefore reflects the extent of highway issues which we understand are likely to be of material interest to the LHA.

1.2 Report Structure

1.2.1 The structure of this Transport Assessment is therefore as follows:

- **Section 2** considers the existing conditions and includes; a description of the site location and existing conditions; a description of the local highway network immediately adjacent to the site; the location of the site relative to local amenities,

facilities and alternative transport mode choices; and, a review of local personal injury accident trends;

- **Section 3** of this report outlines the residential development proposals and includes a review of the proposed site access arrangements, and site servicing arrangements;
- **Section 4** considers the anticipated private car trip generation to/from the site and the distribution of these trips over the local network;
- **Section 5** provides an overview of the key assessment parameters including; consideration of background network traffic growth; any local traffic-generating committed developments; traffic conditions forming the baseline for assessment;
- **Section 6** considers the impact of the potential traffic loadings of the proposed development scheme on key local highway links and junctions;
- **Section 7** presents the Transport Implementation Strategy; and,
- **Section 8** provides a summary and conclusion to the report derived from the analysis presented in the preceding chapters.

2.0 SITE LOCATION & EXISTING CONDITIONS

2.1 Site Location

2.1.1 The location of the proposed Rhosrobin development site is illustrated in **Figure TA1** to this report. This plan identifies the strategic location of the site in relation to the A483(T), the main Town Centre of Wrexham and the local distributor routes of the B5425 Llay Road, Rhosrobin Road and Plas Acton Road.

2.1.2 The immediate context of the site location, including the surrounding local highway network, is illustrated in **Figure TA2** to this statement.

2.2 Description of Site & Local Network

Existing Site Conditions

2.2.1 The Rhosrobin proposal site currently forms a broadly L-shaped parcel of open green land to the immediate east of the B5425 Llay New Road. To the north and east, the site is bounded by the route of Plas Acton Road and cemetery space. To the south the site is bounded by residential properties located along Church Lea, along with the Wrexham-Chester rail line.

2.2.2 The B5425 Llay New Road serves as a distributor route between the settlements of Wrexham, to the south, and Llay, to the north. Approximately halfway along the site frontage the local route of Rhosrobin Road forms the minor western approach to a priority controlled give-way T-junction with the B5425. Just 50m to the north of this junction the route of the B5425 is subject to the National Speed Limit, whilst to the south it becomes a 30mph route, along with Rhosrobin Road. Approximately 1km to the west Rhosrobin Road provides a route into the area of Gwersyllt.

2.2.3 Plas Acton Road forms the eastern minor approach arm to a priority controlled give-way T-junction with the B5425 to the northwestern corner of the proposal site, circa 200m to the north of the Rhosrobin Road

junction. Plas Acton Road serves as a local distributor route through the local settlement of Pandy, ultimately terminating at the grade separated roundabout Junction 6 of the A483 (T), circa 1km to the east.

2.3 Existing Observed Traffic Demand

Network Demand

2.3.1 Base traffic flow patterns for the local highway network have been established through the review of traffic survey data recorded along the route corridors to the immediate west of the site. Classified turning count surveys were carried out during March 2014. **Figure TA3** to this report summarises the recorded traffic flows at the B5425 Llay New Road/Rhosrobin junction for the observed AM and PM network peak rush hour periods of 08:00-09:00 and 16:45-17:45 respectively.

2.3.2 Reference to the recorded peak hour traffic flows demonstrates that prevailing traffic levels illustrate a general tidal flow pattern with southbound movement along the B5425 Llay New Road (towards Wrexham) being more dominant during the AM period and northbound trips along this route being the peak demand during the PM peak. This observed tidal flow reflects journey to work movements to/from the main centre of Wrexham to the south of the site. Maximum two-way traffic flow is noted as occurring during the AM peak hour, with up to 1,232 vehicles recorded on the B5425 to the south of its junction with Rhosrobin Road. This figure falls to just under 1,200 vehicles during the PM peak hour. To the north of the junction two-way traffic levels are noted at c1,000 vehicles, whilst on Rhosrobin Road levels stand at between 520-550 vehicles.

2.4 Personal Injury Accident Records

2.4.1 Personal Injury Accident data (PIA) for the local highway network in the immediate vicinity of the proposal site, including the routes of Llay New Road and Rhosrobin Road, has been obtained using CrashMap.co.uk, which provides PIA data collected by the police. This data is approved by

the National Statistics Authority and reported on by the Department for Transport each year. Data has been collected for the most recent five year period of 1 January 2008 – 31st December 2012. The results of this search are illustrated in **Figure TA4** to this report.

- 2.4.2 Review of **Figure TA4** shows that during the five year search period a total of 14 personal injury accident incidents have been recorded within the illustrated search area, all of which were classified as being slight in nature except one, which was fatal.
- 2.4.3 Review in greater detail identifies that four incidents have been recorded at the junction of the B5425 with Plas Acton Road, with another four at the junction of the B5425 with Rhosrobin Road. Four of the remaining incidents occur on the approaches to each junction along the mainline B5425 carriageway, with the final two on the Rhosrobin Road approach.
- 2.4.4 Whilst Crashmap data does not provide detailed enough information to fully determine the causal nature of each recorded incident, it is clear from the information that is available that the majority of the incidents appear to have occurred as a result of drivers failing to give-way to oncoming traffic, especially when turning right at each junction. In addition to these incidents, a number of incidents on the approach to each junction appear to have arisen as a result of drivers failing to observe stationary vehicles, or vehicles waiting to turn, in front of them, giving rise to shunt type accidents. With regard to the sole fatal incident, very little detail is available, but it is apparent that only one vehicle was involved, late at night, with a young driver. As such it is likely that this incident may have occurred as a result of a loss of control.
- 2.4.5 Overall it is considered that, based upon the above review of road traffic incident data, the nature of the local accident history is typical of such a local network which includes priority controlled junctions, and there are no material highway safety issues within the vicinity of the site.

2.5 Sustainable Transport Connections

Walking and Cycling

2.5.1 The location of the proposal site is anticipated to allow for a range of everyday journeys to be undertaken on foot or by cycle. The Institute for Highways and Transportation (IHT) Document 'Providing for Journeys on Foot' identifies suitable walking distances to common facilities. This document identifies the following guidance on acceptable walking distances for access to key facilities:

- Desirable: 400m
- Acceptable: 800m
- Preferred Maximum: 1200m

2.5.2 **Figure TA5** to this report illustrates 800m and 1200m 'as the crow flies' local catchments as measured from the access point of the proposed Rhosrobin residential development. This analysis illustrates that Gwersyllt and the edge of Wrexham falls within an acceptable local walk catchment and, as such, the site's proximity to the following local everyday services should be noted:

- Gwersyllt County Primary School;
- Gwersyllt Support Centre;
- Gwersyllt Rail Station;
- Local food and convenience shops; and
- A dental surgery.

2.5.3 In addition to walking connections, the pedal cycle has been identified as being an acceptable travel mode for journeys of up to 5km. **Figure TA6** to this report illustrates the 5km cycle catchment from the site, and demonstrates that Wrexham lies entirely within an appropriate cycle distance, along with the outlying areas of Gresford and Llay.

- 2.5.4 Details of available local cycling routes and connections are illustrated in **Figure TA7** to this report and demonstrate that a number of traffic free cycle routes are available within a short cycle ride of the site.

Access to Buses

- 2.5.5 A number of existing local bus services operate within the vicinity of the Rhosrobin proposal site. Bus stops are located on both sides of the Llay New Road carriageway to the immediate south of its junction with Rhosrobin Road. As such, both stops lie within a 400m walk of the centre of the site, which is considered to represent an acceptable walking distance to bus services. Existing bus routes serving the local stops are illustrated in **Figure TA8** to this report, with full service timetables attached at **Appendix TA1** and summarised in **Table TA2.1** below. **Table TA2.1** demonstrates that regular connections are available to important local destinations such as Mold, Hawarden and Chester.

Table TA2.1 – Available Local Public Transport Connections

Route Number	Route Description	Pk hour frequency	Day Time Frequency
28a	Wrexham – Llay – Mold – Flint	Hourly	2 Hourly
32/33	Wrexham – Gwersyllt – Llay	15 mins	15 mins
34	Wrexham – Gwersyllt – Trevalyn	2 Hourly	2 Hourly

Access to Rail

- 2.5.6 As noted above, and illustrated in **Figure TA5**, Gwersyllt Rail Station lies within a 1.2km walk of the site, thereby providing access to local rail services. Review of the available information on the National Rail website identifies that Gwersyllt Rail Station is served by the Wrexham Central – Bidston service, which operates an hourly service in each direction throughout the day.

Summary

- 2.5.7 Overall it is concluded that the proposal site represents a sustainable location for a residential development, being located within an acceptable

walk/cycle catchment of key everyday destinations such as local shopping facilities and schools, and accessible by both bus and rail services to/from key local employment centres. These services are anticipated to reduce the need for residents at the site to utilise the car for everyday journeys.

3.0 DESCRIPTION OF THE DEVELOPMENT PROPOSALS

3.1 Overview

3.1.1 The Rhosrobin proposal site is proposed to be developed for up to 117 residential units and associated public open space. A masterplan of the development scheme is provided at **Drawing CGL.1/TMJ-04** to this report.

3.1.2 The site masterplan also includes for appropriate levels of car parking, turning facilities for service vehicles and sustainable transport infrastructure (footways and cycle access).

3.2 Highway Access Arrangements

3.2.1 Access to the development site is proposed to be taken via a new four arm roundabout junction, replacing the existing three arm priority controlled T-junction of Rhosrobin Road with the B5425 Llay New Road to the immediate site frontage. The compact roundabout scheme has been designed in accordance with the national standards prescribed in DMRB 6.2.3 TD16/07 "Geometric Design of Roundabouts". **Drawing 1520-01-SK103A** to this TA outlines the proposed new junction form. A Stage 1 Road Safety Audit of the roundabout junction scheme has also been undertaken, the findings of which are attached as **Appendix TA2** along with the associated Designer's Response document.

3.2.2 Internally to the site the access route would continue onwards to form a number of cul-de-sac terminations. The main site access spine route would be of a 5.5m width design, in accordance with current WCBC guidance, and is considered suitable to accommodate the additional traffic movements associated with the development site.

3.2.3 Current WCBC guidance also outlines that for developments where internal road lengths are likely to exceed 240m, it will be necessary to include a means of emergency access, in the event that the main site access is in anyway blocked or presents an obstacle in the event of an

emergency. With this in mind the proposed masterplan of the residential scheme includes for such an emergency access point into the development, and which is located approximately 100m to the south of the main access roundabout.

3.3 Vehicle Servicing

- 3.3.1 The proposed site layout includes turning heads to the terminations of the various culs-de-sac within the development, which would enable the turning of large Refuse Collection Vehicles (RCVs). These turning heads have been designed in accordance with WCBC guidance in order to ensure that the site can be fully serviced by emergency and refuse collection vehicles.

4.0 DEVELOPMENT TRIP GENERATION AND NETWORK TRIP ASSIGNMENT

4.1 Introduction

4.1.1 As noted in section 3, the proposal scheme seeks to deliver residential development of up to 117 dwellings.

4.1.2 Trip rates for the proposed residential redevelopment scheme have been derived from the TRICS database of development trip rates. TRICS is a widely accepted national database of historical trip demand information and contains observed traffic data for a large number of development sites. As such, it can be considered to produce reliable trip rate estimates. It should be noted that TRICS provides outputs in hourly intervals (e.g. 17:00-18:00) and not for intervening hourly periods such as that being considered for the PM peak in this assessment 16:45-17:45. For the purposes of this assessment the TRICS information has been applied to the assess peak hour regardless, in order to ensure the most robust assessment.

4.1.3 Trip rate estimates for typical small private residential sites suggest peak hour average trip rates as outlined in **Table TA4.1** below (detailed TRICS printouts are provided in **Appendix TA3** to this report).

Table TA4.1: Average Residential Development Trip Rates

Trip Rates (per dwelling)	Arrivals	Departures	Total
Residential – Average			
AM Peak (08:00-09:00)	0.143	0.407	0.550
PM Peak (17:00-18:00)	0.393	0.229	0.622

4.1.4 Application of these trip rates to the proposed maximum development size of 117 dwellings at the Rhosrobin site, provides the following estimate of trip demand:

Table TA4.2: Predicted Average Development Trip Demand

Trip Total	Arrivals	Departures	Total
Residential – Average			
AM Peak (08:00-09:00)	17	48	65
PM Peak (17:00-18:00)	46	27	73

- 4.1.5 As a sensitivity test an additional development trip generation scenario has been considered for the proposal site, based on 85th percentile trip rates. Such 85th percentile estimates provide an indication of a realistic maximum trip generation for travel to / from a development site and therefore ensures a robust assessment of operational impact. Details of the 85th percentile rates are included in **Table TA4.3** below.

Table TA4.3: 85th Percentile Residential Development Trip Rates

Trip Rates (per dwelling)	Arrivals	Departures	Total
Residential – 85 th ile			
AM Peak (08:00-09:00)	0.321	0.405	0.726
PM Peak (17:00-18:00)	0.405	0.369	0.774

- 4.1.6 Application of these trip rates to the proposed max development size of 117 dwellings at the Rhosrobin site, provides the following estimate of trip demand:

Table TA4.4: Predicted 85th Percentile Development Trip Demand

Trip Total	Arrivals	Departures	Total
Residential – 85 th ile			
AM Peak (08:00-09:00)	38	47	85
PM Peak (17:00-18:00)	47	43	90

- 4.1.7 The above analysis demonstrates that the proposal scheme is not anticipated to generate a substantive level of peak hour travel demand, with maximum two-way vehicle movements being 90 vehicles per hour (based on 85th percentile trip rates). Such levels of traffic are the equivalent of 1-2 vehicle movements every minute and are unlikely to result in any noticeable impact upon local network operating conditions.

4.2 Development Trip Distribution and Assignment

- 4.2.1 The predicted development trips related to the proposal site have been distributed over the local network on the basis of existing peak hour turning movements recorded at the B5425 Llay New Road Road junction with Rhosrobin Road. The development turning proportions used in these assessments are illustrated in **Figure TA9** to this report. This illustrates a

tidal traffic flow with the southbound movement predominating during the AM peak hour and the northbound movement predominating during the PM peak hour, as noted in Section 2 of this TA.

- 4.2.2 Assignment of the anticipated peak hour development trip totals to these distribution proportions is illustrated in **Figure TA10** to this report.

5.0 KEY ASSESSMENT PARAMETERS

5.1 Assessment Time Periods

5.1.1 As identified in Section 2 of this report, review of background daily traffic demand patterns derived from the March 2014 traffic surveys suggests that maximum background traffic levels over the local highway network are experienced during the following time periods:

- Local highway network AM Peak hour: 08:00-09:00;
- Local highway network PM Peak hour: 16:45-17:45.

5.1.2 In practice these AM & PM peak periods are also likely to represent the maximum traffic demand periods associated with traffic to and from the proposed Rhosrobin residential development and therefore these time periods have been utilised for the network capacity appraisals included in this TA report.

5.2 Future Year Traffic Growth Assumptions

5.2.1 It is anticipated that, based upon current market conditions, the development of the residential site could be completed, and fully occupied, by 2017. For the purposes of this assessment a 2017 opening year date has been utilised for core traffic demand assessments. In order to account for future network traffic conditions, an additional future design year of 2022 has been considered for all capacity related assessments. This represents 5 years beyond the projected full opening of the development.

5.2.2 Guidance published by the DfT identifies that future estimates of traffic should be made through the application of regional growth factors derived from the National Transport Model (NTM). NTM forecasts give traffic growth by region, road type and whether the area is built up or not. These forecasts are then adjusted by local TEMPRO factors to reflect local traffic trends. **Appendix TA4** provides the TEMPRO growth factor outputs, whilst **Table TA5.1** summarises the results.

Table TA5.1: TEMPRO Adjusted NTM Growth Factors

	2014-2017	2014-2022
Weekday AM Peak	1.0246	1.0839
Weekday PM Peak	1.0262	1.0865

- 5.2.3 The TEMPRO adjusted NTM growth factors have been applied to the background traffic flows presented in **Figures TA3** to produce the 2017 opening year & 2022 design year baseline traffic flows illustrated at **Figures TA11 and TA12**.

5.3 Predicted Future Year Traffic Flows

- 5.3.1 The additional development trips have been added to the projected opening year and future year background network traffic movements identified above. The resulting network traffic movements used for the assessment of development impact are illustrated in **Figures TA13 and TA14**.

6.0 ASSESSMENT OF ANTICIPATED DEVELOPMENT TRAFFIC IMPACT

6.1 Introduction

6.1.1 This section of the report considers the operation of the immediate highway network to the development site and the ability of this network to accommodate the predicted future development traffic flow conditions identified in Section 4 of this report. Assessment of the impact of the development proposals has been carried out through the consideration of both link flow impact as well as a junction operational assessment for the proposed new site access roundabout junction with the B5425 Llay New Road and Rhosrobin Road.

6.1.2 This assessment of junction capacity has been undertaken for the future design year of 2022, which would represent the worst case assessment conditions for the junction when compared to the 2017 opening year conditions.

6.1.3 The roundabout junction assessment has been modelled using the TRL software package Junctions8. Traffic flows are split into 15-minute time segments within the Junctions8 model inputs. The results generated in the model indicate the peak Ratio of Flow to Capacity (RFC) in any individual peak and likely traffic queues. Again, RFC values between 0.00 and 0.85 are generally accepted as representing stable and acceptable operating conditions, whilst values between 0.85 and unity represent variable operation but still within theoretical capacity, i.e. possible queues building up at the junction during the period under consideration and increases in vehicular delay moving through the junction. RFC values in excess of unity represent overloaded conditions, i.e. congested conditions.

6.2 Link Flow Impact On Immediate Local Network

6.2.1 Reference to Institution of Highways and Transportation (IHT) 'Guidelines for Traffic Impact Assessment' suggests that more detailed analysis of

highway impact and/or capacity improvements is only likely to be required where either:

- Traffic to/from the development exceeds 10% of existing two way traffic on the adjoining highway; or,
- Where traffic to/from the development exceeds 5% of the existing two way traffic flow on the adjoining highways at locations where traffic congestion exists within the assessment period or in other sensitive locations.

6.2.2 March 2007 Welsh Government Guidance TAN18 Annex E (para. E4) provides further advice in respect of likely material increases in traffic levels, specifically occasions under which additional analysis might be required for developments affecting the Welsh Strategic Road Network. In this case TAN18 guidance states:

“When assessing whether or not to consult the Assembly...local planning authorities must give full consideration to the effects of a development’s traffic would have at a junction, particularly in respect of the additional turning movements created. As a broad guide the Assembly Government would regard an increase in turning movements in the order of 5% as material in most cases, that is, a 5% increase of traffic using any link of the junction. Where the capacity of the junction is, or is near to, being exceeded, a smaller percentage increase on a link would normally be material.”

6.2.3 It is therefore concluded that a 5% threshold represents a reasonable guidance threshold for the assessment of link impact on the immediate local highway network to the Rhosrobin development site, albeit that it must be recognised that a simple percentage impact test can represent quite a crude tool – specifically in the context of routes which currently operate with relatively low levels background flow. In such cases, a very small level of predicted development traffic can give rise to the calculation of a significant percentage change value, even though the combined background and development traffic would still be substantially below link capacity thresholds.

- 6.2.4 **Table TA6.1** below demonstrates the predicted changes in two-way background link flows on the local highway network associated with the proposed residential development, during the 2017 opening year, based upon 85th percentile trip rates.

Table TA6.1 – Predicted 2017 Opening Year Proportional Link Impact – 85th Percentile Trip Rates

Two-way Link Flow	AM Peak Period			PM Peak Period		
	Background	Proposed	% Increase	Background	Proposed	% Increase
B5425 (S)	1262	39	3.1%	1225	40	3.3%
Rhosrobin Road	532	16	3.0%	565	18	3.2%
B5425 (N)	1058	31	2.9%	1028	33	3.2%

Flow totals (PCUs)

- 6.2.5 Review of the above tables identifies that the impact of development related traffic would be low, with a maximum proportional increase of 3.3% of background traffic levels during the PM peak hour on the B5425 (S) Llay New Road. Traffic flow increases on all links would be broadly proportionate, at between 2.9-3.3% of background levels. As such it is considered that the development proposals would be unlikely to give rise to any material concerns in respect of highway capacity or highway safety, with all local links experiencing a level of traffic increase notably less than the 5% guidance threshold outlined in TAN18.

6.3 Junction Operational Impact

- 6.3.1 Notwithstanding the results of the above proportional link flow impact exercise, junction capacity modelling has been undertaken for the proposed four arm roundabout junction of the B5425 Llay New Road with the site access and Rhosrobin Road. Assessments have been undertaken for the AM and PM peak hour periods (08:00-09:00 & 16:45-17:45).
- 6.3.2 The results of the Junctions8 assessment of the proposed roundabout junction are summarised in **Table TA6.2** below with the full results provided at **Appendix TA5**.

Table TA6.2: B5425/Site Access/Rhosrobin Road Roundabout Assessment – 2022 Design Year

2022 Future Year Inc Development	AM 08:00-09:00		PM 16:45-17:45	
	RFC	Max Queue	RFC	Max Queue
Arm 1	0.51	1.1	0.77	3.3
Arm 2	0.41	0.7	0.28	0.4
Arm 3	0.76	3.2	0.57	1.3
Arm 4	0.09	0.1	0.07	0.1

Arm 1 – B5425 (S) Arm 2 – Rhosrobin Road Arm 3 – B5425 (N) Arm 4 – Site Access

6.3.3 The above results demonstrate that during both the AM and PM network peak hours, maximum RFCs would fall below 0.85 during the 2022 design year, with very little in the way of queuing predicted. Accordingly it can be concluded that the proposed residential development and roundabout access junction could be delivered without giving rise to any junction capacity concerns.

7.0 TRANSPORT IMPLEMENTATION STRATEGY

7.1 Introduction

7.1.1 In accordance with guidance set out in Planning Policy Wales Technical Advice Note 18: Transport (TAN 18), a Transport Implementation Strategy has been put together as part of the Transport Assessment process, for the proposed Rhosrobin residential development site. Review of Annex D of TAN 18 identifies the following core objectives for a TIS:

- Identify what policy objectives and requirements are set by the development plan in terms of access to the development and movements in and around the site;
- Identify what access arrangements are required for a successful development (meeting the needs of the developer, end user, addressing impacts on neighbours and existing movements around the site); and,
- Specify the package of physical, management and promotional measures needed to accommodate the requirements identified above, such as physical infrastructure, the design and location of buildings, parking management, financial incentives and dedicated travel plan co-ordinators.

7.1.2 Ultimately TAN18 concludes that the TIS should ensure that the proposed development contributes to delivering the aims of the LDP and should set out a package of measures to address site specific issues and demonstrate how the proposals can be integrated into the local transport system.

7.1.3 The Planning Statement submitted in support of the planning application for the Rhosrobin residential development scheme, as prepared by Nigel Thorns Planning Consultancy, provides a full appraisal of the context of all current and relevant development plan policies. The following paragraphs provide a brief summary of those policies identified within this review which are considered most relevant in respect of transportation and highways matters.

Planning Policy Wales (Edition 6, February 2014)

- 7.1.4 Planning Policy Wales (PPW), which is supplemented by Technical Advice Notes (TANs) and circulars, is the national planning policy for Wales and sets out the land use policies of the Welsh Government. Chapter 8 of PPW sets out the aims and objectives in respect of traffic and transportation. Paragraph 8.1.3 outlines a key objective:

*“The Welsh Government supports a **transport hierarchy** in relation to new development that establishes priorities in such a way that, wherever possible, they are accessible in the first instance by walking and cycling, then by public transport and then finally by private motor vehicles. Careful consideration needs to be given to the allocation of new sites which are likely to generate significant levels of movement in Local Development Plans to ensure that access provisions which promote walking and cycling, as well as by public transport are included from the outset. Similarly, the Welsh Government expects that Design and Access Statements give consideration to accessing developments by modes other than private motor vehicles.”*

- 7.1.5 Paragraph 8.7.2 of PPW Chapter 8 goes on to outline the requirement that Transport Assessments should be conducted for major developments in order to fully appraise travel demand and impact:

*“**Transport Assessments (TA)** are an important mechanism for setting out the scale of anticipated impacts a proposed development, or redevelopment, is likely to have. They assist in helping to anticipate the impacts of development so that they can be understood and catered for.”*

and

“It is expected that TAs will also provide the basis for negotiation on scheme details, including the level of parking, and measures to improve public transport access, walking and

cycling. They also provide an important basis for the preparation of Travel Plans."

PPW - Technical Advice Note 18 - TAN18: 'Transport' (March 2007)

- 7.1.6 TAN18 was published in March 2007 and offers technical advice on various transport matters and advises that LPAs should guide the location of new development, reduce the need to travel and promote transport choices in order to reduce pollution and promote environmental improvements.
- 7.1.7 TAN18 recognises the key role of development accessibility in good planning and guides local authorities to maximising development accessibility as a key tool in ensuring social inclusion and the delivery of sustainable development. TAN18 notes that local authorities should ensure that their development plan is compatible with the aim of reducing the need to travel and provides a greater choice of means of transport other than the private car.

Regional Transport Plans

- 7.1.8 TAN18 also identifies the relationship between National Policy and Regional Transport Plans (RTPs). RTPs have replaced local authority Local Transport Plans and seek to address cross-border issues for local authorities and provide a policy framework for local transport matters.
- 7.1.9 The latest version of the North Wales Regional Transport Plan was prepared by Taith (the North Wales Regional Transport Consortium) in September 2009.

Wrexham Unitary Development Plan (February 2005)

- 7.1.10 Wrexham CBC is currently preparing its Local Development Plan (LDP2) 2013-2028, and which is envisaged to become adopted in late 2016. In the meantime, the Wrexham UDP remains adopted. The following

policies are identified as the most relevant in respect of transportation and highways matters

Policy PS4

“Development should maintain the existing settlement pattern and character and be integrated with the existing transport network to help reduce the overall need to travel and encourage the use of alternatives to the car.”

Policy PS8

“The transport network will be developed by providing an integrated range of travel options to and from principal residential, commercial, employment and education centres by making the best use of the existing road and rail network, including, where necessary, the provision of facilities for both passenger and freight interchange and by the encouragement of public transport, cycling and walking.”

Policy GDP1

“All new development should:-

e) Ensure that built development is located where it has convenient access to public transport facilities, and is well related to pedestrian and cycle routes wherever possible.

Policy T1

“Proposals for new and improved public transport facilities for bus, taxi and rail services will be supported, to include public transport interchange facilities, park and ride facilities, car and cycle parking, cycle and walkway routes, and access for buses on new developments.”

Policy T8

"Development granted planning permission will be required to provide vehicle parking spaces either on site or nearby, in accordance with the Council's current parking standards. Special regard will be paid to the following factors, as appropriate:-

- a) the availability of public transport nearby,*
- b) proximity to public car parking,*
- c) proximity to local services and facilities,*
- d) road safety hazards and amenity considerations arising from on-street parking in the vicinity of the site.*

Where implementation difficulties arise in making parking provision on-site or nearby, the Council will require a developer to make financial contributions for measures to assist public transport, or walking and cycling as appropriate.

Policy T9

"Development proposals will be required to provide walking and cycling routes, where feasible and appropriate, that link with existing or proposed walking and cycling routes, and integrate with the public transport system. Opportunities for horse riding along these routes will be secured where appropriate.

7.2 Development Location, Accessibility & Design

- 7.2.1 The Rhosrobin site is considered to represent an appropriate location for new residential development. The site is located to the edge of the existing town of Wrexham and proximate to the local settlement of Gwersyllt and its facilities.
- 7.2.2 The location of the proposal site is anticipated to allow for a range of everyday journeys to be undertaken on foot or by cycle. Review of the site location identifies that Gwersyllt and the edge of Wrexham falls within an acceptable local walk catchment and, as such, the site is proximate to

a wide range of local everyday services such as schools, transport services and local shops. Additionally the site lies within an acceptable cycle distance not only of Wrexham Town Centre but also the outlying areas of both Gresford and Llay.

7.2.3 Nearest local bus stops are located just within a typical preferred regular walk catchment to a development site (400m), whilst the nearest rail services at Gwersyllt Station lie within a 1km walk distance. Further information regarding local sustainable connections to the proposal site is set out in detail in section 2.5 of this TA.

7.2.4 The proposal scheme would be accessed by a new highway connection to the main local distributor road of the B5425 Llay New Road. The vehicle access junction connection to the B5425 Llay New Road would be formed through the introduction of a new 4-arm roundabout junction with the additional arm of Rhosrobin Road. The roundabout would include for improvement of existing footways and cycleways, as well as providing footway/cycleway access to the development site itself. In accordance with WCBC requirements an emergency access point into the development site would be located off the B5425 Llay New Road further to the south.

7.2.5 The internal layout of the site would be designed to promote walking and cycling, with suitable width footpaths provided to both side of all main estate roads. The site design would protect opportunities for additional walking & cycling connections to potential future development areas to the immediate north.

7.3 **Demand Management & Impact Mitigation Measures**

7.3.1 It is considered that the proposal residential development scheme would not generate significant increases in local traffic levels. Based on the first principles assessment of trip generation, it has been determined that the scheme is unlikely to generate more than 90 two-way vehicle movements per hour, during the peak rush hour periods, which equates to just 1-2 additional vehicle movements every minute. On the basis of the review of

operational network capacity set out in Section 6 of this supporting TA report, it has been concluded that the residential development proposals would not give rise to a detrimental impact on operational conditions over the immediate key local highway network when compared to the future year baseline position. No additional off-site traffic related highway network improvements are therefore considered necessary.

7.3.2 Notwithstanding the general conclusions associated with anticipated network operational impact, in order to help promote sustainable travel demand and to encourage appropriate demand management at the site, the scheme would be supported by a site-wide Residential Travel Plan. This Travel Plan comprises a series of physical and operational measures aimed at reducing reliance on travel by the private car and encouraging sustainable travel choices where practical. A copy of the proposed Framework Residential Travel Plan is included as **Appendix TA6** to this report.

7.3.3 The Travel Plan would be funded by the site developer and managed by an appointed Travel Plan Coordinator (TPC). Duties of the site TPC would include preparing suitable travel information for new residents, monitoring travel patterns at the site (in order to understand the effectiveness of Travel Plan measures) and ensuring that the travel infrastructure at the site remains fit for purpose.

7.4 **Compliance with the Development Plan**

7.4.1 Section 7.1 summarises the key policies relevant to transportation and highways matters, with sections 7.2-7.3 containing details of the development proposals. This section outlines how the development proposals and associated mitigation measures comply with key policies.

7.4.2 Assessment of the operational effects that traffic from the site would have upon the local highway network, has demonstrated that all traffic could be safely accommodated without detriment to highway safety or capacity.

7.4.3 Moreover, it has been established that the residential development site would be located in close proximity to a wide range of public transport services (both rail & bus) as well as implementing measures which would encourage the use of both walking and cycling modes. In addition, the development Travel Plan would outline measures designed to further encourage the use of sustainable transport modes, as well as the need to reduce travel. In this regard the residential development proposals would fully comply with Policies PS4, PS8, GDP1 and T9 of the Wrexham Unitary Development Plan.

7.4.4 The proposed parking strategy for the development scheme, in line with WCBC requirements, would also ensure that the site accords with the provisions of Policy T8 of the Wrexham UDP.

7.5 **Proposed Planning Conditions and Obligations**

7.5.1 The delivery and operation of the Rhosrobin residential development could be expected to be controlled by planning conditions and funding obligations which would secure the following.

- Implementation of the new 4-arm roundabout junction and site access connection with the B5425 Llay New Road and Rhosrobin Road in accordance with the layout illustrated in Drawing 1520-01-SK103A.
- Funding and operation of a Residential Travel Plan in accordance with the draft Framework Document and monitoring of future travel patterns.

8.0 SUMMARY

8.1 Introduction

8.1.1 This Transport Assessment has been prepared by Axis in support of a planning application made by Castlemead Group Ltd for the development of up to 117 residential dwellings on land off the B5425 Llay New Road, Rhosrobin, Wrexham.

8.1.2 The project would see the development of up to 117 residential dwellings served directly from the route of the B5425 Llay New Road via a new 4 arm roundabout junction. This report includes a review of existing local conditions, consideration of the development scheme, review of the proposed site access strategy and an analysis of the impact of development related traffic over the immediate local highway network.

8.2 Site Location & Existing Highway Conditions

8.2.1 The Rhosrobin proposal site forms a broadly L-shaped parcel of open green land to the immediate east of the B5425 Llay New Road, and more strategically lies to the north of the A483(T) and Wrexham Town Centre.

8.2.2 The B5425 Llay New Road serves as a distributor route between the settlements of Wrexham, to the south, and Llay, to the north. Approximately halfway along the site frontage the local route of Rhosrobin Road forms the minor western approach to a priority controlled give-way T-junction with the B5425.

Existing Observed Traffic Demand

8.2.3 Background traffic levels on the local highway network have been established through the review of traffic survey data recorded along the route corridors to the immediate west of the site. Classified turning count surveys were carried out during March 2014, and identify that turning movements at the junction peaked during the traditional AM and PM periods (observed as 08:00-09:00 & 16:45-17:45)

- 8.2.4 Prevailing traffic levels illustrate a general tidal flow pattern with southbound movement along the B5425 Llay New Road (towards Wrexham) being more dominant during the AM period and northbound trips along this route being the peak demand during the PM peak. Maximum two-way traffic flow is noted as occurring during the AM peak hour, with up to 1,232 vehicles recorded on the B5425 to the south of its junction with Rhosrobin Road. To the north of the junction two-way traffic levels are noted at c1,000 vehicles, whilst on Rhosrobin Road levels stand at between 520-550 vehicles.

Personal Injury Accident Records

- 8.2.5 Personal Injury Accident data (PIA) for the local highway network to the site has been obtained for the most recent five year period of 1 January 2008 – 31st December 2012. Review of this information has identified a total of 14 personal injury accident incidents have been recorded within the illustrated search area, all of which were classified as being slight in nature except one, which was fatal. Overall, however, it is concluded that the review of road traffic incident data has demonstrated that there are no material highway safety issues within the vicinity of the site.

Site Accessibility

- 8.2.6 The location of the proposal site is anticipated to allow for a range of everyday journeys to be undertaken on foot or by cycle. Analysis of the local catchment area identifies that the site would fall within an acceptable walking distance of a range of key facilities, including local primary schools, and local convenience stores. In addition the site lies within a 5km cycle distance of the main local centre of Wrexham.
- 8.2.7 In addition to walking and cycling opportunities, the site is located within acceptable walking distance of local bus and rail services, which provide frequent onward connections to key local destination which include Wrexham, Llay, Neston and Bidston.

8.3 Description of the Development Proposals

- 8.3.1 The Rhosrobin proposal site is proposed to be developed for up to 117 residential units and associated public open space. The site masterplan also includes for appropriate levels of car parking, turning facilities for service vehicles and sustainable transport infrastructure. Access to the development site is proposed to be taken via a new four arm roundabout junction with the B5425 Llay New Road and Rhosrobin Road. The main internal spine route of the site would be of 5.5m width, in accordance with current WCBC guidance, and an emergency access point is proposed to be provided.

8.4 Development Trip Generation and Network Trip Assignment

- 8.4.1 Trip rates for the proposed residential redevelopment scheme have been derived from the TRICS database of development trip rates. TRICS is a widely accepted national database of historical trip demand information and contains observed traffic data for a large number of development sites. As such, it can be considered to produce reliable trip rate estimates.
- 8.4.2 Trip rate estimates for typical small private residential sites suggest peak hour 85th percentile trip rates which would equate to the following level of trip generation from a development of 117 dwellings:

Table TA8.1: Predicted 85th Percentile Development Trip Demand

Trip Total	Arrivals	Departures	Total
Residential – 85 th ile			
AM Peak (08:00-09:00)	38	47	85
PM Peak (17:00-18:00)	47	43	90

- 8.4.3 The analysis of trip generation demonstrates that the proposal scheme is not anticipated to generate a substantive level of peak hour traffic, with maximum two-way vehicle movements being 90 vehicles per hour. Such levels of traffic are the equivalent of 1-2 vehicle movements every minute and are unlikely to result in any noticeable impact upon local network operating conditions.

8.4.4 Predicted development trips related to the proposal site have been distributed over the local network on the basis of existing peak hour turning movements recorded at the B5425 Llay New Road junction with Rhosrobin Road. This approach illustrates a tidal traffic flow with the southbound movement predominating during the AM peak hour and the northbound movement predominating during the PM peak hour.

8.4.5 Based upon current market conditions, it is envisaged that the development of the residential site could be completed, and fully occupied, by 2017. For the purposes of this assessment a 2017 opening year date has been utilised for core traffic demand assessments. In order to account for future network traffic conditions, an additional future year of 2022 has been considered for all capacity related assessments. Accordingly estimates of 2017 and 2022 future year background network traffic levels have been made through the application of locally adjusted DfT NTM forecasts. Development traffic estimates have then been added to the background network to create predicted 2017 opening year and 2022 design year network traffic flows.

8.5 **Assessment of Anticipated Development Traffic Impact**

8.5.1 This section of the report has considered the operation of the immediate highway network to the development site and the ability of this network to accommodate the predicted future development traffic flow conditions. Assessments have been carried out through consideration of proportional changes in network link flows as a result of development, and an assessment of capacity for the proposed new site access roundabout junction with the B5425 Llay New Road and Rhosrobin Road.

Link Flow Impact

8.5.2 A review of the predicted changes in local network link flows has identified that the impact of development related traffic would be low, with a maximum proportional increase of 3.3% of background traffic levels on the B5425 (S) Llay New Road. Traffic flows increases on all other approach

links would be broadly proportionate, at between 2.9-3.3% of background levels. As such it is considered that the development proposals would be unlikely to give rise to any material concerns in respect of highway capacity or highway safety.

Operational Junction Capacity

- 8.5.3 Notwithstanding the results of the proportional link flow impact exercise, junction capacity modelling has been undertaken for the proposed four arm roundabout junction of the B5425 Llay New Road with the site access and Rhosrobin Road. The results of the assessment of this junction have demonstrated that during both the AM and PM network peak hours maximum RFCs would fall below 0.85 during the 2022 design year, with very little in the way of queuing predicted. Accordingly it can be concluded that the proposed residential development would not give rise to any local junction capacity concerns.

8.6 **Conclusions**

- 8.6.1 It is concluded that the development of land off the B5425 Llay New Road, Rhosrobin, to deliver up to 117 residential dwellings would not result in a detrimental impact on the local highway network, either in operational or highway safety terms.



DRAWINGS

This drawing is the copyright of AXIS P.E.D Limited and may not be loaned, copied or reproduced in any way, or used for any other, quote, tender or construction purposes without written consent of the company to do so.

Follow any figured dimensions - do not scale. IF IN DOUBT ASK.
This drawing has been prepared for feasibility purposes and does not represent a construction plan. All design aspects to be confirmed at the appropriate detailed design stage.

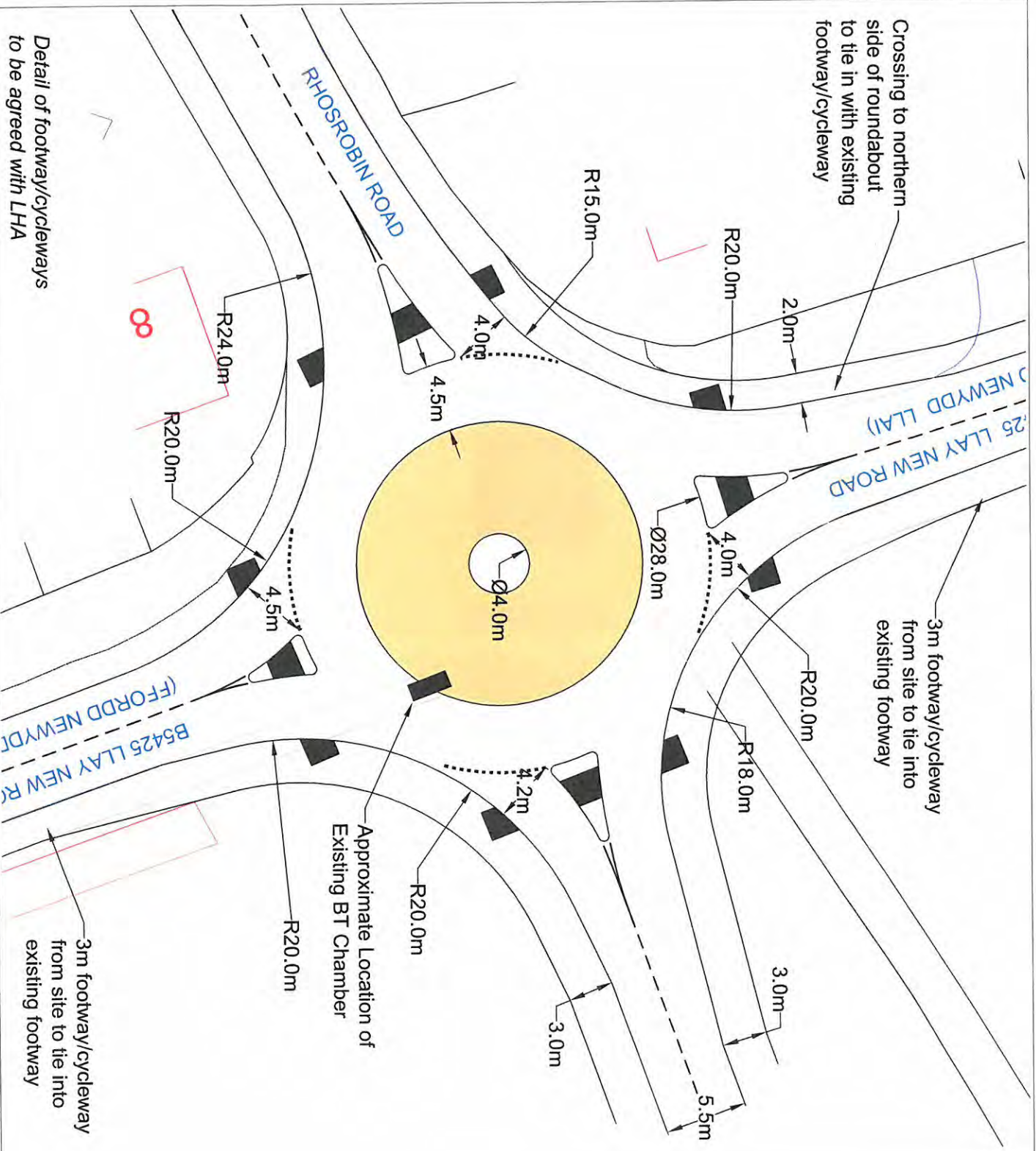
Revision History		Date
A	Footway/cycleway improvements	17.04.13
B	desc	date b
C	desc	date c
D	desc	date d
E	desc	date e
F	desc	date f
G	desc	date g
H	desc	date h
I	desc	date i
J	desc	date j

NOTES:

1: Roundabout designed in accordance with DMRB 6.2.3 TD16/07

2: Maximum entry path radii on each arm as follows:

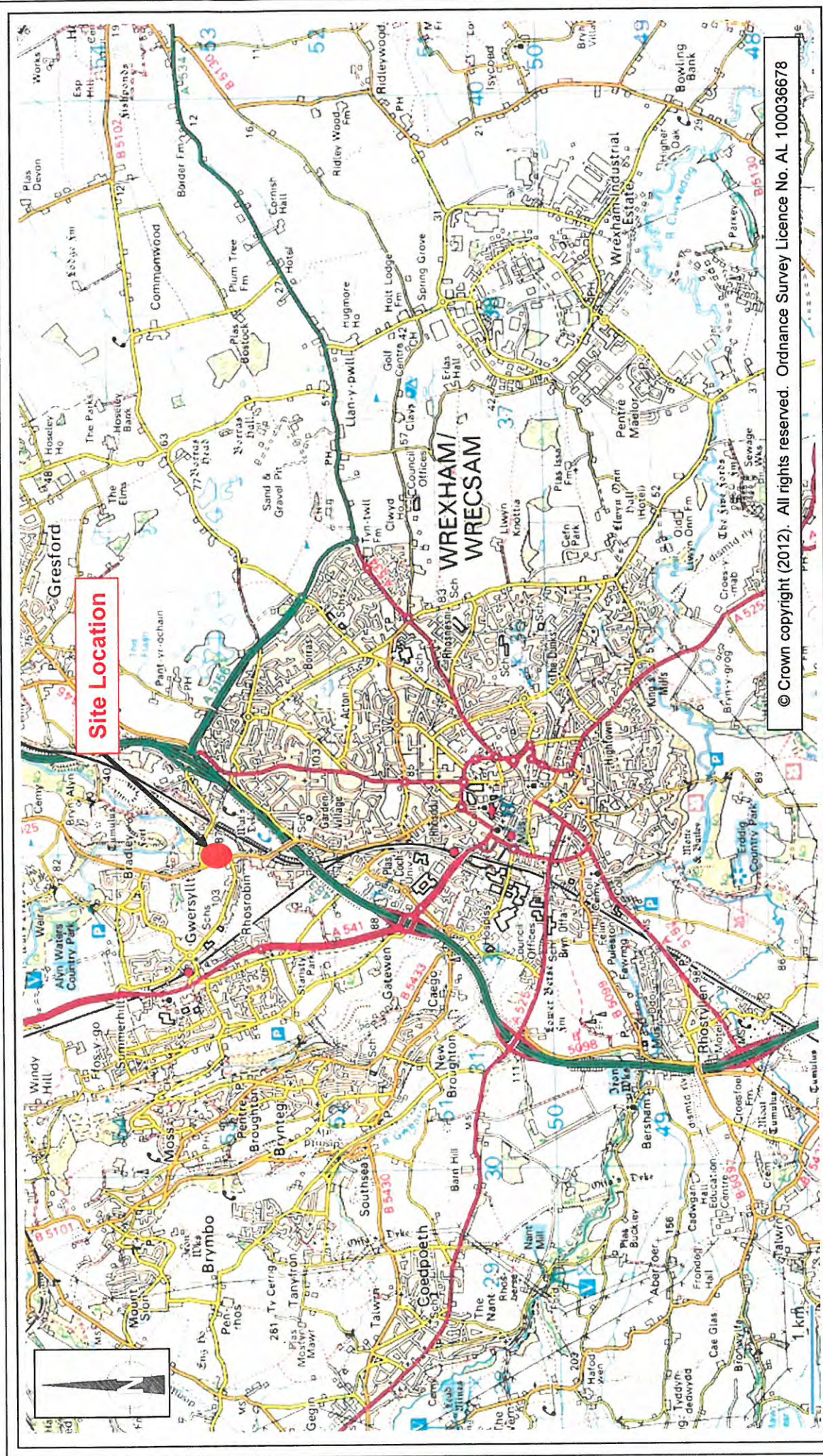
B5425 New Lay Road (S)	48.9m
Rhosrobin Road	117.5m
New Lay Road (N)	63.1m
Proposed Site Access	57.0m



Client: Castle Mead Group Ltd.	
Project: Rhosrobin Residential Site, Wrexham	
Drawing Title: Proposed Roundabout Access Junction Option From B5425 New Lay Road	
Scale: 1:250 (A3)	Date: 05.03.14
Drawing Number: 1520-01-SK103	Rev: A
Status: Information	Rev: A
Planning Environment Design	



FIGURES



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Figure TA1

Strategic Site Location Plan

1520-01

Rhosrobin Residential Site, Wrexham

June 2014



Camellia House
76 Water Lane,
Wilmslow
Cheshire, SK9 5BB

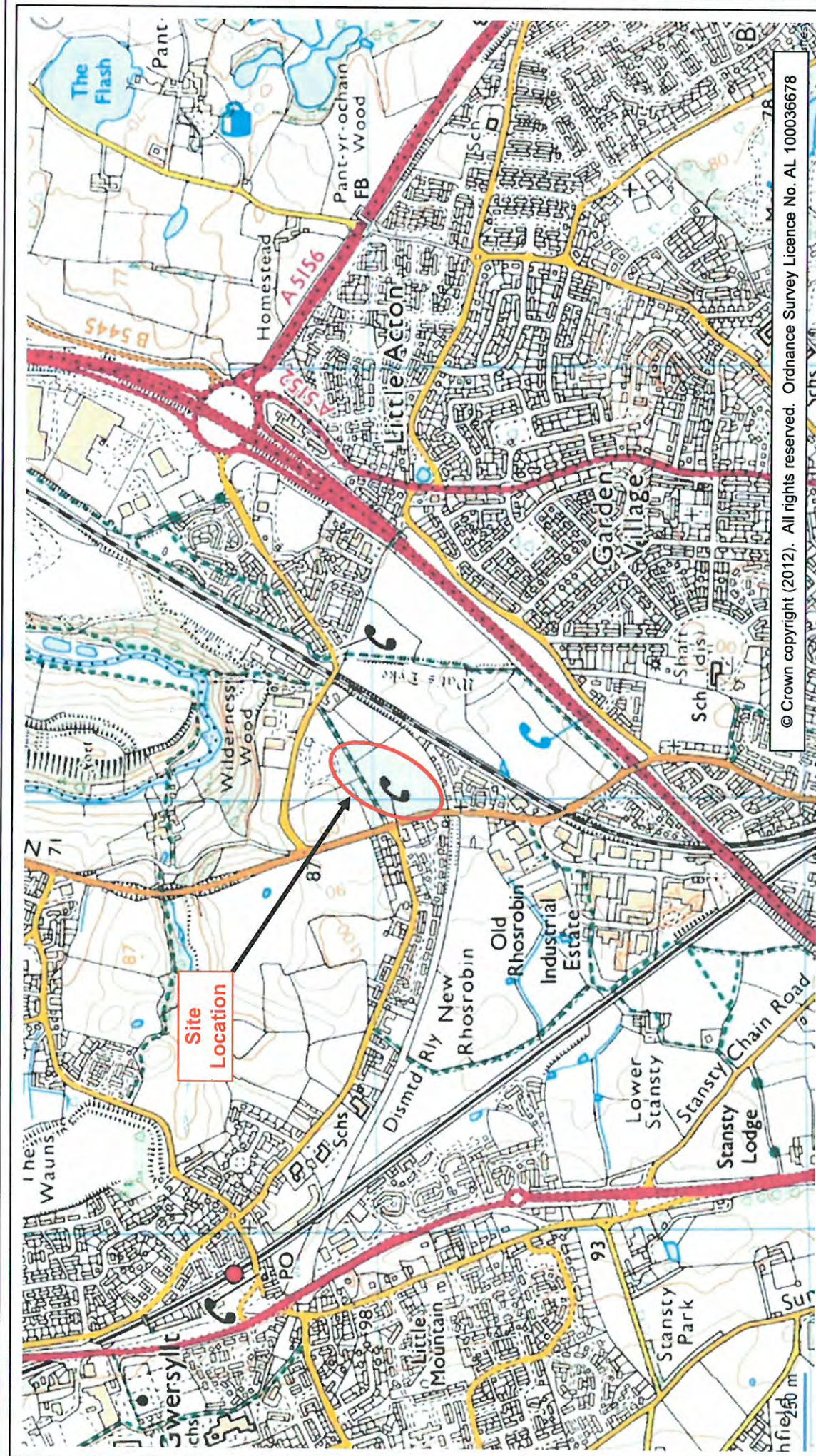
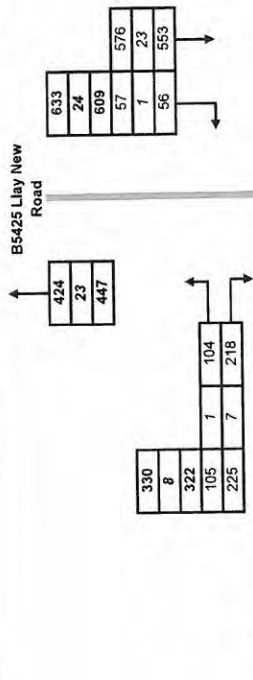
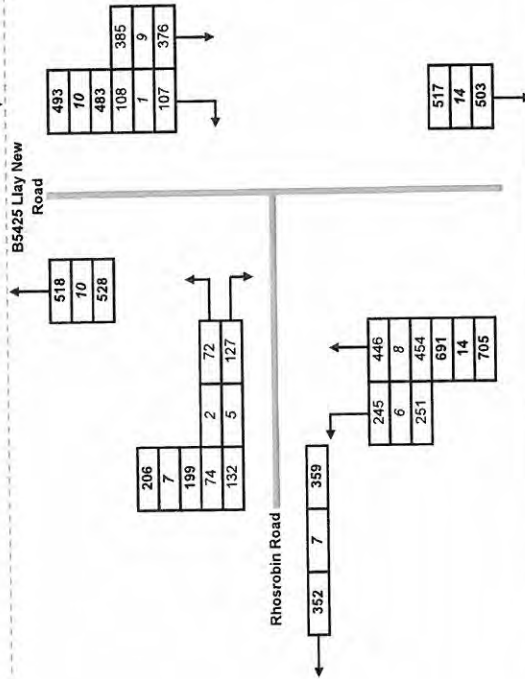


Figure TA2	Site Location Plan – Immediate Context		Camellia House 76 Water Lane, Wylmslow Cheshire, SK9 5BB
1520-01	Rhosrobin Residential Site, Wrexham	June 2014	

AM Peak Period



PM Peak Period



Key

10	total vehicles
2	HGVs
12	PCUs

Figure TA3

1520-01

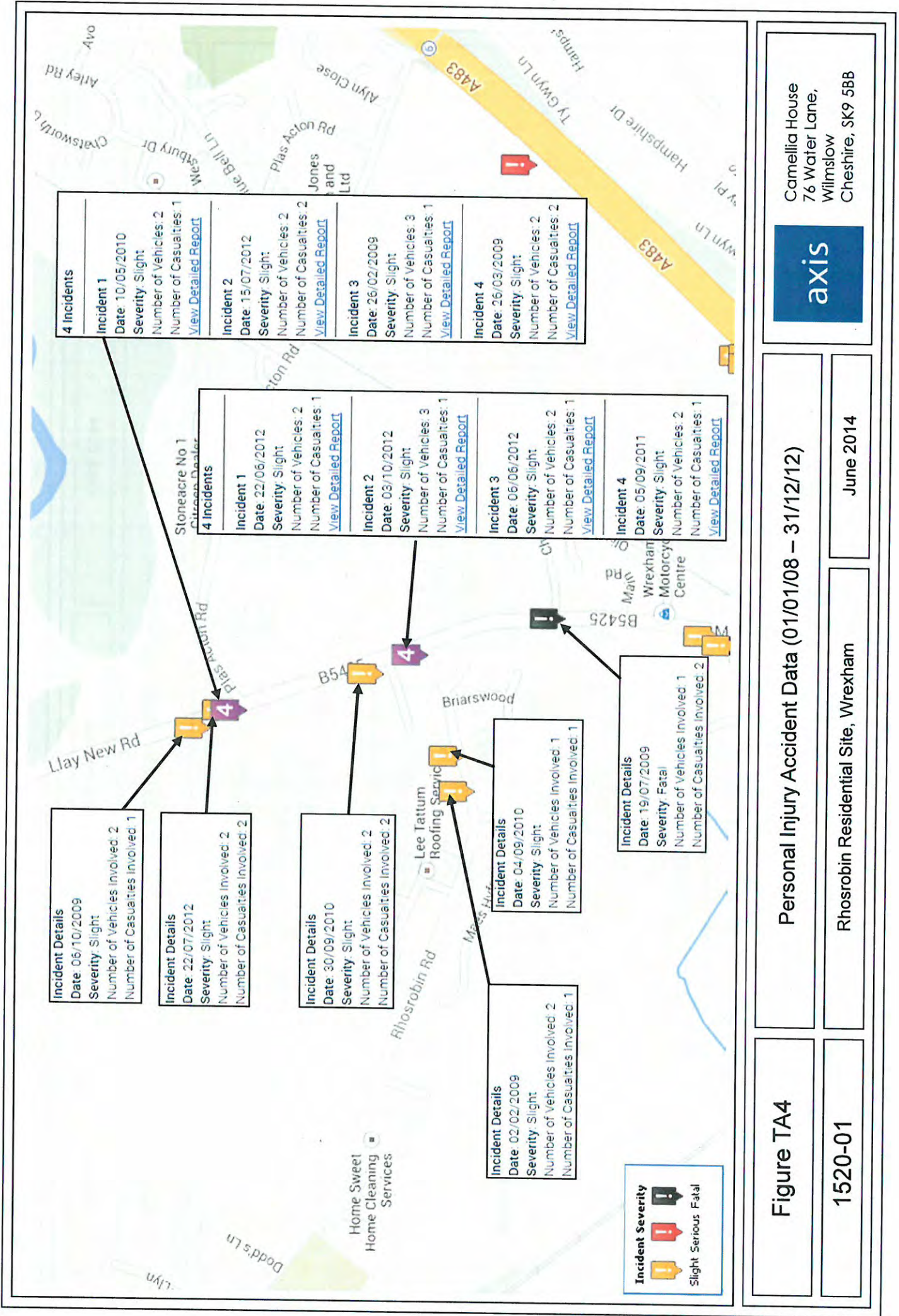
2014 Surveyed Traffic Flows

Rhosrobin Residential Site, Wrexham

June 2014



Camellia House
76 Water Lane,
Wilmslow
Cheshire, SK9 5BB



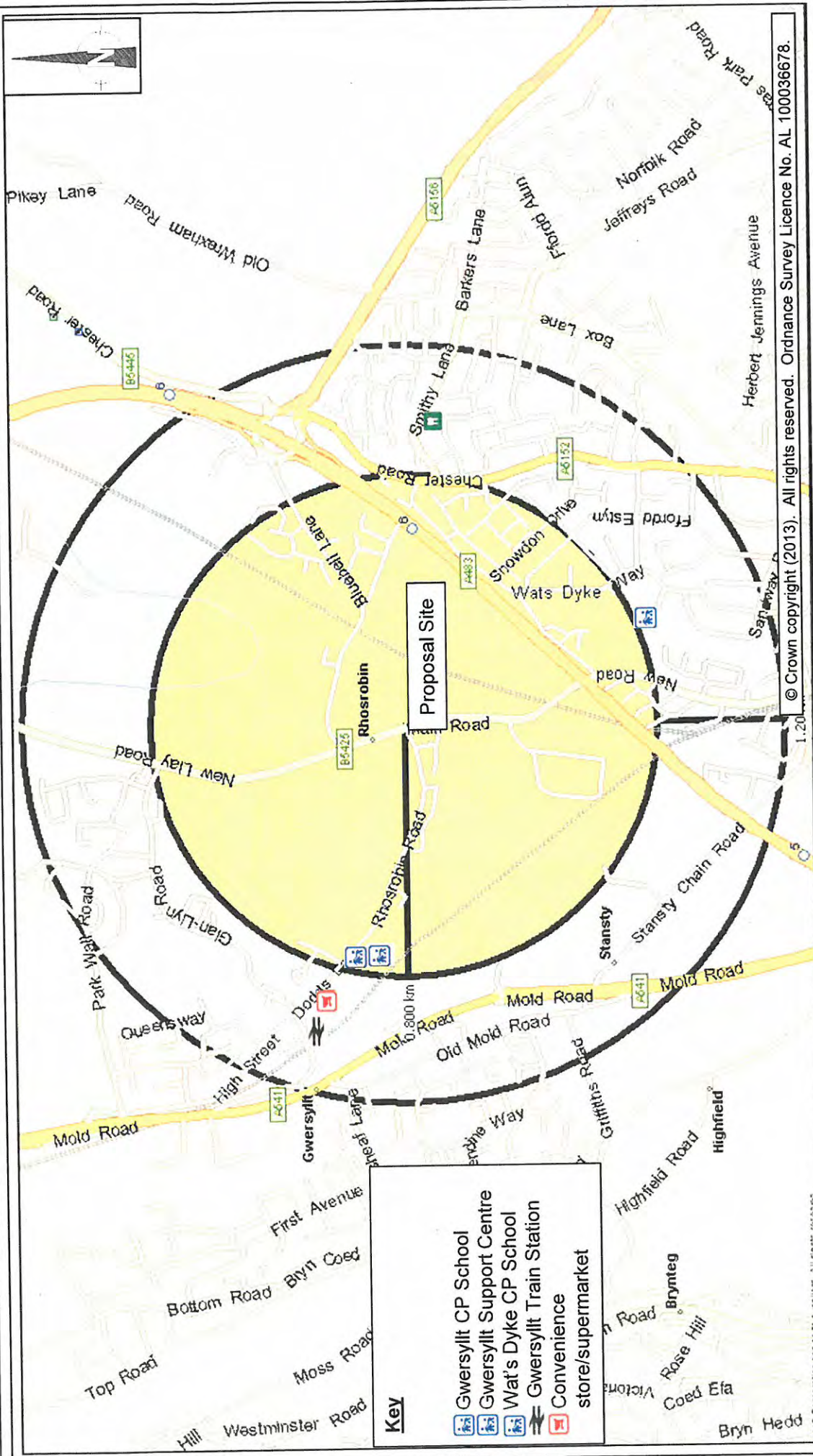


Figure TA5

1520-01

800m & 1.2km "As the Crow Flies" Walking Catchment

Rhosrobin Residential Site, Wrexham

June 2014



Camellia House
76 Water Lane,
Wilmslow
Cheshire, SK9 5BB



Figure TA6

1520-01

5km Cycle Catchment

Rhosrobin Residential Site, Wrexham

June 2014



Camellia House
76 Water Lane,
Wilmslow
Cheshire, SK9 5BB

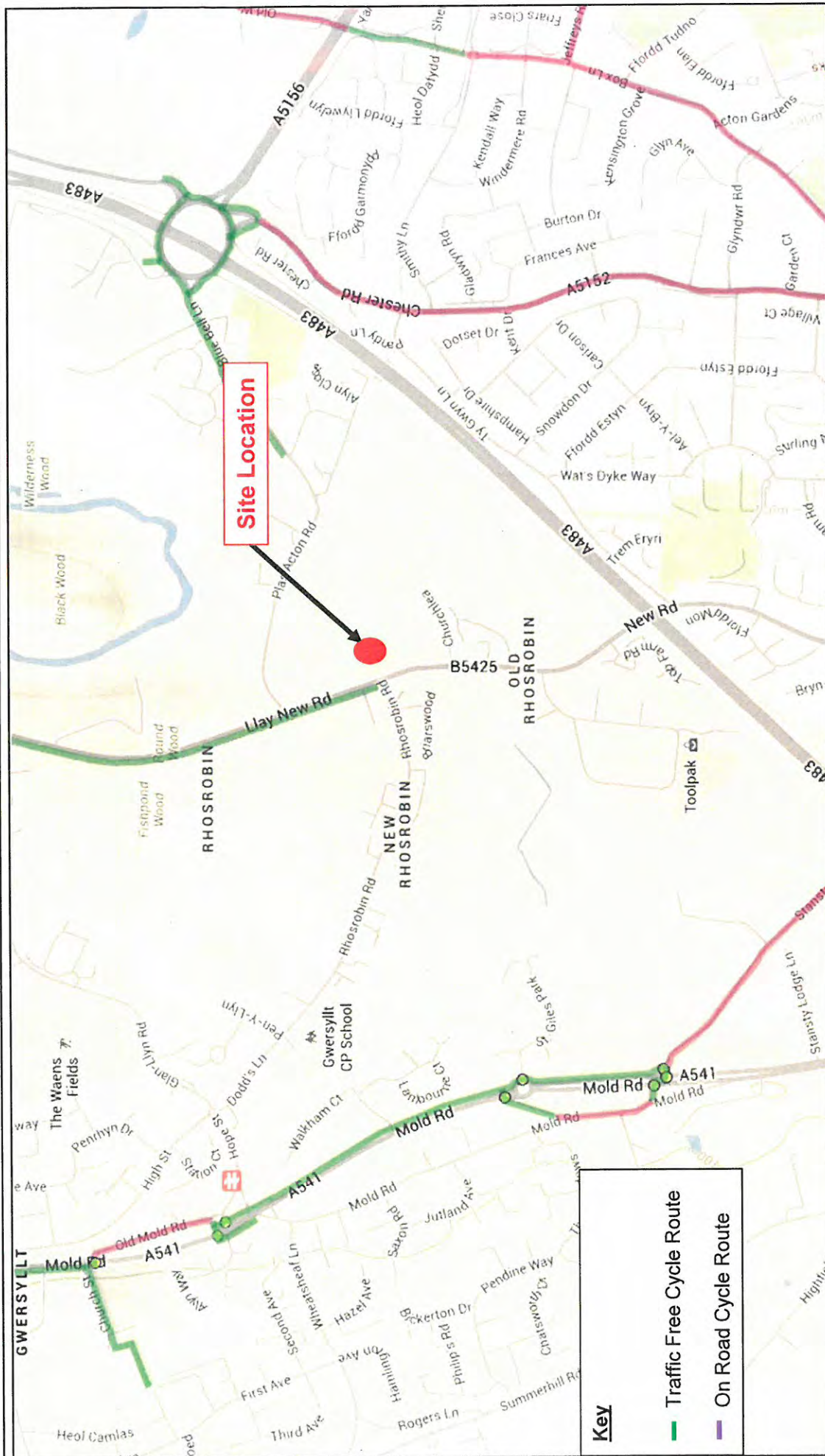


Figure TA7

1520-01

Local Cycle Network Routes

Rhosrobin Residential Site, Wrexham

June 2014

axis

Camellia House
76 Water Lane,
Wilmslow
Cheshire, SK9 5BB

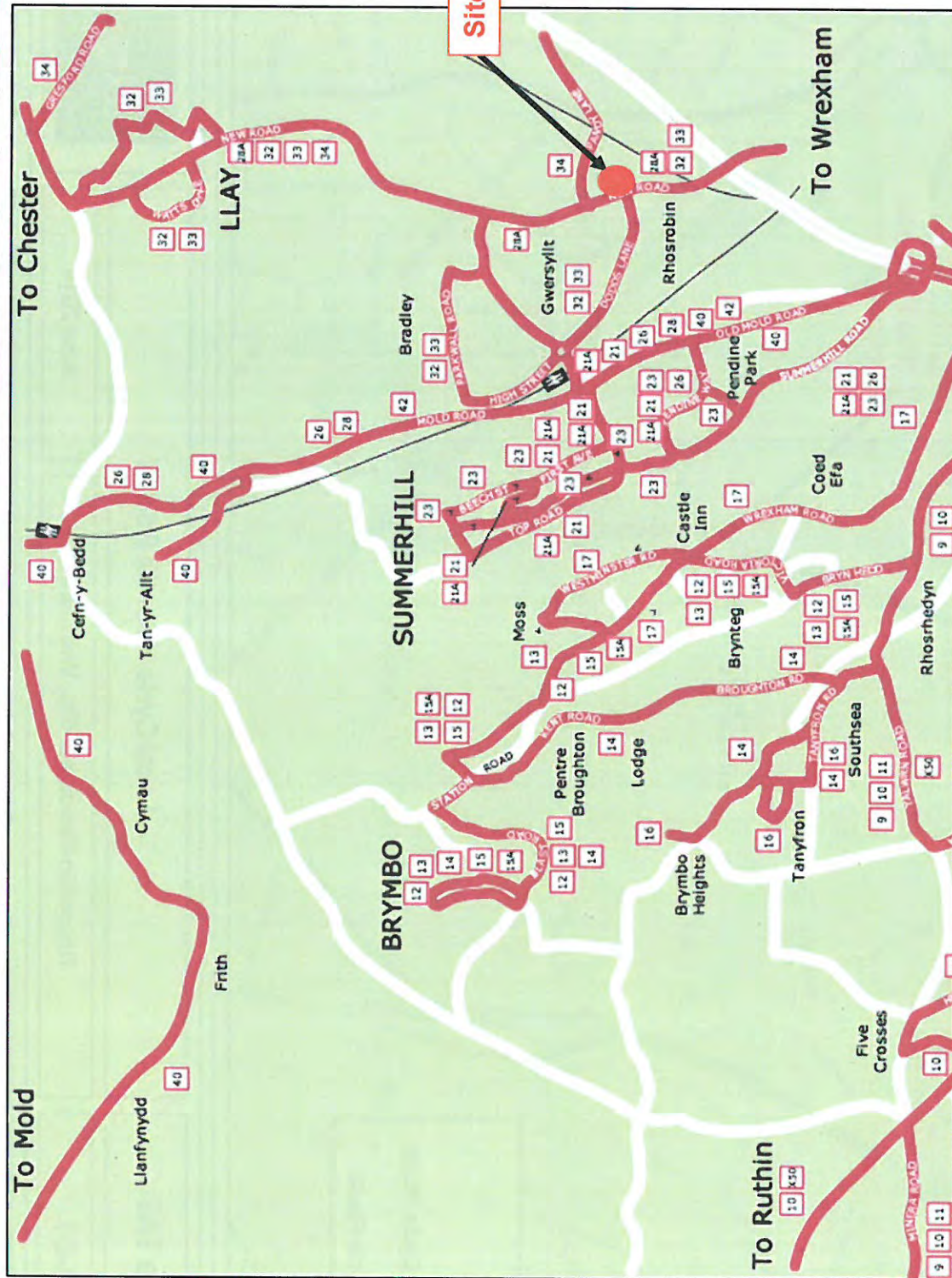


Figure TA8

1520-01

Local Bus Service Routes

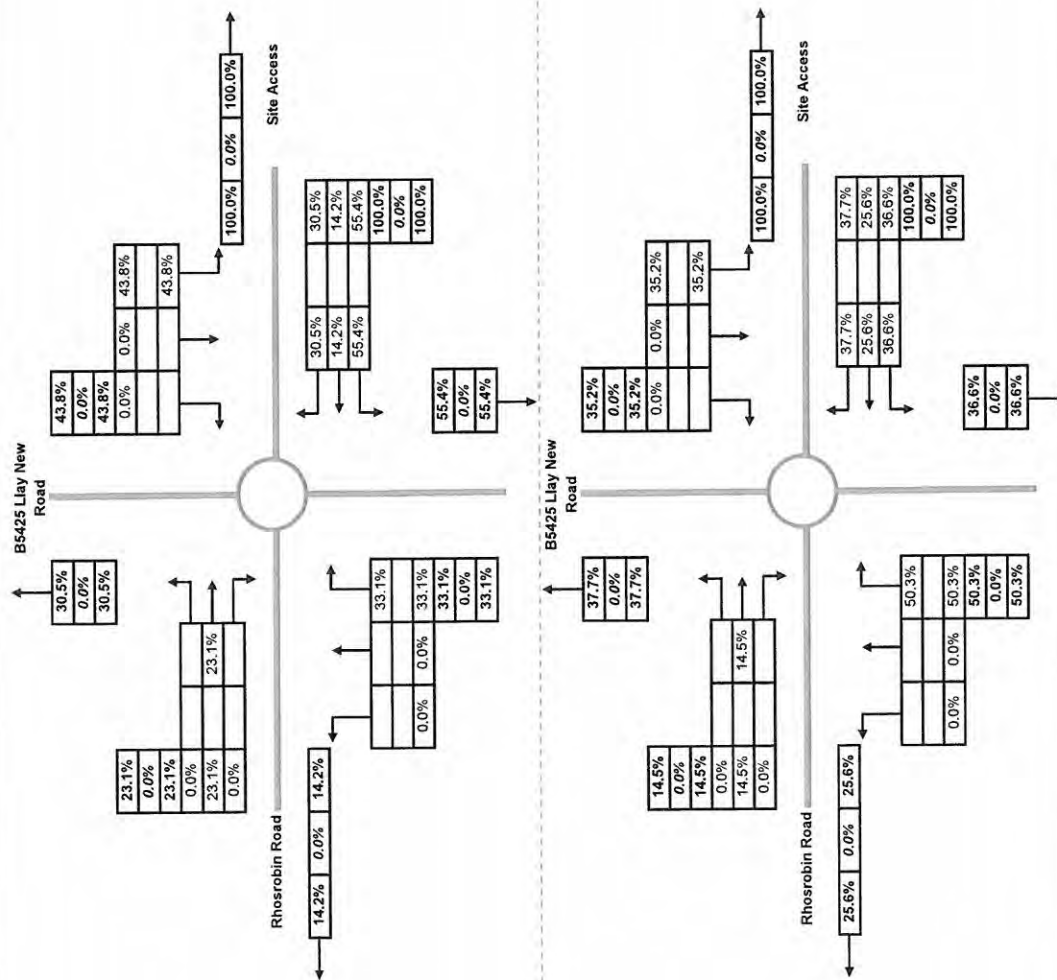
Rhosrobin Residential Site, Wrexham

June 2014

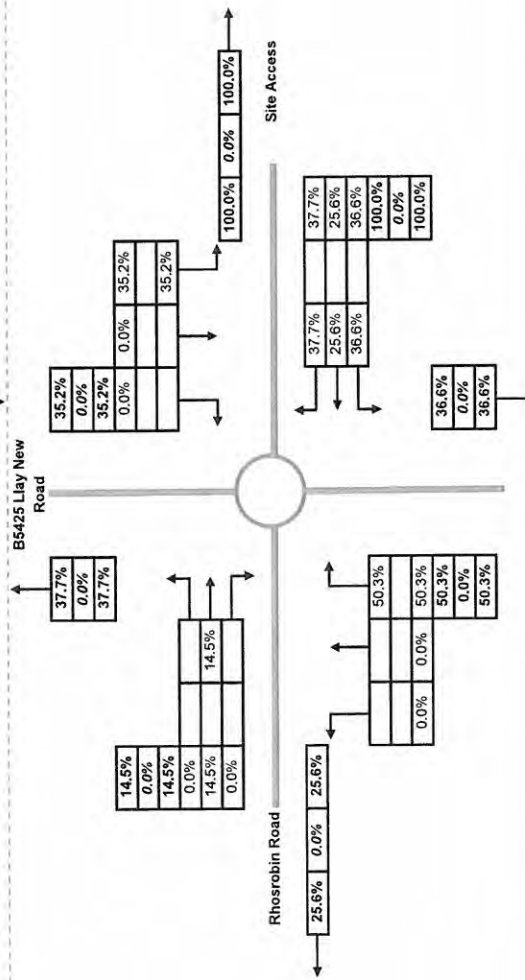


Camellia House
76 Water Lane,
Wilmslow
Cheshire, SK9 5BB

AM Peak Period



PM Peak Period



Key

10	Total vehicles
2	HGVs
12	PCUs

Figure TA9

Proposed Residential Development Traffic Distribution

1520-01

Rhosrobin Residential Site, Wrexham

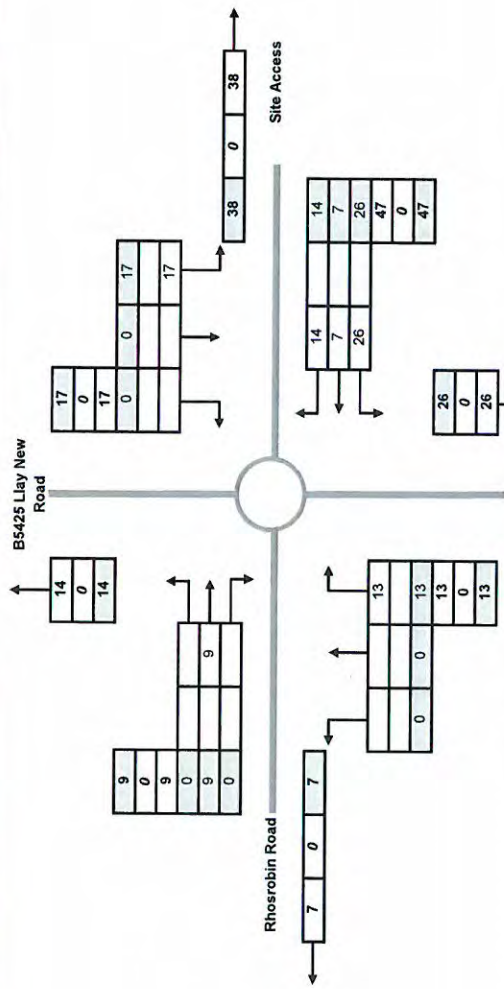
June 2014



Camellia House
76 Water Lane,
Wilmslow
Cheshire, SK9 5BB

AM Peak Period

Total Trips	Arrivals	38
	Departures	47



Key	10	total vehicles
	2	HGVs
	12	PGUs

PM Peak Period

Total Trips	Arrivals	47
	Departures	43

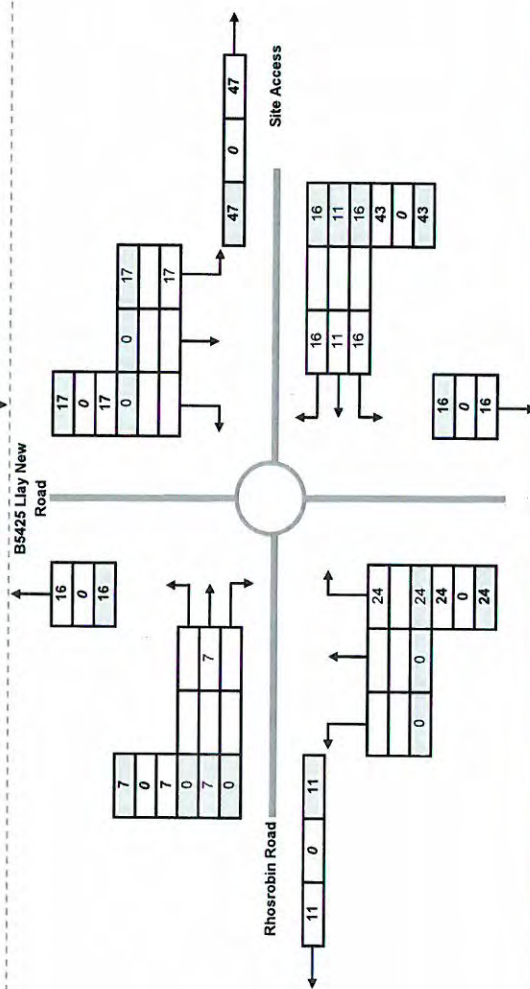


Figure TA10

Proposed Residential Development Traffic Assignment

1520-01

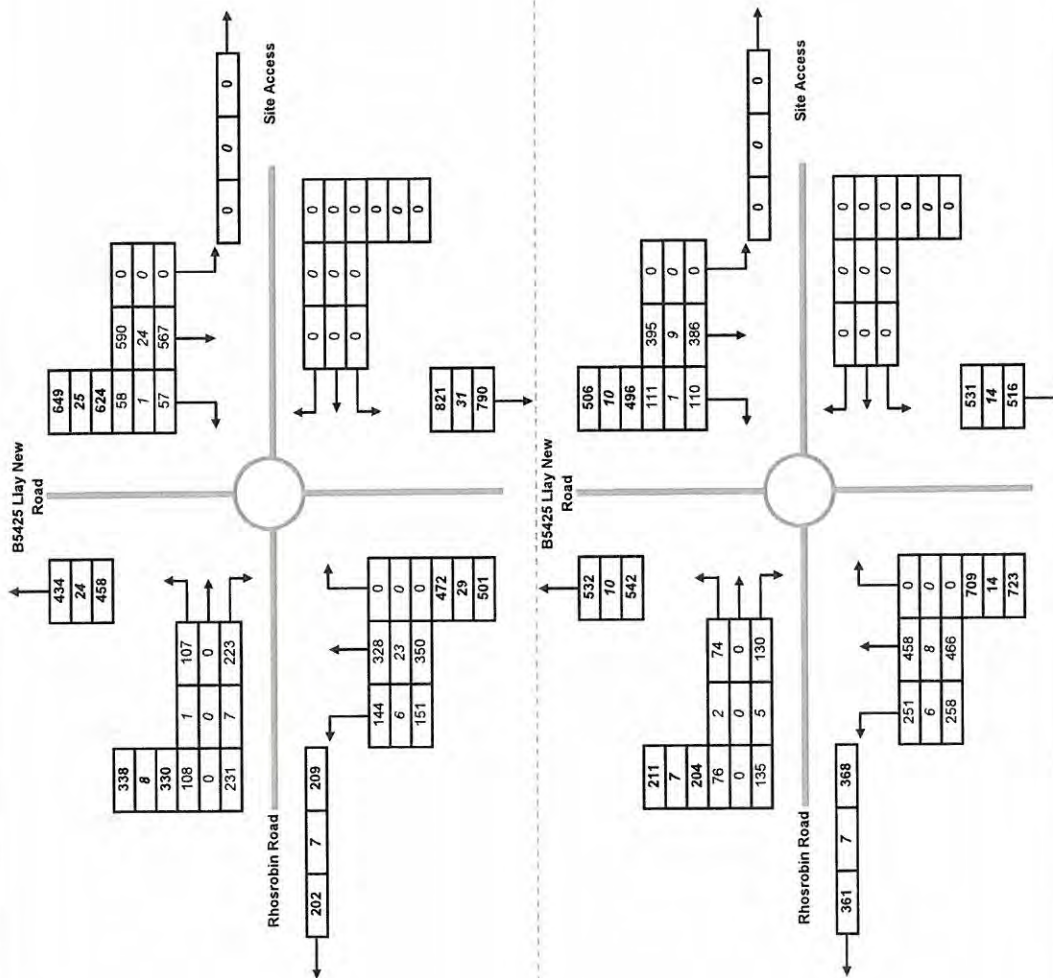
Rhosrobin Residential Site, Wrexham

June 2014



Camellia House
76 Water Lane,
Wilmslow
Cheshire, SK9 5BB

AM Peak Period



PM Peak Period

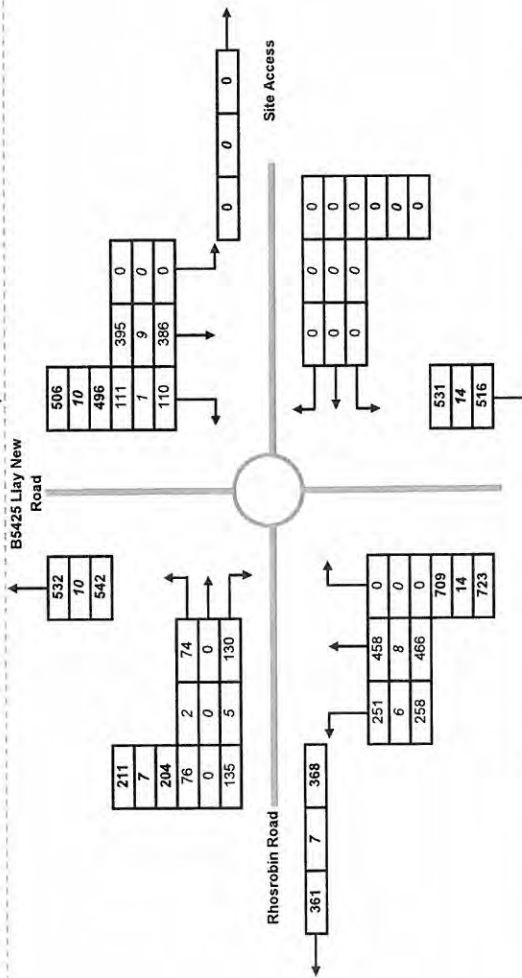


Figure TA11

1520-01

2017 Opening Year Baseline Traffic Flows

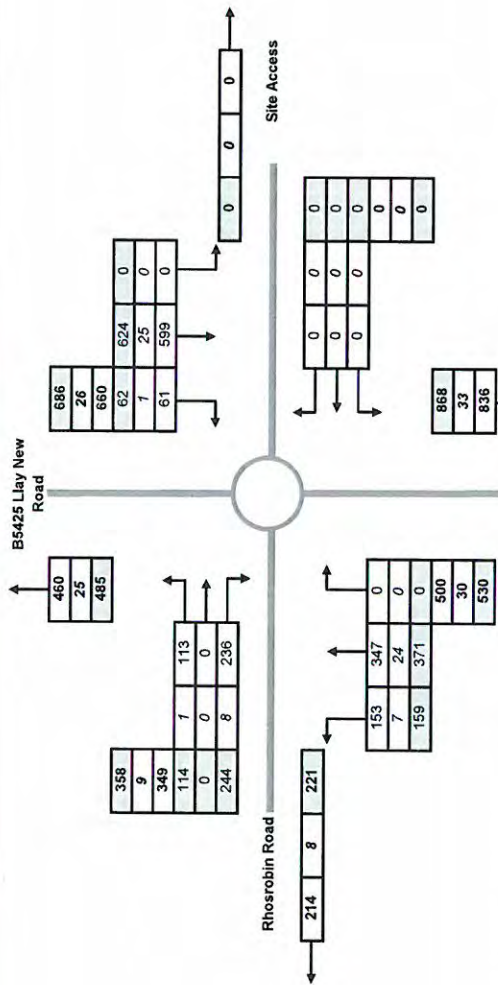
Rhosrobin Residential Site, Wrexham

June 2014

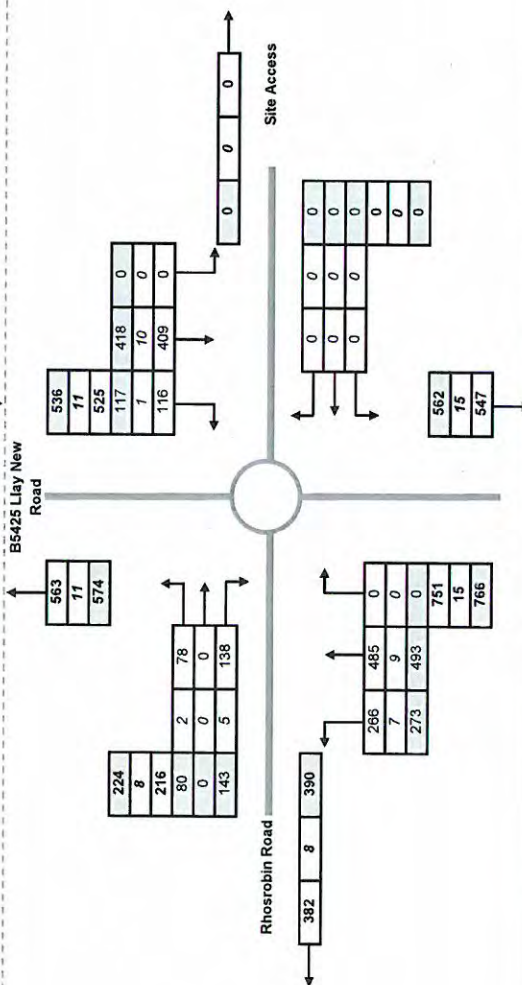


Camellia House
76 Water Lane,
Wilmslow
Cheshire, SK9 5BB

AM Peak Period



PM Peak Period



Key

10	total vehicles
2	HGVs
12	PGUs

Figure TA12

1520-01

2022 Design Year Baseline Traffic Flows

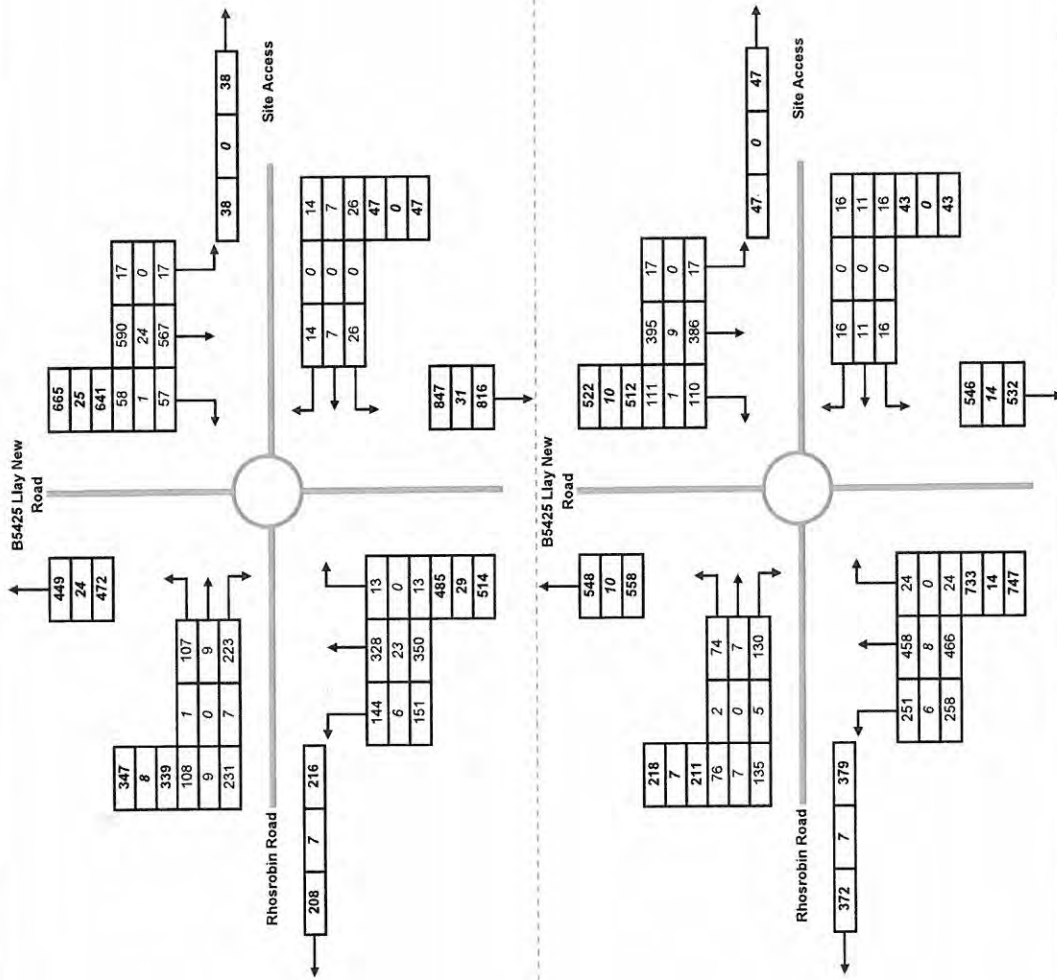
Rhosrobin Residential Site, Wrexham

June 2014



Camelia House
76 Water Lane,
Wilmslow
Cheshire, SK9 5BB

AM Peak Period



PM Peak Period

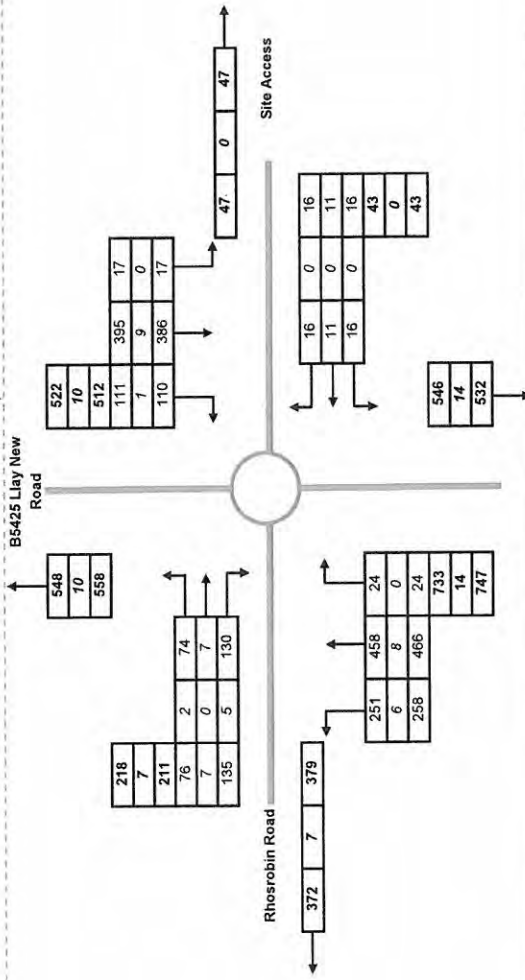


Figure TA13

1520-01

2017 Opening Year Traffic Flows Incl. Development Traffic

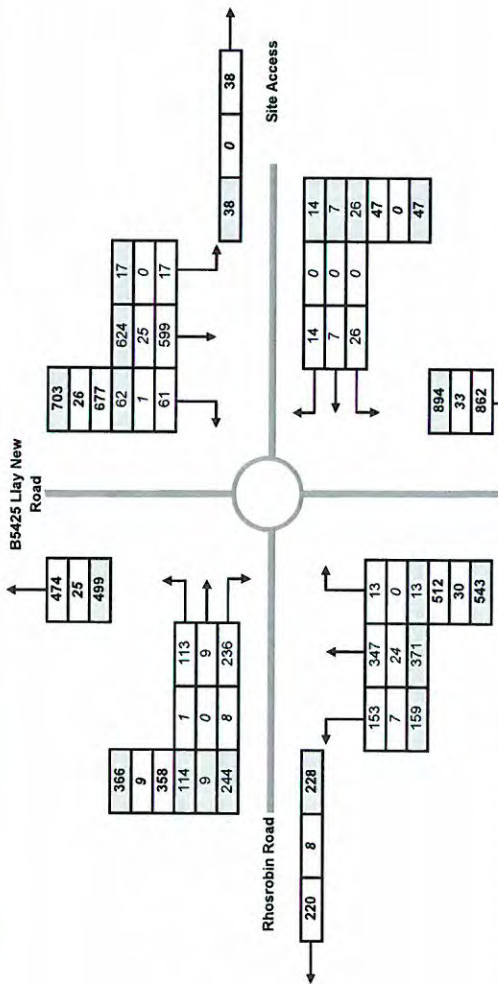
Rhosrobin Residential Site, Wrexham

June 2014

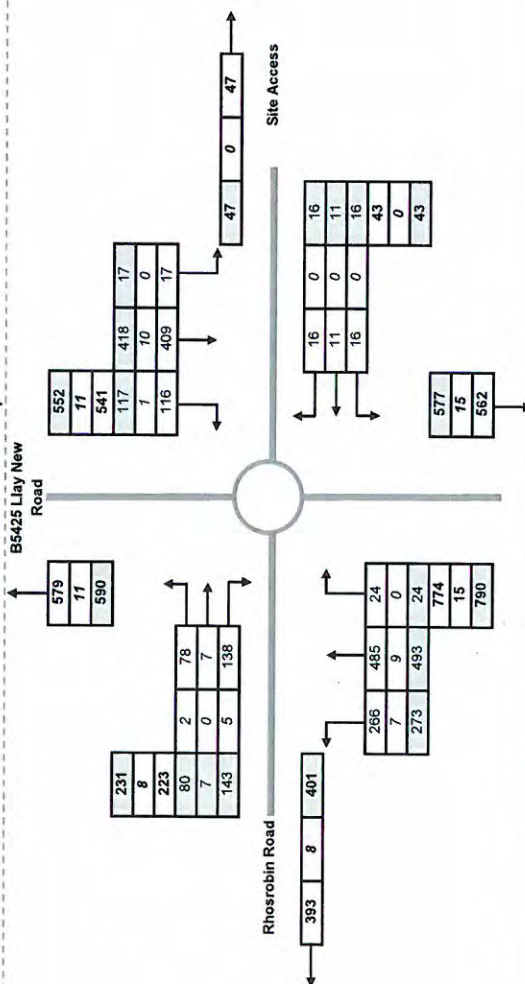


Camellia House
76 Water Lane,
Wilslow
Cheshire, SK9 5BB

AM Peak Period



PM Peak Period



Key

10	total vehicles
2	HGVs
12	PCUs

Figure TA14

2022 Design Year Traffic Flows Incl. Development Traffic

1520-01

Rhosrobin Residential Site, Wrexham

June 2014



Camellia House
76 Water Lane,
Wilmslow
Cheshire, SK9 5BB



APPENDICES



APPENDIX TA1

28A WREXHAM - FLINT

Townlynx



Amserlen Cludiant Cyhoeddus - a ddarparwyd gan Gyngor Bwrdeistref Sirol Wrecsam

via / trwy Maelor Hospital - Caergwrle - Hope - Penyfford - Buckley - Mold

Monday to Saturday except Bank Holidays / Llun i Sadwrn heblaw Gwyliau Cyhoeddus

	NS		S		SDO	NSD	S
Wrexham Bus Station [S4]	9:22	10:22	12:22	14:22	14:50	15:02	16:22
Rhosddu, Park Street	9:24	10:24	12:24	14:24	14:52	15:04	16:24
Llay, Crown	9:34	10:34	12:34	14:34	15:02	15:14	16:34
Hope, Hall Drive	9:39	10:39	12:39	14:39	15:07	15:19	16:39
Penyffordd	9:44	10:44	12:44	14:44	15:12	15:24	16:44
Dobshill	9:48	10:48	12:48	14:48	15:16	15:28	16:48
Buckley Cross	9:54	10:54	12:54	14:54	15:22	15:34	16:54
Mold Bus Station[S3]	10:05	11:05	13:05	15:05	15:33	15:45	17:05
Theatre Clwyd	10:08	11:08	13:08	15:08	.....	15:48	17:08
Northop, Red Lion	10:14	11:14	13:14	15:14	.....	15:53	17:13
Flint	10:27	11:27	13:27	15:27	.....	16:03	17:23

Code/Côd

NS: Not Saturday / Dim Sadwrn

NSD: None School days only /

S: Saturday only / Sadwrn yn unig

SDO: School days only / Dyddiau ysgol yn unig

28A FLINT - WREXHAM

Townlynx



Amserlen Cludiant Cyhoeddus - a ddarparwyd gan Gyngor Bwrdeistref Sirol Wrexham

via / trwy Mold - Buckley - Penyfford - Hope - Caergwrle - Maelor Hospital

Monday to Saturday except Bank Holidays / Llun i Sadwrn heblaw Gwyliau Cyhoeddus

	NS	S	NS	S	NS	S	NS	S
Flint Station	7:45	8:45	9:45	10:45	11:45	12:45	13:45	....
Northop Red Lion	7:55	8:55	9:55	10:55	11:55	12:55	13:55	....
Theatre Clwyd	8:02	9:02	10:02	11:02	12:02	13:02	14:02	....
Mold, Bus Station[S6]	8:05	9:10	10:10	11:10	12:10	13:10	14:10	15:10
Buckley Cross	8:13	9:18	10:18	11:18	12:18	13:18	14:18	15:18
Dobshell	8:17	9:22	10:22	11:22	12:22	13:22	14:22	15:22
Penyffordd	8:22	9:27	10:27	11:27	12:27	13:27	14:27	15:27
Hope Hall Drive	8:33	9:33	10:33	11:33	12:33	13:33	14:33	15:33
Llay Crown	8:38	9:38	10:38	11:38	12:38	13:38	14:38	15:38
Rhosddu, Park Street	8:47	9:47	10:47	11:47	12:47	13:47	14:47	15:47
Wrexham Bus Station	8:49	9:49	10:49	11:49	12:49	13:49	14:49	15:49

Code/Côd

NS: Not Saturday / Dim Sadwrn

S: Saturday only / Sadwrn yn unig

NSD: None School days only /

SDO: School days only / Dyddiau ysgol yn unig

Service Information / Gwybodaeth am y gwasanaethau

Service 28A operates Monday to Saturday except Bank Holidays between Wrexham Bus Station (Stand 4) & Flint and includes the following stops:

Mae gwasanaeth 28A yn gweithredu bob dydd rhwng Gorsaf Fysiau Wrecsam (Arhosfan 4) a Flint ac yn casglu/gadael teithwyr o'r manau canlynol:

Rhosddu - Llay - Caergwrle - Hope - Penyfford - Buckley - Mold - Theatre Clwyd - Northop

This service commenced on 01/11/2008 and is operated by TownLynx normally using a low floor easy access bus. Dechreuodd y gwasanaeth hwn ar 01/11/2008 a/ac fe'i ddarparu gan TownLynx sy'n cael ei ddarparu fel rheol gan fws llawr isel â mynediad hawdd.

Further information / Gwybodaeth bellach

Wrexham BusLine: 01978 266166 - www.wrexham.gov.uk/bus
Llinell fysiau Wrecsam: 01978 266166- www.wrecsam.gov.uk/bws
Traveline Cymru: 0871 200 22 33 - www.traveline.org.uk
TownLynx : 01352 710489



Disclaimer / Ymwadiad

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32 Wrexham to Llay via Rhosddu, Gwersyllt & Bradley

Monday to Saturday except Bank Holidays : Llyn i Sadwrn heblaw Gwyliau Cyhoeddus NS: Not Saturdays/Dim ar Dydd Sadwrn, S: Saturdays Only/ Dydd Sadwrn yn uni ARRIVA BUSES WALES

Days / Dyddiau:	NS			S			NS																		
Wrexham, Bus Station [3]	0720	0745	0750	0820	0850	0920	0950	1020	1050	1120	1150	1220	1250	1320	1350	1420	1450	1520	1550	1620					
Rhosddu	0722	0747	0752	0822	0852	0922	0952	1022	1052	1122	1152	1222	1252	1322	1352	1422	1452	1522	1552	1622					
Rhosrobin	0726	0751	0756	0826	0856	0926	0956	1026	1056	1126	1156	1226	1256	1326	1356	1426	1456	1526	1556	1626					
Gwersyllt	0729	0754	0759	0829	0859	0929	0959	1029	1059	1129	1159	1229	1259	1329	1359	1429	1459	1529	1559	1629					
Gwersyllt	0731	0756	0801	0831	0901	0931	1001	1031	1101	1131	1201	1231	1301	1331	1401	1431	1501	1531	1601	1631					
Bradley Circle	0733	0758	0803	0833	0903	0933	1003	1033	1103	1133	1203	1233	1303	1333	1403	1433	1503	1533	1603	1633					
Llay, Pentre Street	0737	0802	0807	0837	0907	0937	1007	1037	1107	1137	1207	1237	1307	1337	1407	1437	1507	1537	1607	1637					
Llay, First Avenue	0743	0808	0813	0843	0913	0943	1013	1043	1113	1143	1213	1243	1313	1343	1413	1443	1513	1543	1613	1643					
Llay, British Legion	0746	0811	0816	0846	0916	0946	1016	1046	1116	1146	1216	1246	1316	1346	1416	1446	1516	1546	1616	1646					

Wrexham, Bus Station [3]	1650	1720	1750	1930	2130
Rhosddu	1652	1722	1752	1932	2132
Rhosrobin	1656	1726	1756	1936	2136
Gwersyllt	1659	1729	1759	1939	2139
Gwersyllt	1701	1731	1801	1941	2141
Bradley Circle	1703	1733	1803	1943	2143
Llay, Pentre Street	1707	1737	1807	1947	2147
Llay, First Avenue	1713	1743	1813	1950	2150
Llay, British Legion	1716	1746	1816	1956	2156

32 Llay - Wrexham via Bradley, Gwersyllt & Rhosddu

Monday to Saturday except Bank Holidays : Llyn i Sadwrn heblaw Gwyliau Cyhoeddus

Days / Dyddiau:	NS	S	NS																	
Llay, Pentre Street	0737	0802	0807	0837	0907	0937	1007	1037	1107	1137	1207	1237	1307	1337	1407	1437	1507	1537	1607	1637
Llay, First Avenue	0743	0808	0813	0843	0913	0943	1013	1043	1113	1143	1213	1243	1313	1343	1413	1443	1513	1543	1613	1643
Llay, British Legion	0746	0811	0816	0846	0916	0946	1016	1046	1116	1146	1216	1246	1316	1346	1416	1446	1516	1546	1616	1646
Bradley Circle	0750	0815	0820	0850	0920	0950	1020	1050	1120	1150	1220	1250	1320	1350	1420	1450	1520	1550	1620	1650
Gwersyllt	0752	0817	0822	0852	0922	0952	1022	1052	1122	1152	1222	1252	1322	1352	1422	1452	1522	1552	1622	1652
Rhosrobin	0757	0822	0827	0857	0927	0957	1027	1057	1127	1157	1227	1257	1327	1357	1427	1457	1527	1557	1627	1657
Rhosddu	0801	0826	0831	0901	0931	1001	1031	1101	1131	1201	1231	1301	1331	1401	1431	1501	1531	1601	1631	1701
Wrexham, Bus Station	0803	0828	0833	0903	0933	1003	1033	1103	1133	1203	1233	1303	1333	1403	1433	1503	1533	1603	1633	1703

Llay, Pentre Street	1707	1737	1807	1947	2147
Llay, First Avenue	1713	1743	1813	1950	2150
Llay, British Legion	1716	1746	1816	1953	2153
Bradley Circle	1720	1750	1820	1957	2157
Gwersyllt	1722	1752	1822	1959	2159
Rhosrobin	1727	1757	1827	2004	2204
Rhosddu	1731	1801	1831	2008	2208
Wrexham, Bus Station	1733	1803	1833	2010	2210

ARRIVA BUSES WALES

Monday to Saturday (not Bank Hol Mondays) : Llun i Sadwrn heblaw Gwyliau Cyhoeddus NS:Not Saturdays/Dim ar Dydd Sadwrn, S:Saturdays Only/ Dydd Sadwrn yn uni

[illegible]

Wrexham, Bus Station [3]	1605	1635	1705	1735	1805	1830	2030	2245
Rhosddu	1607	1637	1707	1737	1807	1832	2032	2247
Rhosrobin	1611	1641	1711	1741	1811	1836	2036	2251
Gwersyllt	1614	1644	1714	1744	1814	1839	2039	2254
Gwersyllt	1616	1646	1716	1746	1816	1841	2041	2256
Bradley Circle	1618	1648	1718	1748	1818	1843	2043	2258
Llay British Legion	1623	1653	1723	1753	1823	1848	2048	2303
Llay, First Avenue	1626	1656	1726	1756	1826	1850	2050	2305
Llay, Pentre Street	1628	1658	1728	1758	1828	1852	2052	2307

33 Llay to Wrexham via Bradley, Gwersyllt & Rhosddu

Monday to Saturday (not Bank Hol Mondays) : Llun i Sadwrn heblaw Gwyliau Cyhoeddus

Days / Dyddiau:	NS	S	NS	S	NS
Llay British Legion	0703	0748	0753	0818	0823
Llay, First Avenue	0706	0751	0756	0821	0826
Llay, Pentre Street	0711	0756	0801	0826	0831
Bradley, Circle	0715	0800	0805	0830	0835
Gwersyllt	0717	0802	0807	0832	0837
Rhosrobin	0722	0807	0812	0837	0842
Rhosddu	0726	0811	0816	0841	0846
Wrexham Bus Station	0728	0813	0818	0843	0853

Llay British Legion	1623	1653	1723	1753	1823	1848	2048	2303
Llay	1626	1656	1726	1756	1826	1850	2050	2305
Llay, Pentre Street	1631	1701	1731	1801	1831	1952	2052	2307
Bradley, Circle	1635	1705	1735	1805	1835	1856	2056	....
Gwersyllt	1637	1707	1737	1807	1837	1858	2058	....
Rhosrobin	1642	1712	1742	1812	1842	1903	2103	....
Rhosddu	1646	1716	1746	1816	1846	1907	2107	....
Wrexham, Bus Station	1648	1718	1748	1818	1848	1909	2109	....

32 Wrexham - Llay via Rhosddu, Gwersyllt & Bradley

Sundays/ Dydd Sul

Wrexham, Bus Station [3]	1105	1305	1505	1705
Rhosddu	1107	1307	1507	1707
Rhosrobin	1111	1311	1511	1711
Gwersyllt	1114	1314	1514	1714
Gwersyllt	1116	1316	1516	1716
Bradley Circle	1118	1318	1518	1718
Llay, Pentre Street	1122	1322	1522	1722
Llay, First Avenue	1128	1328	1528	1728
Llay, British Legion	1130	1330	1530	1730

32 Llay to Wrexham via Bradley, Gwersyllt & Rhosddu

Llay, Pentre Street	1122	1322	1522	1722
Llay, First Avenue	1128	1328	1528	1728
Llay, British Legion	1130	1330	1530	1730
Bradley, Circle	1135	1335	1535	1735
Gwersyllt	1136	1336	1536	1736
Rhosrobin	1140	1340	1540	1740
Rhosddu	1145	1345	1545	1745
Wrexham, Bus Station	1148	1348	1548	1748

33 Wrexham - Llay via Rhosddu, Gwersyllt & Bradley

Sundays/ Dydd Sul

Wrexham, Bus Station [3]	1005	1205	1405	1605	1805
Rhosddu	1007	1207	1407	1607	1807
Rhosrobin	1011	1211	1411	1611	1811
Gwersyllt	1014	1214	1414	1614	1814
Gwersyllt	1016	1216	1416	1616	1816
Bradley Circle	1018	1218	1418	1618	1818
Llay British Legion	1023	1223	1423	1623	1823
Llay	1026	1226	1426	1626	1826
Llay, Pentre Street	1030	1230	1430	1630	1830

33 Llay to Wrexham via Bradley, Gwersyllt & Rhosddu

Llay British Legion	1023	1223	1423	1623	1823
Llay	1026	1226	1426	1626	1826
Llay, Pentre Street	1030	1230	1430	1630	1830
Bradley, Circle	1035	1235	1435	1635	1835
Gwersyllt	1037	1237	1437	1637	1837
Rhosrobin	1041	1241	1441	1641	1841
Rhosddu	1045	1245	1445	1645	1845
Wrexham, Bus Station	1048	1248	1448	1648	1848

34 Wrexham - Trevalyn via Pandý, Llay & Burton

Monday to Saturday (not Bank Hol Mondays)/ Dydd Llun i Ddydd Sadwrn (ac eithrio gwyliau cyhoeddus)

Wrexham, Bus Station	7	1040	1240	1435
Garden Village Shops		1044	1244	1439
Pandy		1048	1248	1443
Gwersyllt		1052	1252	....
Bradley, Post Office		1054	1254	....
Llay, New Road		1057	1257	1448
Llay, Oldfield Park		1103	1303	1454
Burton		1107	1307	1458
Rossett, The Park		1114	1314	1504
Trevalyn		1116	1316	1507

GHA Coaches

34 Trevalyn - Wrexham via Burton, Llay & Pandý

Monday to Saturday (not Bank Hol Mondays)/ Dydd Llun i Ddydd Sadwrn (ac eithrio gwyliau cyhoeddus)

Trevalyn	0910	1118	1318
Rossett, The Park	0912	1120	1320
Burton, Nurseries	0916	1124	1324
Llay, Gresford Road	0925	1133	1333
Llay, New Road	0927	1135	1335
Bradley, Post Office	0931	1139	1339
Gwersyllt, School	0933	1141	1341
Pandy	0938	1146	1346
Garden Village Shops	0942	1150	1350
Wrexham, Bus Station	0946	1154	1354

GHA Coaches

From 19 May 2014/O 19 Mai 2014



APPENDIX TA2

Proposed Roundabout, B5425 Llay New Road, Rhosrobin Stage 1 Road Safety Audit

Prepared by

MadhavanDesign 

Distribution List

1. Mike Hughes - Axis
2. File Copy

REPORT NUMBER 2014/AP/R/01

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Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
DRAFT	08/04/14	N Madhavan	T Cowie	N Madhavan	First Issue
FINAL	17/04/14	N Madhavan	T Cowie	N Madhavan	Ver1

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1	INTRODUCTION	1
2	ITEMS RAISED BY PREVIOUS AUDITS AND REPORTS.....	3
3	ITEMS RAISED BY THIS AUDIT	4
4	AUDIT TEAM STATEMENT.....	8

Appendix A: Drawings and documents provided

Appendix B: Plan of items raised by this audit

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1 INTRODUCTION

1.1 This report results from a Stage 1 Road Safety Audit carried out on proposals to provide a new 4 arm compact roundabout at the junction of B5425 Llay New Road and Rhosrobin Road. The audit was carried out during April 2014.

1.2 The audit team consisted of:

Team Leader: Naresh Madhavan MCIHT, MSoRSA HA RSA Cert.Comp
Director
Madhavan Design

Team Member: Thomas Cowie MCIHT MSoRSA
Senior Road Safety Engineer
Madhavan Design

1.3 The audit took place at the offices of Madhavan Design, Treuddyn

The site was visited at the following times/conditions:

Day/Date	Weather/carriageway Conditions
Thursday 3 rd April 2014	Cloudy/Wet
Saturday 12 th April 2014	Cloudy/Dry

The detail provided for the audit is shown in Appendix A.

1.4 The terms of reference for this audit are as described in HD 19/03, Design Manual for Roads and Bridges. The scheme has been examined and this report compiled only with regard to the safety implications for road users of the scheme as presented. It has not been examined or verified for compliance with any other standards or criteria. However, in order to clearly explain a safety problem or the recommendation to resolve a problem, the Audit Team may on occasion have referred to a design standard for information only. Any audit comments should not be construed as implying that a technical audit has been undertaken in any respect.

- 1.5 If relevant within this report the generic term “pedestrians” can include walking pedestrians, wheelchair users, dismounted cyclists, the blind, partially sighted, mobility impaired and people with prams or pushchairs. Highway Maintenance Operatives are also included within this term. Where a problem is specific to one or more of these vulnerable groups then appropriate reference will be made in the report.
- 1.6 Any recommendations included within this report should not be regarded as being prescriptive design solutions to the problems identified. They are intended only to indicate a proportionate and viable means of eliminating or mitigating the identified problem, in accordance with HD 19/03, and in no way imply that a formal design process has been undertaken. There may be alternative methods of addressing a problem which would be equally acceptable in achieving the desired elimination or mitigation and these should be considered when responding to this report.
- 1.7 The Audit Team have not been made aware of any possible geometric departures from standards.

2 ITEMS RAISED BY PREVIOUS AUDITS AND REPORTS

- 2.1 The Audit Team are unaware of any previous road safety audits or safety reports relating to this scheme.

3 ITEMS RAISED BY THIS AUDIT

3.1 General

3.1.1 PROBLEM

Location: Proposed roundabout

Summary: Lack of deflection could result in conflict involving excessive speeds

No construction details relating to the proposed over-run area has been supplied for audit. Concern is expressed that the over-run area may be used as part of the circulatory carriageway by through vehicles encouraging higher than desired speeds which could result in an increased propensity in conflict such as sudden braking, failure to give way and side swipe type collisions on the circulatory carriageway.

RECOMMENDATION

Ensure that careful consideration is given to the type of construction of the over-run area during the detailed design stage to discourage its use by non HGVs.

3.1.2 PROBLEM

Location: Llay New Road northbound approach to roundabout

Summary: Reduced forward visibility could result in nose to tail shunts

Northbound forward visibility towards the proposed roundabout is reduced due to the horizontal alignment of the carriageway. Whilst the minimum design standards may be achieved in accordance to the posted 30mph speed limit, concern is expressed that during the site visit, many vehicles were observed to be travelling in excess of this. Should this situation continue once the roundabout is implemented, it could result in an increased propensity for nose to tail shunts on the northbound approach to the roundabout.

RECOMMENDATION

Carry out speed surveys to determine the exact nature of the problem. If necessary, additional speed reduction measures and warning signs should be provided.

3.1.3 PROBLEM

Location: Llay New Road

Summary: Existing bus stop location could cause roundabout conflict

It is noted that an existing northbound bus stop lies in the vicinity of the proposed roundabout approach. Should this remain once the roundabout is implemented it is likely to obstruct the forward visibility for both northbound drivers approaching the roundabout should a bus be waiting, increasing the propensity for nose to tail shunts and failure to give way type collisions.

RECOMMENDATION

Relocate the existing bus stop to an appropriate location as part of the works.

3.1.4 PROBLEM

Location: Proposed roundabout circulatory

Summary: Existing BT chamber could result in loss of control type collisions

The existing BT chamber cover located on the south side of the circulatory carriageway could, as a result of its lower skid resistance, cause loss of control type collisions particularly involving powered two wheelers.

RECOMMENDATION

Relocate the BT chamber to an appropriate location as part of the proposed works. If this is not practical it may be appropriate to replace the chamber cover with an inset cover with suitable high friction surfacing.

3.2 **Non Motorised Road User Provision**

3.2.1 PROBLEM

Location: Throughout the scheme

Summary: Insufficient cyclist measures could result in cycle to vehicular conflict

No details have been supplied as to possible cyclist measures to be provided as part of the scheme. Roundabouts are notoriously dangerous for cyclists to negotiate and insufficient cyclist measures could result in an increased likelihood of cycle to vehicular conflict.

RECOMMENDATION

Provide suitable cycle facilities to allow cyclists to negotiate the roundabout.

3.3 **Road Signs and Markings**

No comments at this stage

3.4 **Lighting and Signals**

3.4.1 PROBLEM

Location: Throughout the scheme

Summary: Insufficient lighting could result in night time conflict

The existing street lighting infrastructure within the vicinity of the proposed roundabout is substandard and in poor condition. Should this situation remain once the roundabout is implemented it could result in an increased propensity for night time conflict at this location.

RECOMMENDATION

Carry out a street lighting assessment as part of the detailed design process to determine the appropriate level of luminance that should be provided.

3.5 Landscaping

No comments at this stage

3.6 Protective Aids

No comments at this stage

3.7 Surface Characteristics and Drainage

3.7.1 PROBLEM

Location: Throughout the scheme

Summary: Poor surface condition could result in loss of control or nose to tail shunts on the roundabout approaches

It was noted during the site visit that the existing carriageway surface is in poor condition on the approaches to the proposed roundabout and could lead to loss of control or nose to tail shunt type collisions on the approach to the roundabout.

RECOMMENDATION

Ensure that all the existing approaches are resurfaced in a suitable material as part of the proposed works.

3.7.2 PROBLEM

Location: Circulatory carriageway

Summary: Over-run area could result in loss of control on the circulatory

No construction details relating to the proposed over-run area has been supplied for audit. Concern is expressed that if significant kerb upstands or surface materials of lesser skid resistance are provided that it could lead to loss of control type collisions particularly involving powered two wheelers.

RECOMMENDATION

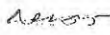
Ensure that suitable surface materials are used in the construction of the over-run area and that any kerb upstand does not cause a safety risk to powered two wheelers.

4 AUDIT TEAM STATEMENT

I confirm that this Audit has been carried out in accordance with the guidelines in HD 19/03.

AUDIT TEAM LEADER

Naresh Madhavan MCIHT MSoRSA
Director
Madhavan Design Limited
Gilrhos House
Ffordd Y Gilrhos
Treuddyn
Mold
Flintshire
CH7 4NW

Signed: 

Date: 17/04/14

AUDIT TEAM MEMBER

Thomas Cowie MCIHT MSoRSA
Senior Road Safety Engineer
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Ffordd Y Gilrhos
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Mold
Flintshire
CH7 4NW

APPENDIX A
DRAWINGS AND DOCUMENTS PROVIDED

DRAWING NUMBER OR REFERENCE	TITLE	DATE
14520-01 SK-103	Proposed roundabout access option	05/03/14

APPENDIX B

PLAN OF ITEMS RAISED BY THIS AUDIT

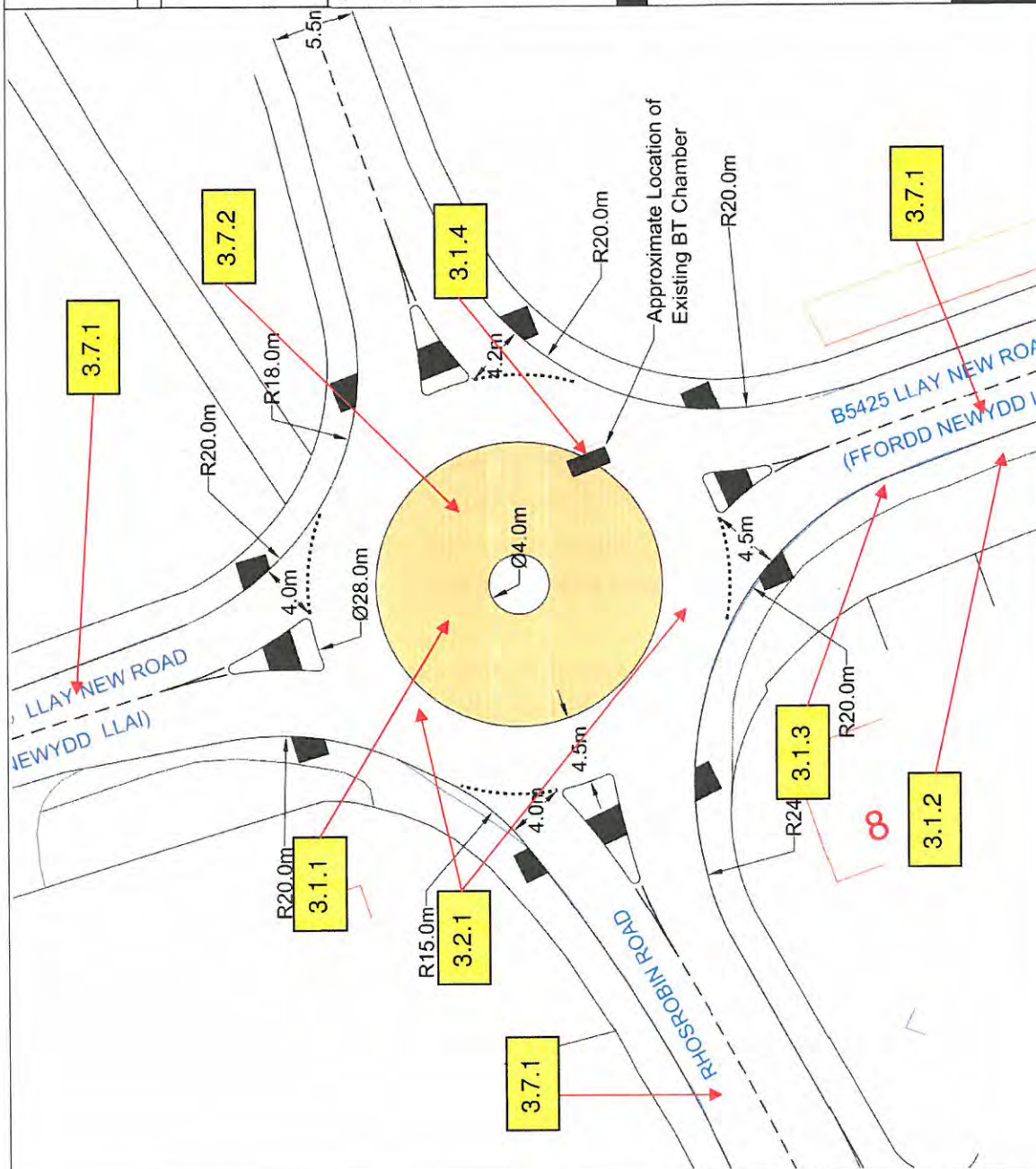
Follow any figured dimensions - do not scale. IF IN DOUBT ASK

Revision History		Date
1	Initial	4/25/04
2	Revised	4/25/04
3	Revised	4/25/04
4	Revised	4/25/04
5	Revised	4/25/04
6	Revised	4/25/04
7	Revised	4/25/04
8	Revised	4/25/04
9	Revised	4/25/04
10	Revised	4/25/04
11	Revised	4/25/04
12	Revised	4/25/04
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96	Revised	4/25/04
97	Revised	4/25/04
98	Revised	4/25/04
99	Revised	4/25/04
100	Revised	4/25/04

D16/07
Roundabout designed in accordance with DMRB 6.2.3

B54/25 New Llay Road (S)	48.9m
Rhosrobin Road	117.5m
New Llay Road (N)	63.1m
Proposed Site Access	57.0m

Drawing No. Drawing Title Date Drawn by	Large rectangular block 15 mm thick 50 mm	axiS
1000 1000 1000	1000 1000 1000	
1000 1000 1000	1000 1000 1000	1000 1000 1000



1520-01-RSADR01: Technical Note

Project: Proposed Residential Development, Rhosrobin, Wrexham
Proposed 4-arm Site Access / Rhosrobin Road Roundabout on B5425
Llay New Road

Title: Stage 1 Road Safety Audit – Designer's Response Note

Date: 17 April 2014

1.0 INTRODUCTION

1.1 This Technical Note has been prepared to act as a formal Designer's Response to the independent Stage 1 Road Safety Audit (RSA1) report prepared by Highway Associates (Report Ref: 2014/AP/R/01). This independent audit was commissioned by Axis as the preliminary design organisation to consider proposals for a new 4-arm roundabout junction to serve a proposed residential development at land off Llay New Road, Wrexham. This new roundabout incorporates the existing priority T-junction of the B5425 Llay New Road / Rhosrobin Road.

1.2 A planning application supporting proposed residential development at Llay New Road will be submitted to Wrexham County Borough Council in due course. Following pre-application discussions with the WCBC highways officer it was identified that the preferred approach to accessing the proposal site would be via the introduction of a new 4-arm roundabout on Llay New Road. WCBC officers considered that such an access option provided local highway safety and capacity advantages over a more straightforward T-junction access scheme. Further information and plans supporting this access strategy will be included within the supporting Transport Assessment to the planning application.

- 1.3 The RSA1 was carried out with reference to the roundabout access drawing illustrated in Drawing 1520-01-SK103. The audit followed the procedures set out in HD 19/03 of the Design Manual for Roads and Bridges (DMRB).
- 1.4 The remainder of this Technical Note reviews the problems identified in the RSA1 report, and sets out the Design Organisation's agreement or otherwise with the issues raised and, where relevant, details of design measures proposed to address these matters.

2.0 ISSUES RAISED IN THE STAGE 1 ROAD SAFETY AUDIT

2.1 RSA1 PROBLEM REFERENCE 3.1.1

Location: Proposed roundabout

Summary: Lack of deflection could result in excessive speeds

Problem: No construction details relating to the proposed overrun area have been supplied for audit. Concern is expressed that the overrun area may be used as part of the circulatory carriageway by through vehicles encouraging higher than desired speeds which could result in an increased propensity in conflict such as sudden braking, failure to give way and sideswipe type collisions on the circulatory carriageway.

Recommendation: Ensure that careful consideration is given to the type of construction of the overrun area during the detailed design stage to discourage its use by non HGVs

Design Organisation Response: **ACCEPTED**

The construction detail for the proposed HGV central overrun area will be considered in detail at the S278 construction detailed design stage and agreed with the local highway authority. The final design of this feature will be informed by WCBC's experience of any other roundabout arrangements within their highway network which also include for HGV overrun areas.

2.2 RSA1 PROBLEM REFERENCE 3.1.2

Location: Llay New Road northbound approach to roundabout

Summary: Reduced forward visibility could result in nose to tail shunts

Problem: Northbound visibility towards the proposed roundabout is reduced due to the horizontal alignment of the carriageway. Whilst the minimum design standards may be achieved in accordance with the posted 30mph speed limit, concern is expressed that during the site visit, many vehicles were observed to be travelling in excess of this. Should the situation continue once the roundabout is implemented, it could result in an increased propensity for nose to tail shunts on the northbound approach to the roundabout.

Recommendation: Carry out speed surveys to determine the exact nature of the problem. If necessary, additional speed reduction measures and warning signs should be provided.

Design Organisation Response: **PARTIALLY ACCEPTED**

The northbound carriageway of Llay New Road, to the south of the proposed junction, does indeed curve. As such, forward visibility towards the proposed new junction is likely to be reduced to some degree. In addition, and as noted in the supporting TA, the route of Llay New Road becomes subject to the National Speed Limit to the north of its junction with Rhosrobin Road. It is considered that any prevailing high vehicle speeds are likely to be as a direct result of this change in speed limit and local driver knowledge of the route.

However, it is considered that the implementation of the new junction would be such that its eastern extents would be fully visible from the northbound approach. Whilst this would not overcome a reduced visibility to the stopline at the junction, it would make oncoming drivers on the northbound approach aware of the junction's presence. As such it is considered that prevailing speeds would naturally reduce. Nonetheless, it is accepted that additional speed reduction measures and warning signs would reinforce the presence of the junction and would assist in reducing the likelihood of any potential incidents. It is proposed that these measures be considered in greater detail as part of the S278 construction detailed design process.

2.3 RSA1 PROBLEM REFERENCE 3.1.3

Location: Llay New Road

Summary: Existing bus stop location could cause roundabout conflict

Problem: It is noted that an existing northbound bus stop lies in the vicinity of the proposed roundabout approach. Should this remain once the roundabout is implemented it is likely to obstruct the forward visibility for northbound drivers approaching the roundabout should a bus be waiting, increasing the propensity for nose to tail shunts and failure to give-way type collisions.

Recommendation: Relocate the existing bus stop to an appropriate location as part of the works.

Design Organisation Response: **REJECTED**

Whilst it is accepted that a bus waiting at the bus stop (assuming it remains in its existing position) would impede forward visibility for drivers on the northbound approach, it is considered that this is unlikely to have any bearing on safety. The carriageway is of single lane width in each direction and so drivers on the northbound approach would have to stop and wait behind any waiting bus, prior to proceeding through the junction. This is entirely normal practice on many routes. Indeed, the bus stop's existing location has not given rise to any accident incidents (as reviewed in the TA) despite the prevailing issues with forward visibility on the northbound approach and the existing NSL giving rise to higher prevailing speeds. It is therefore considered that there should be no reason to relocate the existing bus stop position, unless a logistical need is identified during the S278 detailed design process.

2.4 RSA1 PROBLEM REFERENCE 3.1.4

Location: Proposed roundabout circulatory

Summary: Existing BT chamber could result in loss of control type collisions

Problem: The existing BT chamber cover located on the south side of the circulatory carriageway could, as a result of its lower skid resistance, cause loss of control type collisions particularly involving powered two wheelers.

Recommendation: Relocate the BT chamber to an appropriate location as part of the proposed works. If this is not practical it may be appropriate to replace the chamber cover with an inset cover with suitable high friction surfacing.

Design Organisation Response: **ACCEPTED**

It has always been the intention of the applicant that the existing BT chamber should be relocated to an appropriate location outside of the proposed new carriageway at the junction. This relocation of this chamber would be dealt with in greater detail during the S278 detailed design process.

RSA1 PROBLEM REFERENCE 3.2.1

Location: Throughout the scheme

Summary: Insufficient cyclist measures could result in cycle to vehicular conflict

Problem: No details have been submitted as to possible cyclist measures to be provided as part of the scheme. Roundabouts are notoriously dangerous for cyclists to negotiate and insufficient cyclist measures could result in an increased likelihood of cycle to vehicular conflict.

Recommendation: Provide suitable cycle facilities to allow cyclists to negotiate the roundabout.

Design Organisation Response: PARTIALLY ACCEPTED

Cycle provision would be included within the scheme as far as is practical. It should be recognised that the B5425 Llay New Road junction does not currently experience a substantive level of pedal cycle movements, with just 20 pedal cycle trips recorded over four hours (including weekday AM & PM rush hour periods) during recent 2014 traffic surveys.

Existing cyclist provision at the junction solely incorporates a combined footway/cycleway which lies to the western side of the B5425 Llay New Road carriageway, to the north of the junction. Within the vicinity of the junction cyclists are directed on to the mainline carriageway.

It should be noted that the proposed roundabout scheme illustrated at **Drawing 1520-01-SK103** includes for crossings at all splitter islands, and also includes for a combined footway cycleway to the site-side of the B5425 carriageway. With this provision in mind, it is proposed that markings could be provided which would direct cyclists across the B5425(N) at the junction, before being directed either into the site or across the site access. To the south of the site access approach cyclists could then be directed back on to the B5425 (S), south of the junction. It is not proposed that any further cycle specific measures would be incorporated into the main roundabout design.

Drawing 1520-01-SK103A to this Designer's Response includes the proposed new cyclist measures.

2.6 **RSA1 PROBLEM REFERENCE 3.4.1**

Location: Throughout the scheme

Summary: Insufficient lighting could result in night time conflict

Problem: The existing street lighting infrastructure within the vicinity of the proposed roundabout is substandard and in poor condition. Should this situation remain once the roundabout is implemented it could result in an increased propensity for night time conflict at this location.

Recommendation: Carry out a street lighting assessment as part of the detailed design process to determine the appropriate level of luminance that should be provided.

Design Organisation Response: **ACCEPTED**

This issue is accepted, and it should be noted that the street lighting in the vicinity of the junction is proposed to be improved with the implementation of the new roundabout scheme. A full street lighting assessment would be undertaken as part of the S278 detailed design process, for agreement with WCBC officers.

2.7 **RSA1 PROBLEM REFERENCE 3.7.1**

Location: Throughout the scheme

Summary: Poor surface condition could result in loss of control or nose to tail shunts on the roundabout approaches.

Problem: It was noted during the site visit that the existing carriageway surface is in poor condition on the approaches to the proposed roundabout and could lead to loss of control or nose to tail shunt type collisions on the approach to the roundabout.

Recommendation: Ensure that all the existing approaches are resurface in a suitable material as part of the proposed works.

Design Organisation Response: **ACCEPTED**

It is acknowledged that the existing road surfacing is in poor condition. As such it is proposed that, with implementation of the proposed roundabout junction, the existing approaches would be resurfaced in appropriate materials. These aspects would be detailed further as part of the S278 detailed design process.

2.8 RSA1 PROBLEM REFERENCE 3.7.2

Location: Circulatory carriageway

Summary: Overrun area could result in loss of control on the circulatory.

Problem: no construction details relating to the proposed overrun area have been supplied for audit. Concern is expressed that if significant kerb upstands or surface materials of lesser skid resistance are provided that it could lead to loss of control type collisions particularly involving powered two wheelers.

Recommendation: Ensure that suitable surface material are used in the construction of the overrun area and that any kerb upstand does not cause a safety risk to powered two wheelers.

Design Organisation Response: **ACCEPTED**

The construction detail for the proposed HGV central overrun area will be considered in detail at the S278 construction detailed design stage and agreed with the local highway authority. The final design of this feature will be informed by WCBC's experience of any other roundabout arrangements within their highway network which also include for HGV overrun areas.

3.0 CONCLUSION

- 3.1 The Axis design team has reviewed the issues and recommendations set out in the Stage 1 Road Safety Audit Report. It is considered that the RSA1 does not identify any material safety concerns that would prejudice the safe delivery and operation of the proposed access scheme.
- 3.2 The Design Organisation has accepted most of the audit comments and this Response Report identifies an updated roundabout layout plan identifying the proposed minor amendments to the scheme (**Drawing 1520-01-SK103A**). This layout should be utilised as the basis for agreement with the local highway authority and the detailed construction design stage of the proposals. Any construction design package would need to be subject to a Stage 2 RSA prior to the delivery of works on site.



APPENDIX TA3

TRICS 7.1.1

Trip Rate Parameter: Number of dwellings

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

Calculation Factor: 1 DWELLS

Count Type: VEHICLES

Time Range	No. Days	ARRIVALS		No. Days	DEPARTURES		No. Days	TOTALS	
		Ave. DWELLS	Trip Rate		Ave. DWELLS	Trip Rate		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	27	146	0.071	27	146	0.284	27	146	0.355
08:00-09:00	27	146	0.143	27	146	0.407	27	146	0.55
09:00-10:00	27	146	0.166	27	146	0.219	27	146	0.385
10:00-11:00	27	146	0.151	27	146	0.185	27	146	0.336
11:00-12:00	27	146	0.172	27	146	0.175	27	146	0.347
12:00-13:00	27	146	0.193	27	146	0.175	27	146	0.368
13:00-14:00	27	146	0.188	27	146	0.184	27	146	0.372
14:00-15:00	27	146	0.185	27	146	0.197	27	146	0.382
15:00-16:00	27	146	0.276	27	146	0.201	27	146	0.477
16:00-17:00	27	146	0.323	27	146	0.19	27	146	0.513
17:00-18:00	27	146	0.393	27	146	0.229	27	146	0.622
18:00-19:00	27	146	0.284	27	146	0.228	27	146	0.512
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			2.545			2.674			5.219

TRICS 7.1.1

Trip Rate P Number of dwellings

RANK ORDER for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

Ranking Type: TOTALS Time Range: 08:00-09:00

85th Percentile = no. 5

Rank	Site Ref	Description	Town/City	DWELLS	Day	Date	Arrivals	Departures	Totals
1	SR-03-A-01	DETACHED	STIRLING	115	Monday	23/04/2007	0.165	0.678	0.843
2	WO-03-A-C	DETACHED	KIDDERMINSTER	138	Friday	05/05/2006	0.203	0.543	0.746
3	SH-03-A-04	TERRACED	SHREWSBURY	108	Thursday	11/06/2009	0.287	0.454	0.741
4	SF-03-A-02	SEMI DET./TERRACED	IPSWICH	230	Thursday	24/05/2007	0.243	0.491	0.734
5	WM-03-A-1	MIXED HOUSING	COVENTRY	84	Monday	24/09/2007	0.321	0.405	0.726
6	FI-03-A-03	MIXED HOUSES	DUNFERMLINE	155	Monday	30/04/2007	0.174	0.548	0.722
7	SF-03-A-03	MIXED HOUSES	BURY ST EDMUNDS	101	Monday	15/05/2006	0.109	0.554	0.663
8	LN-03-A-01	MIXED HOUSES	LINCOLN	150	Tuesday	15/05/2007	0.187	0.44	0.627
9	LN-03-A-02	MIXED HOUSES	LINCOLN	186	Monday	14/05/2007	0.183	0.425	0.608
10	TV-03-A-01	HOUSES & FLATS	HARTLEPOOL	225	Thursday	14/04/2005	0.138	0.458	0.596
11	WM-03-A-1	TERRACED	COVENTRY	79	Friday	03/02/2006	0.152	0.418	0.57
12	HI-03-A-11	BUNGALOWS	INVERNESS	85	Monday	05/06/2006	0.129	0.424	0.553
13	CB-03-A-04	SEMI DETACHED	WORKINGTON	82	Friday	24/04/2009	0.183	0.366	0.549
14	WO-03-A-C	DET./TERRACED	BROMSGROVE	232	Thursday	30/06/2005	0.099	0.448	0.547
15	CF-03-A-02	MIXED HOUSES	CARDIFF	196	Friday	05/10/2007	0.107	0.413	0.52
16	SF-03-A-01	SEMI DETACHED	IPSWICH	77	Wednesday	23/05/2007	0.104	0.416	0.52
17	AR-03-A-01	MIXED HOUSES	LURGAN	153	Tuesday	15/06/2010	0.111	0.405	0.516
18	LC-03-A-22	BUNGALOWS	BLACKPOOL	98	Tuesday	18/10/2005	0.173	0.337	0.51
19	NY-03-A-01	BUNGALOWS & SEMI DET.	BOROUGHBRIDGE	115	Friday	14/10/2011	0.096	0.4	0.496
20	AN-03-A-01	SEMI-DET.	NEWTOWN ABBEY	132	Thursday	10/06/2010	0.129	0.356	0.485
21	CH-03-A-02	HOUSES/FLATS	CREWE	174	Tuesday	14/10/2008	0.103	0.374	0.477
22	NF-03-A-02	HOUSES & FLATS	NORWICH	98	Monday	22/10/2012	0.122	0.347	0.469
23	NT-03-A-03	SEMI DETACHED	KIRKBY-IN-ASHFIELD	166	Wednesday	28/06/2006	0.108	0.313	0.421
24	WL-03-A-0	SEMI D./TERRACED W. BAL	WOOTTON BASSETT	99	Monday	02/10/2006	0.071	0.333	0.404
25	CH-03-A-01	SEMI-DET./BUNGALOWS	CREWE	129	Tuesday	14/10/2008	0.163	0.24	0.403
26	MS-03-A-0	TERRACED	RUNCORN	372	Thursday	06/10/2005	0.091	0.269	0.36
27	FA-03-A-02	MIXED HOUSES	FALKIRK	161	Wednesday	29/05/2013	0.062	0.28	0.342

TRICS 7.1.1

Trip Rate P Number of dwellings

RANK ORDER for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

Ranking Type: TOTALS Time Range: 17:00-18:00

85th Percentile = no. 5

Rank	Site Ref	Description	Town/City	DWELLS	Day	Date	Arrivals	Departures	Totals
1	SR-03-A-01	DETACHED	STIRLING	115	Monday	23/04/2007	0.583	0.304	0.887
2	WO-03-A-C	DETACHED	KIDDERMINSTER	138	Friday	05/05/2006	0.558	0.319	0.877
3	LN-03-A-02	MIXED HOUSES	LINCOLN	186	Monday	14/05/2007	0.495	0.355	0.85
4	AR-03-A-01	MIXED HOUSES	LURGAN	153	Tuesday	15/06/2010	0.51	0.314	0.824
5	WM-03-A-1	MIXED HOUSING	COVENTRY	84	Monday	24/09/2007	0.405	0.369	0.774
6	SH-03-A-04	TERRACED	SHREWSBURY	108	Thursday	11/06/2009	0.463	0.296	0.759
7	SF-03-A-03	MIXED HOUSES	BURY ST EDMUNDS	101	Monday	15/05/2006	0.525	0.228	0.753
8	SF-03-A-02	SEMI DET./TERRACE	IPSWICH	230	Thursday	24/05/2007	0.478	0.248	0.726
9	NT-03-A-05	SEMI DETACHED	KIRKBY-IN-ASHFIELD	166	Wednesday	28/06/2006	0.398	0.307	0.705
10	FI-03-A-03	MIXED HOUSES	DUNFERMLINE	155	Monday	30/04/2007	0.419	0.245	0.664
11	LN-03-A-01	MIXED HOUSES	LINCOLN	150	Tuesday	15/05/2007	0.413	0.213	0.626
12	TV-03-A-01	HOUSES & FLATS	HARTLEPOOL	225	Thursday	14/04/2005	0.409	0.209	0.618
13	CF-03-A-02	MIXED HOUSES	CARDIFF	196	Friday	05/10/2007	0.398	0.214	0.612
14	WO-03-A-C	DET./TERRACED	BROMSGROVE	232	Thursday	30/06/2005	0.414	0.185	0.599
15	CB-03-A-04	SEMI DETACHED	WORKINGTON	82	Friday	24/04/2009	0.354	0.207	0.561
16	CH-03-A-02	HOUSES/FLATS	CREWE	174	Tuesday	14/10/2008	0.322	0.236	0.558
17	AN-03-A-01	SEMI-DET.	NEWTOWNABBEY	132	Thursday	10/06/2010	0.379	0.167	0.546
18	WM-03-A-1	TERRACED	COVENTRY	79	Friday	03/02/2006	0.342	0.203	0.545
19	FA-03-A-02	MIXED HOUSES	FALKIRK	161	Wednesday	29/05/2013	0.317	0.224	0.541
20	LC-03-A-22	BUNGALOWS	BLACKPOOL	98	Tuesday	18/10/2005	0.347	0.173	0.52
21	MS-03-A-0	TERRACED	RUNCORN	372	Thursday	06/10/2005	0.325	0.194	0.519
22	HI-03-A-11	BUNGALOWS	INVERNESS	85	Monday	05/06/2006	0.376	0.141	0.517
23	WL-03-A-0	SEMI D./TERRACED	WOOTTON BASSETT	99	Monday	02/10/2006	0.374	0.141	0.515
24	NY-03-A-06	BUNGALOWS & SEMI	BOROUGHBRIDGE	115	Friday	14/10/2011	0.296	0.174	0.47
25	SF-03-A-01	SEMI DETACHED	IPSWICH	77	Wednesday	23/05/2007	0.247	0.169	0.416
26	NF-03-A-02	HOUSES & FLATS	NORWICH	98	Monday	22/10/2012	0.235	0.143	0.378
27	CH-03-A-06	SEMI-DET./BUNGALOWS	CREWE	129	Tuesday	14/10/2008	0.132	0.14	0.272



APPENDIX TA4

NTM Growth Factors

2014-2017 AM Peak Period

TEMPRO main form

Data selections

Select dataset version: 62

Result type

☒ Trip ends by time period
☐ Trip ends by car availability
☐ Car ownership data
☐ Planning data

Set area definition...

Enter base year: 2014
 Enter future year: 2017

Trip end selections

Trip end by time period selections

Reset Selections

Select data type

☒ Growth factors
☐ Future year minus base year
☐ Base year data
☐ Future year data

Results

Car Driver Combined Modes

Area Description		All Purposes	
Level	Name	Origin	Destination
Region	WALES	1.0279	1.0275
Authority	Wrexham	1.0212	1.018

NTM Traffic Growth Calculations

1: Select NTM Dataset:

NTM Dataset Description	From	To
NTM AF09 Dataset	2008	2010
NTM AF08 Dataset	2003	2025

2: Select Areas to make up the geographic region:

☒ WALES
☒ Wrexham

3: Select area type:

☐ Urban
☐ Rural
☒ All

4: Select road type:

5: Select which area it serves:

☒ Region
☐ England

Calculate the adjusted local growth figure

Results

Level	Area	Local Growth Figure
Region	WALES	1.0320
Authority	Wrexham	1.0246

2014-2017 PM Peak Period

TEMPRO main form

Data selections

Trip end selections

Trip end by time period selections

Select time period:
 Weekday PM peak period (1600 - 1839)

Trip end type

☐ Production/Attraction
☒ Origin/Destination

Reset Selections

Select data type

☒ Growth factors
☐ Future year minus base year
☐ Base year data
☐ Future year data

Results

Car Driver Combined Modes

Area Description		All Purposes	
Level	Name	Origin	Destination
Region	WALES	1.0283	1.0283
Authority	Wrexham	1.0209	1.0225

NTM Traffic Growth Calculations

1: Select NTM Dataset:

NTM Dataset Description	From	To
NTM AF09 Dataset	2008	2010
NTM AF08 Dataset	2003	2025

2: Select Areas to make up the geographic region:

☒ WALES
☒ Wrexham

3: Select area type:

☐ Urban
☐ Rural
☒ All

4: Select road type:

5: Select which area it serves:

☐ Region
☐ England

Calculate the adjusted local growth figure

Results

Level	Area	Local Growth Figure
Region	WALES	1.0338
Authority	Wrexham	1.0262

2014-2022 AM Peak Period

TEMPRO main form

Data selections

Trip end selections

Trip end by time period selections

Select time period: **Weekday AM peak period (0700 - 0900)**

Trip end type

Production/Attraction

Origin/Destination

Select data type

Growth factors

Future year minus base year

Base year data

Future year data

Results

Car Driver Combined Modes

Area Description	Name	Origin	Destination
Level	WALE	1.0712	1.0712
Region	WALE	1.0712	1.0712
Authority	Wrexham	1.0712	1.0712

NTM Traffic Growth Calculations

1. Select NTM Dataset:

NTM Dataset Description	From	To
NTM AF05 Dataset	2001	2025
NTM AF08 Dataset	2001	2025

2. Select Areas to make up the geographic region:

WALE

Wrexham

3. Select area type:

Urban

Rural

All

4. Select road type:

5. Select which area it serves:

Region

England

Calculate the adjusted local growth figure

Results

Level	Area	Local Growth Figure
Region	WALE	1.0712
Authority	Wrexham	1.0712

2014-2022 PM Peak Period

TEMPRO main form

Data selections

Trip end selections

Trip end by time period selections

Select time period: **Weekday PM peak period (1600 - 1800)**

Trip end type

Production/Attraction

Origin/Destination

Select data type

Growth factors

Future year minus base year

Base year data

Future year data

Results

Car Driver Combined Modes

Area Description	Name	Origin	Destination
Level	WALE	1.0717	1.0717
Region	WALE	1.0717	1.0717
Authority	Wrexham	1.0717	1.0717

NTM Traffic Growth Calculations

1. Select NTM Dataset:

NTM Dataset Description	From	To
NTM AF05 Dataset	2001	2025
NTM AF08 Dataset	2001	2025

2. Select Areas to make up the geographic region:

WALE

Wrexham

3. Select area type:

Urban

Rural

All

4. Select road type:

5. Select which area it serves:

Region

England

Calculate the adjusted local growth figure

Results

Level	Area	Local Growth Figure
Region	WALE	1.0717
Authority	Wrexham	1.0717



APPENDIX TA5

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.4.487 [15039,24/03/2014] © Copyright TRL Limited, 2014
For sales and distribution information, program advice and maintenance, contact TRL: Tel: +44 (0)1344 770758 email: software@trl.co.uk Web: http://www.trlsoftware.co.uk
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: Proposed Rbt 2022 Inc Dev 117 houses.arc8

Path: Q:\1501-1550\1520-01 Rhosrobin Residential\Background Information\Junction Modelling

Report generation date: 30/05/2014 18:00:38

Summary of junction performance

	AM Peak Hour				PM Peak Hour			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
A1 - 2022 Inc Dev								
Arm 1	1.09	6.64	0.51	A	3.25	13.81	0.77	B
Arm 2	0.71	6.37	0.41	A	0.40	5.78	0.28	A
Arm 3	3.20	15.33	0.76	C	1.32	7.88	0.57	A
Arm 4	0.10	7.25	0.09	A	0.07	5.54	0.07	A

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

"D1 - 2022 Inc Dev, AM Peak Hour" model duration: 07:45 - 09:15

"D2 - 2022 Inc Dev, PM Peak Hour" model duration: 16:30 - 18:00

Run using Junctions 8.0.4.487 at 30/05/2014 18:00:38

File summary

Title	Proposed Roundabout Junction
Location	Rhosrobin
Site Number	
Date	06/03/2014
Version	
Status	Preliminary
Identifier	
Client	Castlemead Group Ltd
Jobnumber	1520-01
Enumerator	MH
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCU	PCU	perHour	s	-Min	perMin

(Default Analysis Set) - 2022 Inc Dev, AM Peak Hour

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
2022 Inc Dev, AM Peak Hour	2022 Inc Dev	AM Peak Hour		ONE HOUR	07:45	09:15	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Junction Delay (s)	Junction LOS
1	Rhosrobin Proposed Roundabout	Roundabout	1,2,3,4			10.28	B

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	B5425 (S)	
2	2	Rhosrobin Road	
3	3	B5425 (N)	
4	4	Site Access	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)
1	0.00	99999.00
2	0.00	99999.00
3	0.00	99999.00
4	0.00	99999.00

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	3.30	4.50	5.10	20.00	28.00	26.00	
2	3.30	4.00	15.50	15.00	28.00	13.00	
3	2.90	4.00	11.70	20.00	28.00	18.00	
4	2.75	4.20	6.80	20.00	28.00	29.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.566	1224.080
2		(calculated)	(calculated)	0.578	1235.815
3		(calculated)	(calculated)	0.566	1182.174
4		(calculated)	(calculated)	0.537	1098.200

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

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		ü	ü	HV Percentages	2.00				ü	ü

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	ü	543.00	100.000
2	ONE HOUR	ü	367.00	100.000
3	ONE HOUR	ü	703.00	100.000
4	ONE HOUR	ü	47.00	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Arm	Direct Demand Entry Flow (PCU/hr)	DirectDemandEntryFlowInPCU (PCU/hr)	Direct Demand Exit Flow (PCU/hr)	Direct Demand Pedestrian Flow (Ped/hr)
07:45-08:00	1	408.80	408.80		
07:45-08:00	2	276.30	276.30		
07:45-08:00	3	529.26	529.26		
07:45-08:00	4	35.38	35.38		
08:00-08:15	1	488.15	488.15		
08:00-08:15	2	329.93	329.93		
08:00-08:15	3	631.98	631.98		
08:00-08:15	4	42.25	42.25		
08:15-08:30	1	597.85	597.85		
08:15-08:30	2	404.07	404.07		
08:15-08:30	3	774.02	774.02		
08:15-08:30	4	51.75	51.75		
08:30-08:45	1	597.85	597.85		
08:30-08:45	2	404.07	404.07		
08:30-08:45	3	774.02	774.02		
08:30-08:45	4	51.75	51.75		
08:45-09:00	1	488.15	488.15		
08:45-09:00	2	329.93	329.93		
08:45-09:00	3	631.98	631.98		
08:45-09:00	4	42.25	42.25		
09:00-09:15	1	408.80	408.80		
09:00-09:15	2	276.30	276.30		
09:00-09:15	3	529.26	529.26		
09:00-09:15	4	35.38	35.38		

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To			
		1	2	3	4
From	1	0.000	159.000	371.000	13.000
	2	244.000	0.000	114.000	9.000
	3	624.000	62.000	0.000	17.000
	4	26.000	7.000	14.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To			
		1	2	3	4
From	1	0.00	0.29	0.68	0.02
	2	0.66	0.00	0.31	0.02
	3	0.89	0.09	0.00	0.02
	4	0.55	0.15	0.30	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To			
		1	2	3	4
From	1	1.000	1.042	1.069	1.000
	2	1.032	1.000	1.010	1.000
	3	1.041	1.018	1.000	1.000
	4	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		1	2	3	4
From	1	0.0	4.2	6.9	0.0
	2	3.2	0.0	1.0	0.0
	3	4.1	1.8	0.0	0.0
	4	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.51	6.64	1.09	A
2	0.41	6.37	0.71	A
3	0.76	15.33	3.20	C
4	0.09	7.25	0.10	A

Main Results for each time segment

Main results: (07:45-08:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	408.80	406.60	62.04	0.00	1188.94	0.344	0.55	4.860	A
2	276.30	274.87	298.02	0.00	1063.63	0.260	0.36	4.665	A
3	529.26	525.25	199.22	0.00	1069.33	0.495	1.00	6.820	A
4	35.38	35.18	695.29	0.00	724.61	0.049	0.05	5.220	A

Main results: (08:00-08:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	488.15	487.40	74.39	0.00	1181.95	0.413	0.74	5.484	A
2	329.93	329.44	357.24	0.00	1029.42	0.321	0.48	5.264	A
3	631.98	629.82	238.77	0.00	1046.93	0.604	1.54	8.911	A
4	42.25	42.18	833.61	0.00	650.28	0.065	0.07	5.920	A

Main results: (08:15-08:30)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	597.85	596.46	90.77	0.00	1172.67	0.510	1.09	6.601	A
2	404.07	403.17	437.18	0.00	983.23	0.411	0.71	6.345	A
3	774.02	767.77	292.21	0.00	1016.66	0.761	3.11	14.648	B
4	51.75	51.61	1017.25	0.00	551.61	0.094	0.10	7.198	A

Main results: (08:30-08:45)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	597.85	597.82	91.35	0.00	1172.34	0.510	1.09	6.636	A
2	404.07	404.06	438.18	0.00	982.65	0.411	0.71	6.371	A
3	774.02	773.62	292.86	0.00	1016.29	0.762	3.20	15.330	C
4	51.75	51.74	1023.55	0.00	548.22	0.094	0.10	7.250	A

Main results: (08:45-09:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	488.15	489.51	75.23	0.00	1181.47	0.413	0.75	5.523	A
2	329.93	330.82	358.80	0.00	1028.52	0.321	0.49	5.292	A
3	631.98	638.31	239.78	0.00	1046.36	0.604	1.62	9.294	A
4	42.25	42.38	842.82	0.00	645.33	0.065	0.07	5.971	A

Main results: (09:00-09:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	408.80	409.57	62.73	0.00	1188.55	0.344	0.56	4.899	A
2	276.30	276.80	300.20	0.00	1062.37	0.260	0.36	4.695	A
3	529.26	531.61	200.62	0.00	1068.54	0.495	1.03	6.991	A
4	35.38	35.46	702.78	0.00	720.58	0.049	0.05	5.256	A

(Default Analysis Set) - 2022 Inc Dev, PM Peak Hour

Data Errors and Warnings*No errors or warnings***Analysis Set Details**

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
2022 Inc Dev, PM Peak Hour	2022 Inc Dev	PM Peak Hour		ONE HOUR	16:30	18:00	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Junction Delay (s)	Junction LOS
1	Rhosrobin Proposed Roundabout	Roundabout	1,2,3,4			10.42	B

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	B5425 (S)	
2	2	Rhosrobin Road	
3	3	B5425 (N)	
4	4	Site Access	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)
1	0.00	99999.00
2	0.00	99999.00
3	0.00	99999.00
4	0.00	99999.00

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	3.30	4.50	5.10	20.00	28.00	26.00	
2	3.30	4.00	15.50	15.00	28.00	13.00	
3	2.90	4.00	11.70	20.00	28.00	18.00	
4	2.75	4.20	6.80	20.00	28.00	29.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.566	1224.080
2		(calculated)	(calculated)	0.578	1235.815
3		(calculated)	(calculated)	0.566	1182.174
4		(calculated)	(calculated)	0.537	1098.200

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

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		ü	ü	HV Percentages	2.00				ü	ü

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	ü	790.00	100.000
2	ONE HOUR	ü	230.00	100.000
3	ONE HOUR	ü	552.00	100.000
4	ONE HOUR	ü	43.00	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Arm	Direct Demand Entry Flow (PCU/hr)	DirectDemandEntryFlowInPCU (PCU/hr)	Direct Demand Exit Flow (PCU/hr)	Direct Demand Pedestrian Flow (Ped/hr)
16:30-16:45	1	594.75	594.75		
16:30-16:45	2	173.16	173.16		
16:30-16:45	3	415.57	415.57		
16:30-16:45	4	32.37	32.37		
16:45-17:00	1	710.19	710.19		
16:45-17:00	2	206.77	206.77		
16:45-17:00	3	496.24	496.24		
16:45-17:00	4	38.66	38.66		
17:00-17:15	1	869.81	869.81		
17:00-17:15	2	253.23	253.23		
17:00-17:15	3	607.76	607.76		
17:00-17:15	4	47.34	47.34		
17:15-17:30	1	869.81	869.81		
17:15-17:30	2	253.23	253.23		
17:15-17:30	3	607.76	607.76		
17:15-17:30	4	47.34	47.34		
17:30-17:45	1	710.19	710.19		
17:30-17:45	2	206.77	206.77		
17:30-17:45	3	496.24	496.24		
17:30-17:45	4	38.66	38.66		
17:45-18:00	1	594.75	594.75		
17:45-18:00	2	173.16	173.16		
17:45-18:00	3	415.57	415.57		
17:45-18:00	4	32.37	32.37		

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To			
		1	2	3	4
From	1	0.000	273.000	493.000	24.000
	2	143.000	0.000	80.000	7.000
	3	418.000	117.000	0.000	17.000
	4	16.000	11.000	16.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To			
		1	2	3	4
From	1	0.00	0.35	0.62	0.03
	2	0.62	0.00	0.35	0.03
	3	0.76	0.21	0.00	0.03
	4	0.37	0.26	0.37	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To			
		1	2	3	4
From	1	1.000	1.024	1.018	1.000
	2	1.039	1.000	1.028	1.000
	3	1.024	1.009	1.000	1.000
	4	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		1	2	3	4
From	1	0.0	2.4	1.8	0.0
	2	3.9	0.0	2.8	0.0
	3	2.4	0.9	0.0	0.0
	4	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.77	13.81	3.25	B
2	0.28	5.78	0.40	A
3	0.57	7.88	1.32	A
4	0.07	5.54	0.07	A

Main Results for each time segment

Main results: (16:30-16:45)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	594.75	590.55	107.79	0.00	1163.03	0.511	1.05	6.366	A
2	173.16	172.30	398.46	0.00	1005.60	0.172	0.21	4.462	A
3	415.57	413.15	130.31	0.00	1108.36	0.375	0.61	5.264	A
4	32.37	32.21	507.55	0.00	825.48	0.039	0.04	4.536	A

Main results: (16:45-17:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	710.19	707.98	129.23	0.00	1150.89	0.617	1.61	8.245	A
2	206.77	206.49	477.69	0.00	959.83	0.215	0.28	4.940	A
3	496.24	495.31	156.18	0.00	1093.71	0.454	0.84	6.126	A
4	38.66	38.61	608.44	0.00	771.27	0.050	0.05	4.913	A

Main results: (17:00-17:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	869.81	863.60	158.10	0.00	1134.53	0.767	3.16	13.245	B
2	253.23	252.76	582.75	0.00	899.12	0.282	0.40	5.755	A
3	607.76	605.89	191.08	0.00	1073.94	0.566	1.30	7.813	A
4	47.34	47.26	744.38	0.00	698.23	0.068	0.07	5.530	A

Main results: (17:15-17:30)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	869.81	869.44	158.54	0.00	1134.29	0.767	3.25	13.805	B
2	253.23	253.22	586.60	0.00	896.90	0.282	0.40	5.782	A
3	607.76	607.71	191.56	0.00	1073.67	0.566	1.32	7.878	A
4	47.34	47.34	746.43	0.00	697.13	0.068	0.07	5.539	A

Main results: (17:30-17:45)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	710.19	716.46	129.89	0.00	1150.51	0.617	1.68	8.573	A
2	206.77	207.24	483.29	0.00	956.59	0.216	0.29	4.969	A
3	496.24	498.07	156.92	0.00	1093.29	0.454	0.86	6.187	A
4	38.66	38.73	611.58	0.00	769.59	0.050	0.05	4.925	A

Main results: (17:45-18:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	594.75	597.15	108.64	0.00	1162.55	0.512	1.08	6.520	A
2	173.16	173.44	402.86	0.00	1003.06	0.173	0.22	4.489	A
3	415.57	416.54	131.25	0.00	1107.83	0.375	0.62	5.318	A
4	32.37	32.42	511.54	0.00	823.34	0.039	0.04	4.553	A



APPENDIX TA6

1520-01-TP01b
June 2014

**Proposed Residential Development,
Llay New Road, Rhosrobin, Wrexham**

Travel Plan

Prepared on behalf of:



Castlemead Group Ltd

The logo for axis is a blue square with the word "axis" in white lowercase letters.

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APPENDICES

- Appendix TP1 Schedule of TPC Duties
- Appendix TP2 Example Residential Travel Plan Questionnaire

1.0 INTRODUCTION

1.1 Development Proposals and Planning Context

1.1.1 This Travel Plan Framework has been prepared by AXIS on behalf of Castlemead Group Ltd in support of a planning application related to proposals for a new residential development at land off Llay New Road, Rhosrobin, Wrexham.

1.1.2 The site location is illustrated in **Figure TP1** to this document, with the site masterplan available at **Drawing CGL.1/TMJ-04** to the Transport Assessment report. The site masterplan identifies development for 117 new residential properties at the site, served via a new four arm roundabout junction, replacing the existing three arm priority controlled T-junction of Rhosrobin Road with the B5425 Llay New Road.

1.1.3 This document represents a framework for the development, implementation, and operation of a Residential Travel Plan to build on the main sustainable development principles of the proposal scheme and to encourage / maximise travel to the site by alternative travel modes to the private car. The Travel Plan will be adopted on a 'site-wide' basis for the residential scheme with a central Travel Plan Co-ordinator (TPC) role managing travel requirements for all residents.

1.1.4 This Travel Plan is produced in conjunction with the Axis Transport Assessment (Ref: 1520-01-TA01a), which provides appropriate analysis of the proposed development with regard to its traffic generation potential and network impact. This Transport Assessment concluded:

"It is concluded that the development of land off the B5425 Llay New Road, Rhosrobin, to deliver up to 117 residential dwellings would not result in a detrimental impact on the local highway network, either in operational or highway safety terms."

1.1.5 This Travel Plan document has been prepared to appraise the Local Planning and Highway Authority Wrexham County Borough Council (WCBC), of the sustainable travel credentials of the site, and the developer's commitment to encourage site access by sustainable modes of travel amongst staff and visitors.

1.2 General Travel Plan Objectives

1.2.1 A Travel Plan is a general term for a package of measures and initiatives tailored to the requirements of individual sites and aimed at promoting more sustainable travel choices and reducing reliance on the private car. It involves the development of a set of mechanisms, initiatives and targets that together enable organisations / individuals to reduce the impact of their travel and transport on the local environment.

1.2.2 Travel Plans are about helping to achieve equity, they are not anti car, but rather seek to ensure access opportunities for all - whether a person is disabled, has no access to the private car, or would prefer to travel on foot or by cycle. Travel Plans can be developed either specifically to address issues associated with individual buildings or sites, or to form part of a wider strategy involving Local Authority initiatives and other surrounding developments. This Travel Plan concentrates on those measures that can be developed specifically at the Rhosrobin site, with the principal aim being:

To minimise the need to travel to the site by private car, particularly single occupancy use and to provide opportunities for travel by alternative and more sustainable travel modes.

1.2.3 The developers of the Rhosrobin residential site are committed to promoting sustainable transport solutions where appropriate and practical. It is within this context that the Travel Plan has been produced. Any reduction in car trips achievable at the Rhosrobin site should be viewed against the potential trip generation associated with the operation of the site without the support of Travel Plan measures.

1.3 Travel Plan Guidance

1.3.1 Travel Plans for new development schemes are secured through a policy framework that extends from national through to local.

National Guidance

1.3.2 Chapter 8 of Planning Policy Wales (PPW) Edition 5 (November 2012) sets out the Welsh Governments policies and objectives for managing transport issues in Wales. Paragraph 8.1.4 to PPW document identifies the following core aims:

- Reducing the need to travel, especially by private car, by locating development where there is good access by public transport, walking and cycling;
- Locating development near other related uses to encourage multi-purpose trips and reduce the length of journeys;
- Improving accessibility by walking, cycling and public transport;
- Ensuring that transport is accessible to all, taking into account the needs of disabled and other less mobile people;
- Promoting walking and cycling;
- Supporting the provision of high quality public transport;
- Supporting traffic management measures;
- Promoting sustainable transport options for freight and commerce;
- Supporting sustainable travel options in rural areas;
- Supporting necessary infrastructure improvements; and
- Ensuring that, as far as possible, transport infrastructure does not contribute to land take, urban sprawl or neighbourhood severance.

1.3.3 Planning Policy Wales Technical Advice Note 18 “Transport” seeks to promote the widespread adoption of Travel Plan style measures by businesses, residential developments, schools and other significant trip generating uses as a means of promoting sustainable transport. TAN 18 identifies that in cases where a site is suitable for development, the formal Transport Assessment should be supported by the production of a ‘Transport Implementation Strategy’ (TIS), incorporating a Travel Plan. The TIS should set objectives and targets related to managing travel demand for the development and set out the infrastructure, demand management measures and financial contributions necessary to achieve them.

1.3.4 Additional specific guidance for the preparation of Travel Plans for new residential development has been prepared by the UK Department for Transport and set out in the document "Making Residential Travel Plans Work: Guidelines for New Development". The DfT document identifies that should the Travel Plan be designed into the residential development from the beginning of the project, and if supported by a strong commitment to the measures and initiatives identified, the Plan could be expected to deliver a wide range of benefits including:

- Reducing the need for car use, with benefits in terms of reduced traffic, congestion, air pollution and accidents;
- Improving accessibility and travel choice for reaching local facilities;
- Improving public transport provision / usage;
- Complementing other nearby travel plans for local residential, commercial and employment schemes;
- Improving access by the wider community to the residential development by sustainable modes of transport;
- Representing good practice and providing a tool to help change perceptions about the convenience and benefits of not using the car where alternatives exist;
- Achieving more attractive environments that contribute to regeneration and renewal initiatives; and
- Increasing marketability of the development as more households seek to change their travel behaviour.

1.3.5 The DfT guidance notes that residential travel plans for large residential development (i.e. over 100 dwellings) are likely to achieve the greatest impact.

1.3.6 The DfT guidance identifies further supporting objectives for a residential travel:

- Address residents' need for access to a full range of facilities for work, education, health, leisure, recreation and shopping;
- Promote healthy lifestyles and sustainable, vibrant local communities;

- Encourage good urban design principles that encourage accessibility for walking and cycling linked to the design and support statements;
- Address specific issues identified within the Transport Assessment.

Regional Guidance

1.3.7 Regional Transport objectives for the North Wales Authorities (Taith) are set out in the North Wales Regional Transport Plan (September 2009). This document identifies the key role of travel planning in promoting more sustainable travel behaviour & smarter choices, targeting traffic congestion and tackling climate change. Travel Planning forms part of a range of identified interventions including:

- 4m) In partnership with local planning authorities develop and adopt a consistent regional approach to require travel plans for new and major developments;
- 7a) Local Authorities to set an example to the wider community primarily through the implementation of travel plans;
- 7f) Promoting travel planning toolkits.

Local Guidance

1.3.8 The Welsh Government requires Local Authorities to demonstrate a contribution to delivering “shared priorities” and places emphasis on issues such as accessibility, road casualty reduction, public transport patronage, congestion reduction and air quality. WCBC are currently consulting on a new Local Plan, with a target date for adoption of 2016. In the meantime, the Wrexham Unitary Development Plan 1996-2011 remains valid. The UDP sets out the following policies which are specifically related to sustainable transport and new development schemes:

“Policy PS8 - The transport network will be developed by providing an integrated range of travel options to and from principal residential, commercial, employment and education centres by making the best use of the existing road and rail network, including, where necessary, the

provision of facilities for both passenger and freight interchange and by the encouragement of public transport, cycling and walking.”

“Policy GDP1 - All new development should:

...d) Ensure safe and convenient pedestrian and vehicular access to and from development sites, both on site and in the nearby locality

...e) Ensure that built development is located where it has convenient access to public transport facilities, and is well related to pedestrian and cycle routes wherever possible.”

“Policy T9 - Development proposals will be required to provide walking and cycling routes, where feasible and appropriate, that link with existing or proposed walking and cycling routes, and integrate with the public transport system. Opportunities for horse riding along these routes will be secured where appropriate.”

1.4 Travel Plan Structure

1.4.1 In light of the national and local Travel Plan guidance outlined above, it is proposed that this Travel Plan is developed via a pyramid framework of measures and actions. The principles of this Travel Plan pyramid approach are illustrated in **Figure TP2**, with DfT guidance noting that the Plan process should be built ‘from the ground up’, with each new layer building on the last.

1.4.2 The remaining sections of this report consider the following matters:

- Review of site location and accessibility audit;
- Description of the proposed development;
- Key Action Framework for the delivery of the Travel Plan;
- Details of Plan Administration;
- Formulating of Travel Plan initiatives to be implemented;
- Monitoring and enforcement measures

2.0 SITE LOCATION AND ACCESSIBILITY AUDIT

2.1 Overview

2.1.1 The location of a development site underpins all aspects of accessibility, in particular its proximity to employee and family catchments, relationship with complementary land uses and the range of practical travel mode options available to site users.

2.1.2 This section of the Travel Plan report effectively examines Tier 1 of the Travel Plan Pyramid, 'Site location and proximity to existing facilities and services' and identifies the extent to which the site can be considered to enjoy a good level of accessibility by sustainable modes of transport.

2.2 Site Location and Existing Conditions

2.2.1 Strategically the development area is located approximately 2.5km to the north of Wrexham Town Centre (see **Figure TP1**). The site forms a broadly L-shaped parcel of open green land to the immediate east of the B5425 Llay New Road. To the north and east, the site is bounded by the route of Plas Acton Road and cemetery space. To the south the site is bounded by residential properties located along Church Lea, along with the Wrexham-Chester rail line.

2.3 Available Sustainable Transport Connections

Walking and Cycling

2.3.1 The location of the proposal site is anticipated to allow for a range of everyday journeys to be undertaken on foot or by cycle. The Institute for Highways and Transportation (IHT) Document 'Providing for Journeys on Foot' identifies suitable walking distances to common facilities. This document identifies the following guidance on acceptable walking distances for access to key facilities:

- Desirable: 400m
- Acceptable: 800m
- Preferred Maximum: 1200m

2.3.2 **Figure TP3** to this report illustrates 800m and 1200m 'as the crow flies' local catchments as measured from the access point of the proposed Rhosrobin residential development. This analysis illustrates that Gwersyllt and the edge of Wrexham falls within an acceptable local walk catchment and, as such, the site's proximity to the following local everyday services should be noted:

- Gwersyllt County Primary School;
- Gwersyllt Support Centre;
- Gwersyllt Rail Station;
- Local food and convenience shops; and
- A dental surgery.

2.3.3 In addition to walking connections, the pedal cycle has been identified as being an acceptable travel mode for journeys of up to 5km. **Figure TP4** to this report illustrates the 5km cycle catchment from the site, and demonstrates that Wrexham lies entirely within an appropriate cycle distance, along with the outlying areas of Gresford and Llay.

2.3.4 Details of available local cycling routes and connections are illustrated in **Figure TP5** to this report and demonstrate that a number of traffic free cycle routes are available within a short cycle ride of the site.

Access to Buses

2.3.5 A number of existing local bus services operate within the vicinity of the Rhosrobin proposal site. Bus stops are located on both sides of the Llay New Road carriageway to the immediate south of its junction with Rhosrobin Road. As such, both stops lie within a 400m walk of the centre of the site, which is considered to represent an acceptable walking distance to bus services. Existing bus routes serving the local

stops are illustrated in **Figure TP6** to this report and summarised in **Table TP2.1** below. **Table TP2.1** demonstrates that regular connections are available to key local destinations such as Mold and Wrexham Town Centre.

Table TP2.1 – Available Local Public Transport Connections

Route Number	Route Description	Peak hour frequency	Day Time Frequency
28a	Wrexham – Llay – Mold – Flint	Hourly	2 Hourly
32/33	Wrexham – Gwersyllt – Llay	15 mins	15 mins
34	Wrexham – Gwersyllt – Trevalyn	2 Hourly	2 Hourly

Access to Rail

- 2.3.6 As noted above, and illustrated in **Figure TP3**, Gwersyllt Rail Station lies within a 1.2km walk of the site, thereby providing access to local rail services. Review of the available information on the National Rail website identifies that Gwersyllt Rail Station is served by an hourly service in each direction throughout the day (southbound to Wrexham Central and northbound to Biston).

Summary

- 2.3.7 Overall it is concluded that the proposal site represents a sustainable location for a residential development, being located within an acceptable walk/cycle catchment of key everyday destinations such as local shopping facilities and schools, and accessible by both bus and rail services to/from key local employment centres. These services are anticipated to reduce the need for residents at the site to utilise the car for everyday journeys.

3.0 DESCRIPTION OF DEVELOPMENT

3.1 Introduction

- 3.1.1 This section of the report has been prepared in line with Tier 2 of the Travel Plan Pyramid 'Sustainable site design – parking restraint, suitable density and amenity' and sets out those key site elements that will help promote sustainable travel.

3.2 Development Scheme

- 3.2.1 The proposed residential scheme comprises the development of 117 residential units and associated public open space at open green land to the immediate east of the B5425 Llay New Road.

3.3 Site Access Arrangements

- 3.3.1 The proposed residential development site is proposed to be accessed via a new four arm roundabout junction, replacing the existing three arm priority controlled T-junction of Rhosrobin Road with the B5425 Llay New Road. Internally to the site the access route would continue onwards to form a number of cul-de-sac terminations. An emergency access point is also provided onto the B5425 for use in the event that the main site access is in anyway blocked.

4.0 IMPLEMENTATION OF THE TRAVEL PLAN – KEY ACTION FRAMEWORK

4.1 It is envisaged that the development and implementation of the Travel Plan at the Rhosrobin site will ultimately be delivered over a number of key stages. These stages are described in the remaining sections of this document and cover the identification of base travel trends to the site (from the analysis of resident questionnaire data / ATC data to be collected following occupation of the development site), to the implementation of Travel Plan measures / initiatives, and the monitoring of the effects of the Plan.

4.2 The identified key stages for the development of the Travel Plan are as follows:

- A. Preliminary assessment of travel behaviour of residents (to be undertaken following occupation of the first 50 dwellings);
- B. Plan Administration through the selection and appointment of the Travel Plan Co-ordinator, i.e. Tier 3 of the Travel Plan Pyramid 'Implementation & development of the Travel Plan';
- C. Formulation and agreement of the final Travel Plan measures and targets to produce a Full Travel Plan, i.e. Tier 4 of the Travel Plan Pyramid 'Services and facilities';
- D. Monitoring of the effectiveness of the final Travel Plan and revision post development completion on site, i.e. Tier 5 of the Travel Plan Pyramid 'Marketing & promotion, awareness raising, monitoring and review'.

4.3 **Figure TP7** to this report identifies the key intermediate stages of this implementation programme.

5.0 RESIDENTIAL TRAVEL PLAN ADMINISTRATION

5.1 Introduction

5.1.1 The development and implementation of the final site Travel Plan for the Rhosrobin development site will be the responsibility of the site developer, Castlemead Group Ltd. Measures included in **bold and underlined** text represent commitments which will be pursued by the developer under the Travel Plan at the site.

5.1.2 Management of the Travel Plan process will be achieved through the early identification of a suitable person as the Travel Plan Co-ordinator (TPC). The TPC role will be key to the delivery of a successful Travel Plan at the site and therefore a suitable person at the site management company or specialist Transport Planning Consultancy would be designated to undertake the required TPC duties. Until a TPC role has been formally identified, Travel Plan matters will be managed by the site project manager at Castlemead Group Ltd.

5.1.3 **The formal TPC role will be established prior to first occupation of properties at the Rhosrobin development site.** Details of the Travel Plan Coordinator will be provided to the Taith Regional Travel Plan Coordinator (jessica.pritchard@taith.gov.uk).

5.1.4 Once appointed, the TPC will act as the main contact for the Travel Plan and will be responsible for implementing plan measures, involving new residents and monitoring the effects of implementation. A review of the duties and responsibilities of the TPC is set out below.

5.2 Duties and Responsibilities of the Travel Plan Co-ordinator

5.2.1 The TPC will act as the main liaison between the occupier of the development and the Taith Regional Travel Plan Coordinator (RTPC) with respect to Travel Plan matters. The site TPC will act as the first point of contact for residents in all matters regarding

travel and the management of physical travel measures within the development curtilage.

5.2.2 The key roles and responsibilities of the TPC will be as follows:

- Managing the development and implementation of the Travel Plan;
- Review physical infrastructure provision on site and ensuring that it is fit for purpose and delivered to an adoptable standard;
- Liaising with public transport operators & Local Authority / Taith officers to ensure up-to-date transport information is available;
- Monitoring travel patterns at the site.

5.2.3 **The TPC will be able to delegate some duties to other suitable nominated staff, as required, but will retain overall responsibility for all matters relating to the operation of the Travel Plan.** A schedule of duties is provided in **Appendix TP1** to this framework document. This schedule effectively represents an 'Action Plan' for the development of the Travel Plan.

5.3 Key Travel Plan Administration Tasks

5.3.1 As part of the on-going operation of the Travel Plan the following key administrative tasks will need to be undertaken by the TPC:

- Informing of the Taith Regional Travel Plan Coordinator (RTPC) of the contact details of the TPC at the inception of the Plan. Updating of this information should the TPC role be transferred to an alternative staff member within the lifetime of the Plan;

- Manage a key contacts file of appropriate personnel at other organisations such as the Local Planning Authority, Local Highway Authority, Public Transport Operators, etc.
- Develop a suitable New Buyers Welcome Pack to be supplied to all new residents at the site. This welcome pack should be made available to residents at or before moving-in;
- Maintain Travel Noticeboards at the site to include up-to-date travel information, public transport timetables, maps and details of travel initiatives such as National Cycling Week, healthy living information, etc.

6.0 RESIDENTIAL TRAVEL PLAN OPERATION

6.1 Introduction

6.1.1 The aims of Tiers 4 & 5 of the Travel Plan Pyramid are to establish the measures and initiatives to be implemented on site to reduce the level of dependency on the private car and to determine how their operation / effectiveness can be promoted and monitored. The following section of this document outlines those Travel Plan measures to be promoted and implemented at the Rhosrobin site.

6.1.2 The Travel Plan is proposed to be delivered as part of a three stage process:

- 'Physical' site works which would be provided at the Rhosrobin site;
- 'Operational' measures which would to encourage sustainable travel patterns;
- Monitoring of the implementation and success of Travel Plan initiatives.

6.2 'Physical' Travel Plan Measures

6.2.1 This Travel Plan seeks to demonstrate to new / prospective residents the range of travel options at the Rhosrobin site and to encourage the development of sustainable travel patterns for everyday journeys. The chief elements of the proposed Residential Travel Plan can be broken down into the following physical measures:

- The provision of suitable walk / cycle routes within the development site area and connections to the immediate local highway network;
- Incorporation of dropped crossings and tactile paving at all arms of the proposed new site access roundabout to facilitate pedestrian movements to / from the site;

- The provision of a Travel Plan noticeboard within the development curtilage providing details of local public transport timetables, local connections, etc. It is anticipated that a noticeboard would also be provided during the site construction / management phases at the sales / site office to demonstrate to prospective residents the locational advantages of the site.

6.3 Operational Measures

6.3.1 For ease of reference, Operational Travel Plan measures that could be implemented have been grouped under the following key sub-headings:

- Encouraging efficient car use;
- Encouraging increased use of public transport;
- Encouraging increased use of walking; and
- Encouraging increased use of cycling.

6.3.2 **Information discussed under each heading should be provided to residents in a "New Buyers Welcome Pack"**. It is anticipated that this pack will be a useful tool in the promotion of the residential Travel Plan and would comprise:

- Information on the objectives of the Travel Plan;
- Short introductory note to accompany the Travel Plan pack to explain why the Travel Plan has been produced and detailing key contacts, including the Travel Plan Coordinator; and
- Demonstration of site accessibility and available local sustainable connections to local shops and services within promotional information supporting the development of the site, e.g. websites, development PR material, etc.

Encouraging Efficient Car Use

6.3.3 Promote information encouraging residents to join Liftshare Wales free car sharing scheme. Residents can register their details online, and the Liftshare Wales database

will return the contact details of potential car sharers, i.e. people who meet certain criteria such as living locally / on the way to your destination.

Encouraging Increased Use of Public Transport

- 6.3.4 Provide Local Public Transport route maps for the Wrexham area (as produced by the relevant bus operators / WCBC at the time of site occupation).
- 6.3.5 Promote information relating to the bus and council websites for access to online public transport information such as (<http://www.wrexham.gov.uk/>), online bus journey planners (e.g. <http://www.travelinecymru.co.uk> / also contact lthomas@travelinecymru.info and the National Rail website for on-line rail journey planners (<http://www.nationalrail.co.uk/>).

Encouraging Increased Use of Walking

- 6.3.6 Provide information about the local footpath network.
- 6.3.7 Provide information regarding the health benefits of walking, such as the 'Walking the Way to Health' scheme.
- 6.3.8 Provide information / maps of local shops and services within suitable walking distance of the proposal site.

Encouraging Increased Use of Cycling

- 6.3.9 Promote events such as National Bike Week where families, students and commuters are encouraged to leave their cars at home and try cycling. The TPC should liaise with Sustrans and promote any other relevant events (contact: glyn.evans@sustrans.org.uk).

- 6.3.10 Provide information concerning the health benefits of cycling, and direction to key information sources such as www.bike2work.info, www.sustrans.org.uk, <http://wrexham.cyclestreets.net/>, etc.

6.4 Plan Implementation

- 6.4.1 **All measures identified within sections 6.2 & 6.3 to this report will be demonstrated to be available at the date of first occupation of residential units at the Rhosrobin Site.**
- 6.4.2 **A suitable Travel Plan operating budget will be set aside to assist the delivery of the Travel Plan.** This budget will be utilised for promoting, encouraging and providing incentives for increasing sustainable travel at the Rhosrobin site. The funds could also be used for covering typical travel plan administration tasks such as the design and production of publicity material, maintenance of on-site sustainable travel infrastructure (Travel Plan Noticeboard, walking routes, signage etc.) and the production of site specific travel information.
- 6.4.3 **Monitoring of the use of the Travel Plan operational budget will be carried out by the TPC, with details of spending on travel initiatives and current budget position recorded within the annual Travel Plan Progress Report provided to the Taith RTPC.**

7.0 MONITORING PROGRESS

7.1 Introduction

7.1.1 In order to gain an understanding of the influence of the Travel Plan and to measure the Plan's progress in encouraging sustainable travel patterns, monitoring of resident travel trends at the Rhosrobin site will be undertaken at specified intervals.

7.1.2 Travel Questionnaires of residents and the undertaking of suitable traffic counts on the main site access road will be organised by the site TPC at set intervals following Travel Plan implementation, with results being submitted to the Taith RTPC within 1 month of survey completion, as part of a Travel Plan Performance Report (see Section 7.3).

7.1.3 It is proposed that the first Travel Survey exercise is undertaken following occupation of the first 50 dwellings, and comprises a Travel Questionnaire (similar to the template Travel Questionnaire provided in **Appendix TP2**), to be supplied to every occupied unit on the development scheme and an automatic traffic counter survey on the main site access road. A follow up Travel Survey would be undertaken on completion of the site building work and full occupation of all on-site units.

7.2 Travel Plan Targets

7.2.1 Section 1 to this report identifies that the key objectives of the Travel Plan is to reduce single occupancy car journeys and encourage increased use of a wide range of more sustainable travel modes. Targets for the Travel Plan have therefore been based on these key objectives.

7.2.2 As baseline travel trends for the Rhosrobin development are not currently available, a temporary target to seek to reduce car use at the proposal site to 5% below existing background travel trends for the local area (based on 2011 census travel trends) has been set. 2011 census travel trends for 'journey to work' movements with a home

origin within the local Gwersyllt East & South Electoral Division, identify the following mode share:

- Private Car (Driver, Passenger, Taxi): 88.1%
- Bus: 5.7%
- On foot: 4.0%
- Bicycle: 1.3%
- Train: 1.7%

7.2.3 Review of the 2011 Census data suggests that an initial target for this Travel Plan would be to reduce car use to circa 88.1% – 83.1%, with a corresponding increase in walking, cycling and public transport use.

7.2.4 Following the completion of the first Travel Survey exercise, it is proposed that this preliminary target is reviewed and that Specific, Measureable, Achievable, Realistic and Time Bound (SMART) targets are set, based upon the site specific baseline data. Any revised target will be included in the first Travel Plan Performance Report.

7.2.5 Progress towards targets will be monitored via regular update surveys, with short term targets acting as a guide to the progress of Travel Plan initiatives.

7.2.6 Should it become clear that any targets will not be achievable, or indeed have been met early, then they should be reviewed in conjunction with the Taith RTPC.

7.3 Review Procedure

7.3.1 Review of the operation of the Travel Plan will be undertaken by the site TPC in discussion with the Taith RTPC, based on the results of the monitoring survey programme where relevant. This review would assess the progress of the Travel Plan with respect to targets and consider the take up / effectiveness of individual measures. This review may identify areas within the Travel Plan which require changes or modification.

7.3.2 **To assist the review process, the site TPC will prepare an Annual Travel Plan Performance Report for submission to the Taith RTPC.** It is envisaged that the Annual Performance Report would comprise the following:

- The results of the most recent travel surveys with respect to targets;
- The current position of the Travel Plan operational budget;
- The general effectiveness of current initiatives within the Travel Plan;
- Those measures within the Travel Plan which are proposed to be continued into the next year / those measures to be dropped; and,
- Details of any new travel initiatives to be provided at Rhosrobin site.



FIGURES

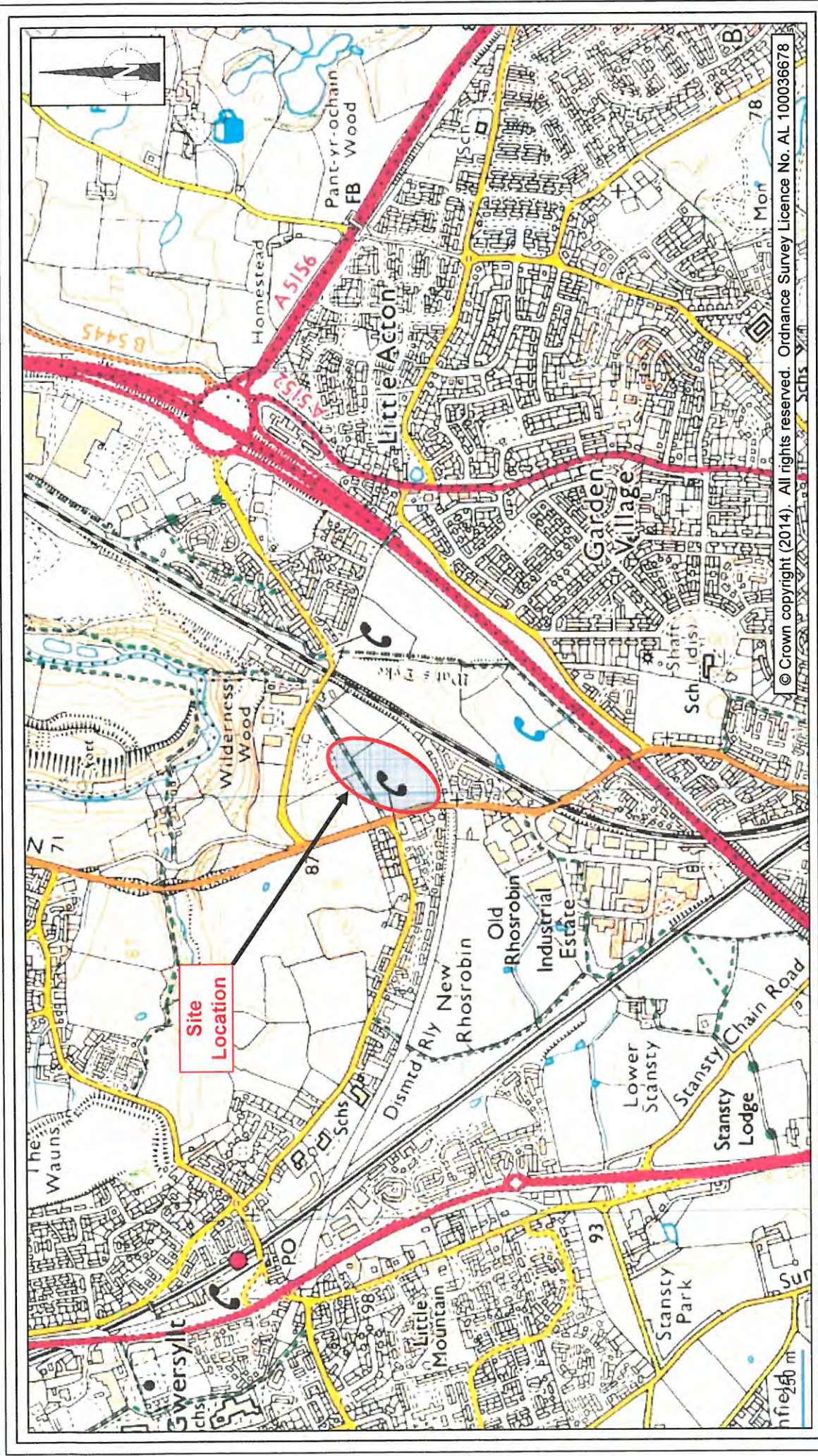


Figure TP1

Site Location: Strategic Context

axis

Camellia House
76 Water Lane,
Wilmslow
Cheshire, SK9 5BB

1520-01

Rhosrobin Residential Site, Wrexham

June 2014

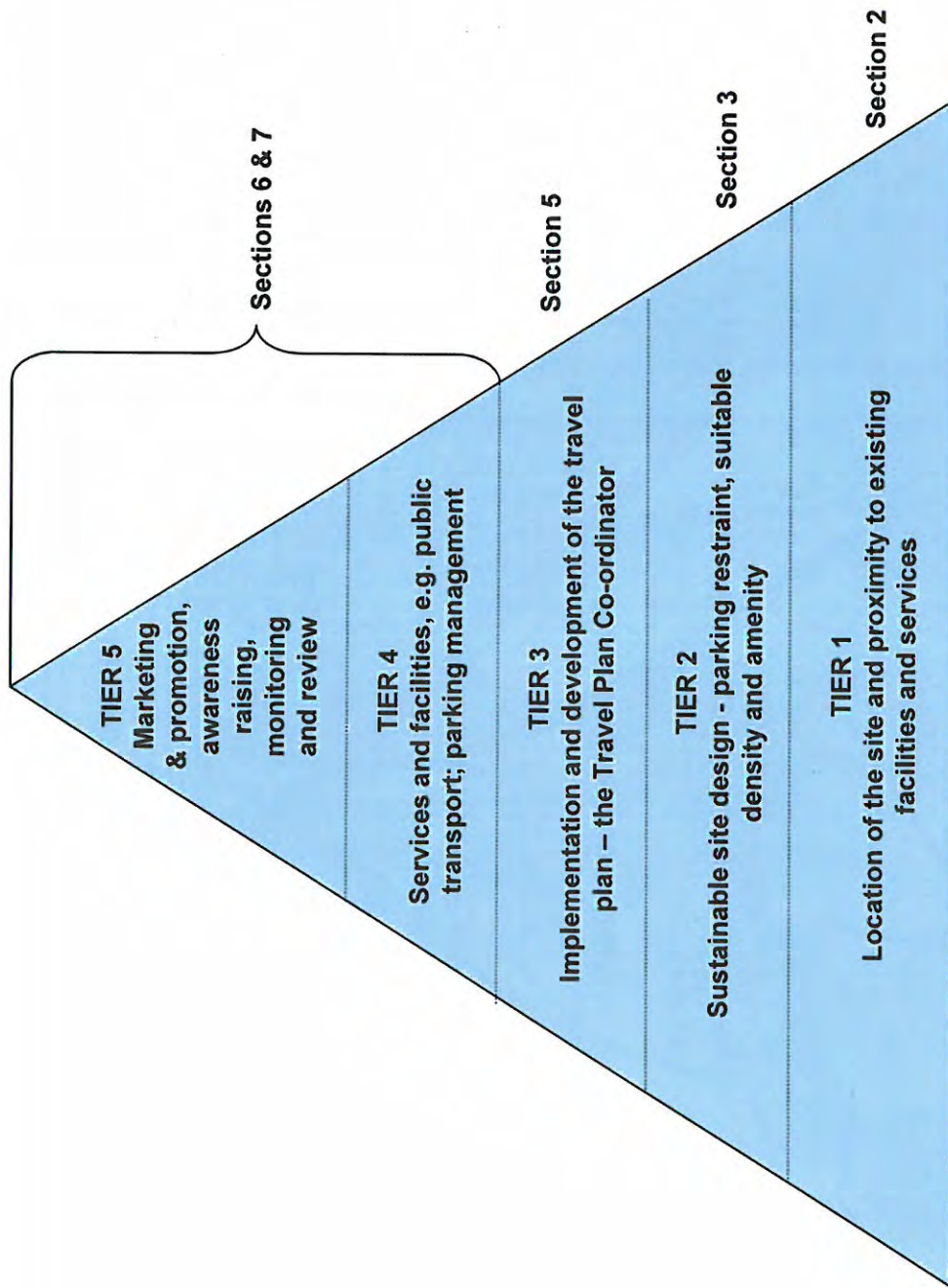


Figure TP2

1520-01

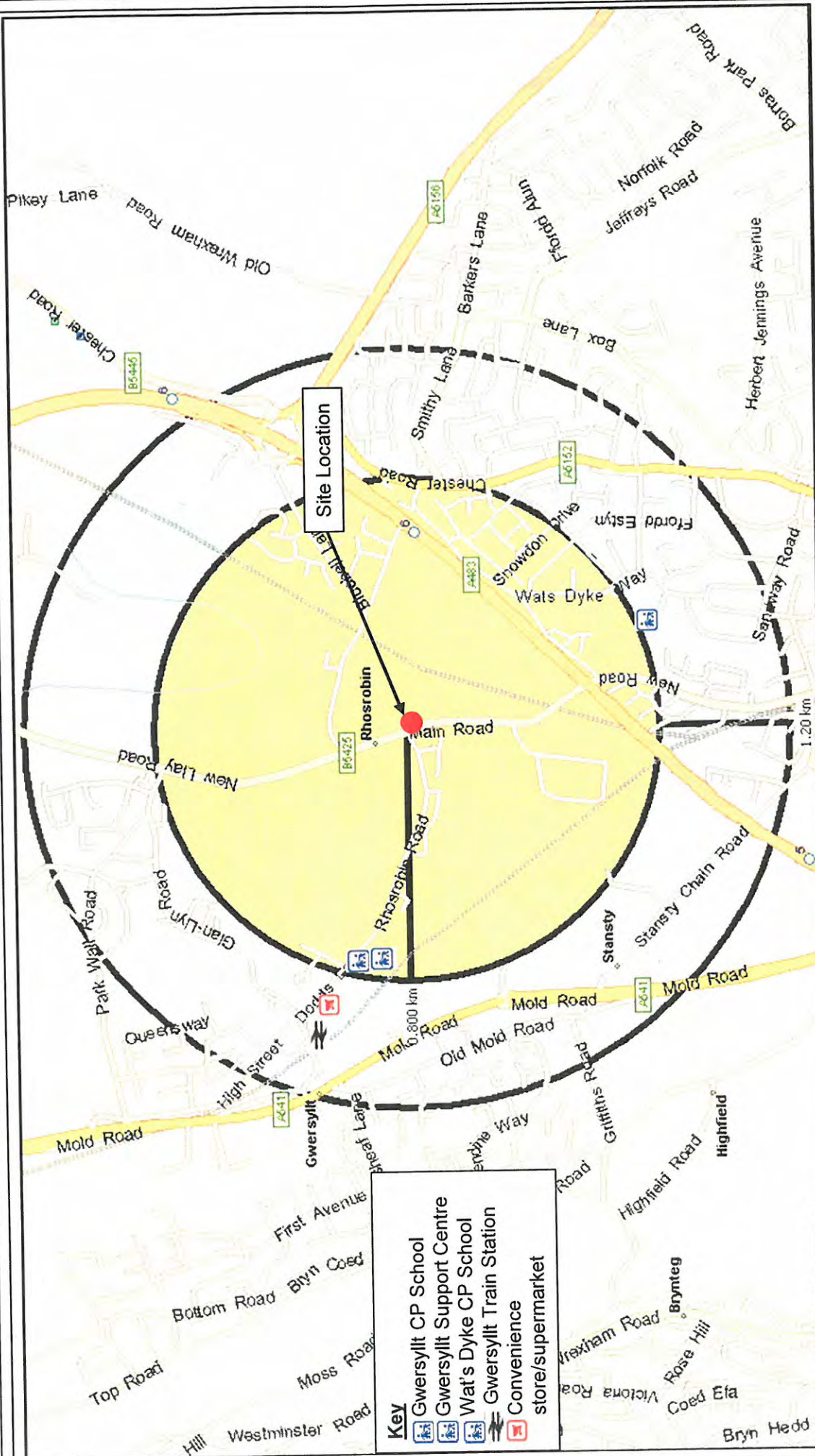
The Travel Plan Pyramid

Rhosrobin Residential Site, Wrexham

June 2014

axis

Camellia House
76 Water Lane,
Wilmslow
Cheshire, SK9 5BB



Camellia House
76 Water Lane,
Wilmslow
Cheshire, SK9 5BB

axis

'As the Crow Flies' Walking Catchment from the Proposal Site

June 2014

Rhosrobin Residential Site, Wrexham

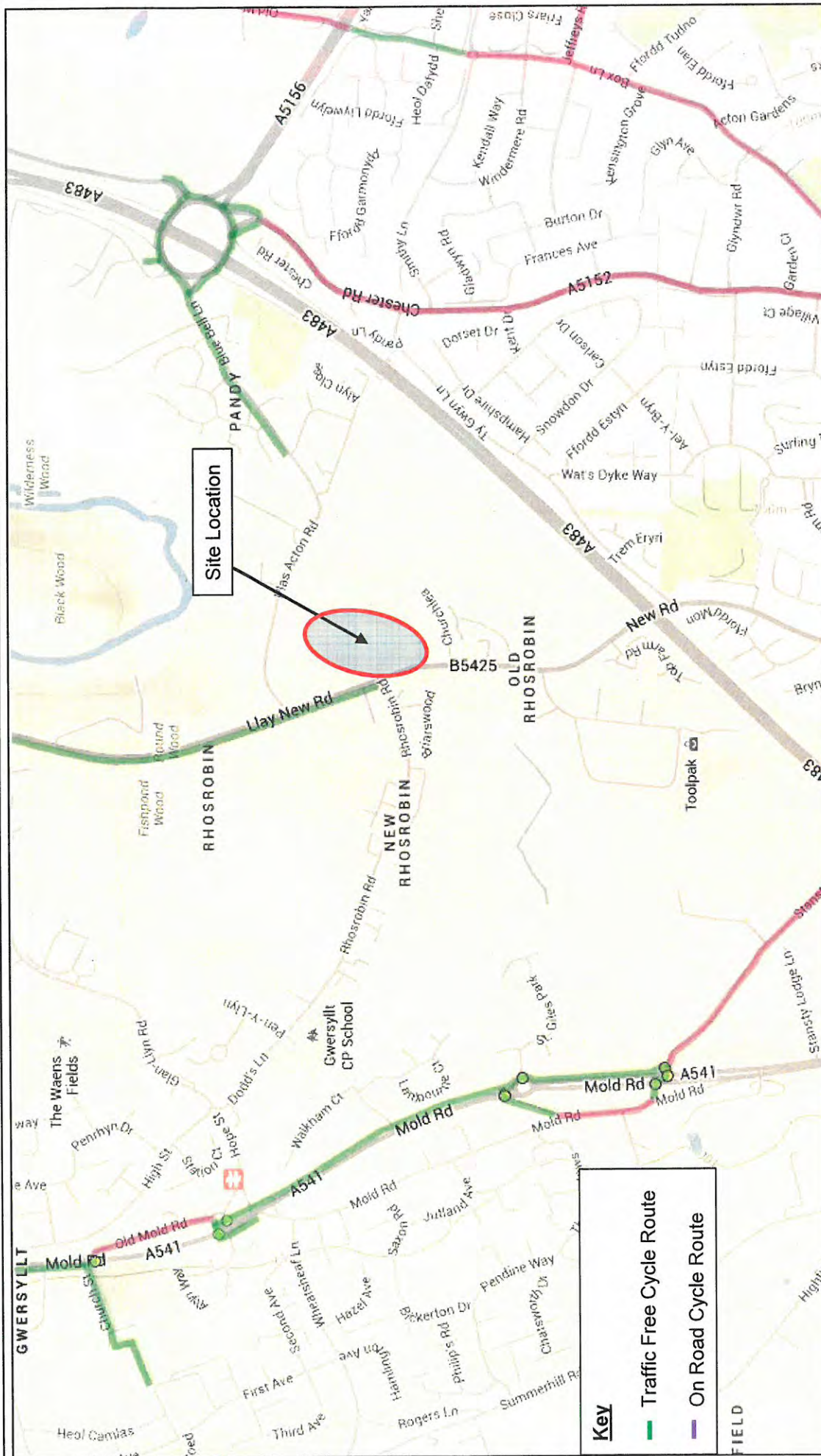


Figure TP5

Local Cycle Facilities in Vicinity of the Proposal Site

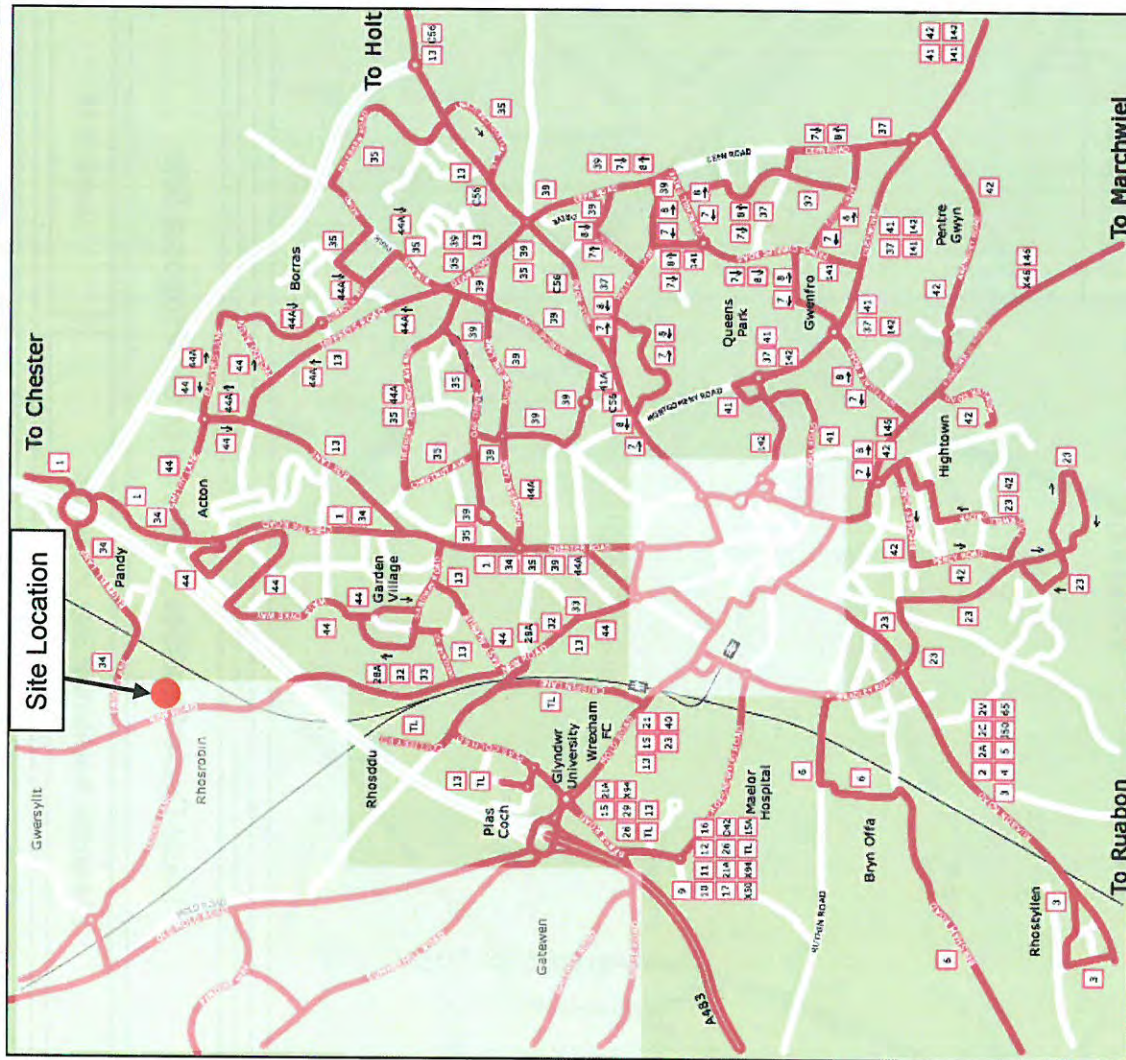
1520-01

Rhosrobin Residential Site, Wrexham

June 2014



Camellia House
76 Water Lane,
Wilmslow
Cheshire, SK9 5BB



Extract from wrexham.gov.uk

Figure TP6

1520-01

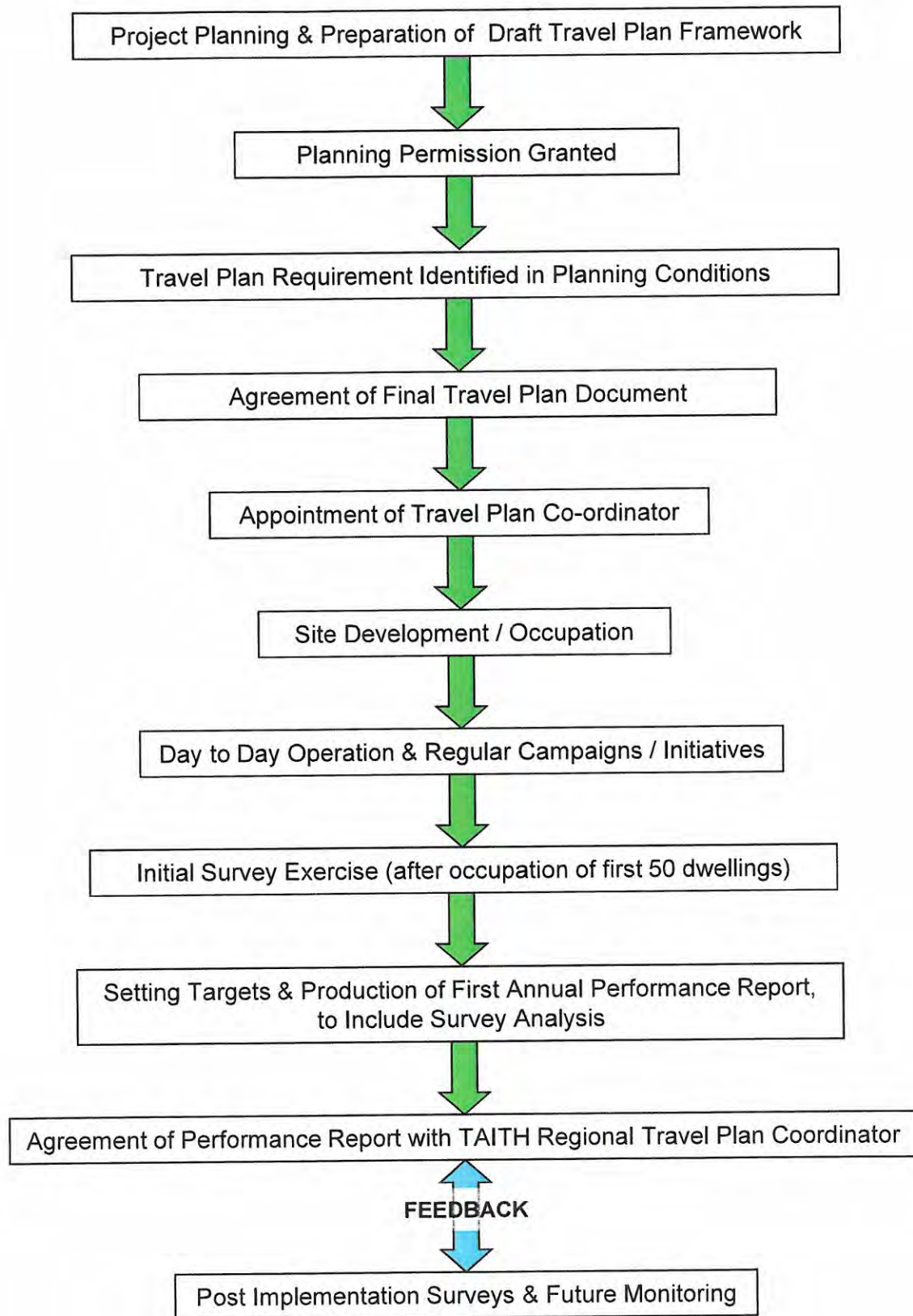
Local Public Transport Connections

Rhosrobin Residential Site, Wrexham

June 2014

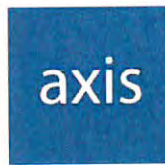


Camellia House
76 Water Lane,
Wilmslow
Cheshire, SK9 5BB





APPENDICES



APPENDIX TP1

RESIDENTIAL DEVELOPMENT, LLAY NEW ROAD, RHOSROBIN, WREXHAM

SCHEDULE OF TPC DUTIES / ACTION PLAN

Setting Up

Task	Implementation Date	Completed?
Maintain Travel Noticeboard at site office / sales office	Throughout main construction / sales period	
Appoint TPC	ASAP	
Provide TPC contact details to Taith RTPC	ASAP	
Set up Travel Plan Working File	ASAP	

Initial Site Travel Plan Launch

Task	Implementation Date	Completed?
Contact Wrexham CBC public transport officer / public transport operators and obtain up-to-date timetables and literature	3 weeks prior to first occupation on site	
Review walking and cycle provision on-site to ensure completion and fit for purpose	2 weeks prior to first occupation on site	
Collate resident welcome packs	1 weeks prior to first occupation on site	
Ensure Travel Plan Noticeboard is updated and in place	1 weeks prior to first occupation on site	

On-going duties (Over Life Time of Plan)

Task	Implementation Date	Completed?
Liaise with Taith RTPC and other TPC / groups where appropriate	As required	
Provide promotional Travel Data and health campaign information on display and keep up-to-date	Formal review every 3 months	
Ensure on-site cycle facilities and shared paths are maintained and fit for purpose	Formal review every 3 months	
Promote and support national campaigns	Review annually	

Initial Travel Patterns Survey

Task	Implementation Date	Completed?
Undertake survey of residents / commission ATC at site access	Following occupation of first 50 homes	
Submit survey review report to Taith RTPC / Wrexham CBC planning department	1 month post completion of initial survey	
Undertake Travel Plan Audit and modify where appropriate	Following Survey	
Update Travel Plan Noticeboard to reflect progress towards targets and objectives	Following Survey	

Further Monitoring: Development Completion

Task	Implementation Date	Completed?
Undertake survey of residents / commission ATC at site access	Two years post initial survey exercise.	
Submit survey review report to Taith RTPC / Wrexham CBC planning department	1 month post completion of survey	
Undertake Travel Plan Audit and modify where appropriate	Following Survey	
Update Travel Plan Noticeboard to reflect progress towards targets and objectives	Following Survey	



APPENDIX TP2

RESIDENT TRAVEL QUESTIONNAIRE

This travel survey is being undertaken amongst all residents of the Llay New Road, Rhosrobin site to gain an understanding of the existing travel patterns. This information will be used to help inform the Travel Plan for the site which will seek to promote alternative travel options to the private car.

The survey should be completed during the week commencing [DATE] and should only be completed **ONCE** by each resident age **16 OR OVER**. Please complete the survey based on your general travel habits on the basis of a typical journey. Once completed please return your survey form in the pre-paid envelope.

The information that you provide will be treated with the utmost confidentiality.

1. What is your home address?

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2. Are you:

Male ☐

Female ☐

3. How many other residents of age 16 or over live at your property?

None ☐

One ☐

Two or more ☐

4. Do you have a disability which affects your travel arrangements?

Yes ☐

No ☐

5. What mode of transport do YOU primarily use to:

	Travel to work?	Travel to education / childcare	Travel to Shopping
Walk	☐	☐	☐
Cycle	☐	☐	☐
Bus	☐	☐	☐
Train	☐	☐	☐
Car (Driver)	☐	☐	☐
Car (Passenger)	☐	☐	☐
Motorbike	☐	☐	☐
Don't make this journey	☐	☐	☐

	Travel to work?	Travel to education / childcare	Travel to Shopping
Walk	☐	☐	☐
Cycle	☐	☐	☐
Bus	☐	☐	☐
Train	☐	☐	☐
Car (Driver)	☐	☐	☐
Car (Passenger)	☐	☐	☐
Motorbike	☐	☐	☐
Don't make this journey	☐	☐	☐

7. On moving into your property you would have received a copy of a Travel welcome pack, which outlines the range of local travel opportunities available in the immediate vicinity of your new home. Did you find this welcome pack:

Very useful ☐

Quite useful ☐

Not very useful ☐

Not at all useful ☐

Do you have any comments on the contents of the welcome pack?

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8. Do you have any comments or ideas that you would like to tell us about your existing / future travel to work journey?

[illegible]

Thank you for completing this survey.

Please return the completed forms in the pre-paid envelope.

