PROPOSED COSTA DRIVE-THRU UNIT
PLAS COCH RETAIL PARK

TRANSPORT STATEMENT

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1.0 INTRODUCTION

1.1 This Transport Statement (TS) has been prepared by TTHC Ltd on behalf of Ediston Real Estate in association with a planning application for land at Plas Coch Retail Park in Wrexham, hereinafter referred to as ”the Site”.

1.2 The application proposes a drive-thru Costa Coffee unit with associated access and parking. The proposed Unit will compliment, and be integrated within, the existing surrounding Retail Park.

1.3 This TS provides further information under the following headings:

- Site Location & Accessibility;
- Development Proposals;
- Trip Generation;
- Transport Implications;
- Access, Parking and Servicing; and
- Summary and Conclusions.

2.0 SITE LOCATION & ACCESSIBILITY

2.1 The Site forms part of Plas Coch Retail Park, which is located approximately 1.5km to the north-west of Wrexham town centre.

2.2 The Retail Park is bordered to the West by the A483 and to the East by the B5101. To the South of the Retail Park is Mold Road and to the North of the Retail Park lies Ysgol Plas Coch.

2.3 The Site is shown in the context of its local surroundings in **Figure 1**. It is located to the north of the wider retail park area and is accessed via the Retail Park's internal road network, which includes a roundabout junction at its northern and southern end.

2.4 The northern roundabout provides access to the Site, via the northern arm. The internal road network is well lit and provides footways on both sides of the road, a cycle link is also provided in close proximity to the Site.

2.5 The Retail Park is accessed via a roundabout junction off the B5101. The roundabout is lit and provides dropped kerb pedestrian crossing facilities.

2.6 The B5101 is a single carriageway road subject to a 30mph speed limit, with street lighting and footways on both sides. In the vicinity of the Site the B5101 runs in a roughly north to south alignment, with residential areas to the north and a roundabout junction with Mold Road to the south, which in turn routes to Wrexham Centre to the east and the A483 to the west.

2.7 The A483 is a dual carriageway road that runs in a roughly north /south alignment and is subject to the national speed limit. When accessing Plas Coch Retail Park, drivers would exit via the Mold Road Interchange (Junction 4).

Walking and Cycling

2.8 The Institute of Highways and Transportation (IHT) produced 'Guidelines for Journeys on Foot' in 2000 which states that around 80% of walk journeys and walk stages are less than one mile (1.6km).

2.9 It is generally recognised that walking is the most important mode of travel at the local level, and has the greatest potential to replace car trips for distances up to 2 kilometres.

2.10 The distance that people are prepared to walk depends on the journey purpose. The IHT guidance also provides 'suggested acceptable walking distances'. The walking thresholds presented in **Table 1** are suggested:

Table 1: Suggested Acceptable Walking Distances

	Commuting, school and sightseeing (m)	Elsewhere (m)
Desirable	500	400
Acceptable	1000	800
Preferred maximum	2000	1200

2.11 The Site's 2km walking catchment extends to include the residential areas surrounding the Site and also encompasses Wrexham General and Central rail stations as well as New Broughton.

2.12 In relation to cycling, it is generally recognised that cycling can substitute car trips, particularly for journeys up to 5km.

2.13 The Site's 5km cycle catchment extends beyond the walk catchment to cover all of Wrexham, Brynteg, Coedpoeth, Gresford and Llay. The cycle network in the vicinity of the Site Is shown in **Appendix A**.

Public Transport

2.14 **Figure 2** shows the public transport connections serving the Site.

2.15 The closest bus stops to the Site are approximately 100m from the Site, located within the Retail Park. The Site therefore benefits from very convenient access to bus services. These stops are served by bus routes 12A, 13A and 21.

2.16 Routes 12A and 13A run between Wrexham Bus Station and Brymbo. These routes serve the nearby residential areas of New Broughton, Brynteg and Pentre Broughton; routeing via Mold Road and the B5101 out of Wrexham town centre before turning right onto Bryn Hedd and heading towards High Street.

2.17 Route 21 runs between Wrexham Bus Station and Summerhill, calling at Plas Coch Retail Park via Mold Road. This service follows Summerhill Road to the West of Mold Road Interchange before traversing the residential areas South East of Summerhill and calling in close proximity to Gwersyllt Train Station.

2.18 **Table 2** provides a summary of the bus service information.

Table 2: Local Bus Services

No.	Route	Monday-Friday daytime frequency	Saturday daytime frequency	Sunday Daytime Frequency
12A	Wrexham Bus Station/ Plas Coch/ Brymbo	Hourly	Hourly	Hourly
13A	Wrexham Bus Station/ Plas Coch/ Brymbo	2 per day	N/A	N/A
21	Wrexham Bus Station/ Plas Coch/Summerhill	Hourly	Hourly	Every 2 Hours

2.19 The closest rail station to the Site is Wrexham General, which is less than 1km from the Site, as the crow flies. The station provides links to Llandudno,

Holyhead, Cardiff Central and Bidston (Birkenhead). Trains run approximately every hour on weekdays, Saturdays and Sundays.

2.20 The above demonstrates that the Site is accessible by a range of non-car modes of transport. Given the nature of the proposed development, it is assumed that a large proportion of its customers will be car-based. However, the Site's accessibility by sustainable modes of travel will be particularly important for employees, who will access the site on a regular basis. The Site's accessibility by non-car modes of transport therefore provides significant potential for employees to travel by sustainable means.

3.0 DEVELOPMENT PROPOSALS

3.1 The proposed development would provide a Costa Coffee drive-thru unit with access, disabled parking, outdoor seating and landscaping. The unit would have a gross floor area of 167 sqm. The proposed development area currently comprises retail park car parking and landscaping. The layout of the proposed development is shown in **Appendix B.**

3.2 Vehicular access to the Site would be via the northern arm of the Retail Park's northern roundabout. This route would also serve the drive-thru entrance, which runs in a south to north direction such that access and egress from the drive thru will be consistent with the directional vehicle flow around the wider car park.

3.3 Servicing of the development would take place from the car park and would be by means of smaller commercial vehicles and vans. Articulated services vehicles are not expected to serve the Site.

3.4 Given the scale of the proposed development, and its location within an established retail park, it is not expected that the proposed development will have any material detrimental implications on the existing car park or on the operation of the surrounding highway network. The majority of customers are expected to already be visiting the Retail Park, and therefore they would have no impact on the external highway network.

3.5 Despite this, traffic flows and car parking surveys have been undertaken to consider these points and are discussed in the following Sections.

4.0 TRIP GENERATION

4.1 The proposed development comprises a 167sqm GFA Costa Coffee unit with drive-thru facility.

4.2 The vehicle trip generation of the proposed development has been calculated using the TRICS database, selecting sites in the 'Drive-thru' category with the following criteria:

- Excluding Greater London and Ireland;
- Restaurants up to 500 m^2 GFA;
- Excluding any town centre or edge of town centre sites;
- Surveys from year 2000 onwards to increase the number of relevant surveys.

4.3 TRICS does not contain data specifically relating to coffee shops. The category for fast food drive-through is the most closely related group to the proposed development. This category predominantly comprises surveys of McDonalds sites, but also includes some Burger King and KFC sites. As a consequence, we expect that this assessment methodology will overestimate the vehicular activity associated with the proposed development.

4.4 The majority of selected sites from the TRICS database are also located on busy road corridors and therefore attract significant passing trade. One site has been excluded as it is located within a roadside service area and therefore is not representative.

4.5 The peak vehicular activity during weekdays and Saturdays has been considered. Given that the main focus of a coffee shop is drinks rather than food, it is expected that the proposed development's customer activity would be more evenly spread throughout the day, and less 'peaky' than the TRICS restaurant profile. The resultant peak hour TRICS trip rates are detailed below, along with the corresponding number of trips for the proposed 167 m2 GFA unit. A copy of the TRICS output is provided in **Appendix C.**

Table 3: Fast Food Drive-Thru Trip Generation				
	Trip Rates (per 100 sq.m.)		Trip Generation (167 sq.m.)	
	IN	OUT	IN	OUT
Weekday 1200 – 1300 hrs	18.4	17.4	31	29
Saturday 1300 – 1400 hrs	25.7	27.0	43	45

4.6 The above shows that peak Site activity would occur during Saturdays, which is also expected to be the case for activity over the wider Plas Coch Retail Park. The above table indicates that the scale of peak activity in and out of the car park (assuming that all Retail Park customers move their car to the Costa Coffee unit, as opposed to walking across after visiting another unit) would be in the order of 43 vehicles in and 45 out over the course of the hour. As discussed, this is based on drive-thru restaurant activity and so is considered to be robust assessment for the proposed cafe-type facility. The above level of trip activity would easily be accommodated, both within the Site and at the Site access junction.

4.7 As discussed previously, the majority of customers are expected to already be visiting the Retail Park, and therefore they would have no impact on the external highway network. Even those who are classed as 'pass-by' customers would only result in a reallocation of a few turning movements at the roundabout access junction along the B5101. Beyond here, there would be no perceptible impact resulting from the proposed unit.

4.8 Given the nature of the proposed development, the assessment within this report has focussed on the Saturday peak hour between 11:30 – 14:30 as this is the period when most trips are likely to be generated.

‘Retail Park Pass-by’ and ‘Linked’ Trip Making

4.9 Being located in an established Retail Park, the majority of customers to the proposed unit will be shoppers already visiting the wider Retail Park (i.e. linked trips). These customers will not result in an increase in trips to the Retail Park; rather, their length of stay at the Retail Park will experience a slight increase.

4.10 Therefore, other than a few vehicle trips associated with Costa Coffee employees, the number of ‘new’ trips generated as a consequence of the proposed development is expected to be negligible.

4.11 However, for robustness in considering the Transport Implications of this development, we will assume that all trips to the proposed development will be ‘new’ trips on the highway network; i.e. that no linked trip making will occur. This is not expected to happen in reality, but will enable the testing of a ‘worst case scenario’.

4.12 The Site may also be served by an element of ‘pass-by’ trips from the B5101, subject to signage and advertising. Such movements would not result in an increase in trip-making; rather they would be a minor diversion to existing trips on the highway network; (i.e. trips made by those who would call into the site and then continue on their journey to a separate destination), which can equate for up to 90% of the associated trips with a drive-thru Costa Coffee.

4.13 These ‘passby’ trips are normally deducted from the trip generation quantities leaving a ‘primary’ trip figure of new trips that would be generated onto the network as a direct result of the development.

4.14 However, given the location of the proposed development, ‘passby’ trips are likely to form a much smaller proportion of trips to the Site (and therefore also into and out of the wider Retail Park) than for ‘normal’ Costa drive-thru facilities which are traditionally focussed on attracting passing trade and located along busy road corridors. This assessment with therefore assume that no linked trip making will occur.

4.15 As such, the trip generation used for the assessment of the proposed development will be that calculated by the TRICS database. This trip generation is in excess of what is expected to occur at the proposed development, but will represent a robust worst case scenario for assessment purposes.

4.16 The following section considers the transport implications of these trip generation assumptions.

5.0 TRANSPORT IMPLICATIONS

5.1 The access to the Site from the public highway network is via the B5101 roundabout junction. This roundabout has been assessed using TRL's ARCADY software to consider the implications of proposed development trips on the local highway.

5.2 As discussed, it is expected that the number of 'new' development trips will be negligible. On that basis, we would not typically undertake junction assessment work, as no material detrimental impact would be expected to occur. However, we have undertaken an assessment of the Retail Park access junction with the B5101 to assist in responding to pre-application comments from the Local Authority, which discussed the trip generation of the proposed development.

Base Traffic Flows

5.3 A Traffic Survey of the B5101 roundabout junction was undertaken on Saturday 13th January. The survey was undertaken during school term time, was not affected by a bank holiday and is expected to reflect typical trading activity.

5.4 Traffic growth factors have been calculated using TEMPRO software and applied to the north / south movements of the B5101 to represent a future base year of 2023. The assessment time period is between 11:45-12:45, which is the peak hour identified by the traffic survey data.

Junction Assessment

5.5 The operation of the roundabout junction has been assessed using TRL's ARCADY software, which has tested the junction using a 'surge' profile. This uplifts the central half hour of the peak flows by 12.5% on all approach arms simultaneously to create a 'peak within a peak'. This represents a robust assessment of the access junction.

5.6 The ARCADY results are summarised in **Table 4** below, with the full ARCADY output provided in **Appendix D.**

Table 4: Summary of the Access Roundabout ARCADY Results

	Base Scenario		Base + Development Scenario	
	RFC	**Max queue**	**RFC**	**Max queue**
B5101 North	0.55	1	0.58	1
University	0.16	1	0.19	1
B5101 South	0.85	5	0.87	6
Plas Coch Retail Park	0.53	1	0.56	1

5.7 The above shows that the roundabout is operating within capacity during the future year Base scenario peak hour. The approach with the greatest demand is the B5101 south, which shows a maximum queue of 5 vehicles.

5.8 The above also shows that the addition of development trips has a negligible effect on the roundabout's operation, both in terms of the RFC values and queue length. That level of changes in traffic conditions would be imperceptible in reality, and cannot be considered a material detrimental impact on the operation of the highway network.

5.9 It should also be remembered that the above assessment has been based onerous conditions which represent a 'worst case' scenario. The traffic impact of the proposed development is expected to be much lower than the above in reality.

6.0 CAR PARKING IMPLICATIONS

6.1 As discussed, the proposed development area currently comprises retail park car parking and landscaping. In response to feedback from pre-application discussions with the Local Authority, a survey of the existing car park has been undertaken to consider the implications of the proposed development on the operation of the existing car parking area.

6.2 The proposed development will provide new parking spaces within its plot, including disabled parking spaces close to the building entrance. However, given that the proposed development will be located on areas currently used for parking, it would result in a net reduction of 24 parking spaces for Plas Coch Retail Park. An assessment of the existing parking activity has therefore been undertaken, to consider whether the proposed development would have any material adverse implications on the operation of the existing car park.

Parking Survey

6.3 An occupancy survey of the car park surrounding the proposed development was undertaken on Saturday 13th January. The survey was undertaken during school term time, was not affected by a bank holiday and is expected to reflect typical trading patterns.

6.4 The car park occupancy levels were analysed during 5-minute intervals between the hours of 11:30 and 14:30, which the traffic survey has identified as the peak trading period. The parking accumulation profile, and peak parking accumulation level, during this period has been calculated.

6.5 The peak car park occupancy occurred between 12:35 and 12:40, when 169 vehicles were parked. If we assume that all the disabled parking remained empty during that period (a worst case assumption), then the car park would have 161 standard parking spaces available during its peak occupancy period.

6.6 When the parking accumulation profile is considered, the peak accumulation level occurs during a single 5 minute period; either side of that peak the number of parked vehicles is lower. For the majority of the Saturday peak hour there are 180 or more parking spaces unoccupied. A graph of the parking profile, including the number of spaces available, is shown in **Appendix E**.

6.7 The implications of the proposed development on parking space availability will now be considered.

'Parking Implications'

6.8 The construction of the proposed development will result in a net reduction of 24 parking spaces. The operation of the proposed development may also result in an increase in vehicle parking, or an increase in 'dwell time' of existing parked vehicles, which can affect parking space availability and are considered further below.

6.9 As discussed, it is not expected that the proposed development would generate any significant increase in parking demand; rather it is expected that the majority of customers will be linked to those already visiting other destinations within the Retail Park.

6.10 However, in order to consider a robust assessment, the trip generation figures in **Section 4, (Table 3),** have been considered as 'new' trips to the proposed development, and incorporated within the parking accumulation calculations. We have also assumed that <u>all</u> of this total hourly trip generation will be parked on-site during the peak car park accumulation period (between 12:35 and 12:40), which is not likely in reality.

6.11 The result of the above approach shows that, taking into account the net reduction in car park spaces and an onerous increase in proposed development-related parking activity, the car park would have 31% of its spaces unoccupied during the car park's peak 5 minute period. This equates to 94 available car parking spaces. As discussed, the parking profile shows

that spare parking availability would be greater than this either side of the peak and also for the majority of the peak hour.

6.12 The above demonstrates that, post-development, the Retail Park's car park would have sufficient spare parking to retain normal operation; even during its peak period of accumulation. It should be remembered that a greater level of spare car parking is expected in reality.

7.0 SUMMARY AND CONCLUSIONS

7.1 This Transport Statement has been prepared by TTHC Ltd on behalf of Ediston Real Estate in association with a planning application for land at Plas Coch Retail Park in Wrexham.

7.2 The application proposes a drive-thru Costa Coffee unit with associated access and parking. The proposed Unit will compliment, and be integrated within, the existing surrounding Retail Park. The unit would have a gross floor area of 167 sqm.

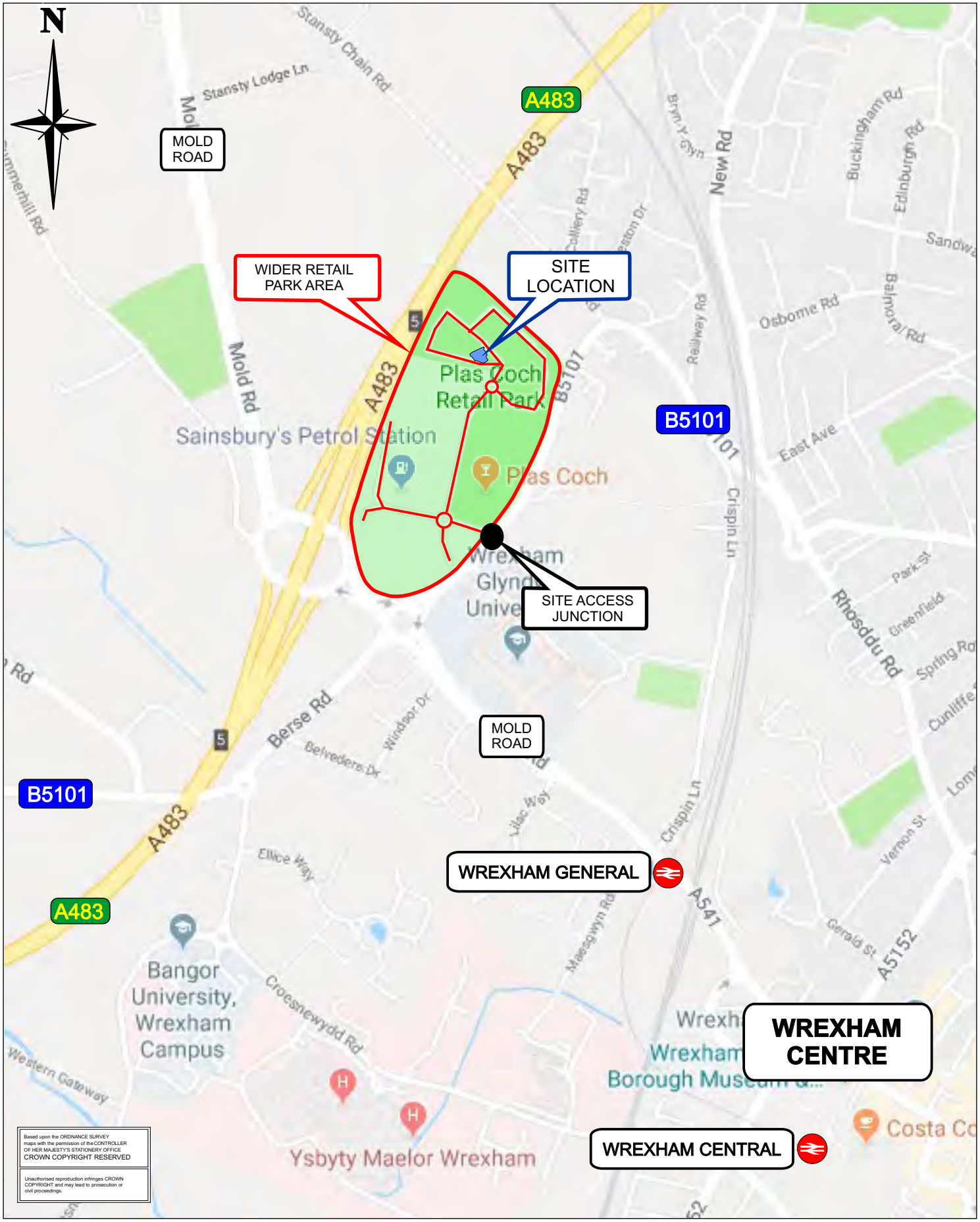
7.3 The Site is accessible by a range of non-car modes of transport; access to sustainable travel will be particularly important for employees, who will access the site on a regular basis.

7.4 The proposed development area currently comprises retail park car parking and landscaping. In response to feedback from pre-application discussions with the Local Authority, a survey of the existing car park has been undertaken to consider the implications of the proposed development during peak accumulation periods. This work has concluded that the Retail Park's car park would retain sufficient spare parking during its period of peak accumulation to retain normal car park operation.

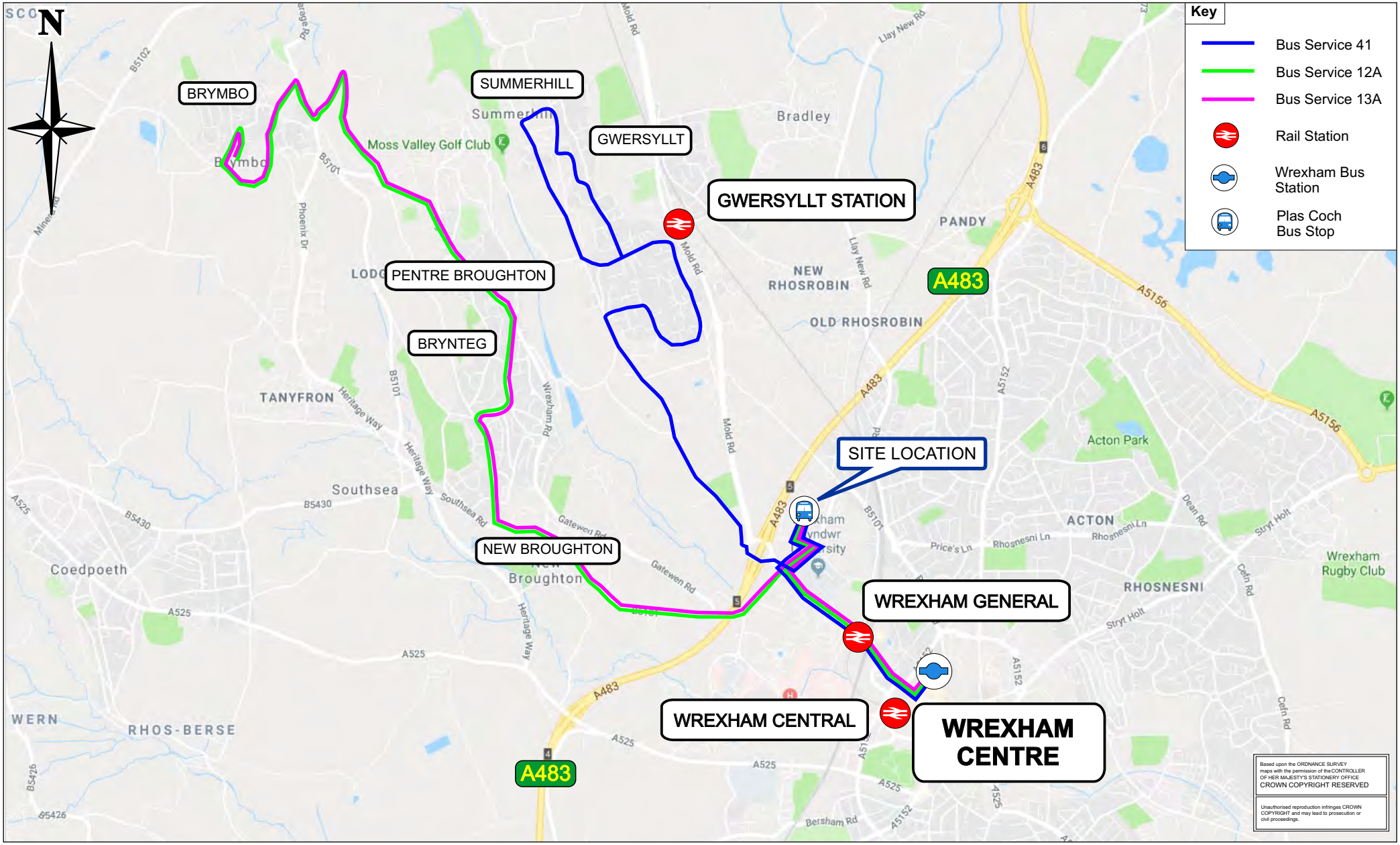
7.5 An assessment of the Retail Park's access junction with the B5101 was undertaken in response to pre-application comments from the Local Authority, which discussed the trip generation of the proposed development. This work has concluded that the proposed development would have no material detrimental implications for the local highway network, despite the assessment being based on robust assumptions.

7.6 In conclusion, there are no transport-related reasons to prevent the granting of planning permission for the proposed development.

Figures



tthc the Traffic, Transport & Highway Consultancy	Drawing No 17137-C-001	Rev .	PLAS COCH RETAIL PARK - COSTA DRIVE-THRU	
	Date 04.01.18	Rev Date .	SITE LOCATION	
	Drawn By WHS	Authorised JE	Scale NTS	**FIGURE 1**



tthc the Traffic, Transport & Highway Consultancy	Drawing No 17137-C-002	Rev .	PLAS COCH RETAIL PARK - COSTA DRIVE-THRU
	Date 04.01.18	Rev Date .	PUBLIC TRANSPORT CONNECTIONS
	Drawn By WHS	Authorised JE	Scale NTS	**FIGURE 2**

Appendix A

Wrecsam / Wrexham

Mae pob sgwâr grid ar y map hwn yn cynrychioli 1km (0.6 milltir)
Each grid square on this map represents 1km (0.6 miles)

Tua 10 munud
Approximately 10 minutes

Tua 4 munud
Approximately 4 minutes

Bradley
Gwersyllt
New Rhosrobin
Rhosddu Industrial Estate
Garden Village
Pandy
Little Acton
Borras
Acton
Acton Park
Stansty
Plas Coch
Rhosddu
Rhosnesni
Hightown
Bellevue Park
The Dunks
Whitegate Industrial Estate
Kings Mill
Pentre Gwyn
Llwyn-Onn
Rhostyllen
Wrexham Cemetery
Erddig Country Park
Erddig (N.T)
Island Green Retail Park
Eagle Meadows Retail Park
Caia Park
Queensway Sports Complex
Wrexham Maelor Hospital
Wrexham FC
Glyndwr University
Central Retail Park
Border Retail Park
The Flash
Pant yr Ochain
Gresford Industrial Estate
To Alyn Waters Country Park
To Alyn Waters Country Park / Llay
To Gresford
To Gresford / Marford
To New Broughton / Brymbo
To Bersham / Johnstown
To Ruabon
To Wrexham Industrial Estate
Wrexham Rugby Club

Llwybr Beicio Cynghorol/ Di-draffig
Cycle Route Advisory / Traffic Free
Stryd i Gerddwyr
Pedestrian street
Parth 20mya
20mph zone
Llwybr troed
Footpath
Llwybr arfaethedig
Proposed route
Ysgol
School
Coleg
College
Ysbyty
Hospital
Man Addoli
Place of Worship
Siopau / Ardal siopa
Shops / Shopping area
Gwybodaeth i dwristiaid
Tourist information
Canolfan Hamdden
Leisure Centre
Gorsaf drenau
Train station
Croesfan twcan
Toucan crossing
Croesfan i gerddwyr
Pedestrian crossing
Groesfan
Level crossing
Gorsaf fysiau
Bus station

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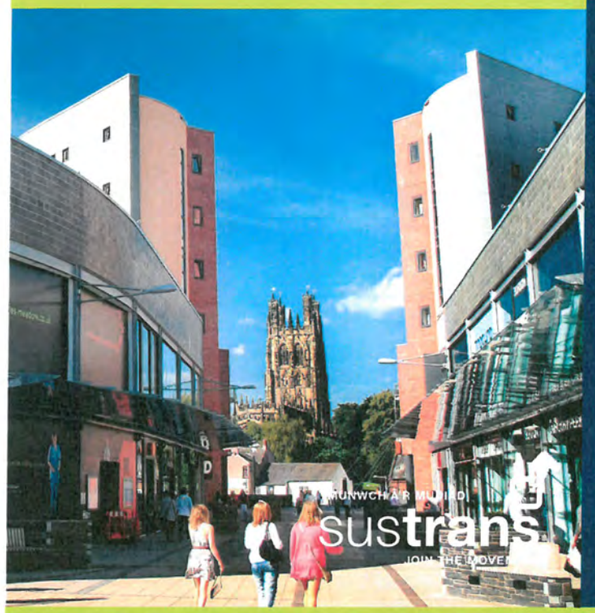

MAP TEITHIO BYW / ACTIVE TRAVEL MAP

Ystad Ddiwydiannol Wrecsam / Wrexham Industrial Estate

Cysylltu eich siwrnai

Cerdded a beicio

Sustrans. Porwch, lawrlwythwch a chreu mapiau ar-lein o lwybrau cerdded a beicio lleol eich hun. Gallwch hefyd blotio eich siwrnai er mwyn ei rhannu gyda ffrindiau a theulu.
www.sustrans.org.uk/maps Ffôn: **0845 113 0065**
Dewch i ddarganfod y gorau o'r Rhwydwaith Beicio Cenedlaethol yng Wrecsam ar ein gwefan:
www.sustrans.org.uk/walesroutes
Am ragor o fanylion ar lwybrau cerdded a beicio yn Wrecsam: **http://www.sustrans.org.uk/wales/national-cycle-network/free-leaflets-and-maps**

Trên a bws

I gael gwybodaeth teithio cysylltwch â **Traveline Cymru**, y gwasanaeth gwybodaeth trafnidiaeth gyhoeddus ar gyfer Cymru.
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Sustrans yw'r elusen sy'n galluogi pobl i deithio ar droed, beic neu drafnidiaeth gyhoeddus ar gyfer rhagor o'r si-wrneiau a wnawn bob dydd. Mae ein gwaith yn ei gwneud hi'n bosibl i bobl ddewis siwrneiau iachach, glanach a rhatach gyda gwell lleoedd a gofodau i symud drwyddynt a byw ynddynt.

Mae'n bryd i ni gyd wneud dewisiadau gwell yn y ffordd yr ydym yn teithio. Cymerwch y cam a chefnogwch Sustrans heddiw.

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Rhesymau da dros deithio o gwmpas ar droed, beic, bws neu drên

Er budd eich iechyd a'ch lles

Mae cerdded a beicio i'r gwaith, i'r siopau neu i ymweld â ffrindiau a theulu yn ffyrdd ardderchog i gynnwys gweithgaredd corfforol rheolaidd yn eich trefn arferol bob dydd. Gall hyn eich cynorthwyo i losgi calorïau, lleihau colesterol a gostwng pwysedd gwaed. Mae gweithgaredd corfforol rheolaidd hefyd yn gwella eich hwyliau, eich teimlad o les a gall gynorthwyo i roi hwb i'ch hunan-barch.

Ar y bws neu'r trên, fe gewch amser i fwynhau'r daith - gwrando ar gerddoriaeth, ymgolli mewn llyfr da neu sgwrsio - a thrwy roi gorffwys i'ch cerbyd gallwch arbed arian hefyd!

Er budd yr amgylchedd

Drwy fynd ar y trên neu'r bws rydych yn lleihau eich allyriadau carbon gan rhwng chwech ac wyth gwaith o gymharu â mynd mewn car. Yn well byth, nid yw cerdded a beicio yn cynhyrchu allyriadau carbon. Mae llai o geir ar y ffordd hefyd yn golygu amgylchedd mwy diogel, yn arbennig ar gyfer plant, a lle mwy pleserus i bawb ohonom.

Er mwyn arbed arian

Un o fanteision teithio o gwmpas o dan eich grym eich hun yw ei fod yn eithriadol o rad. Dim treth car, dim MOT a dim gofidiau petrol. Os byddwch yn cerdded neu'n beicio'n rheolaidd fe arbedwch ffortiwn!

Good reasons to get around by foot, bike, bus or train

For your health and well-being

Walking and cycling to work, the shops, or to visit friends and family are great ways to fit regular physical activity into your daily routine. This can help you burn calories, reduce cholesterol and lower blood pressure. Regular physical activity also improves your mood, your sense of well-being and can help boost self-esteem.
On the bus or train, you'll have time to enjoy the journey – listen to music, read a good book or have a chat - and by giving your vehicle a well deserved rest, you can save money too!

For the environment

By taking a train or bus you reduce your carbon emissions by between six and eight times compared to going by car. Even better, walking and cycling do not produce any carbon emissions. Fewer cars on the road also mean a safer environment, particularly for children, and a more pleasant place for us all.

For saving money

One of the things about getting around under your own steam is that it's really cheap. No car tax, no MOT and no petrol price worries. If you walk or cycle regularly you'll save a fortune!

Connecting your journey

Walking and cycling

Sustrans. Browse, download and create online maps of local walking and cycling routes. You can also plot your journey to share with friends and family.
www.sustrans.org.uk/maps Tel: **0845 113 0065**
Discover the very best of the National Cycle Network in Wales on our website:
www.sustrans.org.uk/walesroutes
For further details on walking and cycling routes in Wrexham: **http://www.sustrans.org.uk/wales/national-cycle-network/free-leaflets-and-maps**

Train and bus

For travel information contact **Traveline Cymru**, the public transport information service for Wales. Visit **www.traveline-cymru.info** or call **0871 200 22 33** for bus, coach and rail service details.

A ddatblygwyd fel rhan o'r prosiect Live Well, Gwaith dda gyda chylliid gan Lywodraeth Cymru.
Developed as part of the Live Well, Work Well project with funding from the Welsh Government.

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Cover photo: © Crown Copyright (2014) Wrexham County Borough Council
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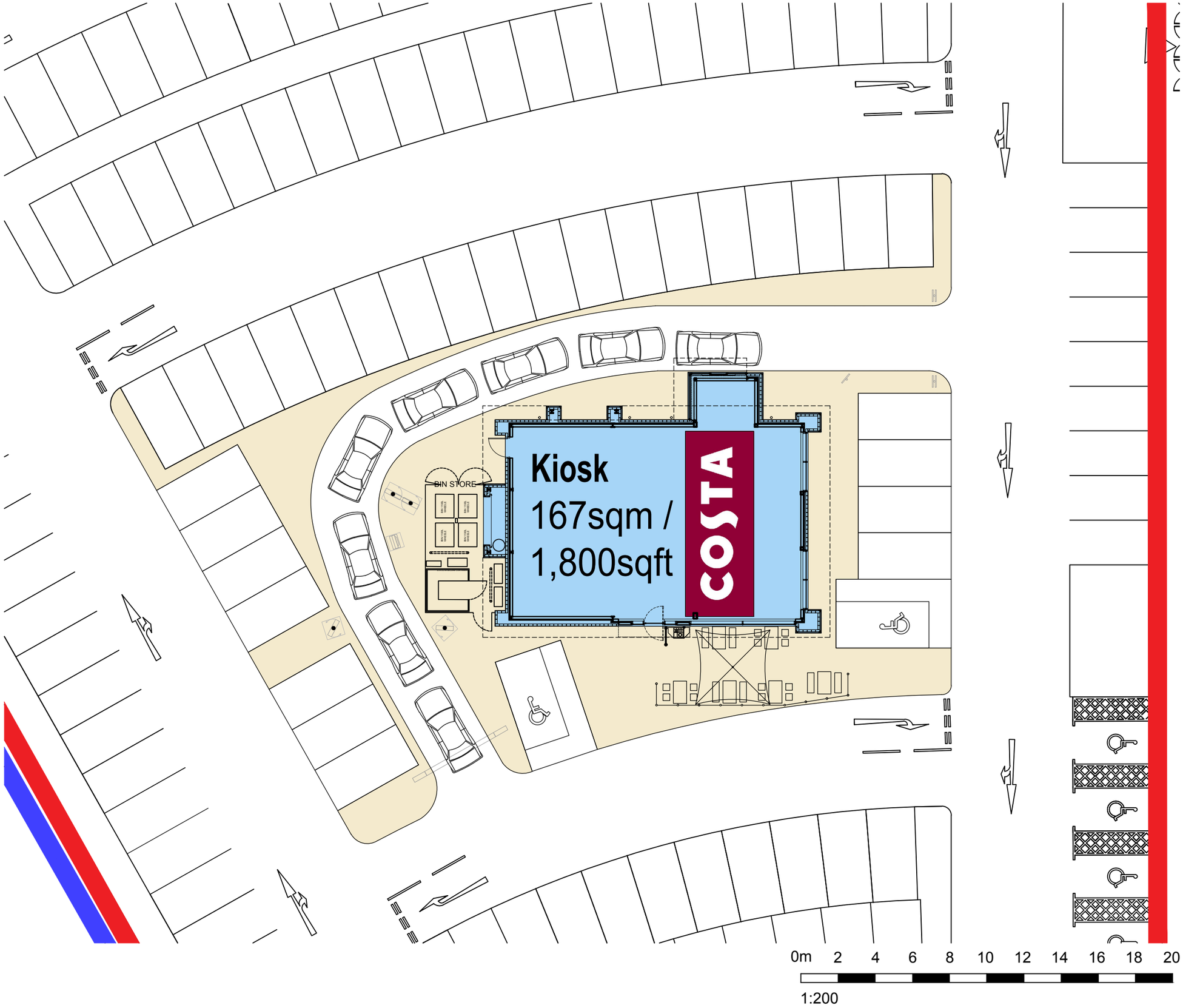
Appendix B



2. All sizes to be checked on site prior to construction.
3. This drawing is the copyright of the author.

Ownership Boundary
(8.45 Acres / 3.42 Hectares)

Application Boundary
(1.92 Acres / 0.78 Hectares)

Development Schedule

Existing Parking Spaces (within implied boundary): **289**

Proposed Parking Spaces (within implied boundary): **265**
Deficit: -24

A	18/04/18	External Seating Amended	CEM
	14/03/2018	PLANNING APPLICATION ISSUE	SMc

smith design associates

Glasgow Leatherhead Dumfries
16 Lynedoch Crescent, Glasgow G3 6EQ 0141 353 3501
glasgow@smithdesign.co.uk www.smithdesign.co.uk

client: Ediston Real Estate

project: Plas Coch Retail Park
Wrexham, Wales

drawing: Proposed Site Plan
Building Site

original size: A3

scale: 1:200

drawn: SMc

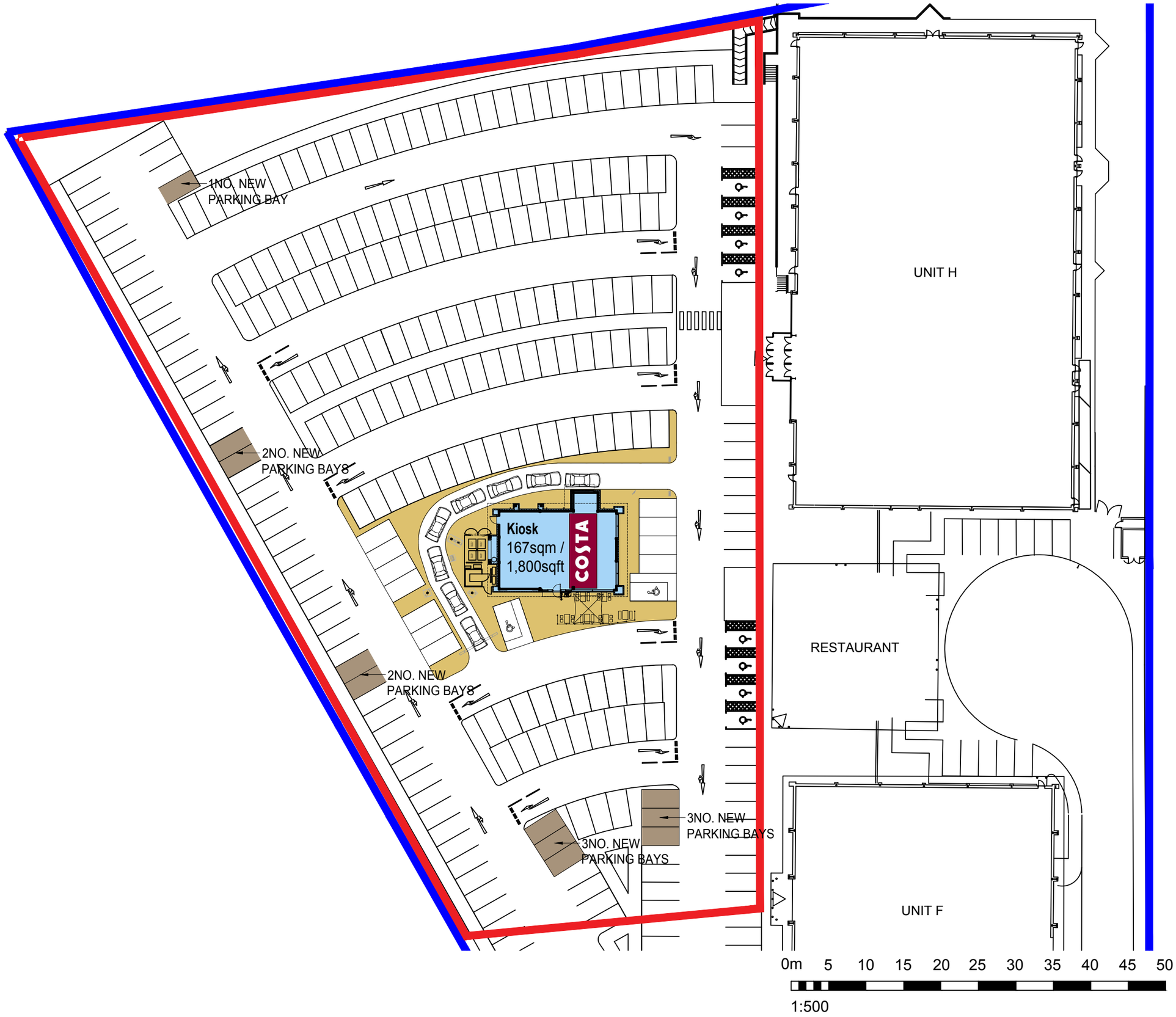
date: 07.03.18

checked: AD

status: PLANNING

passed: AD

job no.	drawing no.	revision
G2717	AL(0)005	A



2. All sizes to be checked on site prior to construction.
3. This drawing is the copyright of the author.

Ownership Boundary
(8.45 Acres / 3.42 Hectares)

Application Boundary
(1.92 Acres / 0.78 Hectares)

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Proposed Parking Spaces (within implied boundary): **265**

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A	18/04/18	External Seating Amended	CEM
	14/03/2018	PLANNING APPLICATION ISSUE	SMc

smith design associates

Glasgow Leatherhead Dumfries
16 Lynedoch Crescent, Glasgow G3 6EQ
glasgow@smithdesign.co.uk
0141 353 3501
www.smithdesign.co.uk

client: Ediston Real Estate

project: Plas Coch Retail Park
Wrexham, Wales

drawing: Proposed Site Plan
original size: A3

scale: 1:500
drawn: SMc

date: 07.03.18
checked: AD

status: PLANNING
passed: AD

job no. G2717
drawing no. AL(0)003
revision A

Appendix C

TRICS 7.3.3

Trip Rate Parameter: Gross floor area

Selection

GFA up to 500 sqm | Exc GL & Ireland

Back to Yr 2000 | No tc, edge tc

(site HC-06-D-01 nr Romsey excluded as at Service Area)

SATURDAY — FOOD & DRINK/D - FAST FOOD - DRIVE THROUGH

Ranking Type: TOTALS Time Range: 13:00-14:00

85th/15th Percentile Survey Not Highlighted

Rank	Site Ref	Description	Town/City	GFA	Day	Date	Arrivals	Departures	Totals
1	CE-06-D-01	MCDONALD'S	ABERYSTWYTH	350	Saturday	09/05/2015	36.857	42.286	79.143
2	HF-06-D-01	MCDONALDS	HERTFORD	326	Saturday	22/03/2003	39.264	37.73	76.994
3	DC-06-D-01	MCDONALDS	CHRISTCHURCH	498	Saturday	04/10/2003	26.506	27.912	54.418
4	TW-06-D-01	KFC	NEWCASTLE	317	Saturday	14/11/2015	18.612	20.505	39.117
5	NW-06-D-01	KFC	NEWPORT	341	Saturday	16/10/2010	17.009	16.422	33.431
6	LC-06-D-03	BURGER KING	BLACKBURN	255	Saturday	08/11/2003	16.078	16.863	32.941
						Average	**25.72**	**26.95**	**52.67**
				167	sqm		43	45	88

WEEKDAY — FOOD & DRINK/D - FAST FOOD - DRIVE THROUGH

Ranking Type: TOTALS Time Range: 12:00-13:00

85th/15th Percentile Survey Not Highlighted

Rank	Site Ref	Description	Town/City	GFA	Day	Date	Arrivals	Departures	Totals
1	NR-06-D-01	MCDONALDS	NORTHAMPTON	220	Tuesday	22/05/2007	36.364	35.909	72.273
2	BR-06-D-01	MCDONALD'S	BRISTOL	210	Monday	21/09/2015	33.333	32.381	65.714
3	FI-06-D-01	MCDONALDS	GLENROTHES	283	Tuesday	26/06/2001	25.795	25.088	50.883
4	CO-06-D-01	MCDONALD'S	ABERGELE	410	Friday	21/10/2011	26.098	22.683	48.781
5	DC-06-D-01	MCDONALDS	CHRISTCHURCH	498	Thursday	09/10/2003	19.88	14.659	34.539
6	EB-06-D-01	MCDONALDS	EDINBURGH	475	Wednesday	18/06/2008	13.474	13.263	26.737
7	WM-06-D-01	BURGER KING	BIRMINGHAM	250	Tuesday	25/11/2008	8.8	11.2	20
8	SO-06-D-01	MCDONALD'S	SLOUGH	480	Wednesday	21/11/2012	8.958	8.542	17.5
9	SY-06-D-01	KFC	BARNSLEY	360	Thursday	10/04/2003	7.5	6.667	14.167
10	CA-06-D-01	MCDONALDS	CAMBRIDGE	450	Wednesday	19/10/2011	3.333	3.333	6.666
						Average	**18.35**	**17.37**	**35.73**
				167	sqm		31	29	60

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 06 - HOTEL, FOOD & DRINK
Category : D - FAST FOOD - DRIVE THROUGH
VEHICLES

Filtering Stage 2 selection:

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

Parameter:	Gross floor area
Actual Range:	255 to 498 (units: sqm)
Range Selected by User:	182 to 500 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/00 to 14/11/15

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

Selected survey days:

Saturday	6 days

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

Selected survey types:

Manual count	6 days
Directional ATC Count	0 days

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

Selected Locations:

Suburban Area (PPS6 Out of Centre)	1
Edge of Town	3
Neighbourhood Centre (PPS6 Local Centre)	2

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

Selected Location Sub Categories:

Industrial Zone	1
Commercial Zone	1
Residential Zone	1
Retail Zone	2
Built-Up Zone	1

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

LIST OF SITES relevant to selection parameters

1 CE-06-D-01 MCDONALD'S CEREDIGION
FFORDD PARC Y LLYN

ABERYSTWYTH
Edge of Town
Retail Zone
Total Gross floor area: 350 sqm

2 DC-06-D-01 MCDONALDS DORSET
SOMERFORD ROAD
SOMERFORD
CHRISTCHURCH
Neighbourhood Centre (PPS6 Local Centre)
Industrial Zone
Total Gross floor area: 498 sqm

3 HF-06-D-01 MCDONALDS HERTFORDSHIRE
HERTFORD RUSH GREEN
RUSH GREEN
HERTFORD
Edge of Town
Residential Zone
Total Gross floor area: 326 sqm

4 LC-06-D-03 BURGER KING LANCASHIRE
LOWER AUDLEY
WATERSIDE
BLACKBURN
Suburban Area (PPS6 Out of Centre)
Commercial Zone
Total Gross floor area: 255 sqm

5 NW-06-D-01 KFC NEWPORT
SPYTTY ROAD

NEWPORT
Edge of Town
Retail Zone
Total Gross floor area: 341 sqm

6 TW-06-D-01 KFC TYNE & WEAR
CLIFFORD STREET
BYKER
NEWCASTLE
Neighbourhood Centre (PPS6 Local Centre)
Built-Up Zone
Total Gross floor area: 317 sqm

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

MANUALLY DESELECTED SITES

Site Ref	Reason for Deselection
HC-06-D-01	within service area

RANK ORDER for Land Use 06 - HOTEL, FOOD & DRINK/D - FAST FOOD - DRIVE THROUGH

VEHICLES

Ranking Type: TOTALS Time Range: 13:00-14:00

WARNING: Using 85th and 15th percentile highlighted trip rates in data sets of under 20 surveys is not recommended by TRICS and may be misleading.

15th Percentile = No. 5 NW-06-D-01 Tot: 33.431

85th Percentile = No. 2 HF-06-D-01 Tot: 76.994

Median Values		Mean Values	
Arrivals:	22.559	Arrivals:	25.721
Departures:	24.209	Departures:	26.953
Totals:	46.767	Totals:	52.674

Rank	Site-Ref	Description	Town/City	Area	GFA	Day	Date	Trip Rate (Sorted by Totals)		
								Arrivals	Departures	Totals
1	CE-06-D-01	MCDONALD'S	ABERYSTWYTH	CEREDIGION	350	Sat	09/05/15	36.857	42.286	79.143
2	HF-06-D-01	MCDONALDS	HERTFORD	HERTFORDSHIRE	326	Sat	22/03/03	39.264	37.730	76.994
3	DC-06-D-01	MCDONALDS	CHRISTCHURCH	DORSET	498	Sat	04/10/03	26.506	27.912	54.418
4	TW-06-D-01	KFC	NEWCASTLE	TYNE & WEAR	317	Sat	14/11/15	18.612	20.505	39.117
5	NW-06-D-01	KFC	NEWPORT	NEWPORT	341	Sat	16/10/10	17.009	16.422	33.431
6	LC-06-D-03	BURGER KING	BLACKBURN	LANCASHIRE	255	Sat	08/11/03	16.078	16.863	32.941

This section displays actual (not average) trip rates for each of the survey days in the selected set, and ranks them in order of relative trip rate intensity, for a given time period (or peak period irrespective of time) selected by the user. The count type and direction are both displayed just above the table, along with the rows within the table representing the 85th and 15th percentile trip rate figures (highlighted in bold within the table itself).

The table itself displays details of each individual survey, alongside arrivals, departures and totals trip rates, sorted by whichever of the three directional options has been chosen by the user. As with the preceeding trip rate calculation results table, the trip rates shown are per the calculation factor (e.g. per 100m2 GFA, per employee, per hectare, etc). Note that if the peak period option has been selected (as opposed to a specific chosen time period), the peak period for each individual survey day in the table is also displayed.

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 06 - HOTEL, FOOD & DRINK
Category : D - FAST FOOD - DRIVE THROUGH
VEHICLES

Filtering Stage 2 selection:

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

Parameter:	Gross floor area
Actual Range:	210 to 498 (units: sqm)
Range Selected by User:	182 to 500 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/00 to 14/11/15

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

Selected survey days:

Monday	1 days
Tuesday	3 days
Wednesday	3 days
Thursday	2 days
Friday	1 days

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

Selected survey types:

Manual count	10 days
Directional ATC Count	0 days

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

Selected Locations:

Suburban Area (PPS6 Out of Centre)	5
Edge of Town	3
Neighbourhood Centre (PPS6 Local Centre)	2

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

Selected Location Sub Categories:

Industrial Zone	2
Commercial Zone	1
Residential Zone	3
Out of Town	1
High Street	1
No Sub Category	2

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

LIST OF SITES relevant to selection parameters

1 BR-06-D-01 MCDONALD'S BRISTOL CITY
SHEENE ROAD
BEDMINSTER
BRISTOL
Neighbourhood Centre (PPS6 Local Centre)
High Street
Total Gross floor area: 210 sqm

2 CA-06-D-01 MCDONALDS CAMBRIDGESHIRE
NEWMARKET ROAD

CAMBRIDGE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 450 sqm

3 CO-06-D-01 MCDONALD'S CONWY
RHUDDLAN ROAD

ABERGELE
Edge of Town
Out of Town
Total Gross floor area: 410 sqm

4 DC-06-D-01 MCDONALDS DORSET
SOMERFORD ROAD
SOMERFORD
CHRISTCHURCH
Neighbourhood Centre (PPS6 Local Centre)
Industrial Zone
Total Gross floor area: 498 sqm

5 EB-06-D-01 MCDONALDS CITY OF EDINBURGH
GYLEMUIR ROAD

EDINBURGH
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 475 sqm

6 FI-06-D-01 MCDONALDS FIFE
FLEMINGTON ROAD
QUEENSWAY
GLENROTHES
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 283 sqm

7 NR-06-D-01 MCDONALDS NORTHAMPTONSHIRE
MARQUEE DRIVE

NORTHAMPTON
Edge of Town
Commercial Zone
Total Gross floor area: 220 sqm

8 SO-06-D-01 MCDONALD'S SLOUGH
WINDSOR ROAD

SLOUGH
Edge of Town
Residential Zone
Total Gross floor area: 480 sqm

9 SY-06-D-01 KFC SOUTH YORKSHIRE
WAKEFIELD ROAD

BARNSLEY
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Gross floor area: 360 sqm

LIST OF SITES relevant to selection parameters (Cont.)

10 WM-06-D-01 BURGER KING WEST MIDLANDS
KINGSBURY ROAD
ERDINGTON
BIRMINGHAM
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Gross floor area: 250 sqm

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

MANUALLY DESELECTED SITES

Site Ref	Reason for Deselection
HC-06-D-01	within service area
HC-06-D-01	within service area

RANK ORDER for Land Use 06 - HOTEL, FOOD & DRINK/D - FAST FOOD - DRIVE THROUGH

VEHICLES

Ranking Type: TOTALS Time Range: 12:00-13:00

WARNING: Using 85th and 15th percentile highlighted trip rates in data sets of under 20 surveys is not recommended by TRICS and may be misleading.

15th Percentile = No. 9 SY-06-D-01 Tot: 14.167
85th Percentile = No. 2 BR-06-D-01 Tot: 65.714

Median Values		Mean Values	
Arrivals:	16.677	Arrivals:	18.354
Departures:	13.961	Departures:	17.372
Totals:	30.638	Totals:	35.726

Rank	Site-Ref	Description	Town/City	Area	GFA	Day	Date	Trip Rate (Sorted by Totals)		
								Arrivals	Departures	Totals
1	NR-06-D-01	MCDONALDS	NORTHAMPTON	NORTHAMPTONSHIRE	220	Tue	22/05/07	36.364	35.909	72.273
2	BR-06-D-01	MCDONALD'S	BRISTOL	BRISTOL CITY	210	Mon	21/09/15	33.333	32.381	65.714
3	FI-06-D-01	MCDONALDS	GLENROTHES	FIFE	283	Tue	26/06/01	25.795	25.088	50.883
4	CO-06-D-01	MCDONALD'S	ABERGELE	CONWY	410	Fri	21/10/11	26.098	22.683	48.781
5	DC-06-D-01	MCDONALDS	CHRISTCHURCH	DORSET	498	Thu	09/10/03	19.880	14.659	34.539
6	EB-06-D-01	MCDONALDS	EDINBURGH	CITY OF EDINBURGH	475	Wed	18/06/08	13.474	13.263	26.737
7	WM-06-D-01	BURGER KING	BIRMINGHAM	WEST MIDLANDS	250	Tue	25/11/08	8.800	11.200	20.000
8	SO-06-D-01	MCDONALD'S	SLOUGH	SLOUGH	480	Wed	21/11/12	8.958	8.542	17.500
9	SY-06-D-01	KFC	BARNSLEY	SOUTH YORKSHIRE	360	Thu	10/04/03	7.500	6.667	14.167
10	CA-06-D-01	MCDONALDS	CAMBRIDGE	CAMBRIDGESHIRE	450	Wed	19/10/11	3.333	3.333	6.666

This section displays actual (not average) trip rates for each of the survey days in the selected set, and ranks them in order of relative trip rate intensity, for a given time period (or peak period irrespective of time) selected by the user. The count type and direction are both displayed just above the table, along with the rows within the table representing the 85th and 15th percentile trip rate figures (highlighted in bold within the table itself).

The table itself displays details of each individual survey, alongside arrivals, departures and totals trip rates, sorted by whichever of the three directional options has been chosen by the user. As with the preceeding trip rate calculation results table, the trip rates shown are per the calculation factor (e.g. per 100m2 GFA, per employee, per hectare, etc). Note that if the peak period option has been selected (as opposed to a specific chosen time period), the peak period for each individual survey day in the table is also displayed.

Appendix D

```
_________________ A R C A D Y  6 _________________

    ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY


    Analysis Program: Release 7.0 (FEBRUARY 2010)

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_________________________________________________

      For sales and distribution information,
      program advice and maintenance, contact:

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Nine Mile Ride         Email: software@trl.co.uk
Wokingham, Berks.      Web:   www.trlsoftware.co.uk
RG40 3GA,UK

 ---------------------------------------------------------------------------
  THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS
  IN NO WAY RELIEVED OF THEIR RESPONSIBILITY FOR THE CORRECTNESS  OF THE SOLUTION
 ---------------------------------------------------------------------------

 Run with file:-
 "c:\Users\mshakiba\Dropbox\17000 Projects\DR17132 Plas Coch, Wrexham\M17132 B5101 Plas Coch Rd 2023 Base.vai"
(drive-on-the-left ) at 17:41:52 on Thursday, 25 January 2018


.FILE PROPERTIES
 ****************

   RUN TITLE: Plas Coch Road
    LOCATION: Wrexham
        DATE: 22/12/17
      CLIENT:
  ENUMERATOR: MS
  JOB NUMBER: M17132
      STATUS:
 DESCRIPTION:

.INPUT DATA
 ***********
 ARM A - B5101 Plas Coch Rd N
 ARM B - University
 ARM C - B5101 Plas Coch Rd S
 ARM D - Retail Park

.GEOMETRIC DATA
 --------------


 ---------------------------------------------------------------------------------------------------------------------------------- T5
 I ARM    I   V (M)   I    E (M)   I    L (M)   I    R (M)   I     D (M) I   PHI (DEG)  I  SLOPE  I INTERCEPT (PCU/MIN) I
 ----------------------------------------------------------------------------------------------------------------------------------
 I ARM  A I    5.54   I     5.97   I     0.40   I    23.30   I    35.90   I     45.0     I  0.622  I       27.182        I
 I ARM  B I    2.67   I     4.07   I     2.00   I    13.70   I    35.90   I     61.0     I  0.432  I       13.628        I
 I ARM  C I    4.88   I    10.11   I     4.50   I    27.90   I    35.90   I     52.0     I  0.631  I       28.351        I
 I ARM  D I    7.36   I     7.36   I     0.00   I    30.90   I    35.90   I     11.0     I  0.820  I       40.260        I
 ----------------------------------------------------------------------------------------------------------------------------------

 V = approach half-width       L = effective flare length            D = inscribed circle diameter
 E = entry width               R = entry radius                      PHI = entry angle


.TRAFFIC DEMAND DATA
 --------------------

 Only sets included in the current run are shown
.SCALING FACTORS
.------------------------ T13
 IARM  I FLOW SCALE(%) I
 ------------------------
 I A   I      100      I
 I B   I      100      I
 I C   I      100      I
 I D   I      100      I
 ------------------------

 TIME PERIOD BEGINS(11.45)AND ENDS(12.45)
.LENGTH OF TIME PERIOD -(  60) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE INPUT DIRECTLY.
.DEMAND SET TITLE: Plas Coch Road


 DEMAND SET TITLE:  Plas Coch Road
.------------------------------------------------------------------ T33
 I                    I         TURNING PROPORTIONS                I
 I                    I         TURNING COUNTS                     I
 I                    I        (PERCENTAGE OF H.V.S)               I
 I                    ---------------------------------------------
 I       TIME         I FROM/T  I  ARM A I  ARM B I  ARM C I  ARM D I
 ---------------------------------------------------------------------
 I   11.45 - 12.45    I         I        I        I        I        I
 I                    I  ARM  A I  0.000 I  0.013 I  0.542 I  0.444 I
 I                    I         I    0.0 I    0.7 I   28.8 I   23.6 I
 I                    I         I (  0.0)I (  0.0)I (  0.0)I (  0.0)I
 I                    I         I        I        I        I        I
 I                    I  ARM  B I  0.240 I  0.000 I  0.680 I  0.080 I
 I                    I         I    0.6 I    0.0 I    1.7 I    0.2 I
 I                    I         I (  0.0)I (  0.0)I (  0.0)I (  0.0)I
 I                    I         I        I        I        I        I
 I                    I  ARM  C I  0.172 I  0.017 I  0.000 I  0.811 I
 I                    I         I   21.4 I    2.1 I    0.0 I  100.8 I
 I                    I         I (  0.0)I (  0.0)I (  0.0)I (  0.0)I
 I                    I         I        I        I        I        I
 I                    I  ARM  D I  0.196 I  0.004 I  0.800 I  0.000 I
 I                    I         I   22.2 I    0.5 I   90.7 I    0.0 I
```

```
I                    I         I (  0.0)I (  0.0)I (  0.0)I (  0.0)I
I                    I         I        I        I        I        I
-----------------------------------------------------------------
```

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
11.45-12.00									
ARM A	8.90	17.54	0.507	- - -	0.0	1.0	14.5	-	0.114
ARM B	0.42	3.36	0.125	- - -	0.0	0.1	1.9	-	0.338
ARM C	20.70	25.79	0.803	- - -	0.0	3.8	51.2	-	0.180
ARM D	18.90	37.01	0.511	- - -	0.0	1.0	15.1	-	0.055

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
12.00-12.15									
ARM A	8.90	17.51	0.508	- - -	1.0	1.0	15.3	-	0.116
ARM B	0.42	3.31	0.127	- - -	0.1	0.1	2.1	-	0.345
ARM C	20.70	25.77	0.803	- - -	3.8	4.0	58.5	-	0.196
ARM D	18.90	36.97	0.511	- - -	1.0	1.0	15.6	-	0.055

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
12.15-12.30									
ARM A	8.90	17.51	0.508	- - -	1.0	1.0	15.4	-	0.116
ARM B	0.42	3.31	0.127	- - -	0.1	0.1	2.2	-	0.345
ARM C	20.70	25.77	0.803	- - -	4.0	4.0	59.6	-	0.197
ARM D	18.90	36.97	0.511	- - -	1.0	1.0	15.6	-	0.055

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
12.30-12.45									
ARM A	8.90	17.51	0.508	- - -	1.0	1.0	15.4	-	0.116
ARM B	0.42	3.31	0.127	- - -	0.1	0.1	2.2	-	0.345
ARM C	20.70	25.77	0.803	- - -	4.0	4.0	60.1	-	0.197
ARM D	18.90	36.97	0.511	- - -	1.0	1.0	15.7	-	0.055

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
12.00	1.0	*
12.15	1.0	*
12.30	1.0	*
12.45	1.0	*

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
12.00	0.1
12.15	0.1
12.30	0.1
12.45	0.1

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
12.00	3.8	****
12.15	4.0	****
12.30	4.0	****
12.45	4.0	****

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
12.00	1.0	*
12.15	1.0	*
12.30	1.0	*
12.45	1.0	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND	* QUEUEING * DELAY *	* INCLUSIVE QUEUEING * DELAY *

	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	534.0	534.0	60.7	0.11	60.7	0.11
B	25.2	25.2	8.4	0.33	8.4	0.33
C	1242.0	1242.0	229.4	0.18	229.7	0.18
D	1134.0	1134.0	62.0	0.05	62.0	0.05
ALL	2935.2	2935.2	360.5	0.12	360.8	0.12

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

```
_____________________ A R C A D Y  6 _____________________

    ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY


    Analysis Program: Release 7.0 (FEBRUARY 2010)

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 ---------------------------------------------------------------------------
  THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS
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 ---------------------------------------------------------------------------

 Run with file:-
 "c:\Users\mshakiba\Dropbox\17000 Projects\DR17132 Plas Coch, Wrexham\
  M17132 B5101 Plas Coch Rd 2023 Base + Dev.vai"
(drive-on-the-left ) at 17:37:12 on Thursday, 25 January 2018


.FILE PROPERTIES
 ****************

   RUN TITLE: Plas Coch Road
    LOCATION: Wrexham
        DATE: 22/12/17
      CLIENT:
  ENUMERATOR: MS
  JOB NUMBER: M17132
      STATUS:
 DESCRIPTION:

.INPUT DATA
 ***********
 ARM A - B5101 Plas Coch Rd N
 ARM B - University
 ARM C - B5101 Plas Coch Rd S
 ARM D - Retail Park

.GEOMETRIC DATA
 --------------


 ------------------------------------------------------------------------------------------------------------------------------ T5
 I ARM    I   V (M)   I    E (M)   I    L (M)   I    R (M)   I     D (M) I   PHI (DEG)  I  SLOPE  I INTERCEPT (PCU/MIN) I
 ------------------------------------------------------------------------------------------------------------------------------
 I ARM  A I    5.54   I     5.97   I     0.40   I    23.30   I   35.90   I     45.0     I  0.622  I       27.182        I
 I ARM  B I    2.67   I     4.07   I     2.00   I    13.70   I   35.90   I     61.0     I  0.432  I       13.628        I
 I ARM  C I    4.88   I    10.11   I     4.50   I    27.90   I   35.90   I     52.0     I  0.631  I       28.351        I
 I ARM  D I    7.36   I     7.36   I     0.00   I    30.90   I   35.90   I     11.0     I  0.820  I       40.260        I
 ------------------------------------------------------------------------------------------------------------------------------

 V = approach half-width       L = effective flare length            D = inscribed circle diameter
 E = entry width               R = entry radius                      PHI = entry angle


.TRAFFIC DEMAND DATA
 -------------------

 Only sets included in the current run are shown
.SCALING FACTORS
.----------------------- T13
 IARM  I FLOW SCALE(%) I
 -----------------------
 I A   I      100      I
 I B   I      100      I
 I C   I      100      I
 I D   I      100      I
 -----------------------

 TIME PERIOD BEGINS(11.45)AND ENDS(12.45)
.LENGTH OF TIME PERIOD -(  60) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE INPUT DIRECTLY.
.DEMAND SET TITLE: Plas Coch Road


 DEMAND SET TITLE:  Plas Coch Road
.------------------------------------------------------------------ T33
 I                   I         TURNING PROPORTIONS                I
 I                   I         TURNING COUNTS                     I
 I                   I        (PERCENTAGE OF H.V.S)               I
 I                   ---------------------------------------------
 I       TIME        I FROM/T  I  ARM A I  ARM B I  ARM C I  ARM D I
 ---------------------------------------------------------------------
 I   11.45 - 12.45   I         I        I        I        I        I
 I                   I  ARM  A I  0.000 I  0.013 I  0.534 I  0.453 I
 I                   I         I    0.0 I    0.7 I   28.8 I   24.4 I
 I                   I         I (  0.0)I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I        I        I        I        I
 I                   I  ARM  B I  0.240 I  0.000 I  0.680 I  0.080 I
 I                   I         I    0.6 I    0.0 I    1.7 I    0.2 I
 I                   I         I (  0.0)I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I        I        I        I        I
 I                   I  ARM  C I  0.167 I  0.016 I  0.000 I  0.816 I
 I                   I         I   21.4 I    2.1 I    0.0 I  104.3 I
 I                   I         I (  0.0)I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I        I        I        I        I
 I                   I  ARM  D I  0.196 I  0.004 I  0.800 I  0.000 I
```

```
I                    I         I   23.1 I    0.5 I   94.3 I    0.0 I
I                    I         I (  0.0)I (  0.0)I (  0.0)I (  0.0)I
I                    I         I        I        I        I        I
-----------------------------------------------------------------
```

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
11.45-12.00									
ARM A	9.00	17.15	0.525	- - -	0.0	1.1	15.5	-	0.121
ARM B	0.42	3.04	0.138	- - -	0.0	0.2	2.2	-	0.379
ARM C	21.30	25.72	0.828	- - -	0.0	4.5	58.6	-	0.201
ARM D	19.70	37.01	0.532	- - -	0.0	1.1	16.4	-	0.057

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
12.00-12.15									
ARM A	9.00	17.11	0.526	- - -	1.1	1.1	16.4	-	0.123
ARM B	0.42	2.99	0.141	- - -	0.2	0.2	2.4	-	0.390
ARM C	21.30	25.69	0.829	- - -	4.5	4.6	68.5	-	0.226
ARM D	19.70	36.97	0.533	- - -	1.1	1.1	17.0	-	0.058

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
12.15-12.30									
ARM A	9.00	17.11	0.526	- - -	1.1	1.1	16.5	-	0.123
ARM B	0.42	2.99	0.141	- - -	0.2	0.2	2.4	-	0.390
ARM C	21.30	25.69	0.829	- - -	4.6	4.7	70.2	-	0.226
ARM D	19.70	36.97	0.533	- - -	1.1	1.1	17.1	-	0.058

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
12.30-12.45									
ARM A	9.00	17.11	0.526	- - -	1.1	1.1	16.6	-	0.123
ARM B	0.42	2.99	0.141	- - -	0.2	0.2	2.4	-	0.390
ARM C	21.30	25.69	0.829	- - -	4.7	4.7	70.9	-	0.227
ARM D	19.70	36.96	0.533	- - -	1.1	1.1	17.1	-	0.058

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
12.00	1.1	*
12.15	1.1	*
12.30	1.1	*
12.45	1.1	*

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
12.00	0.2
12.15	0.2
12.30	0.2
12.45	0.2

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
12.00	4.5	****
12.15	4.6	*****
12.30	4.7	*****
12.45	4.7	*****

.QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
12.00	1.1	*
12.15	1.1	*
12.30	1.1	*
12.45	1.1	*

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND	* QUEUEING *	* INCLUSIVE QUEUEING *

		* DELAY *		* DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	540.0	540.0	65.0	0.12	65.0	0.12
B	25.2	25.2	9.4	0.37	9.4	0.37
C	1278.0	1278.0	268.2	0.21	268.6	0.21
D	1182.0	1182.0	67.6	0.06	67.6	0.06
ALL	3025.2	3025.2	410.1	0.14	410.6	0.14

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
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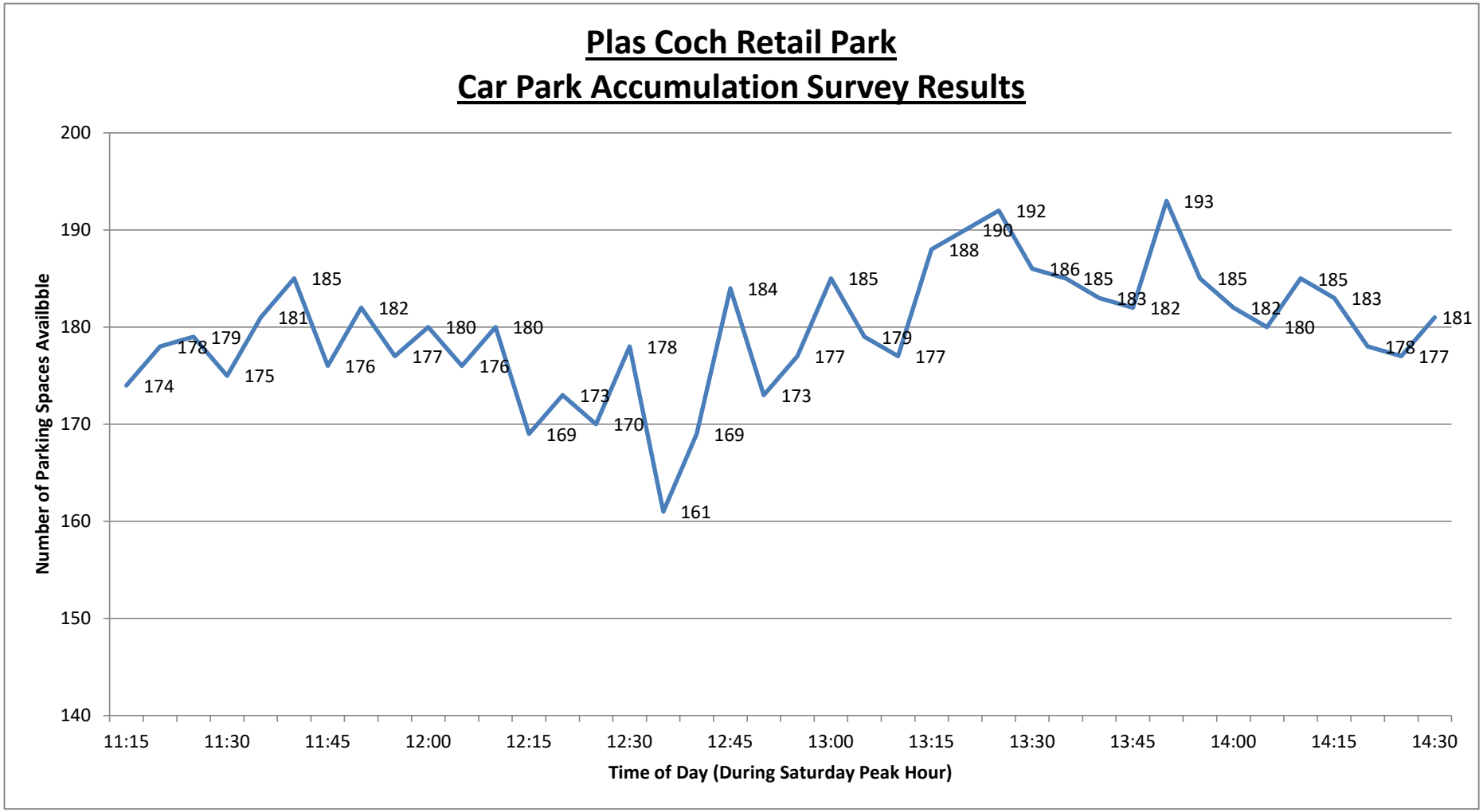
END OF JOB

Appendix E



M17132-E-001

the Traffic, Transport & Highway Consultancy