

Porthkerry Road, Rhoose

Transport Assessment - Appendices

May 2014

Waterman Transport & Development Limited 38 Cathedral Road, Cardiff CF11 9LL www.watermangroup.com





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Comments



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LAND TO THE NORTH OF THE RAILWAY LINE (WEST), RHOOSE





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REVISION/S:





B. UDP Allocation Masterplan





C. Bellway / Persimmon Submissions Used as Background Information

LAND NORTH OF THE RAILWAY LINE, RHOOSE

TRANSPORT ASSESSMENT

JUNE 2010



LAND NORTH OF THE RAILWAY LINE RHOOSE

TRANSPORT ASSESSMENT

PREPARED FOR



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FMW CONSULTANCY LIMITED TRYM LODGE 1 HENBURY ROAD WESTBURY-ON-TRYM BRISTOL BS9 3HQ

JUNE 2010



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1 INTRODUCTION

Brief

- 1.1 FMW Consultancy has been appointed by Bellway Homes Ltd and Persimmon Homes Ltd to prepare a Transport Assessment (TA) for a proposed housing development on land to the north of the Railway Line, which is located east of Rhoose in the Vale of Glamorgan (VoG). The site is allocated within the VoG's Unitary Development Plan (UDP) 1996-2011 as part of Housing Site 22. This report has been prepared to embodied the principles identified in the Approved Development Brief 2006.
- 1.2 This TA has however been prepared to support the proposed development on the eastern half of the allocated site for up to 350 residential units (Figure 1.1). The TA has also considered the potential development of land adjacent to the site and nearby committed development.
- 1.3 This report has been prepared following extensive discussions with Officers from VoG as highway authority, concerning the transportation issues associated with the proposed development of the site.
- 1.4 The structure of this report is summarised below:
 - Section 2: Describes the existing conditions on the transportation network surrounding the development site;
 - Section 3: Describes the relevant transportation policy framework;
 - Section 4: Outlines the characteristics of the proposed development;
 - Section 5: Details the access arrangements and transport infrastructure proposed to serve the site;
 - Section 6: Estimates the number of additional trips that would be generated by the proposed development and identifies where these trips would be travelling to and from;
 - Section 7: Assesses the impact of these additional trips upon the surrounding road network in addition to any nearby committed developments;
 - Section 8: Details the facilities proposed to enable travel to and from the site by sustainable modes of transport;



| * | Section 9: | Provides a | an a | assessmen | t of | the e | ase of a | ccess | ibility to loc | al fa | cilities |
|---|-------------|--|------|-------------|------|-------|-----------|-------|----------------|-------|----------|
| | | from the s | ite | by sustaina | able | mode | es of tra | vel; | | | |
| * | Section 10: | Presents | а | summary | of | the | report | and | identifies | the | main |
| | | conclusions that can be drawn from the Transport Assessment. | | | | | | | | | |



2 EXISTING CONDITIONS

Local Highway Network

- 2.1 The local highway network in relation to the site is shown within Figure 2.1.
- 2.2 The site is bounded by Pentir Y De to the east. The road is some 7.3m in width with a 4.0m footway/cycleway along the western edge of its single carriageway. To the north the road connects Porthkerry Road by way of a standard 3 arm roundabout (known as Rhoose Point Roundabout). To the south Pentir Y De leads into the relatively recent residential development of Rhoose Point south of the railway line.
- 2.3 Porthkerry Road is one of the main roads in Rhoose and is typically 7.3m wide with 2.0m footways found on both sides of its single carriage through the town as far as Rhoose Point Roundabout. To the east of Rhoose Point Roundabout Porthkerry Road leads out of Rhoose and towards Cardiff Airport and eventually onto the A4226, this subsequently leads towards Barry.
- 2.4 To the west along Porthkerry Road some 580m from Rhoose Point Roundabout, the road connects with Rhoose Road by way of a standard four arm roundabout. Rhoose Road itself is single carriageway some 7.3m in width with footways of at least 2.0m found on both sides of its carriageway. Rhoose Road becomes Fontygary Road to the west of the junction with Station Road. Fontygary Road is similar in character to Rhoose Road as previously described and forms a signalised crossroads with Fonmon Road. Fonmon Road leads onto the B4265 to the north, whilst Fontygary Road continues west and eventually links to the B4265.
- 2.5 The B4265 leads towards villages and small towns to the west of Rhoose, namely St. Athan and Llantwit Major. To the east the B4265 becomes the A4226 and A4050. These stretch of road runs along the northern urban boundary of Barry and eventually links to a 3 arm roundabout known as Barry Docks Link Roundabout. The roundabout provides links to the M4 to the north and Cardiff to the south.

Pedestrians and Cyclists

- 2.6 Local walking and cycling routes in relation to the site are shown in Figure 2.2.
- 2.7 A traffic free cycle route is located to the east of the site. The route is a 4.0m footway / cycleway that runs adjacent to the roads of Pentir Y De, Trem Echni and Heol Y Pentir that

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leads towards Rhoose Railway Station from Rhoose Point Roundabout. There are good levels of cycle parking provision located within the station car park to encourage cycle use.

- 2.8 A regional walking route is located to the south of Rhoose Point and follows the coast line and eventually leads up onto Station Road and to the footpaths to the north of Rhoose.
- 2.9 A Public Rights of Way (PROW) is found adjacent to the west of the site boundary. To the north it leads onto Porthkerry Road and to the south leads onto Trem Echni via an at grade pedestrian level crossing at the railway line. The crossing is known as 'Happy Valley Crossing'.
- 2.10 Given the low levels of traffic within Rhoose and Rhoose Point it is considered that the existing walking and cycling facilities are sufficient to encourage walking and cycling for existing and future residents.

Existing Bus Services

- 2.11 The nearest bus stops to the site are located to the north of the site on Porthkerry Road. The most direct route to these would be via the PROW which currently bounds the site to the west. The bus stops themselves are of high quality with provisions of modern shelters and tactile paving. The summary of the bus services are given in Table 2.1 overleaf whilst Figure 2.3 identifies their routes.
- 2.12 It can be seen that there are a good range of bus services offering links to the larger neighbouring settlements of Rhoose, namely Barry and Cardiff. Service X91 in particular provides an hourly service to Cardiff between Mondays and Saturdays and a two hourly service on Sundays and public holidays.



| Service | Route | Frequ | Operator | |
|---------|--|-----------------------------------|----------|------------------|
| | | Mon - Sat | Sun & PH | |
| X5 | Llantwit Major – Cardiff Bay & City Centre | 0 | 120 mins | Veolia Transport |
| X45 | Llantwit Major - Cardiff | 60 mins | 0 | EST Bus |
| X91 | Llantwit Major – St Athan – Rhoose - Cardiff | 60 mins | 120 mins | Cardiff Bus |
| V5 | Cowbridge - Barry | 4 per day | 0 | Cartel Travel |
| M1 | Llantwit Major – Morrisons Store | 2 per day (Wednesdays only) | 0 | Caring Coaches |
| 905 | Cardiff Airport Rail Link Bus Service | 60 mins | 60 mins | Veolia Transport |

Table 2.1: Summary of Existing Bus Services

Existing Rail Services

2.13 Rhoose benefits from having a local railway station located to the west of the site on Station Road. A summary of the services from this station is given in Table 2.2 below.

| Route | Frequ | iency | Operator |
|---|------------|-------------|--------------|
| | Mon - Sat | Sun & PH | |
| Rhoose - Barry Docks – Penarth - Cardiff | 60 minutes | 120 minutes | Arriva Train |
| Rhoose – Bridgend | 60 minutes | 120 minutes | Arriva Train |

Table 2.2: Summary of Rail Services

2.14 It can be seen from Table 2.2 that Arriva Train Wales (ATW) provides an hourly service from Mondays to Saturdays to Cardiff and Bridgend. During the peak hours, a four 'car'



train is provided. Throughout the off-peaks, a two 'car' train is provided. Trips to such destination are reduced to every two hourly on Sundays.

- 2.15 Based on discussions with ATW it has been confirmed that during the AM peak, there is capacity for passengers to board at Rhoose, but the train reaches passenger capacity as it continues east towards Cardiff as it picks up more passengers at Barry and other locations. In the PM peak the 4-car train leaving Cardiff is full and there is no guarantee that passengers for Rhoose are able to board. ATW advises that the track between Cogan Junction and Cardiff is at Capacity with 16 two-way passenger trains per hour plus freight trains.
- 2.16 The most common way of improving passenger capacity is to provide an extra 'car' on the train. However, this is not a possibility at present, as the existing platforms are not long enough to accommodate longer trains.
- 2.17 A review of South East Wales Transport Alliance (SEWTA) in particular the Rail Strategy identified aspirations to provide a 30 minute frequency along the entire length of the VoG line. The onus would be on WAG to fulfil the SEWTA aspirations since Arriva are only a franchise that operates the trains on behalf of WAG.
- 2.18 The possibility of extending the existing 30 minute frequency service from Barry to Rhoose are minimal since the only place where a train could turn west of Barry is Bridgend due to the double tracked nature of the line (i.e. one direction of travel per line). This would result in a 30 minute frequency on the entire VoG line and not just to the Rhoose to Cardiff section of the line.
- 2.19 ATW has noted that the National Transport Plan for Wales identified that plans for a 30 minute frequency services on the VoG line would not be introduced until after the Cardiff Area Signalling works are completed in 2014.
- 2.20 ATW advises that any additional passengers using Rhoose Railway Station would require the installation of ticket machines platforms to ensure that fares from additional patronage can be collected.

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- 2.21 ATW confirms that the impact of the proposed Defence Technical College development at St Athan would not affect the existing passenger capacity issues on the VoG line, as the additional passengers would use the train contra to peak flows, i.e. Cardiff to Llantwit Major in the AM and Llantwit Major to Cardiff in the PM.
- 2.22 Furthermore, DTC train users can catch either the VoG line from Llantwit Major to Cardiff, or head to Bridgend and transfer to a faster mainline train to Cardiff.

Traffic Volumes

- 2.23 The VoG has supplied traffic survey information for several junctions in Rhoose and around the VoG. A total of nine junctions have been surveyed, however five of these junctions were surveyed back in 2007, leaving the four remaining having been surveyed in 2010.
- 2.24 The locations of these junctions are shown within Figure 2.4 and are summarised with year of survey indicated in brackets below:
 - ✤ Waycock Cross Roundabout (2007);
 - Fonmon Road / B4265 Junction (2010);
 - Wales Airport Hotel Roundabout (2007);
 - Sritish Airways Maintenance Cardiff Roundabout (2010);
 - Station Road Junction (2007);
 - Barry Docks Link Roundabout (2007);
 - Colcot Cross Roundabout (2010);
 - Fonmon Road Signals (2010); and
 - Rhoose Point Roundabout (2007).
- 2.25 Traffic turning movements for the 2007 surveyed flows are shown in Figure 2.5 whilst the 2010 surveyed flows are shown in Figure 2.6.
- 2.26 The 2007 surveyed flows have been increased using a growth factor of 1.036 based on TEMPRO adjusted National Road Traffic Forecast (NRTF) shown in Appendix A. These are combined with the 2010 surveyed flows to form the 2010 base flows as shown in Figure 2.7. The full surveyed flows are attached as Appendix B to this report.



2.27 These surveys identified the following two-way peak hour traffic volumes in the highway network in and around Rhoose, which are summarised into Table 2.3 below. Note that these two-way flows are based on the 2010 base flows shown in Figure 2.7. The two-way flow location for reference with Table 2.3 is shown in Figure 2.8.

| Road | AM Peak Hour (vph) | PM Peak Hour (vph) | TA 79/99 Capacity (Two-Way) | %-age spare capacity (busiest hour) |
|---|-----------------------|-----------------------|-----------------------------------|---|
| 1. Porthkerry Road (E of Pentir Y De) | 662 | 757 | 2,450 | 69% |
| 2. Porthkerry Road (W of Pentir Y De) | 557 | 633 | 2,167 | 71% |
| 3. Rhoose Road (E of Station Road) | 468 | 413 | 2,167 | 78% |
| 4. Fontygary Road (W of Station Road) | 503 | 434 | 2,167 | 77% |
| Fontygary Road (E of signals) | 376 | 384 | 2,167 | 82% |
| 6. Fonmon Road | 185 | 223 | 2,167 | 90% |
| Fontygary Road (W of signals) | 220 | 222 | 2,450 | 91% |
| 8. B4265 (E of Fonmon Road) | 676 | 723 | 2,450 | 70% |
| 9. B4265 (W of Fonmon Road) | 886 | 942 | 2,450 | 62% |
| 10. Port Road (S of Airport Hotel RBT) | 944 | 1,056 | 2,450 | 57% |
| 11. Port Road West (E of Wales Airport Hotel RBT) | 1,714 | 1,901 | 2,450 | 22% |
| 12. Port Road West (W of Waycock RBT) | 1,753 | 1,792 | 2,450 | 27% |
| Waycock Road | 818 | 730 | 1,700 | 52% |
| Port Road West (E of Waycock RBT) | 1,524 | 1,634 | 2,450 | 33% |
| Pontypridd Road | 1,549 | 1,405 | 2,100 | 26% |
| Port Road East | 1,947 | 2,022 | 2,450 | 17% |
| Port Road | 2,418 | 2,725 | 3,100 | 12% |
| A4231 | 1,731 | 1,801 | 3,100 | 42% |

Table 2.3: 2010 Base Traffic Volumes

2.28 Table 2.3 demonstrates that the highway network in Rhoose, based on 2010 base flows currently operate with no capacity issues.



Accident Analysis

- 2.29 Collision data covering the nine surveyed junctions has been obtained from VoG for the most recent five years of data available at time of writing.
- 2.30 The information is based on STATS19 Police Accident Reports and refers to three categories of accidents:
 - A fatal accident is one in which at least one person is fatally injured;
 - A **serious** accident is one in which at least one person is seriously injured, but noone suffers a fatal injury, and which is in one (or more) of the following categories:
 - (a) an injury for which a person is detained in hospital as an in-patient; or

(b) any of the following injuries (whether or not the person is detained in hospital): fractures, concussion, internal injuries, crushing, severe cuts and lacerations, severe general shock requiring treatment.

- A **slight** accident is one in which at least one person suffers "slight" injuries (i.e. a sprain, bruise or cut which is not judged to be severe, or slight shock requiring roadside attention), but no-one is seriously or fatally injured.
- 2.31 The full accident data is attached as Appendix C in this report and is summarised below:
 - Waycock Cross Roundabout: Three slight accidents occurred all due to driver error which resulted in vehicular collisions. No pedestrian or cyclists accident recorded.
 - Fonmon Road / B4265 Junction: Two slight accidents and one fatal accident have been recorded at this junction. The two slight accidents occurred due to driver error and resulted in rear end shunts. The fatal accident occurred when a vehicle turning right onto the B4265 from Fonmon Road collided with a motorcyclist.
 - Wales Airport Hotel Roundabout: Two slight accidents recorded at this junction.
 One of these involved a pedal cyclist being struck by a car which did not see the cyclist when entering the roundabout. The other slight accident was a rear end shunt caused by driver error
 - BAMC Roundabout: One recorded slight accident due to driver error which resulted in a rear end shunt.
 - Station Road Junction: Two accidents have been recorded in the vicinity of this junction. One slight accident involving a pedal cyclist occurred at the junction of



Fontygary Road and Kemeys Road due to driver misjudgement. One serious accident occurred on Station Road when a motorcyclist was travelling too fast and lost control.

- Barry Docks Link Roundabout: Four slight accidents occurred at this junction.
 Three of these were due to driver error which resulted in vehicular collisions. The one remaining accident involved a pedal cyclist caused by driver entering the roundabout into the path of the cyclist who was already on the roundabout.
- Colcot Cross Roundabout: A total of five accidents have been recorded at this junction. Four of the five accidents involved vehicles with the remaining one involving a pedal cyclist. The accident involving vehicles were all due to driver error resulting in rear end shunts or collisions. The one slight accident involving a pedal cyclist occurred due to rider error when the cyclist entered the carriageway from pavement and collided with travelling vehicle.
- Fonmon Road signals: No recorded accident at this junction in the most recent five year period.
- Rhoose Point Roundabout: One slight accident occurred at this junction. The accident involved a vehicle entering the roundabout and colliding with a pedal cyclist who was already on the roundabout.
- 2.32 In summary a total of twenty accidents have been recorded in the study areas. Of these one was recorded as serious and one being a fatality, both of which involved motorcyclists. The majority of these accidents involved motorists and driver error which resulted in collisions. A total of five accidents involved pedal cyclists; however they were all recorded as slight accidents.
- 2.33 In conclusion the number of accidents are relatively low given the five year study period. Although there was one recorded fatality the Fonmon Road / B4265 junction; this is a relatively common type of accident involving motorcycles, and it is considered that the accident was not caused by deficiencies in the existing junction arrangement.



3 TRANSPORTATION POLICY FRAMEWORK

3.1 There are an array of national, regional and local policy documentation, which outlines the planning policy framework for the development of the Land North of Railway Line site.

National Policies

- 3.2 The national and regional planning policies relevant to the transport aspects of this development are set out in the following documents:
 - Manual for Streets
 - ✤ Wales Spatial Plan (2008)
 - Planning Policy Wales (2002)
 - Technical Advice Note 18: Transport (TAN 18 2007).
- 3.3 The overarching aim of these documents is to encourage a more sustainable approach to transport that reduces the negative environmental impacts associated with private car use and instead prioritises pedestrians, cyclists and public transport users. More specifically, in relation to the development the land north of railway line site, the objectives of these documents are to:
 - Reduce growth in the reliance on the private motor car;
 - Promote more sustainable transport choices for people;
 - Promote accessibility to jobs, shopping and leisure facilities by public transport, walking and cycling; and
 - Reduce the overall need to travel by promoting new development of sites that are well served by non-car modes and that have a high level of accessibility for local facilities.

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Manual for Streets

- Manual for Street (MfS) supersedes Design Bulletin 32 and its companion guide, Places,
 Streets and Movement. MfS was produced by the DfT in 2007 and is applicable in Wales.
 Its objectives are to promote:
 - Creative thinking in the delivery of streets to create high quality places
 - Design which places a high priority on the needs of pedestrians, cyclists and public transport users and not just motor vehicles, so that growth in these modes of transport are encouraged
 - Creation of streets that help build communities and meet the needs of all users
 - Creation of streets that are attractive with a distinct identity whilst forming part of a well connected network
 - Creation of streets that are cost-effective in construction and maintenance and safe
- 3.5 MfS discourages the building of streets that are:
 - Primarily designed to meet the needs of motor traffic
 - Unsafe and unwelcoming to pedestrians and difficult to serve by public transport
 - Bland, unattractive and poorly designed and constructed

Wales Spatial Plan

- 3.6 Spatial Planning is the process aimed is ultimately aimed at achieving sustainable development. The process is based on a development plan that enables Local Authorities and other organisations to better work together and achieve their objectives.
- 3.7 The Wales Spatial Plan has been formally adopted in 2004 by the National Assembly as a requirement of the Planning and Compulsory Purchase Act 2004 (section 60) and updated in 2008.
- 3.8 The Spatial plan covers the VoG and the overall aims of the plans are summarised as follows:
 - Economic development and the long term goal of full employment at a rate of 80%;
 - Regeneration programmes in various parts of Wales;
 - Improving skill levels in the workforce;
 - Improving regional and national strategic planning for transport;
 - Reducing annual greenhouse gas emissions;
 - Understanding and meeting affordable housing needs;



- Making the right decisions, and getting the most benefit from specific major investment decisions, affecting public services;
- Helping to shape capital investment though the Strategic Capital Investment Framework.

Planning Policy Wales

- 3.9 Land use policy is set out in Planning Policy Wales (PPW). PPW encourages Local Planning Authorities to promote residential environments which are sustainable, avoid large housing areas of monotonous character and make provisions for affordable housing. In summary the Planning Authorities are encouraged to promote:
 - Mixed tenure communities;
 - Development that is easily assessable by sustainable modes of transport;
 - Attractive landscaping around dwellings, with use of open space with regards to biodiversity and nature conservation;
 - Efficient use of land; and
 - Energy efficient construction with the use of renewable energy where possible.
- 3.10 PPW is supplemented by a series of Technical Advice Notes (TANs), one of which is TAN 18 Transport 1998.

TAN 18: Transport

- 3.11 TAN 18 gives advice on how to integrate land use and transport planning including how transport impacts from developments should be assessed and mitigated if necessary. The document is split into various chapters as summarised below:
 - Integration between Land Use Planning and Transport;
 - Location of Development;
 - Parking;
 - Design of Development;
 - Walking and Cycling;
 - Public Transport;
 - Planning for Transport Infrastructure; and
 - Assessing Impacts and Managing Implementation.



Local Policy

The Vale of Glamorgan Adopted Unitary Development Plan 1996 - 2011

- 3.12 The Vale of Glamorgan Adopted Unitary Development Plan (UDP) identifies plans, policies and measures to ensure the growth and environmental protection in the Vale of Glamorgan.
- 3.13 Land north of the railway line, Rhoose has been indentified for residential development under the UDP.
- 3.14 The adopted UDP has a range of policies that will shape the VoG up until 2011, these includes:
 - Environment;
 - Housing;
 - Transportation;
 - Sport and recreation; and
 - ✤ Waste management.



4 PROPOSED DEVELOPMENT

- 4.1 The proposed development is on land listed under VoG's UDP (listed as Housing Site 22) north of the railway line, Rhoose.
- 4.2 The proposed development is for up to 350 residential units on land controlled by Persimmon Homes and Bellway. Land to the west of the site is also identified within the UDP under Housing Site 22 and is owned by WAG. Whilst it does not form part of the current proposals the approved Development Brief intends for it to be accessed through the proposals site in the future.
- 4.3 Main vehicular access to the site will be taken from Pentir Y De with the provision of a 'sustainable modes' only access from Porthkerry Road via the existing PROW.
- 4.4 The proposed development in its indicative stage is attached as Appendix D to this report.



5 SITE ACCESS AND INTERNAL LAYOUT

Site Access Strategy

5.1 Figure 5.1 shows the proposed access strategy to the development site. The transport infrastructure includes facilities for the private car, walking and cycling in order that an integrated transport network is provided to serve the site.

Internal Layout

- 5.2 The internal layout of the site is based on the recommendations found in *Manual for Streets* which encourages lower vehicular speeds with good permeability given to both pedestrians and cyclists.
- 5.3 A public open space approximately 2.2ha will be provided within the site.

Facilities for Cars

- 5.4 Vehicular access to the site is taken via a 3 arm roundabout along Pentir Y De some 200m south of the Rhoose Point Roundabout. The access arrangement is shown in Figure 5.2 whilst the salient aspects of the design are summarised below:
 - ✤ Inscribed Circle Diameter = 35m.
 - Entry Deflection for all arms = less than 100 to reduce entry speeds.
 - Site Access Arm Width = 7.3m (excluding footway and cycleway provisions).
 - Footway and Cycleway = 4m along the site access arm to tie into the existing along Pentir Y De.
 - Pedestrian / Cyclist crossing provided at the site access arm deflection island.
- 5.5 This design is in line with the Design Manual for Roads and Bridges TD16/07 *Geometric Design of Roundabouts*.

Facilities for Pedestrians and Cyclists

5.6 The site is bounded by a PROW of way to the west, this will be used exclusively for pedestrians and cyclists. The PROW leads north onto Porthkerry Road and its existing pedestrian facilities.



- 5.7 As part of the site access arrangement a 4.0m footway and cycleway will be provided along the site access arm which will also link to the existing found along Pentir Y De.
- 5.8 The inclusion of both these measures and its internal layout ensures good permeability for sustainable modes of transport

Facilities for Buses

- 5.9 The internal site layout will be designed in such as manner as to accommodate buses and provide provisions for any services to be diverted to serve the site in the future.
- 5.10 A full loop arrangement will not come into effect until the development of the WAG land to the west of the development proposal. It is envisaged that a diversion of one of the buses operating along Porthkerry Road into the development site will not take place until full occupation (700 units) is reached on account of patronage potential.



6 TRIP GENERATION AND DISTRIBUTION

Introduction

- 6.1 The vehicle trips from the Rhoose site have been calculated based on existing modal splits that the proposed development is likely to generate in the AM and PM peak periods.
- 6.2 The TRiCS database has been interrogated in order to determine the person trip rates for the proposed development, which in turn is used to identify the vehicular trip rates that could be generated by the proposed development.
- 6.3 The development will number of affordable housing units provided as part of the proposed development. However the TRiCS calculations contained within this TA will assume that the proposed units will all be privately owned, thus the resultant trip generation will be higher than in actuality and is considered robust. These trip rates have already been agreed with VoG in advance of preparing this TA.

Person Trip Generation

- 6.4 Person trip rates for the proposed development have been taken from the TRiCS 2010(a) database based on average values. The assessment is based on the AM (08.00 to 09.00) and PM (17.00 to 18.00) peak hours and a 12 hour day (07.00 to 19.00).
- 6.5 The resultant person trip rates and trip generation based on 350 residential units are shown in 6.1 below. The full TRiCS data is attached as Appendix E of this report.

| Proposed Residential | Morning Peak Hour | | Evening Peak Hour | | Daily | |
|-------------------------|-------------------|-------|-------------------|-------|---------|--|
| | Arrivals | Deps | Arrivals | Deps | Two-Way | |
| Trip Rate (per unit) | 0.231 | 0.974 | 0.663 | 0.426 | 9.072 | |
| 350 units | 80 | 341 | 232 | 149 | 3,175 | |

Table 6.1: Trips Generated by Proposed Residential Development

6.6 Table 6.1 identifies that the proposed development is likely to generate 421 two-way person trips during the morning peak hour, 381 two-way person trips during the evening peak hour and 3,175 two-way person trips over the course of a 12 hour day.

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Existing Modal Split

6.7 The modal split of the person trips identified for the proposed development site has been based on 2001 Census 'Method of Travel to Work – Resident Population' (MTW) data for the Rhoose Ward, a summary of which is shown in Table 6.2 below.

| Mode of Travel | Persons | Percentage of Total People | Percentage of Travellers |
|---|---------|----------------------------------|--------------------------------|
| All People | 4,014 | 100% | 100% |
| Works mainly at or from home | 263 | 7% | na |
| Underground, metro, light rail or tram | 0 | 0% | 0% |
| Train | 30 | 1% | 1% |
| Bus, minibus or coach | 107 | 3% | 4% |
| Taxi or minicab | 3 | 0% | 0% |
| Driving a car or van | 1,908 | 48% | 80% |
| Passenger in a car or van | 164 | 4% | 7% |
| Motorcycle, scooter or moped | 28 | 1% | 1% |
| Bicycle | 33 | 1% | 1% |
| On foot | 100 | 2% | 4% |
| Other | 15 | 0% | 1% |
| Not currently working | 1,363 | 34% | na |

Table 6.2: Rhoose Ward – Existing Modal Split

- 6.8 In order to accurately identify the modal split of journeys to work, it is necessary to discount those who work mainly at or from home and also those who are not currently working as these two categories do not generate work related trips. The third column of the above table therefore identifies the appropriate modal split values.
- 6.9 It should also be noted that since the Census was undertaken in 2001, Rhoose Railway Station has opened. Discussions with the VoGC indicate that there has been significant modal shift from Buses to Trains. To allow for this modal shift, the modal split for bus use

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| Mode of Travel | Percentage of Travellers | Persons |
|---|-----------------------------|---------|
| All People | 100% | 4,014 |
| Works mainly at or from home | na | 263 |
| Underground, metro, light rail or tram | 0% | 0 |
| Train | 3% | 90 |
| Bus, minibus or coach | 2% | 47 |
| Taxi or minicab | 0% | 3 |
| Driving a car or van | 80% | 1,908 |
| Passenger in a car or van | 7% | 164 |
| Motorcycle, scooter or moped | 1% | 28 |
| Bicycle | 1% | 33 |
| On foot | 4% | 100 |
| Other | 1% | 15 |
| Not currently working | na | 1,363 |

has been reduced to 2% and train use increased to 3%. Table 5.3 below summarises the revised modal shift.

Table 6.3: Rhoose Ward – Adjusted Modal Split

6.10 The results in Table 6.3 show that based on existing travel patterns, 4 out 5 of those who travel to work from Rhoose do so as a car / van driver whilst the combined sustainable modes of travel (bus, train, walk and cycle) accounts for a tenth of trips. Given the size and accessibility of Rhoose these overall findings are as expected.

Vehicular Trip Generation

6.11 The adjusted modal split from Table 6.3 can be used to identify the number of vehicular trips likely to be generated by the proposed development in the peak hours. A summary of the residential vehicle trips is given In Table 6.4 overleaf.



| | AM Peak | | PMI | Peak | Daily |
|------------------------------------|---------|--------|--------|--------|---------|
| | Arrive | Depart | Arrive | Depart | Two-Way |
| Person Trips (350 units) | 80 | 341 | 232 | 149 | 3,175 |
| Vehicle Trips (80% Modal Share) | 64 | 273 | 186 | 119 | 2,540 |

Table 6.4: 350 units Development - Vehicle Trip Generation

- 6.12 Table 6.4 demonstrates that based on existing modal splits the proposed development of 350 units will generate 337 two-way vehicle trips during the morning peak hour, 305 two-way vehicle trips during the evening peak hour and 2,540 two-way vehicle trips over the course of a 12 hour day.
- 6.13 Working backwards based on 350 residential units this equates to vehicular trip rates of 0.183 arrivals and 0.780 departures per residential unit in the AM peak with 0.531 arrivals and 0.340 departures in the PM peak. These values are considered to be extremely robust.

Trip Distribution

- 6.14 Information to estimate the trip distribution has been obtained by using the 2001 Travel to Work Census data from the website www.nomisweb.co.uk (supplied by the Office of National Statistics).
- 6.15 Rhoose Ward was set as being the place of residence (origin of work related trip). The destination of work related trips was set at the Ward level for those travelling to work within VoG and at Local Authority level for those travelling to work beyond VoG.
- 6.16 The resultant trips were combined as a total and distributed to the various main roads leading out of Rhoose. This exercise was done 'by eye' attributing the trip to the destination to the most likely route and where a number of routes could be used splitting the total accordingly. The full data is attached as Appendix F and summarised within Table 6.5 overleaf.

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| | Predicted Car Route | | | | | | |
|-------|---------------------------------|-------------------------------|---|----------------------------------|--|--|--|
| Total | B4265 (To Llantwit Major) | A4226 (To Cardiff & M4) | Waycock Road (To A4 west- bound) | Pontypridd Road (To Barry) | | | |
| 100% | 15.2% | 56.3% | 13.2% | 15.4% | | | |

Table 6.5: Proposed Development – Vehicle Trip Distribution

- 6.17 The trip distributions from the above have already been agreed with VoG in advance of this TA. The trip distribution resulted in the distribution diagram which can be seen in Figure 6.1. The resultant trip assignment for the proposed development (350 units) is shown in Figure 6.2.
- 6.18 Given that the whole of Housing Site 22 is allocated for 600 units. FMW have considered the impacts for such a future scenario as a sensitivity test of 700 units, i.e. an additional 350 houses developed on the western portion of the allocated site, to provide a robust assessment. The vehicular trip generation from Table 6.4 has been doubled and distributed and assigned in the same way as per the proposed development of 350 units. The resultant trip assignment for 700 units is shown in Figure 6.3.


7 IMPACT UPON SURROUNDING ROAD NETWORK

Assessment Junctions

- 7.1 Ten junctions have been assessed using the PICADY 5 and LinSig computer programs, which assesses the operational performance of priority junctions and signal controlled junctions respectively. These junctions are as follows:
 - Proposed Site Access;
 - Waycock Cross Roundabout;
 - Fonmon Road / B4265 Junction;
 - Wales Airport Hotel Roundabout;
 - Sritish Airways Maintenance Cardiff (BAMC) Roundabout;
 - Station Road Junction;
 - Barry Docks Link Roundabout;
 - Colcot Cross Roundabout;
 - Fonmon Road Signals; and
 - Rhoose Point Roundabout.
- 7.2 These ten junctions have been assessed in 2015, i.e. five years from application. This has been agreed with VoG in advance of preparing this TA. Traffic growth has been calculated using TEMPRO adjusted National Road Traffic Forecast (NRTF) medium traffic growth, which are summarised below:
 - 2007 to 2010 = 1.036 (for junctions surveyed in 2007); and
 - ✤ 2010 to 2015 = 1.064.
- 7.3 The 2010 to 2015 growth factor have been applied to the 2010 base flows (Figure 2.7) to calculate the 2015 base flows as shown in Figure 7.1. The TEMPRO output for the 2010 to 2015 growth factor is attached as Appendix G to this report.



Committed Developments

- 7.4 A number of committed developments have been identified and agreed with VoG and are included in the capacity assessments for this TA. These include:
 - The Defence Technical College (DTC) at St Athan;
 - Aerospace Business Park (ABP) at St Athan,
 - Development adjacent to Station Road;
 - Development to the south of the site; and
 - Cardiff International Airport Traffic Growth.
- 7.5 The DTC and ABP have already been granted planning permission. The flows associated to both developments has been taken from the TA prepared by Capita Symonds dated May 2009. This is shown in Figure 7.2.
- 7.6 The development adjacent Station Road compromises of 9 flats and 560m² food store. An interrogation of the TRICS 2010(a) database gave trip rates for each individual use which resulted in the vehicle trip generation shown in Table 7.1 overleaf. The resultant trip assignment is shown in Figure 7.3 whilst the TRICS output for this development is attached as Appendix H to this report.
- 7.7 It should be noted that the trip generation is very significant given its modest floor area. An 80% reduction has been applied to the food store trips to allow for the local nature offering basic provisions for the locality. Its is likely that trips to/from further destinations would be minimal (hence the 80% reduction).
- 7.8 Table 7.1 demonstrates that the Station Road committed development would generate 16 two-way flows during the morning peak hour and 18 two-way flows during the evening peak hour.



| Land Use | Morning I | Peak Hour | Evening Peak Hour | | |
|-------------------------|-----------|-----------|-------------------|-------|--|
| Food Store | Arrivals | Deps | Arrivals | Deps | |
| Trip Rate (GFA) | 5.818 | 5.542 | 5.542 6.683 | | |
| 560m ² | 33 | 31 | 37 | 39 | |
| Reduced to 80% | 7 | 6 | 7 | 8 | |
| Flats | Arrivals | Deps | Arrivals | Deps | |
| Trip Rate (per unit) | 0.076 | 0.209 | 0.191 | 0.119 | |
| 9 units | 1 | 2 | 3 | 2 | |
| Total | 8 | 8 | 9 | 9 | |

Table 7.1: Committed Development – Station Road Trip Generation

- 7.9 The development to the south of the railway line comprises of 50 residential units with additional developments including a nursery, a public house, an office building and a health centre. The TRICS 2010(a) database has been used to establish trip rates for the development. The vehicle trip generation for each use of the development has been combined and assigned to the highway network as shown in Figure 7.4. The TRICS outputs are attached as Appendix I whilst a summary is shown in Table 7.2 overleaf.
- 7.10 Table 7.2 demonstrates that the development to the south of the site would generate 115 two-way flows during the morning peak hour and 100 two-way flows during the evening peak hour



| Land Use | Morning Peak Hour | | Evening | J Peak Hour |
|--------------------------|-------------------|-------|----------|-------------|
| Nursery | Arrivals | Deps | Arrivals | Deps |
| Trip Rate (GFA) | 7.402 | 6.299 | 0.259 | 1.501 |
| 400m ² | 30 | 25 | 1 | 6 |
| Office | Arrivals | Deps | Arrivals | Deps |
| Trip rate (GFA) | 2.735 | 0.352 | 0.352 | 2.427 |
| 500m ² | 23 | 3 | 3 | 21 |
| Pub | Arrivals | Deps | Arrivals | Deps |
| Trip Rate (GFA) | 0.000 | 0.000 | 3.741 | 3.052 |
| 500m ² | 0 | 0 | 19 | 15 |
| Health Care | Arrivals | Deps | Arrivals | Deps |
| Trip Rate (GFA) | 2.358 | 0.945 | 0.884 | 1.778 |
| 310m ² | 7 | 3 | 3 | 6 |
| Private Resi | Arrivals | Deps | Arrivals | Deps |
| Trip Rates (per unit) | 0.144 | 0.338 | 0.335 | 0.202 |
| 50 | 7 | 17 | 17 | 10 |
| Total | 67 | 48 | 42 | 58 |

Table 7.2: Committed Development –

Land South of Railway Line Trip Generation



- 7.11 The increase in airport traffic has also been included as a committed development. Review of Cardiff International Airport's *Masterplan 2006* has identified the DfT's forecast of 4.1% increase per annum for airport passenger growth. This percentage increase has been applied cumulatively to the airport access from BAMC roundabout over 5 years to establish the increase in airport associated traffic for 2015. This is shown in Figure 7.5.
- 7.12 All the committed developments shown from Figure 7.2 7.5 have been combined into one and the results of which is shown in Figure 7.6.

Assessment Scenarios

- 7.13 The following scenarios have been assessed:
 - ✤ 2015 design year base;
 - 2015 plus committed developments (Figure 7.7);
 - 2015 plus committed developments plus 350 units (Figure 7.8);
 - Sensitivity Test: 2015 plus committed developments plus 700 units (Figure 7.9).

Planned Highways Improvements

7.14 A review of Capita Symond's TA identified that Waycock Cross roundabout would be over capacity due to the DTC and ABP developments. As such Capita Symonds' has proposed an offline highway improvement to the junction which would address the capacity problems identified. Therefore capacity assessments at this junction will use the geometric design proposed by Capaita Symonds. The Waycock Cross junction improvements is attached as Appendix J.

Operational Capacity

7.15 The existing and proposed junctions were tested using the PICADY 5, ARCADY 6 and LINSIG computer programs. The models have been compiled by using on-site observations, Ordnance Survey data and aerial photographs. The following Tables 7.3 – 7.12 show a summary of the results. See Appendix K, L and M for the full ARCADY, PICADY, LINSIG printouts respectively.



| Scenario | Road | RFC (%) | | Average Delay (min/veh) | | Max Queue Length (vehs) | |
|----------------------|-----------------|------------|------|-------------------------------|------|----------------------------|----|
| | | AM | PM | AM | PM | AM | PM |
| 2015 Base + Com | Pentir Y De (N) | 16.3 | 30.0 | 0.05 | 0.06 | 0 | 0 |
| | Pentir Y De (S) | 20.2 | 10.1 | 0.06 | 0.06 | 0 | 0 |
| Dev+ 350 units | Site Access Arm | 27.0 | 11.1 | 0.07 | 0.06 | 0 | 0 |
| Sensitivity Test: | Pentir Y De (N) | 19.3 | 45.4 | 0.05 | 0.08 | 0 | 1 |
| 2015 Base + Com | Pentir Y De (S) | 20.6 | 11.2 | 0.06 | 0.06 | 0 | 0 |
| Dev+ 700 units | Site Access Arm | 54.0 | 22.2 | 0.12 | 0.07 | 1 | 0 |

Proposed Site Access

Table 7.3: Summary of Capacity Assessment of Site Access Roundabout

7.16 Table 7.3 demonstrates that the proposed site access will operate well below capacity in all scenarios.



| Scenario | Road | RFC (%) | | RFC Average (%) Delay (min/veh) | | Max Queue Length (vehs) | |
|------------------------|--------------------|------------|-------|---------------------------------------|------|----------------------------|-----|
| | | AM | PM | AM | PM | AM | PM |
| | Port Road West (E) | 63.5 | 73.8 | 0.14 | 0.18 | 2 | 3 |
| 2015 | Pontypridd Road | 50.8 | 57.4 | 0.09 | 0.11 | 1 | 1 |
| Base Flows | Port Road West (W) | 57.0 | 37.5 | 0.07 | 0.05 | 1 | 1 |
| | Waycock Road | 37.9 | 35.8 | 0.08 | 0.07 | 1 | 1 |
| | Port Road West (E) | 80.9 | 79.4 | 0.28 | 0.23 | 4 | 4 |
| 2015 Base + Com Dev | Pontypridd Road | 59.8 | 63.6 | 0.12 | 0.13 | 2 | 2 |
| | Port Road West (W) | 62.4 | 44.1 | 0.08 | 0.05 | 2 | 1 |
| | Waycock Road | 42.0 | 40.5 | 0.09 | 0.08 | 1 | 1 |
| | Port Road West (E) | 84.3 | 89.8 | 0.34 | 0.45 | 5 | 8 |
| 2015 Base + | Pontypridd Road | 61.2 | 70.0 | 0.12 | 0.17 | 2 | 2 |
| Com Dev + 350 units | Port Road West (W) | 74.1 | 48.9 | 0.12 | 0.06 | 2 | 1 |
| | Waycock Road | 46.3 | 43.8 | 0.11 | 0.09 | 1 | 1 |
| Sensitivity | Port Road West (E) | 89.3 | 108.2 | 0.49 | 4.92 | 8 | 111 |
| Test: 2015 | Pontypridd Road | 64.4 | 77.4 | 0.14 | 0.24 | 2 | 3 |
| Base + Com Dev+ | Port Road West (W) | 85.3 | 53.8 | 0.20 | 0.06 | 6 | 1 |
| 700 units | Waycock Road | 51.3 | 47.2 | 0.13 | 0.10 | 1 | 1 |

Waycock Cross Roundabout

Table 7.4: Summary of Capacity Assessment of Waycock Cross Roundabout

- 7.17 Table 7.4 demonstrates that the offline Waycock Cross improvements designed by Capita Symonds will operate within capacity in 2015 with committed developments. The junction will operate over capacity with 700 units.
- 7.18 The roundabout assessed is currently in its design stage and adjustments can be made to mitigate demand imposed upon the junction by the development proposals. The responsibility of the redesign would fall with WAG as part of their proposals for the DTC at St Athan.



| Scenario | Road | RFC (%) | | Average Delay (min/veh) | | Max Queue Length (vehs) | |
|--------------------------|-------------|------------|------|----------------------------|------|----------------------------|----|
| | | AM | PM | AM | PM | AM | PM |
| | B4265 (E) | - | - | - | - | - | - |
| 2015 Base Flows | Fonmon Road | 37.3 | 19.4 | 0.18 | 0.14 | 1 | 0 |
| | B4265 (W) | 15.2 | 31.1 | 0.12 | 0.15 | 0 | 0 |
| 2015 Base + | B4265 (E) | - | - | - | - | - | - |
| | Fonmon Road | 65.5 | 28.4 | 0.35 | 0.16 | 2 | 0 |
| Com Dev | B4265 (W) | 23.6 | 50.7 | 0.15 | 0.22 | 0 | 1 |
| | B4265 (E) | - | - | - | - | - | - |
| 2015 Base + Com Dev + | Fonmon Road | 70.7 | 30.6 | 0.40 | 0.17 | 2 | 0 |
| 350 units | B4265 (W) | 25.1 | 54.2 | 0.15 | 0.23 | 0 | 1 |
| Sensitivity Test: | B4265 (E) | - | - | - | - | - | - |
| 2015 | Fonmon Road | 76.0 | 33.0 | 0.49 | 0.17 | 3 | 0 |
| Dev+ 700 units | B4265 (W) | 26.4 | 57.8 | 0.15 | 0.25 | 0 | 1 |

Fonmon Road / B4265 Junction

Table 7.5: Summary of Capacity Assessment of Fonmon Road / B4265

7.19 Table 7.5 demonstrates that the existing junction of Fonmon Road / B4265 will operate within capacity for all scenarios. The committed development trips will have a significant impact on capacity and driver delay on the 2015 base flows. The addition of development trips has a minor impact on the junction in comparison.



| Scenario | Road | RFC (%) | | Average Delay (min/veh) | | Max Queue Length (vehs) | |
|--------------------------|-----------|------------|------|-------------------------------|------|----------------------------|----|
| | | AM | PM | А́М | PM | AM | PM |
| | Port Road | 42.9 | 35.6 | 0.07 | 0.07 | 1 | 1 |
| 2015 Base Flows | A4226 (W) | 36.1 | 32.1 | 0.07 | 0.06 | 1 | 1 |
| | A4226 (E) | 35.5 | 55.2 | 0.05 | 0.07 | 1 | 1 |
| 2015 Base + | Port Road | 51.8 | 38.9 | 0.09 | 0.07 | 1 | 1 |
| | A4226 (W) | 38.8 | 37.5 | 0.07 | 0.06 | 1 | 1 |
| Com Dev | A4226 (E) | 47.1 | 61.3 | 0.06 | 0.08 | 1 | 2 |
| | Port Road | 68.5 | 47.1 | 0.14 | 0.08 | 2 | 1 |
| 2015 Base + Com Dev + | A4226 (W) | 43.8 | 39.4 | 0.09 | 0.07 | 1 | 1 |
| 350 units | A4226 (E) | 49.9 | 74.5 | 0.06 | 0.12 | 1 | 3 |
| Sensitivity Test: | Port Road | 86.4 | 53.9 | 0.32 | 0.10 | 6 | 1 |
| 2015 Base + Com | A4226 (W) | 50.1 | 41.4 | 0.11 | 0.08 | 1 | 1 |
| Dev+ 700 units | A4226 (E) | 52.7 | 77.3 | 0.07 | 0.14 | 1 | 3 |

Wales Airport Hotel Roundabout

Table 7.6: Summary of Capacity Assessment of Wales Airport Hotel Roundabout

7.20 Table 7.6 demonstrates that the existing Wales Airport Hotel Roundabout will operate within capacity in all scenarios. The addition of development trips has a notable impact on Port Road in the AM peak and A4226 (E) during the PM peak, but does not cause it to operate over capacity.



| Scenario | Road | RFC (%) | | Average Delay (min/veh) | | Max Queue Length (vehs) | |
|--------------------|-----------------|------------|------|-------------------------------|------|----------------------------|----|
| | | AM | PM | AM | PM | AM | PM |
| | A4226 | 22.4 | 27.1 | 0.05 | 0.05 | 0 | 0 |
| | To Airport | 5.1 | 7.4 | 0.05 | 0.05 | 0 | 0 |
| 2015 Base Flows | Dragonfly Drive | 0.0 | 1.5 | 0.04 | 0.04 | 0 | 0 |
| | B4265 | 30.6 | 20.3 | 0.05 | 0.04 | 0 | 0 |
| | Tredogan Road | 1.2 | 0.5 | 0.04 | 0.03 | 0 | 0 |
| | A4226 | 32.8 | 30.1 | 0.06 | 0.05 | 1 | 0 |
| | To Airport | 0.07 | 9.1 | 0.05 | 0.05 | 0 | 0 |
| 2015 Base + | Dragonfly Drive | 0.0 | 1.5 | 0.04 | 0.04 | 0 | 0 |
| Com Dev | B4265 | 32.6 | 24.8 | 0.05 | 0.05 | 1 | 0 |
| | Tredogan Road | 1.3 | 0.6 | 0.04 | 0.03 | 0 | 0 |

BAMC Roundabout

Table 7.7: Summary of Capacity Assessment of BAMC Roundabout

7.21 Table 7.7 demonstrates that the BAMC roundabout will operate within capacity in 2015 with committed developments with large amounts of spare capacity. The scenario with 350 and 700 units have not been assessed as no development trips have been distributed through this junction.



| Scenario | Road | RFC (%) | | Average Delay (min/veh) | | Max Queue Length (vehs) | |
|--------------------------|----------------|------------|------|-------------------------------|------|----------------------------|----|
| | | AM | PM | ÂM | PM | AM | PM |
| | Rhoose Road | - | - | - | - | - | - |
| 2015 Base Flows | Station Road | 12.7 | 8.9 | 0.13 | 0.14 | 0 | 0 |
| | Fontygary Road | 9.1 | 11.6 | 0.12 | 0.12 | 0 | 0 |
| 2015 Base + | Rhoose Road | - | - | - | - | - | - |
| | Station Road | 15.1 | 10.8 | 0.14 | 0.14 | 0 | 0 |
| Com Dev | Fontygary Road | 9.2 | 12.0 | 0.12 | 0.12 | 0 | 0 |
| | Rhoose Road | - | - | - | - | - | - |
| 2015 Base + Com Dev + | Station Road | 15.1 | 11.0 | 0.15 | 0.15 | 0 | 0 |
| 350 units | Fontygary Road | 9.4 | 12.1 | 0.12 | 0.12 | 0 | 0 |
| Sensitivity Test: | Rhoose Road | - | - | - | - | - | - |
| 2015 Base + Com | Station Road | 15.4 | 11.2 | 0.15 | 0.15 | 0 | 0 |
| Dev+ 700 units | Fontygary Road | 9.5 | 12.2 | 0.12 | 0.12 | 0 | 0 |

Station Road Junction

Table 7.8: Summary of Capacity Assessment of Station Road Junction

7.22 Table 7.8 demonstrates that the existing Station Road junction will operate within capacity for all scenarios. The addition of development trips will have a minor impact on capacity and driver delay.



| Scenario | Road | RFC (%) | | Average Delay (min/veh) | | Max Queue Length (vehs) | |
|------------------------------|----------------|------------|-------|-------------------------------|------|----------------------------|----|
| | | AM | PM | А́М | PM | AM | PM |
| | A4231 | 61.0 | 68.0 | 0.10 | 0.13 | 2 | 2 |
| 2015 Base Flows | Port Road East | 71.0 | 68.0 | 0.71 | 0.12 | 2 | 2 |
| | Port Road | 68.0 | 87.0 | 0.68 | 0.26 | 2 | 7 |
| 2015 Base + | A4231 | 66.0 | 70.0 | 0.12 | 0.15 | 2 | 2 |
| | Port Road East | 81.0 | 72.0 | 0.19 | 0.15 | 4 | 3 |
| Com Dev | Port Road | 76.0 | 90.0 | 0.15 | 0.32 | 3 | 8 |
| | A4231 | 68.0 | 75.0 | 0.13 | 0.18 | 2 | 3 |
| 2015 Base + Com Dev + 350 | Port Road East | 84.0 | 77.0 | 0.22 | .018 | 5 | 3 |
| units | Port Road | 78.0 | 95.0 | 0.17 | 0.57 | 3 | 15 |
| Sensitivity Test: | A4231 | 69.0 | 80.0 | 0.14 | 0.23 | 2 | 4 |
| 2015 Base + Com | Port Road East | 94.0 | 88.0 | 0.58 | 0.35 | 14 | 7 |
| Dev+ 700 units | Port Road | 81.0 | 101.0 | 0.20 | 1.71 | 4 | 51 |

Barry Docks Link Roundabout

Table 7.9: Summary of Capacity Assessment of Barry Docks Link Roundabout

7.23 Table 7.9 demonstrates that the existing Barry Docks Link Roundabout will operate under 100% capacity for the first three scenarios, including 350 units. The Sensitivity Test for 700 units demonstrates that Port Road will operate over 100% capacity during the PM peak hour.



| Scenario | Road | RFC (%) | | Average Delay (min/veh) | | Max Queue Length (vehs) | |
|--------------------------|----------------|------------|------|-------------------------------|------|----------------------------|----|
| | | AM | PM | ÂM | PM | AM | PM |
| | Colcot Road | 46.1 | 49.9 | 0.09 | 0.10 | 1 | 1 |
| 2015 Base Flows | Port Road West | 89.0 | 65.9 | 0.39 | 0.12 | 8 | 2 |
| | Port Road East | 60.3 | 59.1 | 0.09 | 0.08 | 2 | 1 |
| 2015 Base + | Colcot Road | 52.6 | 51.9 | 0.10 | 0.11 | 1 | 1 |
| | Port Road West | 95.1 | 75.0 | 0.76 | 0.17 | 16 | 3 |
| Com Dev | Port Road East | 68.4 | 62.5 | 0.11 | 0.09 | 2 | 2 |
| | Colcot Road | 53.5 | 54.4 | 0.11 | 0.12 | 1 | 1 |
| 2015 Base + Com Dev + | Port Road West | 109.0 | 80.0 | 5.19 | 0.21 | 132 | 4 |
| 350 units | Port Road East | 70.5 | 68.0 | 0.12 | 0.10 | 2 | 2 |
| Sensitivity Test: | Colcot Road | 54.4 | 59.0 | 0.11 | 0.14 | 1 | 1 |
| 2015 Base + Com | Port Road West | 118.0 | 85.0 | 9.56 | 0.27 | 246 | 5 |
| Dev+ 700 units | Port Road East | 72.3 | 75.0 | 0.13 | 0.13 | 3 | 3 |

Colcot Cross Roundabout

Table 7.10: Summary of Capacity Assessment of Colcot Cross Roundabout

- 7.24 Table 7.10 demonstrates that the existing Colcot Cross Roundabout will have capacity issues in the 2015 base scenario, particularly on Port Road West in the AM peak hours. The inclusion of committed developments and development trips further exacerbates the issue.
- 7.25 It should be noted that Colcot Cross Roundabout was not assessed as part of the DTC TA. It is also highly likely that this junction was not considered as part of the transport work undertaken to support the other committed developments either. If the trips associated with the committed developments are excluded from the Colcot Cross ARCADY analysis, the results would demonstrate that the existing roundabout would operate between 85% and 100% RFC, which is within capacity, and thus would not require mitigation as part of the proposed development.



Fonmon Road Signals

- 7.26 The software used to undertake the analysis is LINSIG V3.0.
- 7.27 The following assumptions have been made regarding the junction, as existing signal timing information is currently not available.
 - Four stage junction, including an all red pedestrian stage
 - Stage 1 Fontygary Road, eastern and western arms are called together, with opposing right turn movements.
 - Stage 2 Fonman Road, northern arm, is called, with an un-opposed right turn.
 Visibility between this arm and Fonman Road, southern arm, is poor, hence the separate staging.
 - Stage 3 Fonman Road, southern arm, is called, again with an un-opposed right turn.
 - Stage 4 All red traffic stage with pedestrian crossing called. Whilst it is unclear as to the level of pedestrian activity across the junction, a worst case scenario is assumed that during morning and evening peak hours the pedestrian stage is called every cycle. The pedestrian flow is assumed to be low and therefore a value of 20 has been used.
- 7.28 The results of the analysis are summarised into Table 7.11 overleaf. Table 7.11 demonstrates that based on the assumptions in the LINSIG model, the junction will operate with significant levels of practical reserve capacity for all assessment scenarios



| Model Seenario | Practical Reserve Capacity |
|--|----------------------------|
| | % |
| 2010 – Base Traffic AM Peak Hour | 169.3 |
| 2010 – Base Traffic PM Peak Hour | 191.4 |
| | |
| 2015 – Base Traffic AM Peak Hour | 154.0 |
| 2015 – Base Traffic PM Peak Hour | 174.6 |
| | |
| 2015 – Base + Committed Development AM Peak Hour | 142.7 |
| 2015 – Base + Committed Development PM Peak Hour | 161.4 |
| | |
| 2015 – Base + Com Dev + 350 Units AM Peak Hour | 114.4 |
| 2015 – Base + Com Dev + 350 Units PM Peak Hour | 129.6 |
| | |
| 2015 – Base + Com Dev + 700 Units AM Peak Hour | 91.5 |
| 2015 – Base + Com Dev + 700 Units PM Peak Hour | 106.9 |

Table 7.11: Summary of Capacity Assessment of Fonmon Road Signals



| Scenario | Road | RFC (%) | | Average Delay (min/veh) | | Max Queue Length (vehs) | |
|--------------------------|---------------------|------------|------|-------------------------------|------|----------------------------|----|
| | | AM | PM | ÂM | PM | AM | PM |
| | Pentir Y De | 12.1 | 3.8 | 0.05 | 0.05 | 0 | 0 |
| 2015 Base Flows | Porthkerry Road (W) | 26.8 | 14.1 | 0.06 | 0.05 | 0 | 0 |
| | Porthkerry Road (E) | 13.7 | 38.5 | 0.05 | 0.07 | 0 | 0 |
| 2015 Base + | Pentir Y De | 15.4 | 8.3 | 0.05 | 0.05 | 0 | 0 |
| | Porthkerry Road (W) | 28.5 | 15.2 | 0.06 | 0.05 | 0 | 0 |
| Com Dev | Porthkerry Road (E) | 18.3 | 41.5 | 0.05 | 0.07 | 0 | 1 |
| | Pentir Y De | 34.1 | 17.6 | 0.06 | 0.06 | 1 | 0 |
| 2015 Base + Com Dev + | Porthkerry Road (W) | 32.4 | 17.8 | 0.07 | 0.05 | 1 | 0 |
| 350 units | Porthkerry Road (E) | 22.2 | 52.8 | 0.05 | 0.09 | 0 | 1 |
| Sensitivity Test: | Pentir Y De | 52.7 | 26.8 | 0.09 | 0.06 | 1 | 0 |
| 2015 Base + Com | Porthkerry Road (W) | 37.2 | 20.7 | 0.08 | 0.06 | 1 | 0 |
| Dev+ 700 units | Porthkerry Road (E) | 26.2 | 64.0 | 0.06 | 0.11 | 0 | 2 |

Rhoose Point Roundabout

Table 7.12: Summary of Capacity Assessment of Rhoose Point Roundabout

7.29 Table 7.12 demonstrates the existing Rhoose Point Roundabout will operate within capacity for all scenarios. The addition of development trips does not significantly impact on the operational capacity of the roundabout.

7.30 A summary of all capacity assessments are summarised into Table 7.13 overleaf.



Summary of Capacity Analysis

7.31 Table 7.13 provides a summary of the junction capacity assessments, identifying which junctions operate under capacity, at capacity or over capacity for the various assessment scenarios.

| | Scenario | | | |
|----------------------------|----------|-------------------|---------------------------|---------------------------|
| Junction | 2015 | 2015 + Com Dev | 2015 + Com + 350 units | 2015 + Com + 700 units |
| Site Access | | | | |
| Waycock Cross | | | | |
| Fonmon Road Junction | | | | |
| Airport Hotel RBT | | | | |
| BAMC RBT | | | | |
| Station Road Junction | | | | |
| Barry Dock Link RBT | | | | |
| Colcot Cross RBT | | | | |
| Fonmon Road Signals | | | | |
| Rhoose Point Roundabout | | | | |

| Кеу | RFC < 85 | RFC 85 - 100 | > 100 |
|-----|----------|--------------|-------|

Table 7.13: Summary of Capacity Assessment of

Rhoose Point Roundabout

- 7.32 Table 7.13 demonstrates that the majority of junctions will operate within capacity during the peak hours for all scenarios. The exceptions to this are:
 - Waycock Cross (Capita Symonds Off-Line Arrangement) will operate within capacity in 2015 with committed development and operate at capacity with the inclusion of 350 units. The addition of 700 units would make the roundabout operate over capacity. It is considered that adjustments to the Capita Symonds proposals could resolve capacity issues before construction.



- Barry Dock Link Roundabout will operate within capacity with the proposed development but over capacity when the additional 350 units are included in 2015;
- Colcot Cross Roundabout operates at capacity in 2015 with committed development trips and would operate over capacity in 2015 with committed development and the proposed development. It should be noted that the transport work undertaken for the committed developments did not consider Colcot Roundabout. If these trips were to be omitted from the analysis, the junction would still operate under 100% with 350 units.



8 SUSTAINABLE TRANSPORT

- 8.1 As part of the development of the site various facilities will be introduced that will assist and encourage travel to and from the site by sustainable modes of transport, in particular cycle and foot.
- 8.2 The facilities and measures proposed by the development are listed below:
 - Cycle / footway connections to the PROW which bounds the site to the west;
 - Cycle / footway connections from the proposed site access arm to the existing cycle / footway along Pentir Y De;
 - Preparation of a Framework Travel Plan to promote travel to and from the site by sustainable modes (Appendix N).
- 8.3 The provision of these facilities and measures will ensure good permeability throughout the site and encourage use of more sustainable modes of transport. The inclusion of a Framework Travel Plan for the site further promotes the use of sustainable transport.



9 ACCESSIBILITY ASSESSMENT

Pedestrian Accessibility

- 9.1 Walking routes from the site towards local facilities, in the main, are provided as footways along Porthkerry Road, Rhoose Road and Fontygary Road.
- 9.2 Acceptable walking distances will vary considerably depending on various factors such as fitness and land topography; however, guidelines by the Institution of Highways and Transportation (IHT) suggest the following walking distances:

| <u>Desirable</u> | <u>Acceptable</u> | Preferred Maximum |
|------------------|-------------------|-------------------|
| 500m | 1,000m | 2,000m |
| (6min 24secs) | (12min 48secs) | (24mins 56secs) |

- 9.3 Based on a walking speed of 1.3m/sec or just over 4.5km/h (for comparison The Design Manual for Roads and Bridges, Volume 11, Section 3, Part 8 recommends an average walking speed of 5km/h), the following facilities are accessible within a 2.0km radius of the site as shown in Figure 9.1 and summarised below:
 - Two primary schools;
 - Two convenience stores;
 - One Post Office;
 - Two GP surgeries;
 - One pharmacy;
 - One dental surgery;
 - Rhoose Railway Station; and
 - Cardiff International Airport.
- 9.4 Existing bus stops on Porthkerry Road are 900m from the furthest extents of the development and can be accessed via pentir y de to the east or the PROW to the west.

Cycling Accessibility

9.5 The Institution of Highways and Transportation (IHT) states that three quarters of journeys by all modes are less than five miles (8km) and half are less than two miles (3.2km). These are distances that can be cycled comfortably by a reasonably fit person. All of Rhoose Urban area is no further than 2.0km, making cycling to and from the development a viable



option. Based on a cycling speed of 4.0 m/sec, or just over 14.4 km/h, all of the Rhoose urban area is just over an 8 minute cycle from the site.

9.6 Barry is located under a 5.0km ride from the site and based on a cycling speed of 4.0m/s, it would take under 20 minutes to cycle to Barry.

Walking Routes to Rhoose Cardiff Airport Railway Station

- 9.7 FMW undertook a Walking Audit on May 10th 2010 to evaluate the walking routes from the proposed site to Rhoose Cardiff Airport Railway Station. Weather conditions were observed to be cloudy but dry.
- 9.8 Two routes were audited, one via Porthkerry Road to the north and the other via Trem Echni to the south of the site. The walking routes are shown in Figure 9.2, whilst Table 9.1 and 9.2 summarises both the walking routes.

| Northern Route to Railway Station | | | | |
|-----------------------------------|---|--|----------------------------------|--------------------------------------|
| To/From | PROW adjacent site - Porthkerry Road | Porthkerry Road - Rhoose Road | Rhoose Road - Station Road | Station Road - Railway Station |
| Distance (m) | 220 | 310 | 240 | 270 |
| Classification | PROW, Track | Footway | Footway | Footway |
| Width (m) | 3 | 2 | 2 | 2 |
| Lighting | None | Street Lighting | Street Lighting | Street Lighting |
| Surfacing | Yes, uneven loose surfacing | Yes | Yes | Yes |
| Average Gradient | +1:22 | -1:77 | -1:26 | -1:27 |

Table 9.1: Northern Route: Walking Audit Summary

- 9.9 Table 9.1 shows that the northern walking route is approximately just over a kilometre in length. Based on a walking speed of 1.3m/s this would take on average just over 13 minutes.
- 9.10 The route starts from the adjacent PROW with a steady incline of 1:22 to Porthkerry Road. From this high point the route follows a gentle slope down all the way to the railway station.



| Southern Route to Railway Station | | | | |
|-----------------------------------|---------------------------------------|--------------------------------------|---|---|
| To/From | PROW South of Site - Trem Echni | Trem Echni - Heol Y Pentir (S) | Heol Y Pentir (S) Heol Y Pentir (W) | Heol Y Pentir (W) - Railway Station |
| Distance (m) | 180 | 500 | 120 | 400 |
| Classification | PROW, Track | Footway | Footway | Footway |
| Width (m) | 2 to 3 | 2 | 2 | 3 |
| Lighting | None | Street Lighting | Street Lighting | Street Lighting |
| Surfacing | Uneven loose surfacing | Yes | Yes | Yes |
| Average Gradient | -1:14 | Broadly Flat | -1:15 | +1:44 |
| Comments | Railway line must be crossed | N/A | N/A | N/A |

Walking is predominantly along footways of at least 2.0m alongside the main roads which have street lighting.

Table 9.2: Southern Route: Walking Audit Summary

- 9.11 Table 9.2 identifies that the southern walking route is approximately 1.2km in length and would take on average just over 13 minutes from the site.
- 9.12 The route starts from the PROW south of the south. The railway line must be crossed at the Happy valley Crossing to reach Trem Echni. The crossing point itself is an at grade pedestrian level crossing with provision of simple stepping blocks across the track.
- 9.13 Walking is mainly along the roads of Trem Echni and Heol Y Pentir on footways of at least2.0m. Gradients can vary greatly from being flat to steep along these roads.



- 9.14 In summary the southern route is slightly longer in length than the northern route. The railway line must first be crossed when taking the southern route; this is not the case with the northern route where no major obstacles present themselves. In addition there is a greater variance in gradient along the southern route. The northern route also provides opportunities for linked trips as there are a number of local shops located along the route All this factored into account make the northern route the most attractive option as it is more safe, secure and usable when compared to the southern route.
- 9.15 It should be noted that any level crossing improvements such as a bridge or under-pass, whilst improving user safety, would increase walking distances due to necessary approach ramps. This would likely further reduce the attractiveness of the southern route for pedestrians.



10 SUMMARY AND CONCLUSIONS

- 10.1 In summary, this report has demonstrated the following:
 - The site is well positioned in relation to the local highway network with no existing capacity issues;
 - Rail services are at peak hour capacity but there is sufficient capacity for off peak travel;
 - The development site is located within vicinity to sustainable transport namely buses and rail services;
 - The site is well located to existing cycle routes and PROW running adjacent to the site providing a traffic free / lightly trafficked link to bus stops and the Railway Station;
 - The development will consist of up to 350 residential units accessed from Pentir Y De by way of a standard 3 arm roundabout;
 - Junction capacity assessments demonstrates that all the junctions assessed, with the exception of Colcot Cross will operate under 100% capacity with the inclusion of committed development trips and 350 units development trips;
 - A Sensitivity Test of 700 units demonstrates that Waycock Cross, Barry Docks Link Roundabout and Colcot Cross Roundabout will operate over 100% capacity;
 - In line with the Development Brief, off-site highway mitigation measures have been considered as part the development proposal. The results of the junction assessments demonstrates that no off-site highway are required to mitigate the development proposal.
 - The development of the site will provide facilities for sustainable modes of travel.
 This includes:
 - Cycle / footway connections to the PROW which bounds the site to the west;
 - Cycle / footway connections from the proposed site access arm to existing along Pentir Y De; and
 - Framework Travel Plan



- The site provides good pedestrian and cycle accessibility to education centres in Rhoose as well as good links to local services and facilities within acceptable distances.
- 10.2 We conclude that the site is suitable for residential development and that there are no transportation reasons why the site should not be developed, providing that the range of transport measures identified in this report are implemented.










































