Land to the North of the Railway Line, Rhoose, Vale of Glamorgan

Transport Assessment | May 2007

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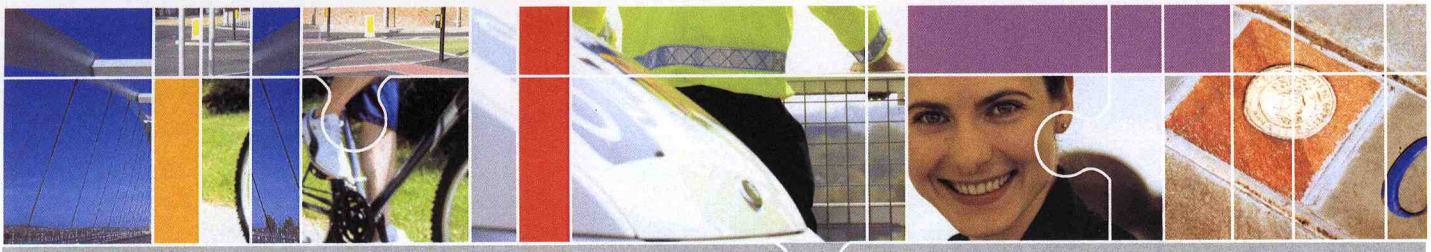

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Land to the North of the Railway Line, Rhoose, Vale of Glamorgan

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1.0 Introduction

1.1 Capita Symonds was commissioned by The National Assembly for Wales, Bellway Plc and Persimmon Homes (Wales) Ltd to produce a Transport Assessment (TA) for a proposed housing development on the Land to the North of the Railway Line, Rhoose, Vale of Glamorgan. A location plan of the proposed site is attached as Figure 1.1.

1.2 The TA has been written in accordance with the "IHT Guidelines on Traffic Impact Assessment", based on guidance from the revised Technical Advice Note on Transport No. 18.

1.3 The site is bounded by a Railway Line to the south and Rhoose Point Access Road, Pentir y De to the east. Vehicular access to the site is for 600 houses off the Rhoose Point Access Road, Pentir y De.

1.4 The report considers the distribution of traffic in Rhoose at the following junctions, as agreed with the Vale of Glamorgan County Council:

- Porthkerry Road/Rhoose Point Link Road Roundabout;
- Port Road/Porthkerry Road Roundabout;
- Fontygary Traffic Signals;
- Proposed Access Junction.

1.5 Capacity analysis has been undertaken during the following observed network peak periods:

- Weekday AM peak – 08:00 – 09:00
- Weekday PM peak – 17:00 – 18:00

It is assumed that modelling on this day will cater for the greatest network and development peaks during the week, and will therefore represent the worst-case scenario.

2.0 Existing Conditions

2.1 The proposed development site comprises of approximately 26 ha of land in open pasture located between the existing village of Rhoose to the northwest and the Rhoose Point residential development to the south.

2.2 The proposed development site is currently owned by The Welsh Assembly Government, Persimmon Homes (Wales) Ltd and Bellway Plc.

The sites ownership is divided up into the following gross areas:

- WAG - 12.15 ha
- Persimmon Homes (Wales) Ltd - 10 ha
- Bellway - 4.275 ha

The proposed site area is shown in Figure 2.1

2.3 Rhoose Point Access Road, which runs alongside the proposed development is at present a 7.3m wide two-lane 30mph road.

2.4 A number of traffic counts were undertaken for the study to establish vehicle flow and turning movements at junctions. Flow data was collected in the form of peak hour Junction Classified Counts (JCC) and Automatic Traffic Counts (ATC) at the following junctions (See Figure 2.2).

Junction Classified Counts

- Porthkerry Road / Rhoose Point Link Road Roundabout
- Port Road / Porthkerry Road Roundabout
- Fontygary Road Traffic Signals

The surveys where undertaken on Wednesday 17th November 2004. This day was chosen to represent typical traffic flows for the road network. The results are attached as Appendix A.

Automatic Traffic Counts

- Porthkerry Road West (west of roundabout)
- Porthkerry Road East (east of roundabout)

The ATC's were undertaken between the dates 17th – 25th November 2004. An ATC was undertaken in order to establish whether the JCC's were undertaken on a typical day. The results are attached as Appendix B.

2.5 Existing traffic flows from each survey can be seen in Figures 2.3 – 2.5. Existing traffic flows have been factored using NRTF Central growth rates, as agreed with the Vale of Glamorgan County Council. Factored traffic flows are summarised in Figures 2.6 – 2.7 and 2.9 – 2.21

3.0 Proposed Development

3.1 The site is allocated for residential development in the adopted Vale of Glamorgan Unitary Development Plan. The plan notes that the site will benefit from potentially good transport links with the re-opening of the Vale of Glamorgan railway line to passenger services. The site offers links to the proposed retail and leisure facilities at Rhoose Point and is well located for employment allocations at Cardiff International Airport.

3.2 The proposed development is for 600 units in total: 400 units within the Unitary Development Plan (UDP) period to 2011, with a further 200 units during the next plan period.

3.3 There is an anticipated development of an additional 88 houses on the vacant piece of land to the south of the development site, on the southern side of the railway line. For the purpose of the TA the land use type has been assumed to be housing, as requested by the Vale of Glamorgan County Council. Access to this development is via Trem Echni.

3.4 Analysis was been undertaken using the total number of 688 units: 600 from the National Assembly for Wales, Persimmon Homes (Wales) Ltd and Bellway Plc development and 88 from the anticipated development to the south. The proposed Development Framework is indicated in Drawing B.10

3.5 Access to the proposed development will be via a 35m ICD roundabout which has been designed by Capita Symonds. The proposed roundabout design is indicated in Drawing 7550/TA/01.

4.0 Trip Attraction and Trip Distribution

4.1 TRICS 2004(b) database has been utilised in order to establish trip generation rates from similar sized developments across the United Kingdom. The results are summarised below and are attached in full as Appendix C. The results below are based on 688 houses. (600 proposed development, 88 anticipated development).

The TRICS database has been used having specified that only the most recent surveys are utilised and that all survey sites in Greater London, Republic of Ireland and Northern Ireland have been removed.

TRICS 2004(b) Trip Rates

	Arrivals		Departures	
	Average	85th %'ile	Average	85th %'ile
AM Peak	0.12	0.20	0.45	0.60
PM Peak	0.4	0.52	0.20	0.26

Total Trip Attractions to the Development

	Arrivals		Departures	
	Average	85th %'ile	Average	85th %'ile
AM Peak	83	138	310	413
PM Peak	275	358	138	179

4.2 85th percentile rates have been used in the analysis as they represent a worst-case scenario of development traffic on the road network.

4.3 The proposed housing development has been modelled under the assumption that a maximum of 551 and 537 additional vehicles during the AM and PM peaks respectively would be attracted to the local highway network.

4.4 The trip generation rates have been based on surveys of sites which are not in close proximity to a train station. With the opening of the Vale of Glamorgan line, the vehicle trip rates from this site are likely to be less than predicted due to people walking to the Train Station. Therefore, this is a worse case analysis.

Distribution Assumptions

4.5 It has been assumed that 90% of the development traffic will exit the access roundabout heading north towards Porthkerry Road. The remaining 10% have been assumed to turn right into Rhoose Point, in order to access the railway station as shown on the Development Framework drawing.

4.6 Distribution of development traffic at Porthkerry Road/Rhoose Point Access has been based upon existing movements witnessed in the JCC. The distribution at the remaining junctions has been taken from existing movements based on the JCC's.

Assessment Years

4.7 IHT Guidelines for Traffic Impact Assessment states:

Estimates of traffic flows on the adjacent links and at key links and junctions within the affected area for:

- Base year, i.e. first year of operation,
- Base year plus 10 years.

If new or modified highway infrastructure is required;

Year of completion of infrastructure plus 15 years.

4.8 Therefore, junction analysis has been undertaken 10 years from year of opening for existing junctions and 15 years from year of opening for new or modified junctions.

Airport Traffic

4.9 Due to the close proximity of the proposed site to Cardiff International Airport (CIA), Capita Symonds has considered the impact of airport passenger growth on the surveyed junctions. The airport access roundabout, north of Porthkerry Roundabout, was surveyed on 4th September 2003. Based on this survey the proportion of Airport Traffic using Porthkerry Road has been established. The results of the survey can be found at the back of Appendix A. Associated turning proportions are summarised below with airport traffic indicated in figures 2.6, 2.7, 2.11, 2.12, 2.17 and 2.18 by use of brackets:

	AM	PM
Southbound Traffic From Airport	11.5%	7.0%
Other Southbound Traffic	88.5%	93.0%
Northbound Traffic to Airport	7.0%	11.5%
Other Northbound Traffic	93.0%	88.5%

4.10 CIA handled 2.35 million passengers in 2006. Passenger numbers are forecast to rise to 3.5 million in 2011. This equates to growth of 8.3% per year. Based on this annual growth, passenger numbers are predicted to rise to 6.1 million by 2018 (see table below).

Year	Projected Passenger Numbers	Growth Rate	
2004	**1,900,000**	*	
2006	**2,350,000**	*	
2007	2,545,050		
2008	2,756,289	1.451	(2004 -2008 Growth Rate)
2009	2,985,061		
2010	3,232,821		
2011	3,501,145		
2012	3,791,740		
2013	4,106,455		
2014	4,447,291		
2015	4,816,416		
2016	5,216,178		
2017	5,649,121		
2018	6,117,998	3.220	(2004 -2018 Growth Rate)
2019	6,625,792		
2020	7,175,733		
2021	7,771,319		
2022	8,416,338		
2023	9,114,894		

** Actual Passenger Numbers*

4.11 Using this table, 2004 actual airport traffic has been factored using a growth rate of 1.451 and 3.220 for years 2008 and 2018 respectively. The remaining proportion of traffic has been factored using NRTF Central Growth rates.

Distribution Assumptions

4.12 It has been assumed that all airport traffic south of the airport access roundabout has an origin/destination west of Fontygary Signals.

5.0 Highway Impact

5.1 Capacity analysis has been undertaken at the following junctions using ARCADY 5:

1. Porthkerry Road/Rhoose Point Access Road Roundabout;
2. Port Road/Portkerry Road Roundabout;
3. Development Access Roundabout.

Capacity analysis has been undertaken at the following junction using LINSIG:

1. Fontygary Traffic Signals.

5.2 As a worst-case scenario no dissipation of development traffic has been assumed prior to the junctions assessed.

5.3 Capacity analysis of the roundabouts has been undertaken using ARCADY 5. The results are summarised below, full printouts are attached as Appendix D.

Porthkerry Road/Rhoose Point Access Road Roundabout

2004 – No Development	AM		PM	
	Max RFC	Max Q	Max RFC	Max Q
Porthkerry Rd (East)	0.140	0.2	0.440	0.8
Rhoose Point	0.211	0.3	0.067	0.1
Porthkerry Rd (West)	0.312	0.5	0.160	0.2

From on on-site observation, ARCADY base analysis queue lengths are similar compared to existing queue lengths.

2008 - No Development	AM		PM	
	Max RFC	Max Q	Max RFC	Max Q
Porthkerry Rd (East)	0.156	0.2	0.482	0.9
Rhoose Point	0.228	0.3	0.074	0.1
Porthkerry Rd (West)	0.350	0.5	0.182	0.2

2008 - With Development	AM		PM	
	Max RFC	Max Q	Max RFC	Max Q
Porthkerry Rd (East)	0.234	0.3	0.749	2.9
Rhoose Point	0.611	1.6	0.270	0.4
Porthkerry Rd (West)	0.466	0.9	0.256	0.3

2018 - No Development	AM		PM	
	Max RFC	Max Q	Max RFC	Max Q
Porthkerry Rd (East)	0.211	0.3	0.610	1.5
Rhoose Point	0.271	0.4	0.092	0.1
Porthkerry Rd (West)	0.465	0.9	0.258	0.3

2018 - With Development	AM		PM	
	Max RFC	Max Q	Max RFC	Max Q
Porthkerry Rd (East)	0.291	0.4	0.882	6.8
Rhoose Point	0.667	2.0	0.305	0.4
Porthkerry Rd (West)	0.605	1.5	0.337	0.5

5.4 Capacity analysis indicates that there are no capacity problems in 2004, 2008 and 2018 at the Porthkerry Road/Rhoose Point Access Road Roundabout without development. However, the additional development traffic turning left off Porthkerry Road to the proposed development site causes the Porthkerry Road (East) arm to operate above the desirable RFC threshold of 0.85 with an associated queue length of 6.8 vehicles during the PM peak period in 2018.

5.5 In order to accommodate the additional demand on Porthkerry Road (East), the entry arm to the roundabout has been modelled with a flare over 30 metres. The additional flared lane has been incorporated in order to accommodate an additional left turn lane at the roundabout. (See Drawing 7550/TA/02) The results are summarised below:

2018 - With Development Additional Flare	AM		PM	
	Max RFC	Max Q	Max RFC	Max Q
Porthkerry Rd (East)	0.223	0.3	0.674	2.0
Rhoose Point	0.667	2.0	0.307	0.4
Porthkerry Rd (West)	0.605	1.5	0.337	0.5

5.6 Capacity analysis indicates that the addition of a 30m flared lane results in the roundabout operating within its level of capacity. During the PM peak period the maximum RFC is 0.674 with an associated queue length of 2 vehicles.

5.7 In order to ensure that ARCADY is not over-estimating capacity at the roundabout by presuming equal lane usage, a sensitivity test has been undertaken. ARCADY guidance has been followed, removing the left turn flow and reducing the Entry Angle to replicate the single movement approach.

2018 - With Development Sensitivity Test	AM		PM	
	Max RFC	Max Q	Max RFC	Max Q
Porthkerry Rd (East)	0.232	0.3	0.632	1.7
Rhoose Point	0.667	2.0	0.307	0.4
Porthkerry Rd (West)	0.605	1.5	0.337	0.5

5.8 ARCADY analysis indicates that there are no capacity problems associated with the Straight Ahead Lane.

Port Road/Porthkerry Road Roundabout

2004 – No Development	AM		PM	
	Max RFC	Max Q	Max RFC	Max Q
Port Road	0.153	0.2	0.425	0.7
Porthkerry Road	0.379	0.6	0.206	0.2
Terminal Buildings	0.018	0.0	0.014	0.0

Based on on-site observation, ARCADY analysis queue lengths validate well when compared to existing queue lengths.

2008 - No Development	AM		PM	
	Max RFC	Max Q	Max RFC	Max Q
Port Road	0.176	0.2	0.468	0.9
Porthkerry Road	0.418	0.7	0.230	0.3
Terminal Buildings	0.027	0.0	0.020	0.0

2008 - With Development	AM		PM	
	Max RFC	Max Q	Max RFC	Max Q
Port Road	0.244	0.3	0.692	2.2
Porthkerry Road	0.634	1.7	0.316	0.5
Terminal Buildings	0.032	0.0	0.021	0.0

2018 - No Development	AM		PM	
	Max RFC	Max Q	Max RFC	Max Q
Port Road	0.254	0.3	0.597	1.5
Porthkerry Road	0.538	1.2	0.309	0.4
Terminal Buildings	0.066	0.1	0.048	0.1

2018 - With Development	AM		PM	
	Max RFC	Max Q	Max RFC	Max Q
Port Road	0.323	0.5	0.822	4.4
Porthkerry Road	0.759	3.1	0.395	0.7
Terminal Buildings	0.079	0.1	0.051	0.1

5.9 ARCADY analysis indicates that there are no capacity problems at the Port Road/Porthkerry Road Roundabout. In 2018 during the PM peak period the maximum RFC is 0.822 with an associated queue length of 4.4 vehicles.

Development Access Roundabout

2023 – With Development	AM		PM	
	Max RFC	Max Q	Max RFC	Max Q
Pentir Y De (N)	0.151	0.2	0.419	0.7
Pentir Y De (S)	0.292	0.4	0.121	0.1
Development Access	0.361	0.6	0.136	0.2

5.10 Capacity analysis indicates that the proposed Development Access Roundabout will operate within its level of capacity in 2023. A maximum RFC of 0.419 and associated queue of 0.7 vehicles is witnessed along the Pentir Y De (north) arm of the roundabout during the PM peak period.

5.11 Capacity analysis has been undertaken using LINSIG V2. The results are summarised below, full printouts are attached as Appendix E.

Fontygary Signals

2004	AM		PM	
	Deg Sat (%)	Max Q	Deg Sat (%)	Max Q
Fontygary Road	24.0	2.0	21.6	1.9
Caravan Park	4.1	0.3	8.5	0.5
B4265	8.3	0.7	10.0	0.8
Fonmon Road	24.5	2.0	20.0	1.2

Based on on-site observation, LINSIG analysis queue lengths validate well when compared to existing queue lengths.

2008 - No Development	AM		PM	
	Deg Sat (%)	Max Q	Deg Sat (%)	Max Q
Fontygary Road	26.8	2.3	23.8	2.2
Caravan Park	4.4	0.3	9.4	0.5
B4265	11.0	0.9	11.6	0.9
Fonmon Road	26.1	2.2	22.8	1.3

2008 - With Development	AM		PM	
	Deg Sat (%)	Max Q	Deg Sat (%)	Max Q
Fontygary Road	29.4	2.8	28.3	2.6
Caravan Park	9.7	0.5	11.3	0.5
B4265	12.0	0.9	17.3	1.4
Fonmon Road	57.3	3.3	27.3	1.4

2018 - No Development	AM		PM	
	Deg Sat (%)	Max Q	Deg Sat (%)	Max Q
Fontygary Road	33.1	3.0	31.7	3.0
Caravan Park	5.5	0.4	13.3	0.6
B4265	19.5	1.7	17.6	1.4
Fonmon Road	33.3	2.7	31.7	1.6

2018 - With Development	AM		PM	
	Deg Sat (%)	Max Q	Deg Sat (%)	Max Q
Fontygary Road	42.4	4.4	36.5	3.5
Caravan Park	6.9	0.4	14.8	0.7
B4265	22.4	2.0	23.3	2.0
Fonmon Road	41.7	3.1	35.2	1.7

5.12 LINSIG analysis indicates that the proposed development will not have a significant effect on Fontygary Signals. A maximum degree of saturation of 42.4% and associated queue of 4.4 vehicles is witnessed on Fonmon Road during the AM peak period.

6.0 Road Safety

6.1 Injury only road traffic accidents for the study area have been obtained from the Vale of Glamorgan County Council for the 5 year period 01/01/1999 – 30/12/2004. Detailed summaries of the accidents are included as Appendix F.

6.2 The records have been examined for any patterns or factors that could have an impact on or from the proposed development traffic.

6.3 In total 7 accidents have been reported in the five-year period, with no fatal accidents and two being identified as serious. The accidents resulted in 8 injuries, all of which were occupants of motor vehicles.

6.4 In total 3 accidents have occurred at the Fontygary Signals, 1 of which is classed as serious. All accidents were caused by driver error.

6.5 The remaining accidents were distributed around the network and no particular accident types occurred with sufficient frequency to be considered as potential problems.

6.6 With no cluster pattern, no obvious improvements to the existing network are highlighted.

7.0 Public Transport

7.1 Public transport to the Rhoose area is provided by a number of bus services and a train service connecting Rhoose to other towns and cities within Wales.

Bus

7.2 A summary of the bus timetable is shown below, representing all services that travel along Fontygary Road and Porthkerry Road.

7.3 Bus services in the area consist of:

X90 Cardiff Bus: Cardiff – CIA – Rhoose – St.Athan – Llantwit Major
X45 Shamrock Service: Cardiff – CIA – Rhoose – St.Athan - Talbot Green
V5 Shamrock Service: Barry – Rhoose – Cowbridge
144 Shamrock Service: Barry – CIA – Rhoose – St.Athan – Llantwit Major

7.4 **Frequency in Peak Hour Periods**

Service	07:00 - 08:00	08:00 - 09:00	16:00 - 17:00	17:00 - 18:00
X90	1 (Llantwit-Cardiff)	1 (Cardiff-Llantwit)	1 (Cardiff-Llantwit) 1 (Llantwit-Cardiff)	1 (Cardiff-Llantwit) 1 (Llantwit-Cardiff)
X45	1 (Talbot-Cardiff) 1 (Cardiff-Talbot)	1 (Talbot-Cardiff)	1 (Talbot-Cardiff) 1 (Cardiff-Talbot)	1 (Talbot-Cardiff) 1 (Cardiff-Talbot)
V5	1 (Barry-Cowbridge)	No Services	No Services	No Services
144	1 (Barry-Llantwit)	1 (Llantwit-Barry)	1 (Barry-Llantwit)	1 (Llantwit-Barry)

Train

7.5 The Vale of Glamorgan railway line has been upgraded to provide a passenger rail service between Bridgend and Cardiff via Barry. The line opened in June 2005 with an hourly service, with possible half hourly services in the future.

7.6 The Vale of Glamorgan train service calls at Bridgend, Llantwit Major, St Athan, Rhoose, Barry, Dinas Powys and Cardiff Central. A free shuttle bus connects with each train to take passengers to the Cardiff International Airport.

7.7 Rhoose train station is in close walking proximity to the development. A proposed pedestrian and cycle network will connect the proposed development with the train station.

7.8 This will provide an ideal commuter link to Cardiff and elsewhere for future residents of the development.

8.0 Pedestrians and Cyclists

Pedestrians

8.1 There is existing pedestrian access to the site. There are pedestrian walkways along Porthkerry Road and the Rhoose Point Access Road. Pedestrian access to the rail station is proposed.

Cyclists

8.2 Rhoose is situated close to the proposed future National Cycle Network route 88 along the South Wales coast, which will run from Cardiff to Port Talbot and Bridgend, connecting up with National Cycle Network route 4. A cycle network will connect the development to the railway station. These links are shown on the Development Framework Drawing B.10

9.0 Car Parking Provision

9.1 For the purposes of the TA it has been assumed that housing will be a mixture of 3 and 4 bedroom houses.

9.2 The Addendum to the South Wales Parking Guidelines state that 3 and 4 bedroom houses with 120m^2 Gross Floor Area (GFA) require a maximum of 3 parking spaces for residents and 1 space per 3 to 5 units for visitors.

A minimum of 120 and maximum of 200 visitor spaces will be provided, together with up to a maximum of 1800 resident parking spaces on the proposed development site.

10.0 Conclusions

10.1 It is anticipated that an hourly maximum of 551 additional vehicles (AM peak) would be attracted to Rhoose's local road network as a result of the Land to the North of the Railway Line development, which includes the additional 88 houses that is anticipated south of the proposed site.

10.2 The Transport Assessment trip generation rates have been based on surveys of sites which are not in close proximity to a train station. With the opening of the Vale of Glamorgan line, the vehicle trip rates from this site are likely to be less than predicted. Therefore, this is a worse case analysis.

10.3 There are no capacity problems predicted at:

Port Road/Portkerry Road Roundabout;
Development Access Roundabout;
Fontygary Traffic Signals.

10.4 Porthkerry Road/Rhoose Point Access Road Roundabout operates above its level of capacity along Porthkerry Road East in 2018.

In order to accommodate the capacity on the Porthkerry Road East arm, the entry arm to the roundabout has been modelled with a flare extending 30 metres.

10.5 There are no capacity problems at Porthkerry Road/Rhoose Point Access Road Roundabout with the additional 30m flare along Porthkerry Road East.