THE VALE OF
GLAMORGAN COUNCIL

TOWN AND COUNTRY PLANNING ACT 1990

APPROVED

SUBJECT TO COMPLIANCE WITH CONDITIONS (IF ANY)

Land to the North of the Railway Line (West) Rhoose

Transport Assessment

May 2014

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Client Name:	Taylor Wimpey
Document Reference:	C 15342 140516 CF JD ARW – Transport Assessment
Project Number:	15342

Quality Assurance – Approval Status

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2008 and BS EN ISO 14001: 2004)

Issue	Date	Prepared by	Checked by	Approved by
1st Issue	May 2014	KA/JD	AW	AW

Comments

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The conclusions resulting from this study and contained in this report are not necessarily indicative of future conditions or operating practices at or adjacent to the Site.

Much of the information presented in this report is based on information provided by others. That information has neither been checked nor verified by Waterman Transport and Development Ltd.

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1. Introduction

Waterman Transport and Development Ltd has been commissioned by Taylor Wimpey to prepare a Transport Asssessment (TA) for a proposed mixed use development comprising 350 residential units and 258 pupil primary school (210 primary pupils and 48 part time nursery spaces) located to the south of Porthkerry Road, Rhoose.

This TA will investigate the local transport systems serving the proposed development site, including the highway network, public transport and cyclist / pedestrian facilities. The TA will also investigate the impact of the proposed redevelopment on the surrounding highway network.

The TA has been produced in accordance with current best practice, including Guidance on Transport Assessments (Department for Transport, 2007) and Planning Policy Wales Technical Advice Note 18: Transport (Welsh Assembly Government, 2007). In agreement with the VoG Highway Officers this TA is similar in scale and scope to supporting work which has been submitted in support of the Bellway / Persimmon proposals adjacent to the proposed development and prepared by FMW Consultancy.

2. General Site Description

2.1 Site Location

The development site is an area of greenfield land located to the south of Porthkerry Road, within the town of Rhoose. The site is bounded, to the south by a Railway Line and to the north, west and northeast by existing residential conurbations and streets. There is also currently an area of greenfield land to the eastern boundary of the site, which has planning consent for the development of 350 dwellings as part of an overall UDP / LDP allocation for the area which includes the development site.

A site location plan showing the sites location in the context of the town of Rhoose is included as Appendix A.

2.2 UDP / LDP Allocation

The site forms part of a Vale of Glamorgan (VoG) Unitary Development Plan (UDP) allocation for housing. The UDP, which was adopted on the 18th April 2005, provides guidelines for development between the period of 2006 and 2011. The development site formed part of housing allocation site 22 (Land North of the Railway Line, Rhoose), which also includes land to the east. Sentence 2 of paragraph 2 of the UDP states that:

"It is anticipated that the site will yield approximately 400 units during the Plan period (1996 – 2011) and 200 units during the next Plan period (2011 – 2026)."

A development brief for these proposals was also produced which included an indicative masterplan. This masterplan showed three points of access into the site, with the main vehicular access taken from Pentir Y De, a Cycleway / Footway and emergency vehicle access from Porthkerry Road, and an additional Cycleway / Footway link to the south west corner of the site linking with the nearby railway station. Details of this masterplan are provided as Appendix B of this TA.

The UDP site has also been included, as housing allocation site 33, in the Deposit Plan of the emerging VoG Local Development Plan (LDP) for the plan period of 2011 – 2026. A total of 650 units are allocated for site 33 within the LDP. In addition the LDP also identifies a requirement for a new primary school and nursery within the allocation site.

Outline planning permission has been granted for a housing development on land to the east of the development site, which forms the remainder of the allocation area discussed within the LDP and UDP. Further details of these proposals are provided below. The original UDP masterplan shows a link between the development proposals and neighbouring site, which is also accounted for in the development masterplan discussed later in this report. It is noted that, as the linkages between these sites have yet to be agreed with the neighbouring landowner, this assessment assumes that this development will be developed in isolation with primary access to the site achieved via Porthkerry Road.

The traffic assessment in this document demonstrates that the proposed access on Porthkerry Road should have sufficient capacity to accommodate the vehicle movements forecast to and from the development. It is also noted that the majority of facilities are located to the north and west of the development proposals and therefore if the link between the development sites was not achievable this should not have a significant impact on the pedestrian accessibility of the development.

2.3 Persimmon / Bellway Site

Permission has been granted for 350 houses on the neighbouring site to the east of the development. It is also proposed that access to this site will be obtained via a new roundabout junction from Pentir Y De. This planning application for the adjacent housing site was submitted by Bellway Homes Ltd and

Persimmon Homes Ltd and therefore these proposals will be referred to as the Bellway / Persimmon proposals throughout the remainder of this document.

A number of transport related documents were submitted in support of these proposals, which are listed as follows:

1. Transport Assessment – Produced by FMW in June 2010
2. Transport Assessment Addendum (First Issue) – Produced by FMW in January 2011
3. Rhoose Pedestrian Accessibility and Movement Audit – November 2011
4. Technical Note 2 Rev A: Rhoose Pedestrian Accessibility and Movement Audit Addendum – Produced by FMW (not dated)
5. Proposed offsite Junction Improvements – Produced by FMW in November 2011
6. Technical Note 4 – Barry Docks Link Roundabout Improvements – Produced by FMW (not dated)

It is noted that the traffic assessments for the development outlined in documents 1, 2, 5 and 6 listed above provided both an assessment the impact of the Bellway / Persimmon proposals as well as the for the full allocation as identified within the emerging LDP, which was assumed to be 700 dwellings within these reports. On this basis, it was agreed with VoG highways department that the analysis could also be used as the basis for the assessment of the proposed development.

Information from documents 1, 2 and 5 has been used as the basis for the development traffic assessment. These documents have therefore been included within this TA, as Appendix C, for the purpose of reference.

3. Development Proposals

3.1 Description of Proposed Development

The architect's masterplan of the site has been included as Appendix D of this report. The proposed development will comprise 350 residential dwellings and a 258 pupil primary school (210 primary pupils and 48 part time nursery spaces). The development mix in terms of dwelling sizes has yet to be confirmed, however, it is proposed that this will be similar to that of the adjacent Bellway / Persimmon proposals. It is proposed that the development will include elements of private and affordable housing.

3.2 Parking

The CSS Wales Parking Standards (2008) state that residential new builds and proposed primary schools in a Zone 4 (Suburban or Near Urban) area require parking as shown in Table 1 (Residential) and Table 2 (Primary School).

Table 1: Parking standards for residential new build

Type of Development	No. of Spaces - Residents	No. of Spaces - Visitors
Houses	1 space per bedroom (maximum requirement 3 spaces)	1 space per 5 units

Table 2: Parking standards for proposed schools

Type of Development	Operation	Non-operation
Nursery/Infants/Primary Schools	1 commercial vehicle space	1 space per each member of teaching staff & 3 visitor spaces

Whilst the mix of housing has yet to be confirmed the level of parking proposed by the development will be consistent with this guidance.

3.3 Residential Trip Attraction

The residential developments trip attraction have been based on trip rates included within the TA prepared by FMW for the Bellway / Persimmon proposals, which will be described as the FMW TA for the remainder of this report. These trip rates, which are summarised in Table 3, have been extracted from Table 6.1 of the FMW TA. The resultant total calculated trip attraction of the site is also outlined in Table 3.

Table 3: Calculated Residential Trip Rates and Trip Attraction for 350 units

	Morning Peak Hour		Evening Peak Hour		Daily
	Arrivals	Departures	Arrivals	Departures	
Trip Rate (per unit)	0.231	0.974	0.663	0.426	9.072
350 units	81	341	232	149	3175

3.4 Residential Modal Split

The modal split for the development is also based on information extracted from the FMW TA as agreed with VoG Highways department. This assumed modal split is summarised in Table 4 below.

Table 4: Modal Split based on FMW TA

Mode	Calculated Model Split
Total People	100%
Vehicles	80%
Cyclists	1%
Vehicle Occupants	7%
Pedestrians	4%
Bus	2%
Train	3%
Taxi	0%
Other	1%
Motorcycle, scooter, moped	1%

3.5 Residential Traffic Generation

The traffic generation for the proposals have been calculated by multiplying the total trip attraction shown in Table 3 by the vehicle modal split shown in Table 4 (80%). The resultant traffic generation is shown in Table 5 below.

Table 5: Calculated Residential Trip Rates and Trip Attraction for 350 units

Morning Peak Hour		Evening Peak Hour		Daily
Arrivals	Departures	Arrivals	Departures	
65	273	186	119	2540

It is noted that original trip generation analysis, which the traffic generation shown in Table 5 is based on, was calculated based on survey sites within the TRICS 'Residential – Private Housing' category. It is likely however that the development will have an element of affordable housing, which typically has a lower traffic generation per unit. This traffic assessment is therefore based on a robust analysis of the traffic generation of the development.

It is also noted that design measures will be implemented within the development to encourage walking/cycling and the use of public transport. A travel plan will also be produced for the residential development, which will seek to encourage residents to use sustainable modes of transport for journeys instead of the private car. For the purposes of estimating traffic generated by the proposed development, the effectiveness of these measures has not been quantified, and therefore the estimated trips generated are conservative. This will ensure a robust analysis of the capacity of the local highway network.

3.6 Residential Traffic Distribution

The traffic distribution and assignment is based on that assumed for the Bellway / Persimmon proposals in the FMW TA (Figure 6.1). Details of this distribution are provided in Figure 3.1.

The distribution in Figure 3.1 has been used to assign the residential development traffic generation in Table 5 to the modelled traffic network, with the resultant residential development traffic flows shown in Figure 3.2 (AM Peak) and 3.3 (PM Peak).

As discussed earlier, this assessment assumes that all of the proposed development will be accessed via Porthkerry Road. It is noted that, if a link were established, it is unlikely that significant amounts of traffic would cross the boundary of these sites to access the outer highway network. Notwithstanding this point, as traffic distribution is biased to the east (i.e. towards Cardiff), if significant traffic were to cross the boundaries of the sites, it is likely that more residential traffic would use the Bellway / Persimmon access. Furthermore, submissions made in support of the Bellway / Persimmon site have already forecast that traffic from 700 dwellings could already be accommodated at the proposed Pentir Y De access and immediate highway network. Thus, it is clear that previous assessments have already demonstrated that, if reassignment of residential traffic were to occur, that this should not be a significant issue.

Given the proposed positioning of the school within the site it is likely that the majority of traffic associated with this development would use the Porthkerry road junction even if the link to the neighbouring site was introduced. Although, in the event that links were established, there may be less traffic impact as more people are likely to travel from the neighbouring site on foot or by bicycle. Thus for this reason the assessment of development flows based on a single point of access is considered to be a worst case assessment.

3.7 Primary School Trip Generation and Distribution

The calculation of the primary school trip generation and distribution is outlined in a technical note included as Appendix E.

3.8 Committed Development

3.8.1 FMW TA

The committed development traffic has been extracted from the original FMW TA (Figure 7.6), as agreed with the highways officers at VoG. This committed development traffic, which is summarised in Figure 3.4 and 3.5, includes the forecast traffic from the following committed developments:

- 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.

As discussed earlier in the report an addendum to the FMW TA (FMW TA Addendum) was produced in January 2011. This addendum excluded the DTC and ABP committed development trips on the basis that cuts in public spending have meant that there is uncertainty as to whether these developments will now be built. VoG confirmed in scoping discussion that these committed development trips should also be

excluded from the analysis within this TA. Details of these trips are shown in Figure 7.2 of the FMW TA and are also summarised in Figure 3.6 and 3.7 of this report.

Cardiff International Airport has recently been purchased by Welsh Government. Thus, whilst recent activity has shown that very little passenger growth has occurred at the airport, this may situation may change as WG may seek to further enhance the facility here. On this basis, the growth at Cardiff International Airport has not been excluded from this analysis.

3.8.2 Barry Waterfront

It has also been requested, by VoG, that the additional traffic of the Barry Waterfront Development be included in the traffic assessments. The traffic flows for this development, which has been granted planning permission, have been extracted from Figure 6.2 and 6.3 of the TA (Rev A) submitted in support of the development. These traffic flows are summarised in Figure 3.8 and 3.9 of this TA.

It is noted that traffic flows are only provided, within the Barry Waterfront TA, for junctions east of and including the Waycock Road / Port Road West / Pontypridd Road roundabout. Traffic flows west of this point have been assigned proportionally based on the relevant traffic turning movements of the AM and PM 2010 base, which are described later in this report.

3.8.3 Bellway / Persimmon Proposals

The Bellway / Persimmon proposals have recently been granted planning permission and on this basis these flows have been included in these assessments. The traffic flows for this development have been extracted from the FMW TA (Figure 6.2) and are outlined in Figure 3.10 and 3.11 of this report.

4. Evaluation of Existing Transport Network

4.1 Highway Network

4.1.1 Access

The primary access to the existing site is directly off Porthkerry Road where there is an existing public footpath. A priority junction will be created using land acquired from the dwelling east of the public footpath (43 Porthkerry Road). This access design avoids land not within the developers control or the control of the highway authority.

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 (Porthkerry Road/ Pentir Y De roundabout). Porthkerry Road also connects with the A4226, which is north of the site and Cardiff International Airport.

An additional pedestrian / cycleway access is also proposed to the southwest of the site to provide a link to the railway station as identified in the original masterplan for the UDP proposals.

It is noted that links are shown to the neighbouring site on the masterplan, however, as discussed earlier, discussions are still ongoing with the neighbouring land owner regarding these linkages. The assessment within this TA therefore assumes a worst case assessment whereby vehicle access is obtained by the Porthkerry Road access.

Details of the development access from the main vehicle access from Porthkerry Road are included as Appendix F. The geometries of this access are in accordance with standards outlined within the Design Manual for Bridges (DMRB) documents, as well as VoG own requirements regarding access junctions of this type.

4.1.2 Remaining Highway

The extent of the highway network to be assessed was agreed at the Scoping Stage with Highways Officers at the Vale of Glamorgan Council and is the same as that assessed in the TA for the proposed adjacent residential development. This highway network, which is identified shown in Figure 2.4 of the FMW TA, is outlined as follows:

1. the roundabout at the junction of A4226/ Waycock Road/ B4266 Pontypridd Road (Waycock Cross Roundabout)
2. the T-Junction at Fonmon Road and B4265 (Fonman Road / B4265 Junction)
3. the roundabout at the junction of A4226/ Port Road (Wales Airport Hotel Roundabout);
4. the roundabout at the junction of A4226/ Tredogan Road/ B4265 (BAMC Roundabout);
5. the T-Junction at Rhoose Road and Station Road (Station Road Junction);
6. the roundabout at the junction of A4050 Port Road/ A4231 Barry Docks Link Road (Barry Docks Link Roundabout)
7. the roundabout at the junction of A4226 Port Road West/ Colcot Road (Colcot Cross Roundabout)
8. the traffic signalled junction at Fonmon Road and Fontygary Road (Fonman Road Signals)
9. the Porthkerry Road/ Pentir Y De (Rhoose Point Roundabout)

4.2 Base Traffic Flows

4.2.1 Traffic counts

As agreed with VoG highways 2010 base traffic flows have been extracted from the FMW TA (Figure 2.7). These base traffic flows have also been summarised, within this report, in Figure 4.1 (AM Peak) and 4.2 (PM Peak).

As discussed and agreed with VoG, these base surveys have been factored to the current year. These growth factors were derived from the TEMPROv6.2 adjusted National Transport Model (NTM). The adjustment rate (Rhoose / Urban Principal) to factor 2010 flows to 2014 flows was 0.9949 in the AM peak, and 0.9993 in the PM peak. The resultant 2014 base flows are shown in Figures 4.3 and 4.4 of the AM and PM peaks respectively.

4.3 Sustainable Transport Network

Public transport to the area is provided by bus and rail allowing for a connection to the other towns and cities in Wales.

4.3.1 Rail Network

The Vale of Glamorgan railway line serves the Rhoose area. The nearest station to the Site is at Rhoose Cardiff International Airport, which is located approximately 250 meters walk from the western boundary of the site and so is in close walking and cycling proximity to the proposed development site. The location of the Railway Station is shown in Figure 4.5.

This station which provides a direct connection to destinations such as Cardiff and Bridgend is served by Arriva Trains Wales. Passenger services to/from this station during weekdays and Saturdays run at approximately one service an hour in either direction. This will provide an ideal commuter link to Cardiff and elsewhere for future residents of the development. On a Sunday there is a less frequent railway service being approximately every 2 hours. Table 6, 7 and 8 provide details of the train times at Rhoose Cardiff International Airport.

Table 6: Train Times at Rhoose Cardiff International Airport – Monday to Friday, AM and PM peak

Service Description	Dep. Time
Bridgend - Aberdare	06:06
Cardiff Central - Bridgend	06:12
Bridgend - Aberdare	07:06
Caerphilly - Bridgend	07:12
Bridgend - Aberdare	08:06
Merthyr Tydfil - Bridgend	08:12
Bridgend - Aberdare	09:06
Merthyr Tydfil - Bridgend	09:10
Bridgend - Aberdare	16:06
Merthyr Tydfil - Bridgend	16:12

Service Description	Dep. Time
Bridgend - Aberdare	17:06
Merthyr Tydfil - Bridgend	17:12
Bridgend - Aberdare	18:06
Merthyr Tydfil - Bridgend	18:12

Table 7: Train Times at Rhoose Cardiff International Airport – Saturday

Service Description	Dep. Time
Bridgend - Aberdare	06:06
Cardiff Central - Bridgend	06:12
Bridgend - Aberdare	07:06
Caerphilly - Bridgend	07:12
Bridgend - Aberdare	08:06
Merthyr Tydfil - Bridgend	08:12
Bridgend - Aberdare	09:06
Merthyr Tydfil - Bridgend	09:12
Bridgend - Cardiff Central	10:06
Merthyr Tydfil - Bridgend	10:12
Bridgend - Aberdare	11:06
Merthyr Tydfil - Bridgend	11:12
Bridgend - Aberdare	12:06
Merthyr Tydfil - Bridgend	12:12
Bridgend - Aberdare	13:06
Merthyr Tydfil - Bridgend	13:12
Bridgend - Aberdare	14:06
Merthyr Tydfil - Bridgend	14:12
Bridgend - Aberdare	15:06
Merthyr Tydfil - Bridgend	15:12
Bridgend - Aberdare	16:06
Merthyr Tydfil - Bridgend	16:12
Bridgend - Aberdare	17:06
Merthyr Tydfil - Bridgend	17:12
Bridgend - Aberdare	18:06
Merthyr Tydfil - Bridgend	18:12

Service Description	Dep. Time
Bridgend - Aberdare	19:06
Merthyr Tydfil - Bridgend	19:12
Bridgend - Aberdare	20:06
Merthyr Tydfil - Bridgend	20:12
Bridgend - Aberdare	21:06
Merthyr Tydfil - Bridgend	21:12
Bridgend - Aberdare	22:06
Merthyr Tydfil - Bridgend	22:12
Bridgend - Cardiff Central	23:06

Table 8: Train Times at Rhoose Cardiff International Airport – Sunday

Service Description	Dep. Time
Cardiff Central - Bridgend	09:12
Bridgend - Cardiff Central	10:06
Merthyr Tydfil - Rhoose (Cardiff Int Airpt)	11:12
Bridgend - Cardiff Central	12:06
Merthyr Tydfil - Bridgend	13:12
Bridgend - Cardiff Central	14:06
Merthyr Tydfil - Bridgend	15:12
Bridgend - Cardiff Central	16:06
Merthyr Tydfil - Bridgend	17:12
Bridgend - Cardiff Central	18:06
Merthyr Tydfil - Bridgend	19:12
Bridgend - Cardiff Central	20:06
Merthyr Tydfil - Bridgend	21:12
Bridgend - Cardiff Central	22:06

In addition to the above a shuttle bus also runs from the station to Cardiff International Airport.

4.3.2 Bus Services

Rhoose is well connected to surrounding towns by the public bus network.

The closest bus stops to the site are located on Porthkerry Road as shown in Figure 4.5. The bus stops, which include bus shelter facilities, are shown in Photographs 1 and 2.

Photograph 1: Bus stop on Porthkerry Road (looking eastbound)

Photograph 2: Bus stop on Porthkerry Road (looking westbound)

There are many bus services offering links to the larger neighbouring settlements of Rhoose, and further afield to Barry and Cardiff.

The bus services in the area consist of:

- 303 N.A.T. Group: Barry – Rhoose – Llantwit Major – Bridgend
- S52 Watts' Coaches: St Richard Gwyn High School – Wick Village Green
- S8 First Cymru: Bishop of Llandaff High School – Marcross
- S54 First Cymru: Richard Gwyn High School – Rhoose
- 905 N.A.T. Group: MOD St Athan – Cardiff Airport – Rhoose Railway Station

Table 9 and Table 10 summarises the existing bus services that stop in the general vicinity of the site (Porthkerry Road Westbound and Eastbound bus stops) and their frequencies representing all the services that travel along Porthkerry Road.

Table 9: Existing Bus Services at Porthkerry Road (Ceri Avenue, Westbound)

Service No.	Route	Frequency by Days of Operation			Operator
		Monday to Friday	Sat	Sun	
303	Barry – Rhoose – Llantwit Major - Bridgend	Hourly	Hourly	Every Two Hours	N.A.T. Group
S52	St Richard Gwyn High School – Wick Village Green	1 service per day	No service	No service	Watts' Coaches
S8	Bishop of Llandaff High School - Marcross	1 service per day	No service	No service	First Cymru
S54	Richard Gwyn High School - Rhoose	1 service per day	No service	No service	First Cymru
905	MOD St Athan – Cardiff Airport – Rhoose Railway Station	Hourly	Hourly	Hourly	N.A.T. Group

Table 10: Existing Bus Services at Porthkerry Road (Ceri Avenue, Eastbound)

Service No.	Route	Frequency by Days of Operation			Operator
		Monday to Friday	Sat	Sun	
303	Bridgend – Llantwit Major – Rhoose - Barry	Hourly	Hourly	Every Two Hours	N.A.T. Group
S52	Wick Village Green – St Richard Gwyn High School	1 service	No service	No service	Watts' Coaches
S8	Marcross – Bishop of Llandaff High School	1 service	No service	No service	First Cymru
S54	Rhoose – Richard Gwyn High School	1 service	No service	No service	First Cymru
905	Rhoose Railway Station - Cardiff Airport - MOD St Athan	1 every hour	1 every hour	1 every hour	N.A.T. Group

It can be seen from Table 9 and Table 10 that there are frequent buses passing in close proximity to the site and therefore opportunity to use sustainable transport to and from the site rather than the car. This is ideal particularly for those who need to commute to work in Cardiff and other areas. Furthermore these services provide access to the key local communities surrounding the site.

It is proposed that the footway of the development's Porthkerry Road access will provide a link between the development site and the bus stops on Porthkerry Road as advised within the approved VoG development brief.

4.3.3 Other Vehicle Transport

Rhoose has a number of taxi/ private hire companies namely Rhoose Cars, Cardiff and Vale Taxis, JD Private Hire and Safecars. In this case, the taxi / private hire companies can provide transport outside the public bus network operating hours.

The South East Wales Transport Alliance (SEWTA) also promotes car sharing in the area through Share Cymru where a new car share service will be launched soon.

4.3.4 Cycle Network

Whilst there are no major designated cycle routes it is clear from the above analysis that facilities within the village are within a short distance of the site. Furthermore, the local residential roads have low traffic speeds, which should encourage trips to be made by bicycle.

4.3.5 Pedestrian Access

There is pedestrian access to the site via the footways on Porthkerry Road as well as the Public Right of Way (PROW) off Porthkerry Road (see Photographs 3, 4 and 5).

Photograph 3: Public Right of Way off Porthkerry Road

Photograph 4: Public Right of Way off Porthkerry Road

Photograph 5: Public Right of Way off Porthkerry Road

The development will also be accessible via footways along the proposed access road. There will also be a pedestrian link to the southwest of the site which will link in with the direct route to the railway station.

4.3.6 Local Facilities

Table 11 specifies the distance and associated walk time to the facilities from the development site. The walk times are based on the Institute of Highways and Transportation's guidance contained within the

‘Providing for Journeys on Foot’ document which states that an average walking speed of 1.4m/s can be assumed for most pedestrians which equates to approximately 400m every 5 minutes.

Table 11: Distance and Estimated Walk Time to Key Facilities

Facility	Shortest Route	Distance*	Approximate Walk Time
Closest Primary School	na	Proposed Within Site	na
Nearest Bus Stops	Porthkerry Road	350m	4-5 minutes
Rhoose Train Station	Torbay Terrace	600m	7-8 minutes
Local Centre	Torbay Terrace, Station Road, Stewart Road	900m	11-12 minutes
Rhws Primary School	Torbay Terrace, Station Road, Stewart Road, Fontgary Road	1000m	12-13 minutes

*Approximate distances measured from the centre of the site

It can be seen from Table 11 that there are a number of facilities within close proximity of the site. It is also noted that there are a number of local amenities located in Rhoose’s local centre including convenience stores, a social club and a GP surgery.

4.3.7 Summary

It is clear that the site is well connected to sustainable transport links. These connections provide convenient links to nearby communities and town and therefore provide a realistic alternative to travel by private car. It is clear existing and improved public transport services will serve to reduce the traffic impact of the development on the nearby highway network.

4.4 Accident Analysis

Accident data has been assessed within the FMW TA. This analysis assessed traffic Collision data covering the nine surveyed junctions for a five year period starting in 2005. The conclusion of this accident analysis was as follows:

“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.”

Revised accident data (1st January 2011 to 30th March 2013) has been obtained for the same area as that assessed for the FMW TA. Details of this data are provided in Appendix G.

Table 12 below provides a summary of the accidents recorded at each junction.

Table 12: Summary of Recorded Accidents with Assessed Traffic Area

Junction	Accident Reference Number and Date	Accident Severity	Accident Description
Waycock Cross	0214576 – 05/02/12	Slight	Rear Shunt on Port Road West Eastern Arm
	110210317 - 14/06/2011	Slight	Driver pulled out of Port Road West Western approach and hit cyclist on circulatory carriageway
Fonman Road / B4265 Junction	No Accidents Reported		
Wales Airport Hotel Roundabout	110207261 - 27/02/2011	Slight	Horse ran into path of car causing a collision on Port Road
BAMC Roundabout	110211091 - 12/08/2011	Slight	Driver collided with cyclist on the circulatory carriageway
	110213936 - 29/12/2011	Slight	Loss of control due to slippery conditions and driver error on the circulatory carriageway
	1200142 - 12/05/2012	Slight	Driver lost control due to illness and collided with a tree
	1200621 - 12/07/2012	Slight	Due to weather conditions the driver has lost control and overturned their vehicle
Station Road Junction	110212732 - 09/11/2011	Slight	Vehicle has collided with parked vehicle on Fontgary Road
Barry Docks Link Roundabout	1201051 - 02/10/2012	Slight	Rear shunt on A4051 western arm

Junction	Accident Reference Number and Date	Accident Severity	Accident Description
Colcot Cross Roundabout	110208190 - 10/04/2011	Slight	Driver attempted to undertake a U-turn due to heavy slow moving traffic on Port Road East and collided with car on the opposite side of the road which was travelling at excessive speed
	110211184 - 30/08/2011	Slight	Rear Shunt on Port Road East
	110213911 - 28/12/2011	Slight	Rear Shunt on Port Road East
	1200199 - 03/05/2012	Slight	Rear Shunt on Port Road East
	1201116 - 12/10/2012	Slight	Cyclists clipped with car wing mirror on Port Road East
Fonman Road Signals	No Accidents Reported		
Rhoose Point Roundabout	110207662 - 08/03/2011	Slight	Rear shunt at Ceri Avenue Junction

It is noted all of the accidents listed in Table 12 are classified as slight and are predominantly related to driver error rather than road geometry. There appears to be a cluster of accidents on the Port Road East arm of Colcot Cross Roundabout. The description of the accidents on this arm appears to be typical of accidents at congested junctions (i.e. rear shunts and collisions due to impatient manoeuvres). Notwithstanding this point, mitigation measures are being proposed as part of Persimmon / Bellway proposals, which as discussed later in this TA, are forecast to also mitigate the traffic impact of the development proposals. A number of accidents are also shown to occur at the BAMC roundabout, however, these accidents are dispersed in their location and do not seem to demonstrate any overall patterns that would raise concerns regarding the overall safety of the junction.

With the exception of the accident at Ceri Avenue shown in Table 12 there were no recorded accidents in the vicinity of the site. Furthermore, whilst a major accident has recently occurred outside the frontage of Rhws School, with a car colliding with a number of pedestrians, it appears that this accident was caused by driver ill health rather than road geometry.

5. Transport Implementation Strategy (TIS)

5.1 Introduction

The Transport Implementation Strategy (TIS) seeks to demonstrate how the objectives of the development proposals discussed in the TA support the wider transport and development policies. The TIS also identifies measures which would assist in meeting and delivering the transport objectives of the policies.

5.2 Policy Objectives for the Development

National, regional and local policies will be referred to throughout this section to assess the extent of their influence on the proposed development site. Relevant planning policies have been reviewed with specific emphasis, where applicable, to the development of new mineral sites.

The following documentation has subsequently been reviewed:

- Planning Policy Wales (2014);
- Planning Policy Wales; Technical Advice Note 18:Transport (March 2007);
- One Wales: Connecting the Nation - The Wales Transport Strategy (2008)
- National Transport Plan (March 2010)
- Sewta Regional Transport Plan (March 2010);
- Vale of Glamorgan Adopted Unitary Development Plan 1996 – 2011; and
- Emerging Local Development Plan 2011 – 2026.

5.3 National Policy

5.3.1 Planning Policy Wales Edition 6 (February 2014)

Planning Policy Wales (PPW) sets the context for sustainable land use planning for the Welsh Government. It sets out the land use planning polices of the Welsh Government and is supplemented by a series of technical advice notes.

Transport guidance within the document is outlined in Chapter 8 which states:

"The Welsh Government aims to extend choice in transport and secure accessibility in a way which supports sustainable development and helps tackle the causes of climate change by: encouraging a more effective and efficient transport system, with greater use of the more sustainable and healthy forms of travel, and minimising the need to travel. This will be achieved through integration:

- *within and between different types of transport;*
- *between transport measures and land use planning;*
- *between transport measures and polices to protect and improve the environment; and*
- *between transport measures and polices for education, health, social inclusion and wealth creation."*

PPW promotes a number of measures to achieve the Assembly Government's transport objectives, including:

- *'reducing the need to travel, especially by private car, by locating development where there is good access by public transport, walking and cycling;*
- *locating development near other related uses to encourage multi-purpose trips and reduce the length of journeys;*
- *improving accessibility by walking, cycling and public transport;*
- *ensuring that transport is accessible to all, taking into account the needs of disabled and other less mobile people'*

Emphasis is placed on the promotion of walking and cycling, and the support of public transport facilities to reduce trips made by car. This approach is further supported under the PPW Housing section in Chapter 9 of the report stating that Local Authorities should support *'development that is easily accessible by public transport, cycling and walking, although in rural areas required development might not be able to achieve all accessibility criteria in all circumstances'* (PPW; p128; ch.9).

The development site is located in an area with good sustainable transport links. In addition, the development will connect with these links which means that the development is clearly in accordance with these transport objectives. Furthermore, the accessibility to these sustainable transport linkages is likely to reduce the requirement to travel by private car and encourage trips to be made by more sustainable modes of transport, thereby reducing the impact on the nearby highway network.

PPW also provides guidance with regards to planning obligations. The following statement is provided in paragraph 3.7.1:

"Planning obligations are useful arrangements to overcome obstacles which may otherwise prevent planning permission from being granted. Contributions from developers may be used to offset negative consequences of development, to help meet local needs, or to secure benefits which will make development more sustainable. It is essential that arrangements are fair to both the developer and the community, that the process is as transparent as possible, and that development plans provide guidance on the types of obligations which authorities may seek from developers…"

Paragraph 3.7.10 elaborates further and states that:

"Planning obligations should only be sought where they are necessary to make a proposal acceptable in land use planning terms. Planning permission may not be bought or sold and negotiations should be conducted in a way that is seen to be fair, open and reasonable. Unacceptable development should never be allowed because of unrelated benefits. Acceptable development should never be refused simply because an applicant is unwilling to offer such benefits. If there is a choice between imposing conditions and entering into a planning obligation, the imposition of a condition is preferable. Conditions are more transparent, offer greater flexibility in the light of changing circumstances and offer a developer the right of appeal to the Welsh Ministers against those conditions considered to be onerous."

It is therefore clear from the above statement that planning obligations should only be sought where they are necessary to mitigate against the impacts of the development. On this basis, the proposed highway improvements, which as discussed later in this document, are forecast to mitigate against the impact of the development traffic, are therefore appropriate to the scale of proposals.

5.3.2 Technical Advice Note 18: Transport (2007)

Planning Policy Wales TAN 18 was issued in March 2007 and deals specifically with transport issues.

Concerning the objectives and processes of this guidance, TAN 18 states the importance of integration between land-use planning and development of transport infrastructure for which this integration can help address key environmental concerns by (page 2; para. 2.3):

- *Promoting resource and travel efficient settlement patterns;*
- *Ensuring new development is located where there is, or will be, good access by public transport, walking and cycling thereby minimising the need for travel and fostering social inclusion;*
- *Managing parking provision;*
- *Ensuring that new development and major alterations to existing developments include appropriate provision for pedestrians (including those with special access and mobility requirements), cycling, public transport, and traffic management and parking / servicing;*
- *Encouraging the location of development near other related uses to encourage multi-purpose trips;*
- *Promoting cycling and walking;*
- *Supporting the provision of high quality, inclusive public transport;*
- *Promoting the location of warehousing and manufacturing developments to facilitate the use of rail and sea transport for freight;*
- *Encouraging good quality design of streets that provide a safe public realm and a distinct sense of place; and*
- *Ensuring that transport infrastructure or service improvements necessary to serve new development allow existing transport networks to continue to perform their identified functions.*

Technical Advice Note (TAN) 18 was published in 2007 as a supplement to PPW. Paragraph 2.4 states:

"The inter-relationships between land use planning and transport are complex and varied. The development of land is dependent, in part, upon transport infrastructure and services to function efficiently. By influencing the location, scale, density and mix of land uses and new development, land use planning can help to reduce the need to travel and length of journeys, whilst making it easier for people to walk, cycle or use public transport."

The development which is located in a location with good sustainable transport infrastructure with links to nearby conurbations is therefore in accordance with this policy. Furthermore, the location of the development should allow a significant number of trips to be undertaken by sustainable modes of transport thereby reducing the traffic impact of the development on the local highway network.

5.3.3 One Wales: Connecting the Nation - The Wales Transport Strategy (2008)

The 'One Wales' Transport Strategy published by Welsh Assembly Government (now Welsh Government) sets out the future strategy for Wales. As with PPW14 and TAN 18 the document highlights the need to encourage a model shift away from the private car to more sustainable modes of transport.

The main aims are to:

- Achieve a more effective and efficient transport system;
- Achieve a greater use of the more sustainable and healthy forms of travel;
- Minimising demand on the transport system.

The document makes reference to national targets for the reduction of CO^2 emissions. The document states that Welsh Government have committed to annual carbon equivalent emissions reductions of 3% per year from 2011. The long term target for CO^2 reduction is a 60% reduction of CO^2 from 1990 levels by 2050.

In reference to the annual cut in CO^2 the document states in Section 3.1 that:

"Such an ambitious target can only be achieved by radical changes. Top of the list, as evidenced in the previous chapter, is a reduction of dependence on the private car, particularly when used by a single occupant for commuter journeys. But this outcome in turn requires significant improvement in public transport – in the frequency of bus and rail services, in their accessibility and integration with each other. It also involves increasing opportunities and removing barriers to walking and cycling and other measures to maximise the use of existing capacity."

5.3.4 National Transport Plan (March 2010)

The National Travel Plan produced by the former Welsh Assembly Government (now Welsh Government), sits alongside the Regional Transport Plans in delivering the Wales Transport Strategy. The document reemphasises the rhetoric of the aforementioned national policy in that it seeks to encourage a modal shift from the private car to more sustainable modes of transport. This is emphasised in the following statement:

We will shift the balance of our expenditure towards sustainable transport, for example, sustainable travel centres and multi-modal interchanges, so that we can achieve the One Wales targets for reducing carbon equivalent emissions from transport.

The National Transport Plan dated March 2010 and developed by the Welsh Government will deliver the strategies set out in One Wales.

5.4 Regional Policy

5.4.1 SEWTA Regional Transport Plan (March 2010)

South East Wales Transport Alliance (Sewta) is one of four regional transport consortia established in Wales following powers acquired by the Welsh Government under the Transport Wales Act 2006 and the Railways Act 2005. The Welsh Government has subsequently approved a Regulatory Order to remove the requirement for the 22 local authorities in Wales to produce Local Transport Plans and instead, has introduced the requirements for Regional Transport Plans (RTPs) to be prepared by the four Transport Consortia.

The Sewta RTP was issued in March 2010 and is prepared in accordance with Welsh Government guidance, the product of extensive consultation, listening to the views and ideas of stakeholders, partners and the public. The document is a statutory plan which sets out an integrated and sustainable transport strategy for South East Wales. The plan includes:

- A strategic framework, setting out the issues, analysis, vision, aims, and policies;
- An implementation programme identifying actions, proposals and a five year programme; and
- A monitoring and review mechanism

The overall Vision of the Sewta Regional Transport Plan RTP (March 2010) is *'A modern, accessible, integrated and sustainable transport system for South East Wales, which increases opportunity, promotes prosperity for all and protects the environment; where walking, cycling, public transport, and sustainable freight provide real travel alternatives'.*

The RTP lists eight priorities to achieve its Vision, in order of priority. The first three priorities are as follows:

1) *"To improve access for all to services, facilities and employment, particularly by walking, cycling and public transport.*

2) To increase the proportions of trips undertaken by walking, cycling and public transport.

3) Minimising demand on the transport system."

The proposed development is located adjacent to sustainable transport links which provide a convenient alternative to travel via the private car. Furthermore a travel plan will be submitted which will incentivise sustainable transport use thereby encouraging residents to switch to these modes. It is therefore considered that the development will be in accordance with the rhetoric of the first two transport priorities. Furthermore, by being accordance with the first two priorities the development should reduce its impact on the nearby highway, which is in accordance with the third priority.

5.5 Local Policy

The current development plan for the Vale of Glamorgan comprises the Vale of Glamorgan Adopted Unitary Development Plan 1996-2011.

5.5.1 The Vale of Glamorgan Adopted Unitary Development Plan 1996 – 2011

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. As discussed earlier in the report Land north of the railway line, Rhoose, which includes the development site and Bellway / Persimmon proposals, has been identified for residential development under the UDP. The adopted UDP has a range of policies that will shape the VoG up until 2011, these include:

- Environment;
- Housing;
- Transportation;
- Sport and recreation; and
- Waste management.

Local Policy Objectives for the development

The current strategic policy (Policy 8) relating to development in the County is development will be favoured in locations which:

- *"Are highly access by means of travel other than the private car;*
- *Minimise traffic levels and associated unacceptable environmental effects."*

Policy 8 is designed to provide opportunities to concentrate major generators of demand from travel in existing built up areas, where:

- *"Access to public transport facilities; cycling and walking measures can be easily introduced / improved;*
- *Where the close proximity of housing, employment opportunities, retail facilities and other services encourages a reduced trip length and encourages travel by means other than the private car; and*
- *where existing local and district facilities are located."*

The Council's transportation policy objectives for the UDP (Adopted Unitary Development Plan 1996 – 2011) are:

- To ensure that a balance is maintained between the need to facilitate the development of the

local economy, environmental concerns and social considerations, in order to create a safe, efficient and equitable transport network for the Vale of Glamorgan;

- To maintain and improve access to employment and services;
- To ensure that developments are accessible by means of travel other than the private car;
- To encourage greater use of public transport, cycling and walking;
- To safeguard road lines and routes/ sites of approved transport schemes;
- To improve the safety and convenience of all means of transport; and
- To ensure that adequate parking facilities are provided in accordance with the Council's approved parking guidelines.

5.5.2 Emerging Local Development Plan

VoG is preparing a new Local Development Plan (LDP), which will set out how land within the Vale of Glamorgan is used between 2011 and 2026. When adopted, the LDP will replace the current Adopted Unitary Development Plan (UDP).

Whilst the LDP has yet to be adopted a Deposit report has been released which sets out initial draft policies for the VoG. As discussed earlier in the report Land north of the railway line, Rhoose, which includes the development site and Bellway / Persimmon proposals, has been identified for residential development within this deposit document. In addition, as discussed earlier, the LDP also identifies a requirement for a new primary school and nursery within the allocation site.

The deposit plan includes a number of objectives for the future development of the borough. In terms of transport Objective 3, outlined below, is the most relevant to the development proposals:

"To reduce the need for Vale of Glamorgan residents to travel to meet their daily needs and enabling them greater access to sustainable forms of transport."

It is clear that the development proposals which are located adjacent to sustainable transport links is in accordance with this objective. Furthermore the development will provide convenient connections to these sustainable transport links.

5.5.3 Summary

It is clear that policy at a national, regional and local level seeks to promote the use of sustainable modes of transport to reduce the numbers of trips being made by private car, and subsequently future traffic growth. Furthermore, it is also clear that this policy seeks to encourage the location of developments in close proximity to these sustainable links to enhance the convenience and attractiveness of sustainable modes. The development is located in an area with good links by sustainable transport to nearby towns. Thus, on this basis, it is considered that the proposals have been developed to minimise the numbers of private vehicle trips and subsequent impact on the nearby highway network.

The local plan identified the site as a large scale development area. Furthermore, highway improvements are also proposed which are forecast to provide sufficient mitigation to counteract the traffic impacts of the development. Thus, on this basis, it is clear that the development is in accordance with national, regional and local policy.

5.6 Measures to Achieve Objectives

5.6.1 Travel Plan

A Travel Plan is a package of measures tailored to an individual site, aimed at improving the availability and choice of sustainable travel modes to and from a development. The aim is not to demonise car use but to provide realistic alternatives to traveling by car.

Travel awareness can be integrated into the marketing and occupation of the site. Best practice dictates that Travel Plans should be developed in consultation with the end user and that they should be designed to reflect the local environment in terms of public transport provision, access to the walking and cycling network and the highway infrastructure.

It is suggested that the following are to be investigated further and implemented as Travel Plan measures:

- Car share database (Sewta carshare or an in-house database);

Sewta carshare is absolutely free to use and has been built and designed for every possible user. The website not only offers to promote car sharing but also gives information on a transport options.

The benefits of car sharing are as follows:

- Saves you money – travelling with others enables people to reduce transport costs by up to £1000 per year;
- Reduces the number of cars on the road – resulting in less congestion, less pollution and fewer parking problems;
- Provides a real solution to the parking problems in rural areas;
- Gives employers and employees more transport options; and
- Reduces the need for the private car.

The implementation of such measures would encourage the use of sustainable travel and reduce private car journeys and thus reduce the traffic impact of the development.

Best practise dictates that Travel Plans should be developed in consultation with the end user and that they should be designed to reflect the local environment in terms of public transport provision, access to the walking and cycling network and the highway infrastructure. It is anticipated that this development will not be occupied until 2015 therefore making it impossible, at this stage to consult with end users.

Therefore, at this stage a Travel Plan Framework will be produced. This will lay the foundation of the Travel Plan. It will contain a series of measures that should be undertaken to implement a Travel Plan in line with best practise.

The Travel Plan Framework will not contain any specific modal spilt targets or objectives. Any target setting done at this time will be purely an aspiration instead of being realistic and achievable.

The Travel Plan Framework will address the following:

- Management structure - to assign roles and responsibilities and recommend a reporting structure
- Monitoring programme - to detail how the travel plan will be monitored and how targets will be set and refined
- Potential Travel Plan measures - a list of measures that could be developed if supported by the consultation process

- Resource implications - to provide potential indicative costs
- Implementation strategy - will provide guidelines / timetables on how best to implement the emerging travel plan.

A Travel Plan Framework will need to be prepared in relation to the site, which will include the above measures along with more in depth analysis to mitigate the impact of the development on the local highway. It will be submitted as a separate document.

5.7 Parking

It is important that the proposed development provides sufficient car parking, however the amount of parking provided within the development will influence transport mode choice. In this case, the CSS Wales Parking Guidelines (2008) set out the provisions for residents' and visitors' parking for new-build residential developments. The document also sets out minimum disabled parking requirements, and also requires adequate cycle parking facilities to be provided.

The number of parking spaces required is dependent on the number of bedrooms in the residential dwellings. This information is not currently available, and therefore the parking requirements will be estimated at this stage and determined (in line with the CSS Wales Parking Guidelines) at the detailed design stage.

5.8 Monitoring of TIS

Monitoring will be undertaken by tracking the progress and outcomes of the travel plan against the targets set within it. These targets will be linked to the TIS objectives.

Targets will need to be set within the Travel Plan in order to evaluate it success. The targets will be linked to the TIS objectives.

6. Assessment of TIS

6.1 Access Proposals and Proposed Highway Improvements

As discussed previously in this TA, it is proposed that a point of access be introduced in the form of new priority junction on Porthkerry Road in the location of the existing PROW. Details of this access are provided within Appendix F of this document. It is noted that whilst a visibility splay of 43m, for a residential access onto a 30mph road, would be required so that the junction accords with the standards as advised within the Manual for Streets (MfS) guidance, the junction has been designed to the more stringent strategic road network standards as outlined with the Design Manual for Roads and Bridges Document (DMRB) TD9 93. The access has therefore been designed with a 90m visibility to accord with DMRB TD9 93 standards for a 30mph road.

6.2 Bellway / Persimmon Proposal Highway Improvements

As discussed earlier in this report, a technical note has been submitted by FMW (FMW TN4) in support of the Bellway / Persimmon Proposals which assess proposed mitigation measures that will be introduced to mitigate the impact of that development. These highway improvements encompass the following:

- Waycock Cross Roundabout (Improvement shown as Figure 4.1 of FMW TN4) - It is proposed that the Effective Flare Length (EFL) and entry width be increased on both Port Road West (W) and Waycock Road.
- Colcot Cross Roundabout (Improvement shown as Figure 4.2 of FMW TN4) - It is proposed that the EFL and entry width be increased on Port Road West. A deflector island is also proposed.

The above proposals have been classified within the FMW TN4 as 350 improvements, which mitigate the traffic of the Bellway / Persimmon proposals (350 dwellings), however the Colcot Cross improvements were also shown in the FMW TN4 to mitigate the traffic of 700 units, therefore accommodating the traffic of the full LDP allocation.

In addition to the above further measures were also proposed, at Waycock Cross roundabout (Figure 5.1 of FMW TN4), to accommodate the traffic of 700 units (known as the 700 improvements). These measures encompassed the widening of the entry on Port Road W and the further widening Waycock Road and Port Road West entries.

It is noted that further improvements were also proposed for Barry Docks Link Roundabout. These improvements should now be superseded by the more comprehensive measures proposed as part of the Barry Waterfront proposals, which are discussed later in this chapter.

The remaining junctions were also assessed within the FMW TA and FMW TA Addendum and were forecast to operate within capacity with the full UDP allocation (700 units).

A review of this analysis has been undertaken to assess whether these improvements would still be adequate to accommodate the development of the full LDP allocation site, which is assumed to encompass the Bellway / Persimmon Proposals for 350 dwellings and the development proposals (350 dwellings and a 258 pupil primary school). This approach has been agreed with VoG highways.

6.3 Barry Waterfront Proposals

Improvements have been proposed as part of the Barry Waterfront proposals. These include improvements to increase capacity at the Barry Docks Link Roundabout, which introduce a left slip lane onto each of the approaches onto the roundabout.

The Barry Docks Link Roundabout improvements are shown in Figure 7.12 of the TA (rev A) submitted in

support of the proposals. Details of these proposals have also been included within Appendix H of this TA.

The operation of the Barry Docks Link roundabout will be assessed against the traffic of the Forecast Year scenarios (discussed later in this chapter) to assess whether these improvements could also cater for the traffic of the full LDP allocation site.

It is noted that the Barry Waterfront TA (rev A) also assessed the traffic impact on the Waycock Cross roundabout, however, these assessments were based on the assumption that this junction would be upgraded as part of DTC / St Athan development. Thus, as, for reasons identified earlier in this report, the DTC / St Athan development is now unlikely to go ahead, the subsequent improvements will also now not be introduced. It is therefore clear that no mitigation measures have been introduced to cater for the traffic of the Barry Waterfront proposal and therefore, in order to provide an accurate assessment of the developments impact, the Barry Waterfront trips have been excluded in the assessment of this junction. This approach was agreed with VoG highway authority.

6.4 Highway Impact Assessment

Capacity analysis has been carried out to quantify the impact of the development on the adjacent highway network in terms of practical reserve capacity and queue lengths. The junctions assessed are listed below:

- Proposed Access to site (Porthkerry Road);
- Waycock Cross Roundabout;
- Fonmon Road / B4265 Junction;
- Wales Airport Hotel Roundabout;
- BAMC Roundabout;
- Station Road Junction;
- Barry Docks Link Road Roundabout;
- Colcot Cross Roundabout;
- Fonmon Road Signals; and
- Rhoose Point Roundabout.

Capacity analysis was undertaken to quantify the impact of the development on the adjacent highway network in terms of practical reserve capacity and queues.

It is not forecast that any significant development flows will travel through the proposed access to the Bellway / Persimmon proposals and therefore no assessment has been undertaken of this junction.

6.5 Forecast Year Traffic Scenario

The FMW TA has assumed a forecast year of 5 years post registration of planning application. This horizon has therefore also been assumed for the assessment of the development proposals. On the basis that the registration year of this planning application is 2014 the development proposals will therefore be assessed against a Forecast Year of 2019 (2014 + 5 Years).

The growth rate to factor 2014 flows to 2019 flows was 1.0565 in the AM peak and 1.0561 in the PM peak. These factors have been applied to the 2014 traffic figures in Figures 4.3 and 4.4, with the resultant 2019 traffic flows shown in Figures 6.1 and 6.2.

6.6 Forecast Year Without LDP Traffic Scenario

The 2019 Base Traffic Flows (Figures 6.1 and 6.2) have been combined with the committed development traffic flows from the FMW TA (Figures 3.4 and 3.5) and the traffic of the Barry Waterfront proposals (Figures 3.8 and 3.9). The traffic figures from the DTC / St Athan proposals (Figures 3.6 and 3.7) were then subtracted from the overall traffic movements. The result 'Forecast Year Without LDP' traffic scenario is shown in Figures 6.3 (AM Peak) and 6.4 (PM Peak).

6.7 Forecast Year With UDP Traffic Scenario

The flows from the 'Forecast Year Without UDP' traffic scenario (Figures 6.3 and 6.4) have been combined with the Bellway / Persimmon Proposals Development Traffic (Figures 3.10 and 3.11) and Residential Development Traffic (Figures 3.2 and 3.3) and the School Net Traffic Impact (Figure 11 and 12 of the technical note included as Appendix E). The resultant 'Forecast Year With UDP' traffic scenario is shown in Figure 6.5 and 6.6.

6.8 Capacity Analysis

Capacity analysis of the junctions was undertaken using ARCADY capacity analysis software for the roundabout junctions, PICADY capacity analysis software for priority junctions and LinSig for the signalised junction.

Junction capacity in both ARCADY and PICADY software packages is given as the Ratio of Flow to Capacity (RFC). This is a measure of the volume of traffic making a turning movement divided by the capacity of that movement. A RFC of 0.85 is recommended by some local authorities as a threshold margin, however, junctions can still operate within capacity with a RFC of up to 1.00.

Arm capacity in the Linsig software package is classified in degrees of saturation (DoS), which is measured as a percentage, and assesses arm capacity in association with green time. In addition the Practical Reserve Capacity (PRC), which is also specified as percentage, is a measurement of the junction capacity as a whole and is equal to the link with the worst DoS value. A PRC of 90% is recommended by some local authorities as a threshold margin, however, junctions can still operate within capacity with a PRC of up to 100%.

The assessments have all been assessed against the worst case traffic scenario (i.e 2019 with UDP Traffic Scenario), however, where junctions are shown to exceed capacity in this scenario further assessments have also been undertaken of the '2019 without UDP' scenario to assess whether the LDP traffic is forecast to worsen capacity issues at the junction.

The traffic flows entered into this model are based on the Forecast traffic flows scenarios discussed in this report. It is noted that the peak hours specified in the model outputs have purely been inputted for the purpose of modelling a select period (in this case an hour) and therefore do not represent the traffic hour that has been assessed.

6.8.1 Proposed Access to Site

This junction has been assessed using PICADY junction modelling software. The geometries inputted into this model have been measured from the access design plans. HGV percentages have been calculated from the survey results of the Rhoose Point Roundabout included as Appendix B of the FMW TA which has been included as Appendix C of this document.

The results for the PICADY analysis for the proposed access junction are shown in Tables 13. The results are attached in full in Appendix I.

Table 13: Results of PICADY analysis for Proposed Access Junction – Forecast Year With LDP

Arm	AM		PM	
	RFC	Queue	RFC	Queue
Access arm (left turn)	0.112	0.13	0.040	0.04
Access arm (right turn)	0.770	3.09	0.344	0.52
Porthkerry Road West (ahead and right turn)	0.076	0.14	0.075	0.14

It can be seen from the results in Table 13 that the junction is forecast to operate within capacity with limited queuing in the AM and PM peak hour of the Forecast Year With LDP scenario.

6.8.2 Waycock Cross Roundabout

For reasons discussed earlier in this chapter the committed development traffic of the Barry Waterfront proposals has been removed for the operational assessment of this junction. Traffic flow diagrams have therefore been produced which exclude these movements thereby creating the following scenarios:

- Forecast Year Without LDP Traffic Scenario AM (Excluding Barry Waterfront Traffic) – Figure 6.7
- Forecast Year Without LDP Traffic Scenario PM (Excluding Barry Waterfront Traffic) - Figure 6.8
- Forecast Year With LDP Traffic Scenario AM (Excluding Barry Waterfront Traffic) - Figure 6.9
- Forecast Year With LDP Traffic Scenario PM (Excluding Barry Waterfront Traffic) - Figure 6.10

The assessment of the 'Without LDP' traffic scenario uses the geometries for the existing junction as extracted from the FMW TA Addendum whereas the 'With LDP' scenarios have been assessed based on the geometries of the 700 improvements identified in the FMW TN4.

The HGV proportions entered into the models are based on the original ARCADY assessments that were undertaken by FMW.

The results for the ARCADY analysis for Waycock Cross roundabout is shown in Tables 14 and 15. The results are attached in full in Appendix J.

Table 14: Results of ARCADY analysis for Waycock Cross Roundabout Existing Layout – Forecast Year Without LDP (excluding Barry Waterfront)

Arm	AM		PM	
	RFC	Queue	RFC	Queue
Port Road West (E)	0.627	1.7	0.720	2.5
Pontypridd Road	0.525	1.1	0.600	1.5
Port Road West (W)	1.037	39.5	0.692	2.2
Waycock Road	0.748	2.8	0.623	1.6

Table 15: Results of ARCADY analysis for Waycock Cross Roundabout 700 Improvements – Forecast Year With LDP (excluding Barry Waterfront)

Arm	AM		PM	
	RFC	Queue	RFC	Queue
Port Road West (E)	0.652	1.8	0.831	4.7
Pontypridd Road	0.565	1.3	0.750	2.9
Port Road West (W)	1.074	74.6	0.643	1.8
Waycock Road	0.795	3.6	0.604	1.5

It can be seen from Table 14 that the Port Road West (W) arm of the Waycock Cross junction is forecast to operate overcapacity in the AM peak of the 'Forecast Year Without LDP'. Furthermore the operation of this arm is worsened with the inclusion of LDP traffic even with the 700 improvements identified in the FMW TN4. Thus it is proposed that further junction mitigation measures should be introduced in addition to the 700 improvements. These improvements, which are shown in Appendix K, involve the lengthening of the approach flare on the Port Road West (W) arm.

The proposed improvement has been assessed with the traffic of the Forecast Year With LDP scenario. The results of this analysis are shown in Table 16 below.

Table 16: Results of ARCADY analysis for Waycock Cross Roundabout 700 Improvements + Additional Improvements on Port Road West (W) arm – Forecast Year With LDP (excluding Barry Waterfront)

Arm	AM		PM	
	RFC	Queue	RFC	Queue
Port Road West (E)	0.664	1.9	0.831	4.7
Pontypridd Road	0.564	1.3	0.750	2.9
Port Road West (W)	0.988	24.8	0.593	1.4
Waycock Road	0.869	5.4	0.604	1.5

It can be seen from Table 16 that, with the additional proposed improvements, the Port Road West (W)

arm is forecast to operate better than in the Forecast Year Without LDP scenario with the existing geometry. Furthermore, whilst there is a slight exceedance of the 0.85 RFC threshold on the Waycock Road arm in the AM peak, this exceedance is minimal. Moreover, it is noted that this assessment is based on robust assessment of the LDPs traffic generation, which is based on the whole site being developed as private housing and also does not include any potential reductions that could occur through the introduction of the travel plan. If these aspects were factored into the assessments it is likely that the RFC levels on the Waycock Road arm (AM peak) would actually be within the 0.85 threshold.

6.8.3 Fonmon Road / B4265 Junction

This junction has been assessed using PICADY junction modelling software. The geometries inputted into this model have been extracted from the FMW assessments undertaken in support of the Bellway / Persimmon proposals.

The HGV proportions entered into the models are based on the original PICADY assessments that were undertaken by FMW.

The results for the PICADY analysis for Fonmon Road / B4265 Junction are shown in 17. The results are attached in full in Appendix I.

Table 17: Results of PICADY analysis for Fonmon Road / B4265 Junction – Forecast Year With LDP

Arm	AM		PM	
	RFC	Queue	RFC	Queue
Fonmon Road (left and right turn)	0.547	1.18	0.322	0.47
B4265 (W) (left turn)	0.229	0.29	0.476	0.90

The results of the capacity analysis show that there is no significant adverse impact on the junction of Fonmon Road/ B4265.

6.8.4 Wales Airport Hotel Roundabout

This junction has been assessed using ARCADY junction modelling software. The geometries inputted into this model have been extracted from the FMW assessments undertaken in support of the Bellway / Persimmon proposals.

The HGV proportions entered into the models are based on the original ARCADY assessments that were undertaken by FMW.

The results for the ARCADY analysis for Wales Airport Hotel Roundabout are shown in Table 18. The results are attached in full in Appendix J.

Table 18: Results of ARCADY analysis for the Wales Airport Hotel Roundabout – Forecast Year With LDP

Arm	AM		PM	
	RFC	Queue	RFC	Queue
Port Road	0.873	6.4	0.611	1.6
A4226 (W)	0.564	1.3	0.436	0.8
A4226 (E)	0.516	1.1	0.817	4.3

The results in Table 18 show that the roundabout operates within capacity in the Forecast Year With LDP scenario. Furthermore, whilst there is a slight exceedance of the 0.85 RFC threshold on the Port Road arm in the AM peak, this exceedance is minimal. Moreover, it is noted that this assessment is based on robust assessment of the LDPs traffic generation, which is based on the whole site being developed as private housing and also does not include any potential reductions that could occur through the introduction of the travel plan. If these aspects were factored into the assessments it is likely that the RFC levels on the Port Road arm (AM peak) would actually be within the 0.85 threshold.

6.8.5 BAMC Roundabout

This junction has been assessed using ARCADY junction modelling software. The geometries inputted into this model have been extracted from the FMW assessments undertaken in support of the Bellway / Persimmon proposals.

The HGV proportions entered into the models are based on the original ARCADY assessments that were undertaken by FMW.

The results for the ARCADY analysis for the BAMC Roundabout are shown in Table 19. The results are attached in full in Appendix J.

Table 19: Results of ARCADY analysis for the BAMC Roundabout – Forecast Year With LDP

Arm	AM		PM	
	RFC	Queue	RFC	Queue
A4226	0.264	0.4	0.305	0.4
To Airport	0.069	0.1	0.101	0.1
Dragonfly Drive	0.005	0.0	0.019	0.0
B4265	0.343	0.5	0.286	0.4
Tredogan Road	0.014	0.0	0.007	0.0

The results of the capacity analysis show that there forecast to be no significant adverse impact on BAMC roundabout.

6.8.6 Station Road Junction

This junction has been assessed using PICADY junction modelling software. The geometries inputted into

this model have been extracted from the FMW assessments undertaken in support of the Bellway / Persimmon proposals.

The HGV proportions entered into the models are based on the original PICADY assessments that were undertaken by FMW.

The results for the PICADY analysis for Station Road Junction are shown in Tables 20. The results are attached in full in Appendix I.

Table 20: Results of PICADY analysis for Station Road/ Rhoose Road – Forecast Year With LDP

Arm	AM		PM	
	RFC	Queue	RFC	Queue
Station Road (left and right turn)	0.173	0.21	0.132	0.15
Fontygary Road (left turn)	0.088	0.10	0.130	0.15

The results of the capacity analysis show that there is forecast to be no significant adverse impact on the Station Road Junction.

6.8.7 Barry Docks Link Road Roundabout

This junction has been assessed using ARCADY junction modelling software. The geometries inputted into this model have been extracted from the Ove Arup & Partners Ltd assessments, within the TA (rev A) undertaken in support of the Barry Waterfront Proposals.

The HGV proportions entered into the models are based on the original ARCADY assessments that were undertaken by FMW.

The results for the ARCADY analysis for the Barry Docks Link Road Roundabout are shown in Table 21. The results are attached in full in Appendix J.

Table 21: Results of ARCADY analysis for A4050 Port Road/ A4231 Barry Docks Link Road Roundabout – Barry Waterfront improvements – Forecast Year with LDP

Arm	AM		PM	
	RFC	Queue	RFC	Queue
A4231	0.606	1.5	0.761	3.1
Port Road East	0.727	2.6	0.470	0.9
Port Road	0.476	0.9	0.701	1.3

The results of the capacity analysis show that the improvements proposed to Barry Docks Link Road Roundabout as part of Barry Waterfront proposals will also accommodate the traffic from the LDP allocation.

6.8.8 Colcot Cross Roundabout

This junction has been assessed using ARCADY junction modelling software. The assessment of the 'Without LDP' traffic scenario uses the geometries for the existing junction as extracted from the FMW TA

Addendum whereas the 'With LDP' scenarios have been assessed based on the geometries of the 350 improvements identified in the FMW TN4.

The HGV proportions entered into the models are based on the original ARCADY assessments that were undertaken by FMW.

The results for the ARCADY analysis for Colcot Cross Roundabout are shown in Tables 22 and 23. The results are attached in full in Appendix J.

Table 22: Results of ARCADY analysis for Colcot Cross Roundabout – Existing Geometry – Forecast Year Without LDP

Arm	AM		PM	
	RFC	Queue	RFC	Queue
Colcot Road	0.615	1.6	0.672	2.0
Port Road West	1.161	115.1	0.831	4.7
Port Road East	0.725	2.6	0.803	4.0

Table 23: Results of ARCADY analysis for Colcot Cross Roundabout – 350 Improvements – Forecast Year With LDP

Arm	AM		PM	
	RFC	Queue	RFC	Queue
Colcot Road	0.642	1.8	0.775	3.3
Port Road West	1.102	96.0	0.729	2.6
Port Road East	0.776	3.4	0.929	11.0

The results show that the Port Road West is forecast to operate overcapacity in the AM peak of the Forecast Year Without LDP scenario, with the existing roundabout geometry. With the introduction of LDP traffic and the 350 improvements proposed as part of the Bellway / Persimmon proposals, this arm is forecast to show betterment in terms of operation and queuing. Furthermore, whilst there is a slight exceedance of the 0.85 RFC threshold on the Port Road East arm in the PM peak, this exceedance is minimal. Moreover, it is noted that this assessment is based on robust assessment of the LDPs traffic generation, which is based on the whole site being developed as private housing and also does not include any potential reductions that could occur through the introduction of the travel plan. If these aspects were factored into the assessments it is likely that the RFC levels on the Port Road East arm (AM peak) would actually be within the 0.85 threshold.

6.8.9 Fonmon Road Signals

This junction has been assessed using Linsig junction modelling software. Cycle Timings were based on information extracted from the FMW TA, however, as no other timing information was available, the minimum greens and intergreen timings are based on information provided by VoG highway authority. In addition, as geometry information was also not available, the geometries for this assessment were measured from OS plans.

HGV proportions have been calculated from the survey results of the junction included as Appendix B of the FMW TA which has been included as Appendix C of this document.

The results for the LinSig analysis for Fonmon Road Road Signals are shown in Table 24. The results are attached in full in Appendix L.

Table 24: Results of LinSig analysis for Fonmon Road Signals – Forecast Year With LDP

Link	AM		PM	
	Deg Sat (%)	Max Queue	Deg Sat (%)	Max Queue
Fontygary Road (East)	45.5	6.4	40.4	5.5
Fontygary Road (West)	12.7	1.5	22.0	2.8
Fonmon Road	43.8	4.1	40.5	3.2
Caravan Park Exit	17.8	0.8	24.8	1.1

The LINSIG results in Table 24 indicate that the junction should continue to operate efficiently with the development.

6.8.10 Rhoose Point Roundabout

This junction has been assessed using ARCADY junction modelling software. The geometries inputted into this model have been extracted from the FMW assessments undertaken in support of the Bellway / Persimmon proposals.

The HGV proportions entered into the models are based on the original ARCADY assessments that were undertaken by FMW.

The results for the ARCADY analysis of the Rhoose Point Roundabout are shown in Table 25. The results are attached in full in Appendix J.

Table 25: Results of ARCADY analysis for Rhoose Point Roundabout – Forecast Year With UDP

Arm	AM		PM	
	RFC	Queue	RFC	Queue
Pentir Y De	0.390	0.6	0.217	0.3
Porthkerry Road (W)	0.566	1.3	0.283	0.4
Porthkerry Road (E)	0.297	0.4	0.702	2.3

The ARCADY results in Table 25 indicate that the junction should continue to operate efficiently with the development.

6.8.11 Waycock Cross Roundabout Sensitivity Test

A further assessment has also been undertaken of the Waycock Cross roundabout with the geometries of

the 350 improvements as outlined in the FMW TN4. This assessment which excludes the traffic of the Bellway / Persimmon proposals has been undertaken to demonstrate that the development proposals could still be developed with the 350 improvements should the development of the Bellway / Persimmon residential development be abandoned.

The relevant traffic flows for this assessment are shown in Figures 6.11 and 6.12. The resultant ARCADY results are also shown in Table 26, with the resultant outputs included as Appendix J.

Table 26: Results of ARCADY analysis for Waycock Cross Roundabout 350 improvements – Forecast Year With Development (excluding Barry Waterfront and Bellway / Persimmon Proposals)

Arm	AM		PM	
	RFC	Queue	RFC	Queue
Port Road West (E)	0.678	2.1	0.812	4.2
Pontypridd Road	0.544	1.2	0.669	2.0
Port Road West (W)	1.002	28.4	0.631	1.7
Waycock Road	0.739	2.7	0.572	1.3

The results in Table 26 show that the Forecast Year With Development (excluding Barry Waterfront and Bellway / Persimmon Proposals) scenario is shown to operate within capacity on all but one of the arms, namely the Port Road West (W) arm in the AM peak. It is noted however that the forecast RFC in the AM peak on the Port Road West (W) arm still represents betterment when compared with the results of the assessment of the Forecast Year Without LDP scenario, with the existing roundabout geometry, as shown in Table 14. It is therefore clear that the 350 Improvements as outlined within the FMW TN4 would be sufficient to cater for the traffic of the development should the Bellway / Persimmon proposals be abandoned.

6.8.12 Summary

The above assessments show that traffic from the LDP allocation can be accommodated with the following offsite junction improvements:

- Waycock Cross – The 750 Improvements proposed within the FMW TN4 with additional improvements to Port Road West as set out in Appendix K
- Barry Dock Link Roundabout – Improvements proposed as part of Barry Waterfront Development
- Colcot Cross Roundabout – 350 Improvements as proposed within FMW TN4

It is noted that the both the Barry Docks Link Road improvements and Colcot Cross Roundabout improvements will be carried out as part of existing committed development within the VoG, namely the Bellway / Persimmon proposals and Barry Waterfront site. The additional developments at Waycock Cross will need to be undertaken to offset the impact of the development, although some of these improvements will be carried out as part of the Waycock Cross 350 improvements proposed as part of the adjacent Bellway / Persimmon proposals.

If for any reason the Bellway / Persimmon proposals were abandoned, the Waycock Cross improvements could be reduced to the 350 Improvements, as set out in FMW TN4, which would still accommodate the traffic of the development proposals.

6.9 Construction Traffic

A Construction Traffic Management Plan (CTMP) will be developed during the detailed design stage to manage construction traffic associated with the development.

6.10 Outline Travel Plan

6.10.1 Introduction

An Outline Travel Plan has been developed using guidance contained within "A Walking and Cycling Action Plan for Wales 2009-2013", and "Smarter Choices: Wales". The purpose of this Travel Plan is to set out a strategy to reduce dependence on private car for journeys to/from the proposed development, as well as to broaden the choices available, specifically by public transport, cycling and walking.

A Travel Plan (TP) is a site-specific strategy designed to provide a package of measures aimed at encouraging sustainable transport modes by increasing travel choice. Users are encouraged to adopt more sustainable alternatives to single-occupancy car use, such as walking, cycling, public transport or car sharing. A Travel Plan is a 'live document', which needs to be appraised, evaluated and adapted according to the changing circumstances of the Site.

In addition to reducing congestion, a shift away from a reliance on car travel also results in an improvement in air quality, a reduction in traffic accidents, improved access and parking availability for residents and visitors, increased social interaction between the community, and healthier lifestyles.

The implementation of a successful Travel Plan for the proposed development site requires commitment of the site users to promote and raise awareness of sustainable modes of transport.

This Outline Travel Plan provides a framework to be developed by a Travel Plan Co-ordinator (TPC) who will be appointed by the developer for the whole development site.

Within a Travel Plan, it is necessary to consider and incorporate the following issues into the Travel Plan Strategy:

- Proximity to public transport network;
- High quality pedestrian and cycle network within and adjacent to the Site; and
- Level of parking provision on-site.

It is difficult to predict any future travel patterns. An understanding of post development travel patterns of residents is essential for the successful implementation of the Travel Plan. Annual surveys will therefore be undertaken to monitor the effectiveness of the Plan.

A Full TP will be issued once the development is fully occupied. It is suggested that the requirement for this travel plan be included as a condition for planning approval. TP progress reports will also be issued to VoG on an annual basis.

The first TP progress report will also include the results of the first set of travel surveys and will therefore also include more targeted measures to encourage a mode shift to more sustainable modes of transport.

6.10.2 Objectives

The objectives for the Travel Plan will need to be developed in association with the TPC for the entire site as well as reflecting the objectives and policy of the Welsh Government, VoG and SEWTA.

The Outline Travel Plan sets out to maximise the opportunity for residents of the Site to travel by modes other than by car. This will be achieved by providing high quality information highlighting the diverse

choice of transport modes, which will ultimately enable residents travelling to/from the proposed development site to make intelligent and informed travel decisions. Furthermore, the Plan seeks to address concerns over safety, congestion, access, the environment, and health.

Other objectives include:

- The involvement of residents and village centre staff in the development of the Travel Plans in order to address future travel related issues. Actively involving those who will be using the schemes will increase awareness and the effectiveness of the Travel Plans.
- Ensure that residents and village centre staff without the use of a car are not disadvantaged.
- Setting targets for increased participation in more sustainable forms of transport such as walking and cycling.
- Monitor progress and manage improvements.

6.10.3 Walking and Cycling

A number of national and regional policy documents support and encourage walking and cycling, and one of the key targets of the travel plan is to encourage residents to walk or cycle.

The development will consist of a comprehensive network of existing and new cycle routes / footways, which will links to existing external routes. This is a key design feature to encourage walking and cycling to / from and within the Site. To promote walking and cycling to the station it is recommended that the Travel Plan Co-ordinator work with the developer to ensure that more signage, similar to that found on Porthkerry Road is provided to direction to /from the station.

A new pedestrian/ cycle link will be facilitated to the southwest corner of the development linking in with the routes to the railway station. Pedestrian connections will also be provided to the Porthkerry Road access and therefore to the bus stops on Porthkerry Road.

In order to encourage the use of these routes, a number of initiatives should be implemented, such as:

- Providing information to residents and other users such as Sustrans cycle route maps, and details of safe pedestrian and cycle routes to and from the nearby schools, and the health benefits of cycling. Such information could be displayed in public areas and through the provision of information leaflets to home buyers.
- Providing pedestrian and cycle routes within the Site that are direct, signed, safe, attractive and well-lit.
- Traffic calming measures will be incorporated into the internal highway layout within the Site, and at proposed pedestrian and cycle crossing points.
- Secure, well-lit and ideally covered cycle parking should be provided for cycles in public places.

6.10.4 Public Transport

Public transport is considered a safer and environmentally friendly alternative to car travel.

Measures for improvement in public transport to be put forward are:

- Residents to be provided with route and timetable information relating to relevant bus and train services. The recommendation is that Traveline Cymru or Sustrans is engaged in an attempt to deliver personalised timetable information to the residents.
- It is recommended the Travel Plan Co-ordinator negotiates with the train and bus operators in an

attempt to secure a discount to incentivise residents to travel by train.

No changes to the existing rail network are envisaged as part of the proposed development, however there are future network improvements recommended in the SEWTA Rail Strategy (March 2013), which should enhance the developments accessibility by rail.

6.10.5 Car Sharing

A car share scheme is a successful way of promoting sustainable travel by increasing car occupancy, resulting in a reduction in vehicle usage. Residents should therefore be encouraged to adopt this initiative.

It is recommended that information is provided to new home buyers on car share schemes, such as www.sewtacarshare.com.

The introduction of a 'car club' could also reduce the level of car ownership within the development, which in turn could reduce the number of trips made by private car.

6.10.6 Implementation and Management

A TPC will be identified for the entire Site prior to the occupation of the first dwelling and who would then be responsible for:

- On-going development of the Travel Plan;
- Liaison with the SEWTA and VoG;
- Organising travel surveys;
- Managing and implementing measures in the proposed Travel Plan;
- Monitoring and reviewing interim and agreed targets.

It is important that regular travel patterns to/from the proposed development site are known. In this case, it would be necessary for the TPC to undertake annual travel surveys of Site residents to establish the change in mode share throughout the life of the TP. This will allow travel patterns of Site users to be established from which realistic targets can be set, which at this stage are difficult to quantify.

It is also necessary for the TPC to obtain and maintain the commitment and support of Site users, and investigate and encourage any funding opportunities to develop and implement new initiatives. Progress reports should also be produced, which set out the results of the travel surveys and comparison with targets will be disseminated to SEWTA and VoG.

The TPC for the Site should be appointed prior to the occupation of the first dwelling, with intention that the post should be filled for a minimum of five years.

An action plan should be developed for the Site, linking the Travel Plan to the targets, responsibilities and timescale for implementation. In the absence of initial baseline travel surveys it is difficult at this stage to develop an Action Plan for the Site. In addition, given the type of development it will be more difficult to influence the residents to sign up to such schemes and as such, more difficult for them to be implemented. The onus will, however, be on the Developer at the outset and VoG thereafter with support from residents' committed to implement such schemes in order to encourage the use of sustainable transport modes.

6.10.7 Targets and Penalties

Quantitative, realistic and achievable targets will be outlined in the Travel Plan as it evolves. Baseline

data for quantifiable targets will only be available once the first set of household travel surveys has been completed. In this case, it is not possible at this stage to set definitive targets due to a lack of travel survey information. New targets would therefore be developed by the TPC, in consultation with VoG, based on new travel survey information when it becomes available.

Penalties will also be agreed with VoG and will be included within the full TP.

7. Conclusions

This report and the associated analysis have shown that the proposed development is located in a sustainable location, within walking distance of nearby local facilities. Furthermore, the development is also located close to nearby public transport corridors, which are served by frequent bus and train services providing access to key destinations in the vicinity of Rhoose and beyond. The masterplan of the development will capitalise on the site's sustainable location by providing walking and cycling links which connect the development with the sustainable transport network. A travel plan will also be submitted with the proposals which will encourage residents to travel by sustainable modes of transport.

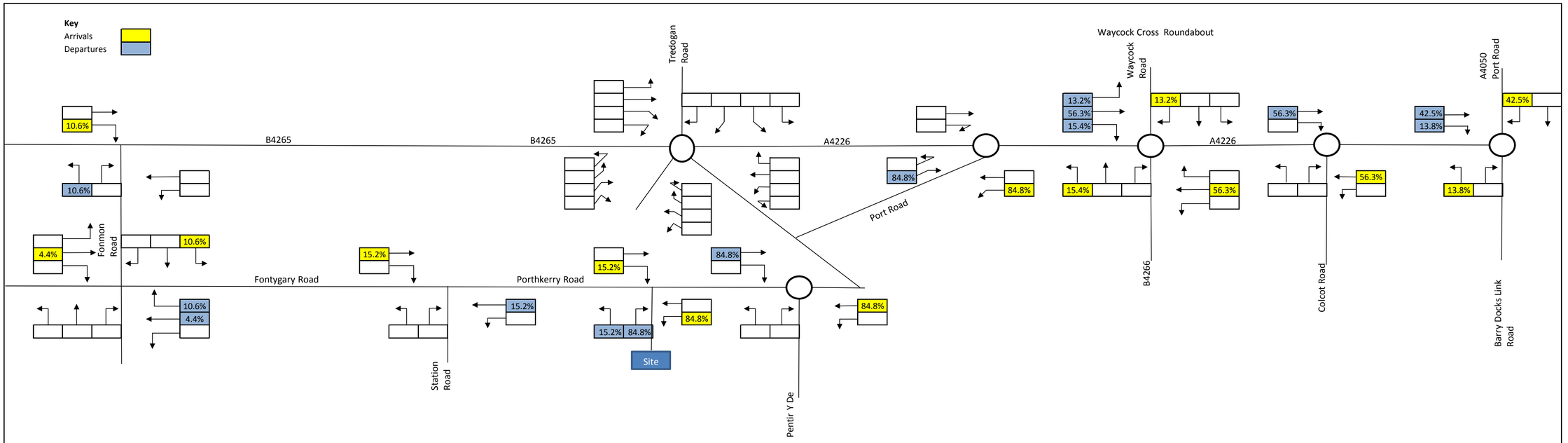
Capacity analysis was undertaken using ARCADY, PICADY and LinSig. These assessments show that traffic from the 'Land North of the Railway Line, Rhoose' LDP allocation, which includes the development proposals and adjacent Bellway / Persimmon proposals, can be accommodated with the following offsite junction improvements:

- Waycock Cross – The '750 Improvements' proposed within the FMW TN4 with additional improvements to Port Road West as set out in Appendix K.
- Barry Dock Link Roundabout – Improvements proposed as part of Barry Waterfront Development
- Colcot Cross Roundabout – '350 Improvements' as proposed within FMW TN4

It is noted that the both the Barry Docks Link Road improvements and Colcot Cross Roundabout improvements will be carried out as part of existing committed development within the VoG, namely the Bellway / Persimmon proposals and Barry Waterfront site. The additional improvements at Waycock Cross will need to be undertaken to offset the impact of the development, although some of these improvements will be carried out as part of the Waycock Cross 350 improvements proposed as part of the adjacent Bellway / Persimmon proposals.

Following this rigorous assessment of all of the transport issues associated with the proposed development scheme it is considered that there are no transport or highway reasons as to why the scheme should not be approved.

FIGURES



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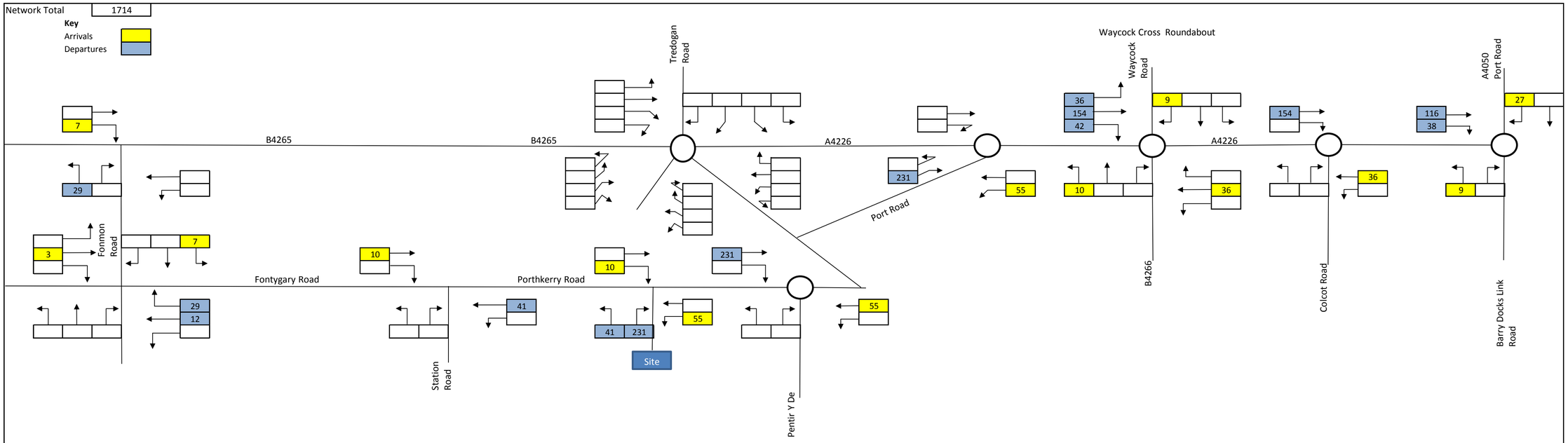
15342		Title: Residential Development Traffic Distribution	Telephone: (029) 2038 4400 Facsimile: (029) 2038 4544



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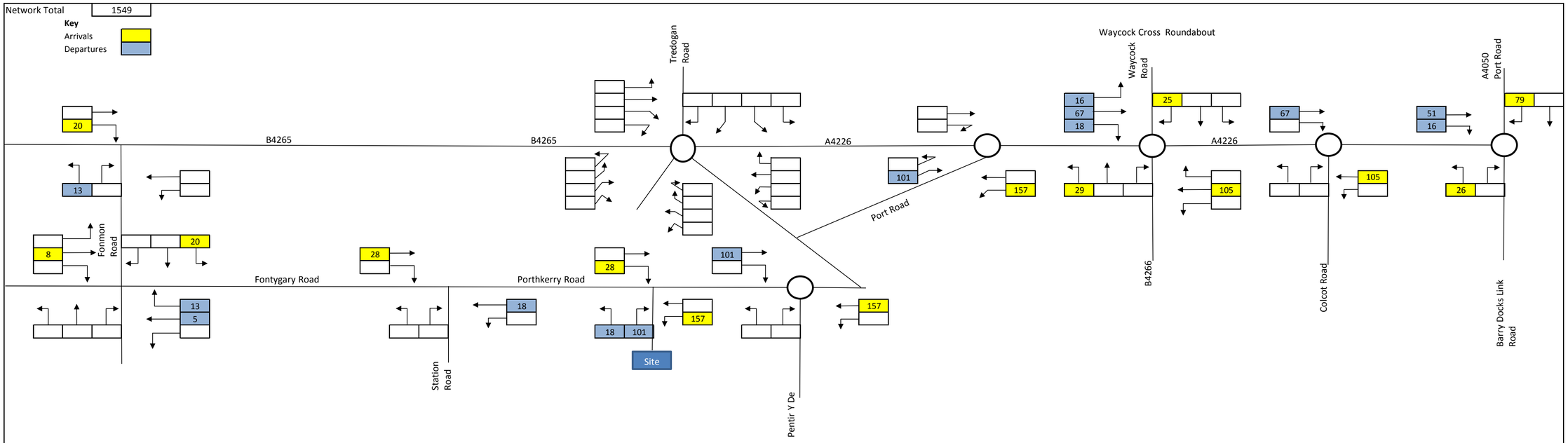

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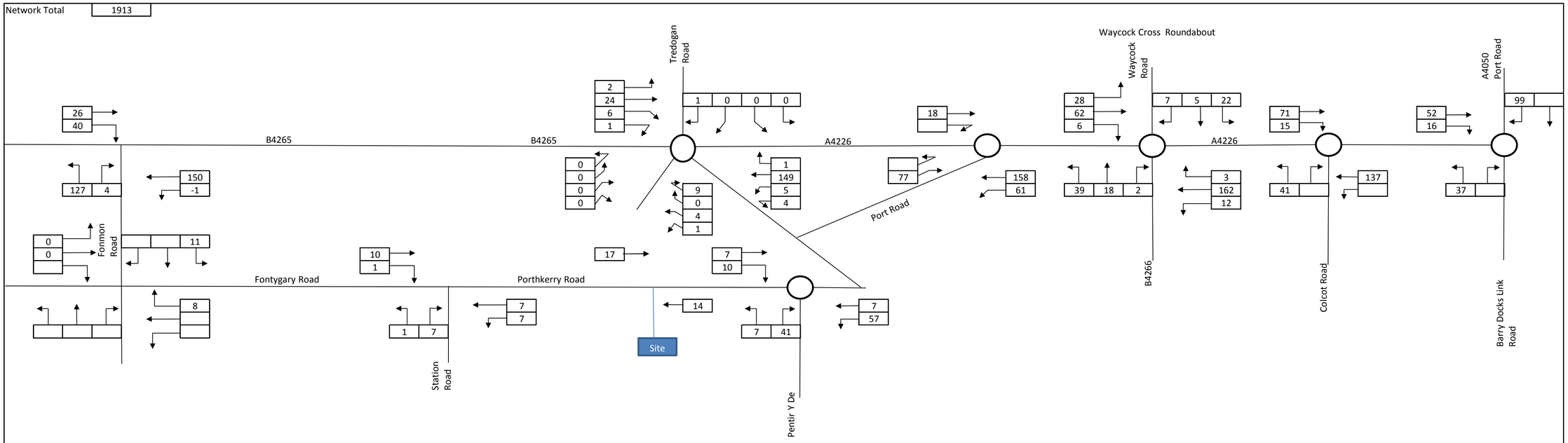

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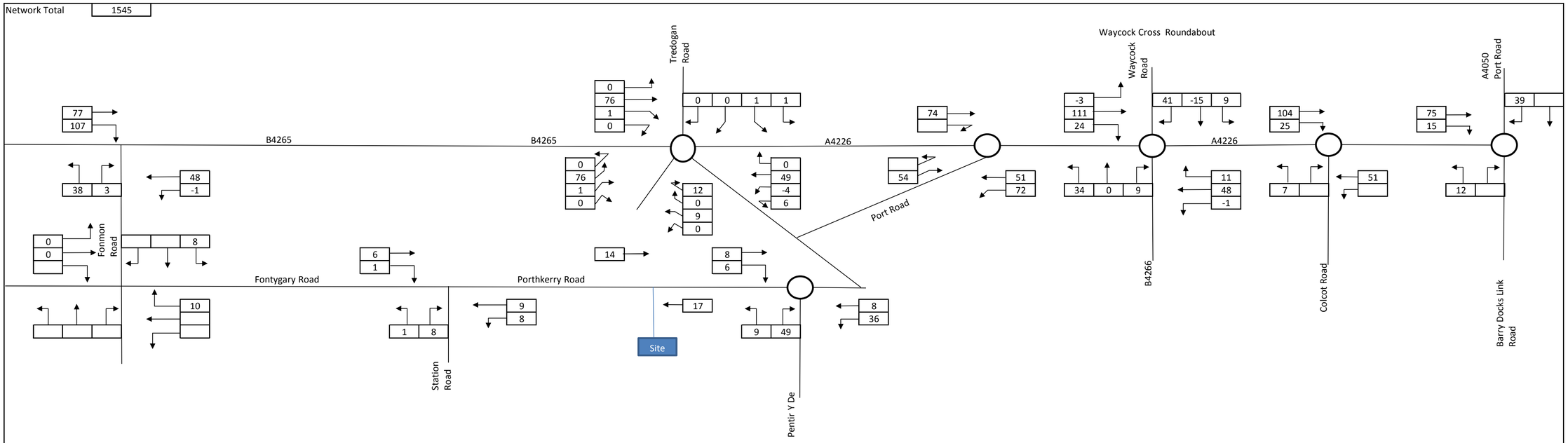

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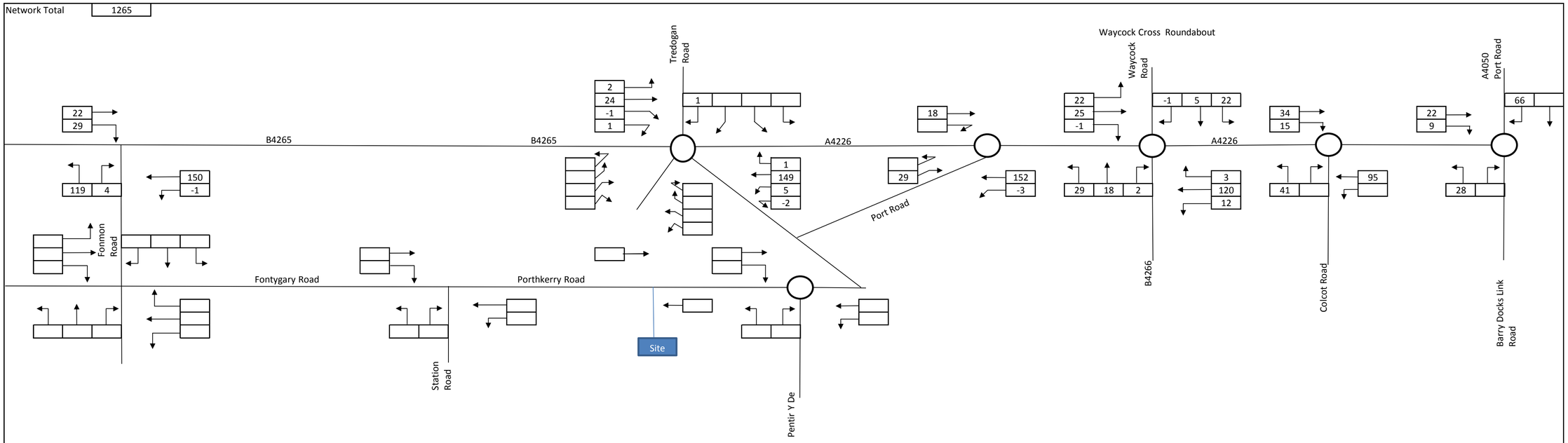

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Figure No. 3.6	Flow Diagram.xls	Client: South Wales Land Development	
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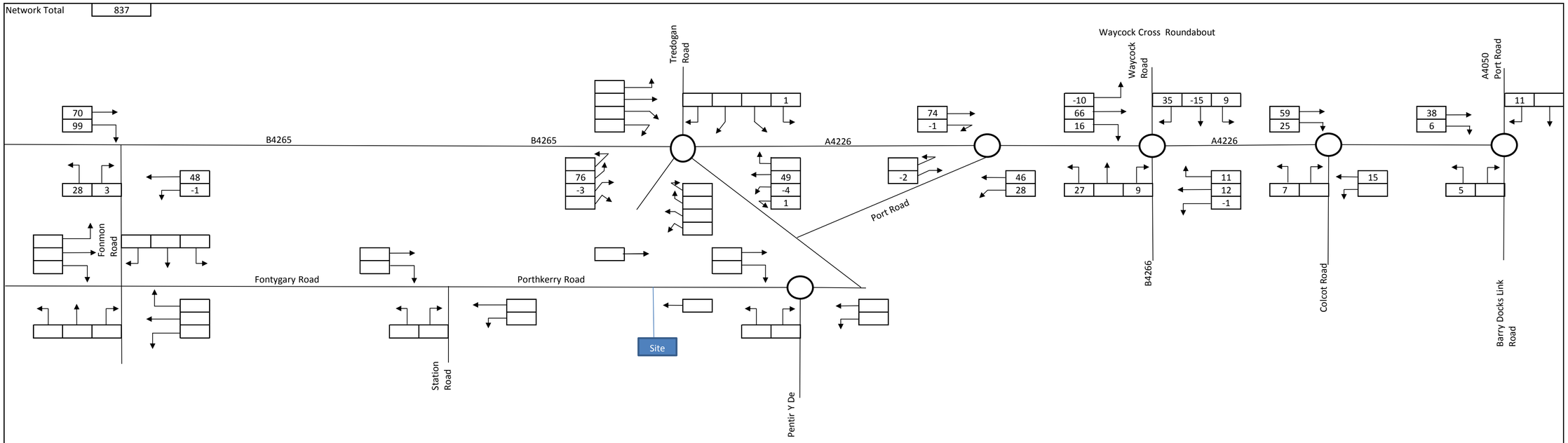

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Figure No.: 3.7	Flow DiagramPM.xls	Client: South Wales Land Development	
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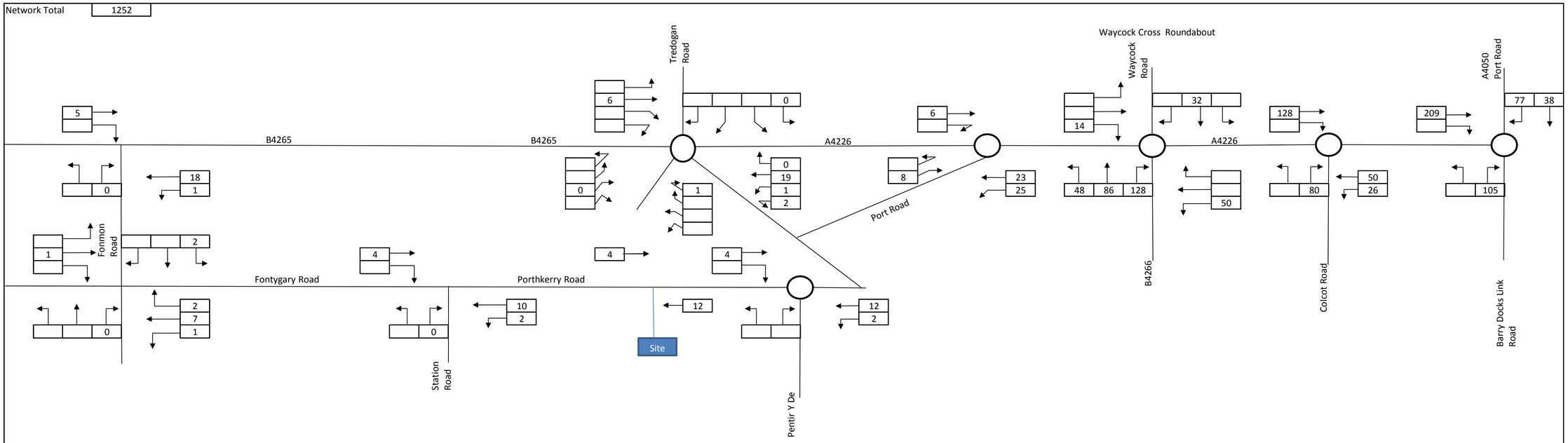

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Figure No. 3.8	Flow Diagram.xls	Client: South Wales Land Development	
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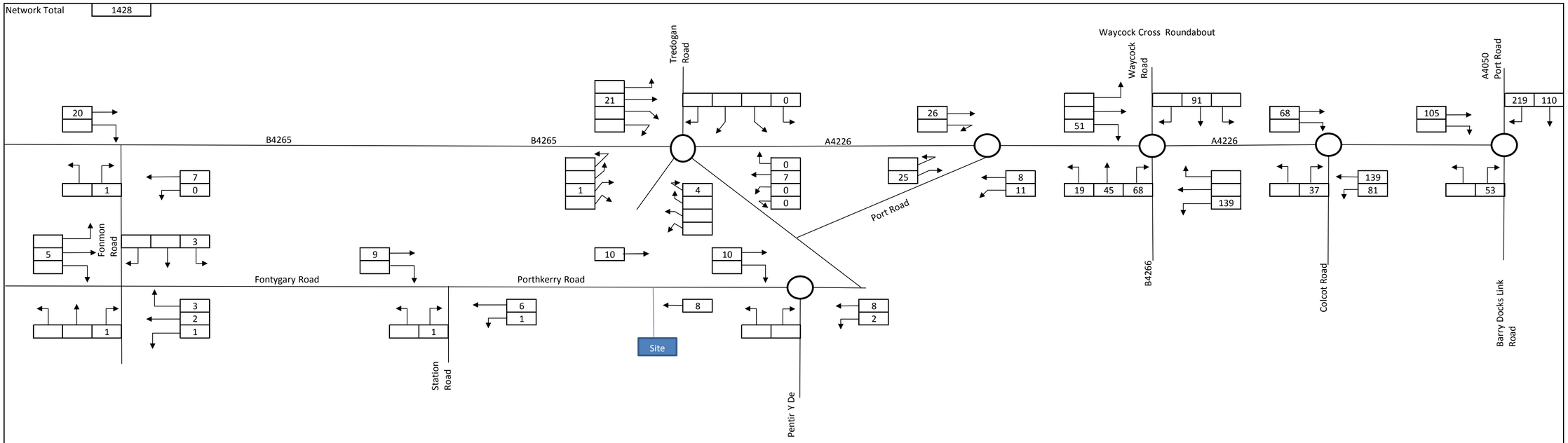

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Figure No. 3.9	Flow DiagramPM.xls	Client: South Wales Land Development	
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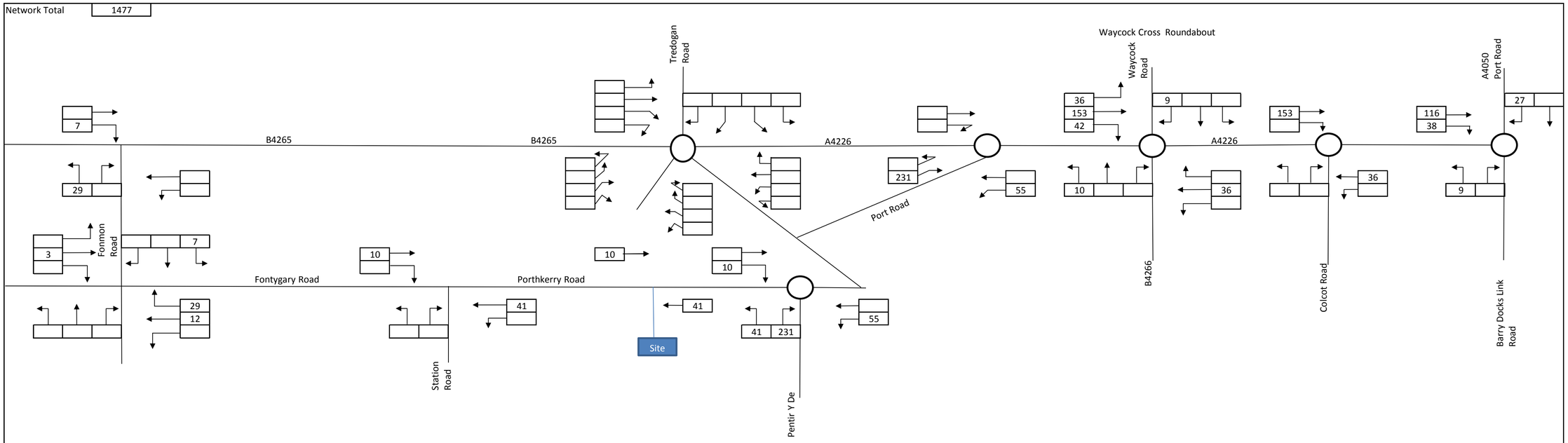

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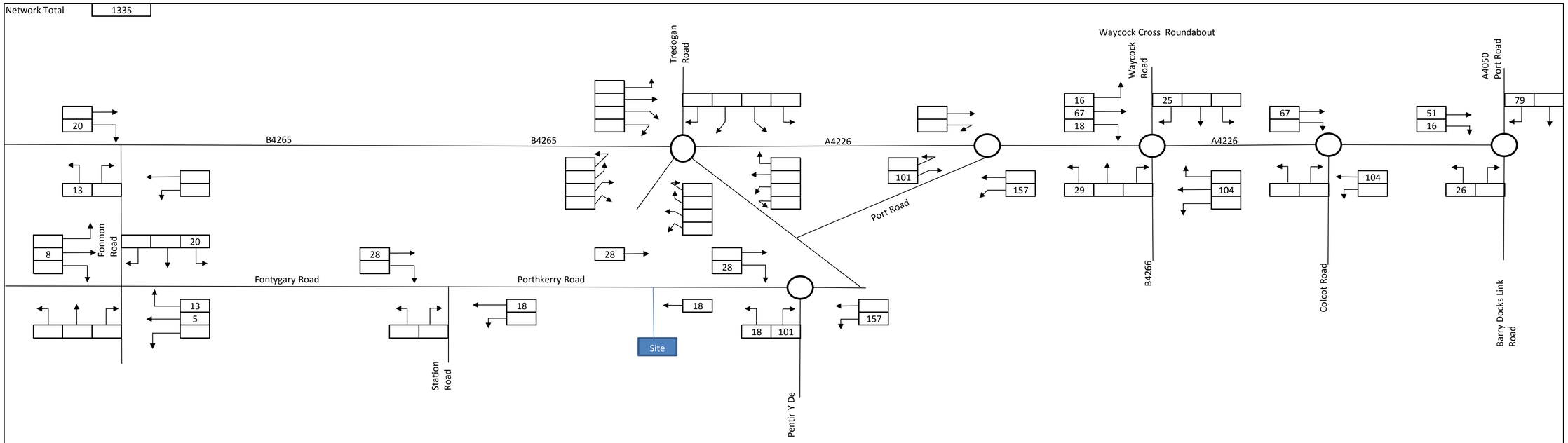
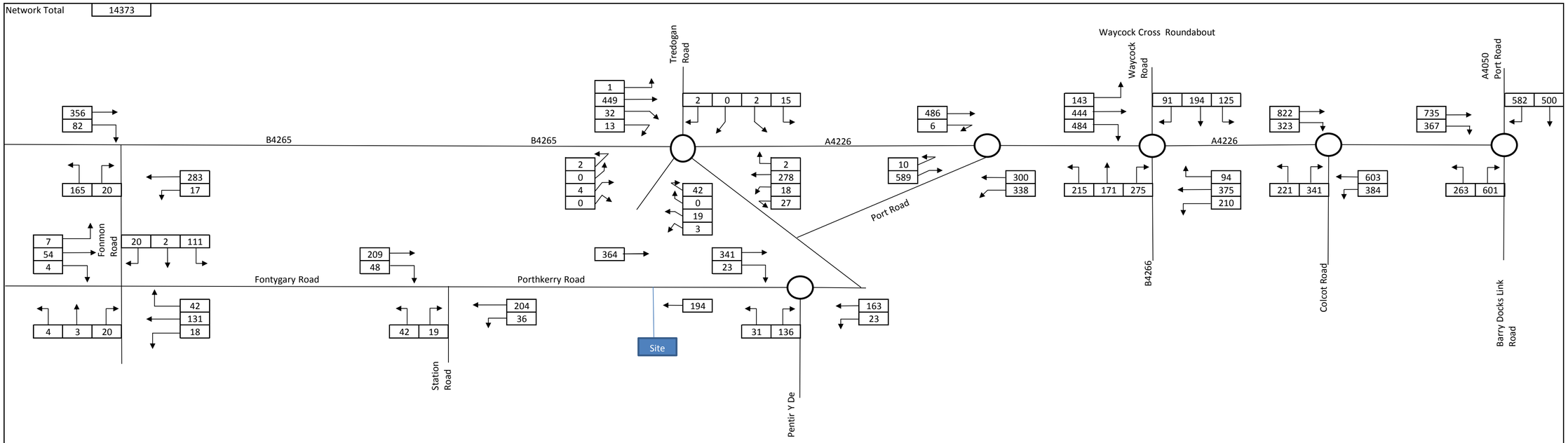
Figure No.: 3.10	Flow Diagram.xls	Client: South Wales Land Development	
15342		Title: Bellway / Persimmon Proposals Development Traffic AM (350 units)	Telephone: (029) 2038 4400 Facsimile: (029) 2038 4544



		Project: Porthkerry Road, Rhoose	Waterman Transport and Development 38 Cathedral Road Cardiff CF11 9LL
Figure No. 3.11	Flow DiagramPM.xls	Client: South Wales Land Development	
15342		Title: Bellway / Persimmon Proposals Development Traffic PM (350 units)	Telephone: (029) 2038 4400 Facsimile: (029) 2038 4544


Network Total
14373
Waycock Cross Roundabout
Tredogan Road
Waycock Road
A4050 Port Road
B4265
B4265
A4226
A4226
Port Road
Fonmon Road
Fontygary Road
Porthkerry Road
B4266
Colcot Road
Barry Docks Link Road
Station Road
Pentir Y De
Site
356
82
165
20
283
17
7
54
4
20
2
111
1
449
32
13
2
0
2
15
2
0
4
0
42
0
19
3
2
278
18
27
209
48
364
341
23
42
131
18
4
3
20
204
36
42
19
194
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484
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194
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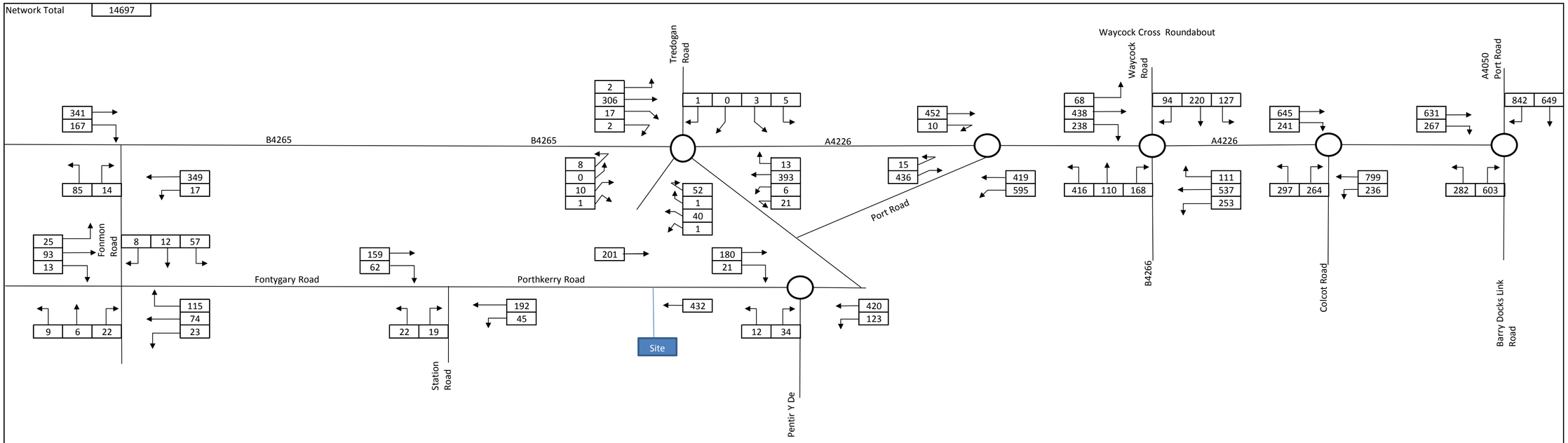
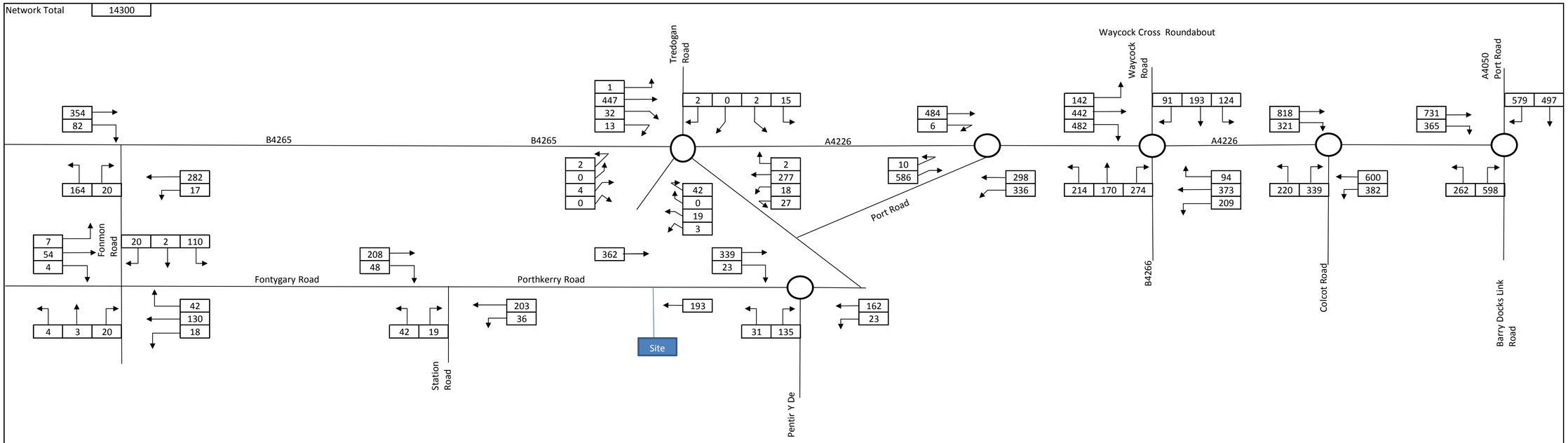
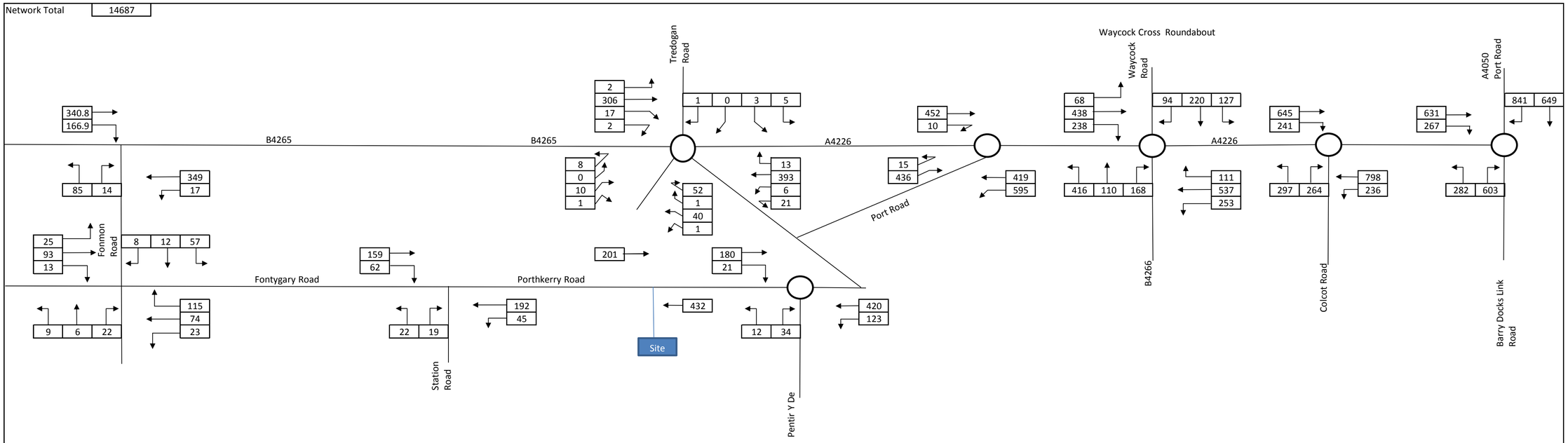
215
171
275
94
375
210
822
323
603
384
221
341
735
367
582
500
263
601
Project
Porthkerry Road, Rhoose
Figure No.
4.1
Flow Diagram.xls
Client
South Wales Land Development
15342
Title
2010 AM Base Traffic Flows
Waterman Transport and Development
38 Cathedral Road
Cardiff
CF11 9LL
Telephone: (029) 2038 4400
Facsimile: (029) 2038 4544



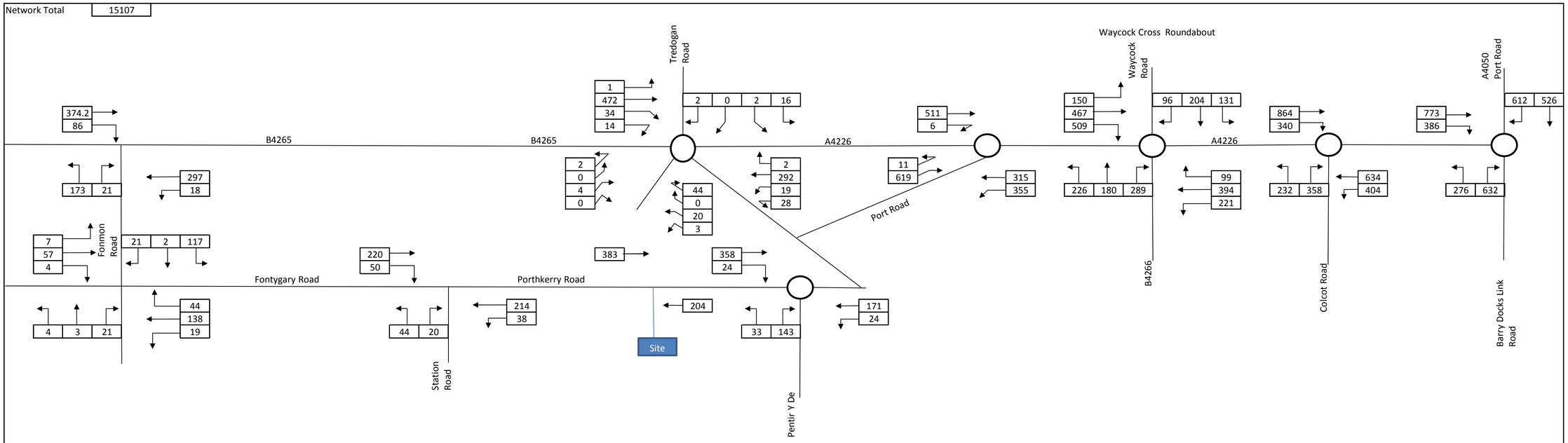
		Project: Porthkerry Road, Rhoose	Waterman Transport and Development 38 Cathedral Road Cardiff CF11 9LL
Figure No.: 4.2	Flow DiagramPM.xls	Client: South Wales Land Development	
15342		Title: 2010 PM Base Traffic Flows	Telephone: (029) 2038 4400 Facsimile: (029) 2038 4544



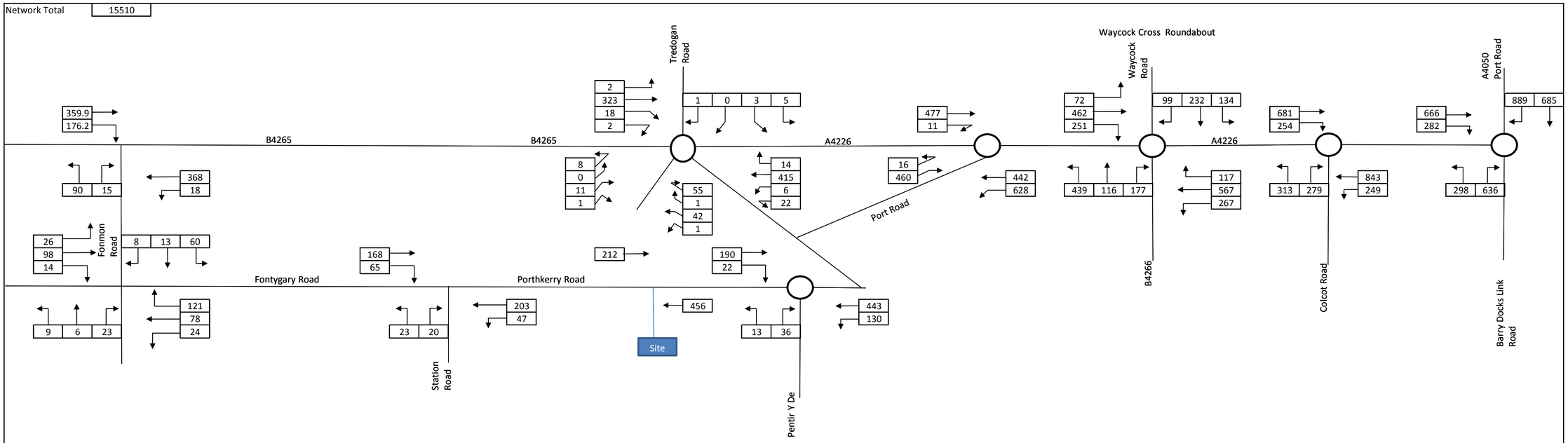
		Project: Porthkerry Road, Rhoose	Waterman Transport and Development 38 Cathedral Road Cardiff CF11 9LL
Figure No.: 4.3	Flow Diagram.xls	Client: South Wales Land Development	
15342		Title: 2014 AM Traffic Flows	Telephone: (029) 2038 4400 Facsimile: (029) 2038 4544



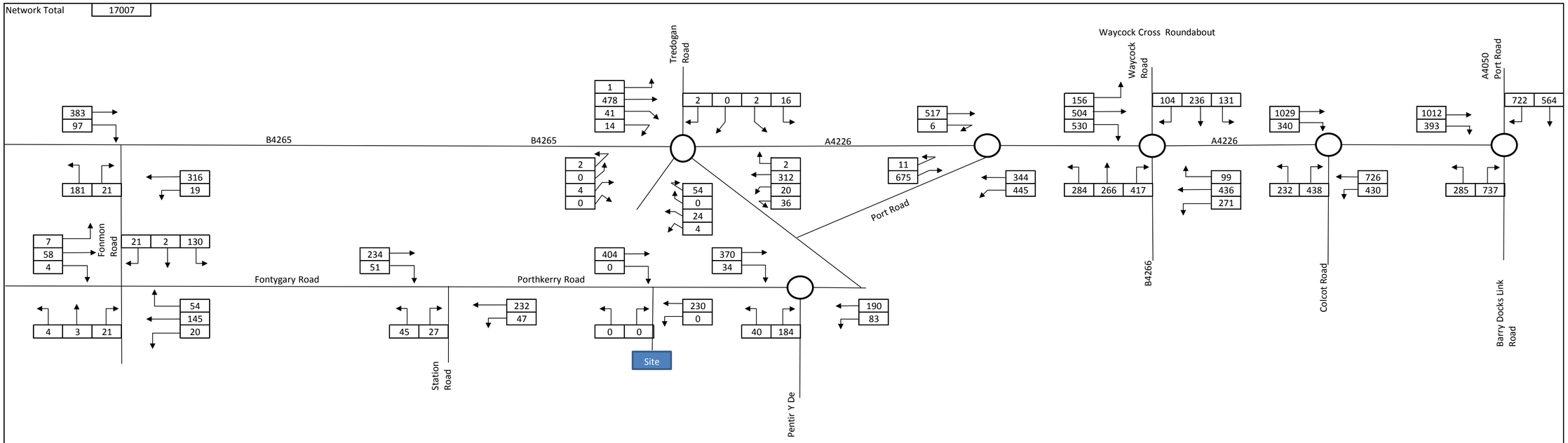
		Project: Porthkerry Road, Rhoose	Waterman Transport and Development 38 Cathedral Road Cardiff CF11 9LL
Figure No.: 4.4	Flow DiagramPM.xls	Client: South Wales Land Development	
15342		Title: 2014 PM Traffic Flows	Telephone: (029) 2038 4400 Facsimile: (029) 2038 4544



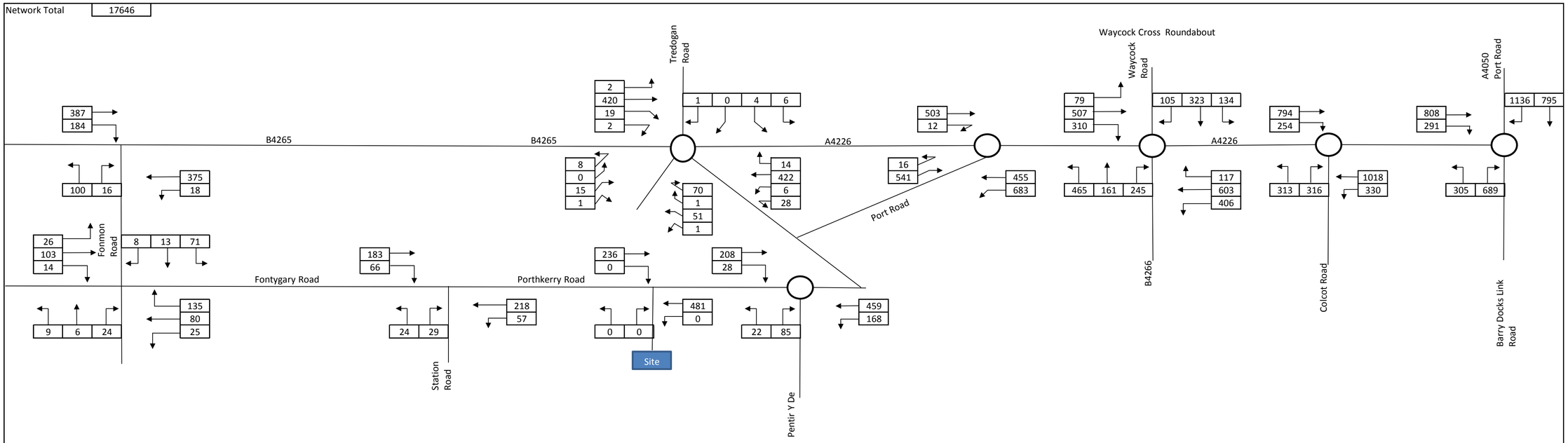
		Project: Porthkerry Road, Rhoose	Waterman Transport and Development 38 Cathedral Road Cardiff CF11 9LL Telephone: (029) 2038 4400 Facsimile: (029) 2038 4544
Figure No.: 6.1	Flow Diagram.xls	Client: South Wales Land Development	
15342		Title: 2019 Base AM Traffic Flows	



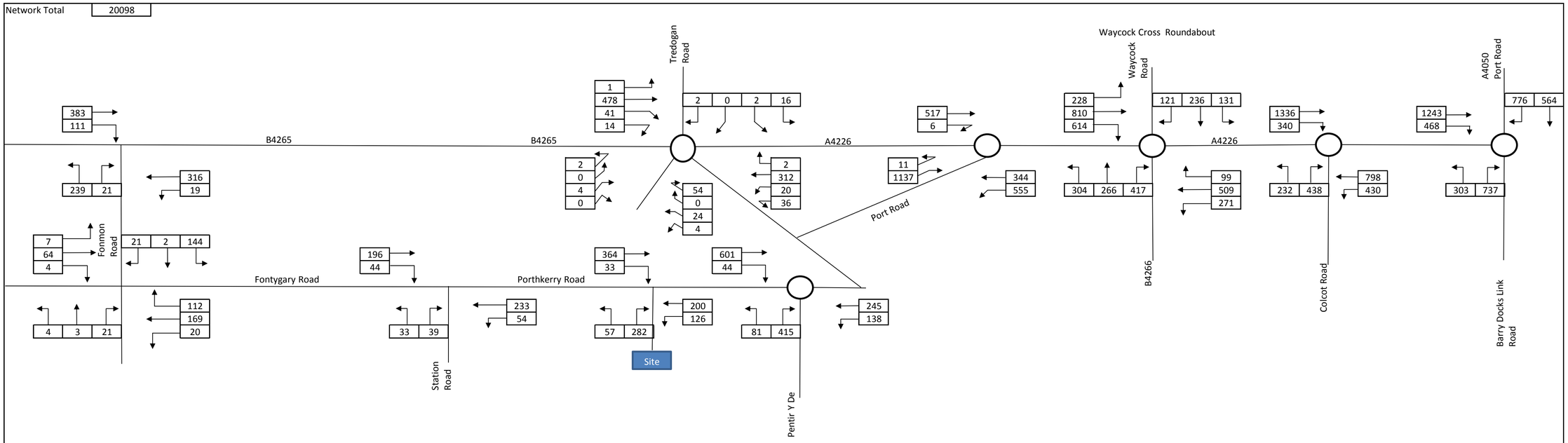
		Project: Porthkerry Road, Rhoose	Waterman Transport and Development 38 Cathedral Road Cardiff CF11 9LL
Figure No.: 6.2	Flow DiagramPM.xls	Client: South Wales Land Development	
15342		Title: 2019 Base PM Traffic Flows	Telephone: (029) 2038 4400 Facsimile: (029) 2038 4544



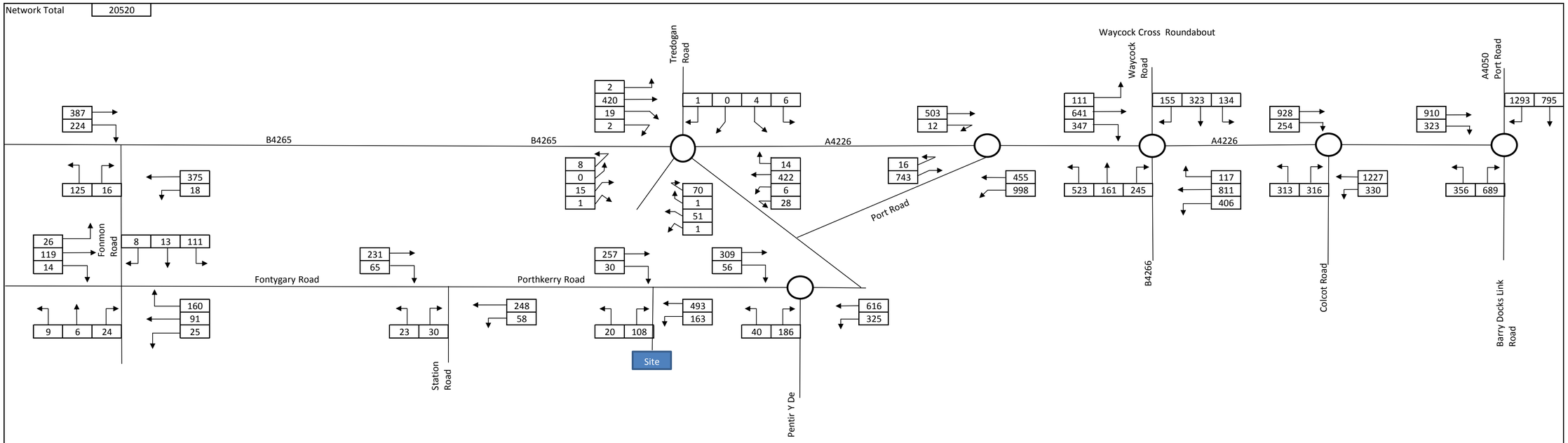
		Project: Porthkerry Road, Rhoose	Waterman Transport and Development 38 Cathedral Road Cardiff CF11 9LL Telephone: (029) 2038 4400 Facsimile: (029) 2038 4544
Figure No. 6.3	Flow Diagram.xls	Client: South Wales Land Development	
15342		Title: Forecast Year Without LDP Traffic Scenario - AM	



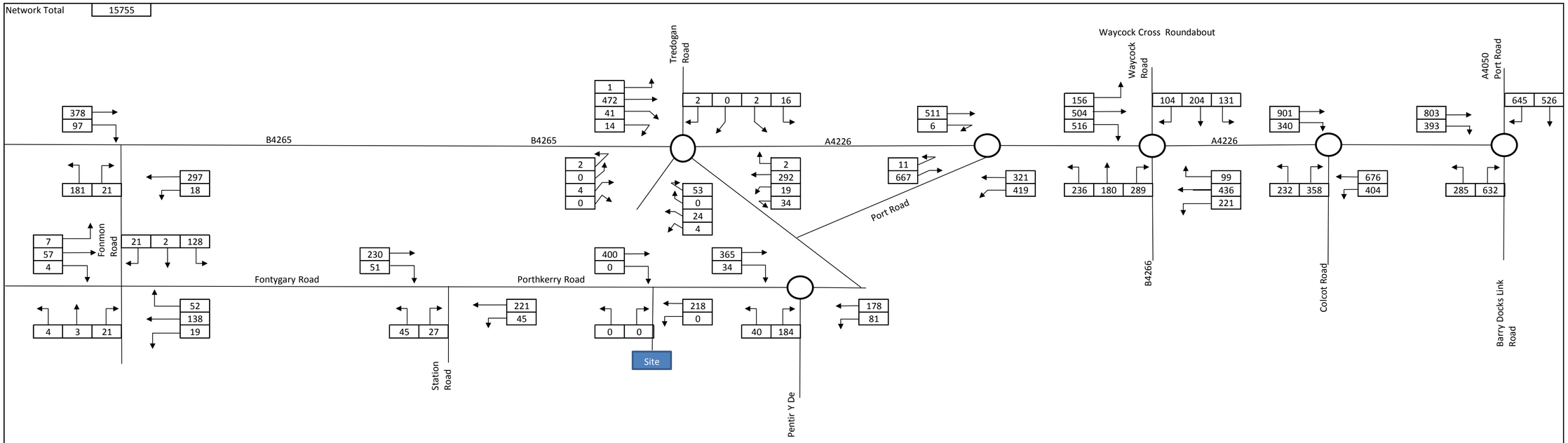
		Project: Porthkerry Road, Rhoose	Waterman Transport and Development 38 Cathedral Road Cardiff CF11 9LL
Figure No.: 6.4	Flow DiagramPM.xls	Client: South Wales Land Development	
15342		Title: Forecast Year Without LDP Traffic Scenario - PM	Telephone: (029) 2038 4400 Facsimile: (029) 2038 4544



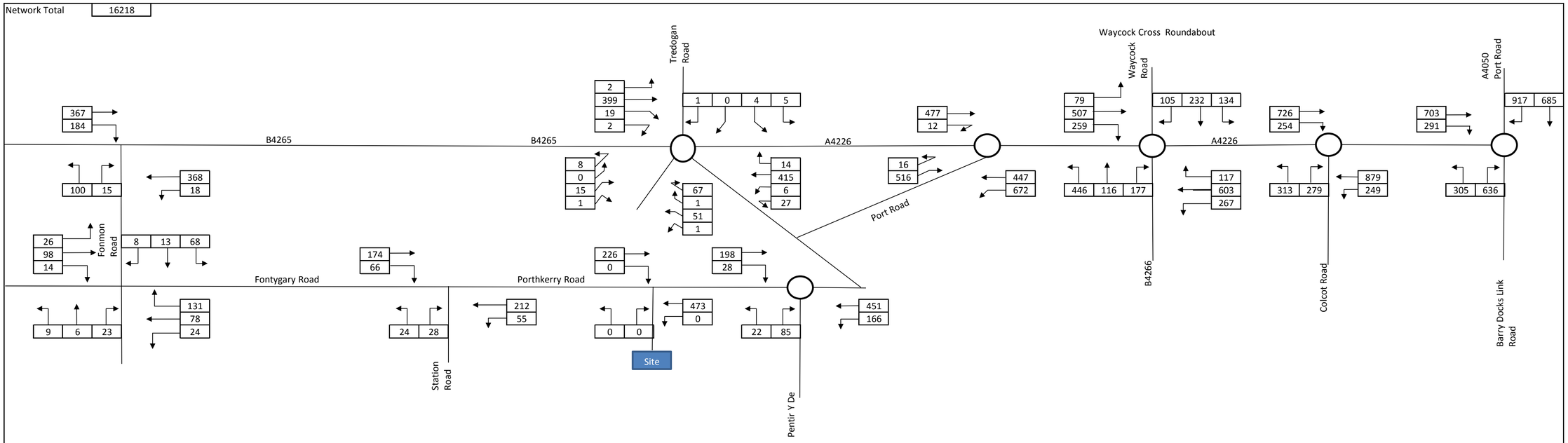
		Project: Porthkerry Road, Rhoose	Waterman Transport and Development 38 Cathedral Road Cardiff CF11 9LL Telephone: (029) 2038 4400 Facsimile: (029) 2038 4544
Figure No.: 6.5	Flow Diagram.xls	Client: South Wales Land Development	
15342		Title: Forecast Year With LDP Traffic Scenario AM	



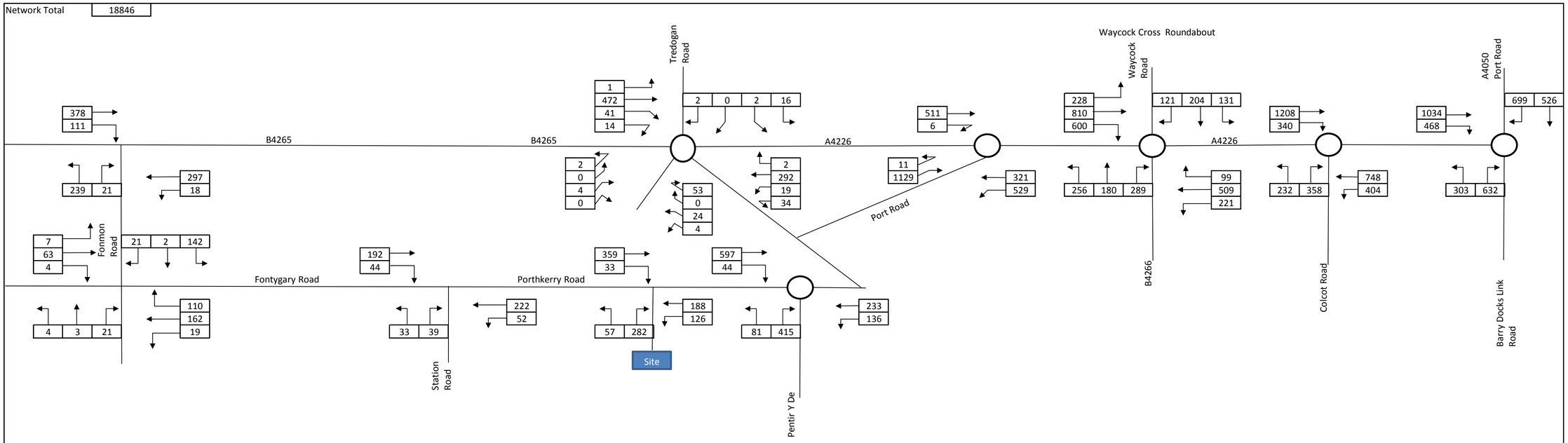
		Project: Porthkerry Road, Rhoose	Waterman Transport and Development 38 Cathedral Road Cardiff CF11 9LL Telephone: (029) 2038 4400 Facsimile: (029) 2038 4544
Figure No. 6.6	Flow DiagramPM.xls	Client: South Wales Land Development	
15342		Title: Forecast Year With LDP Traffic Scenario PM	



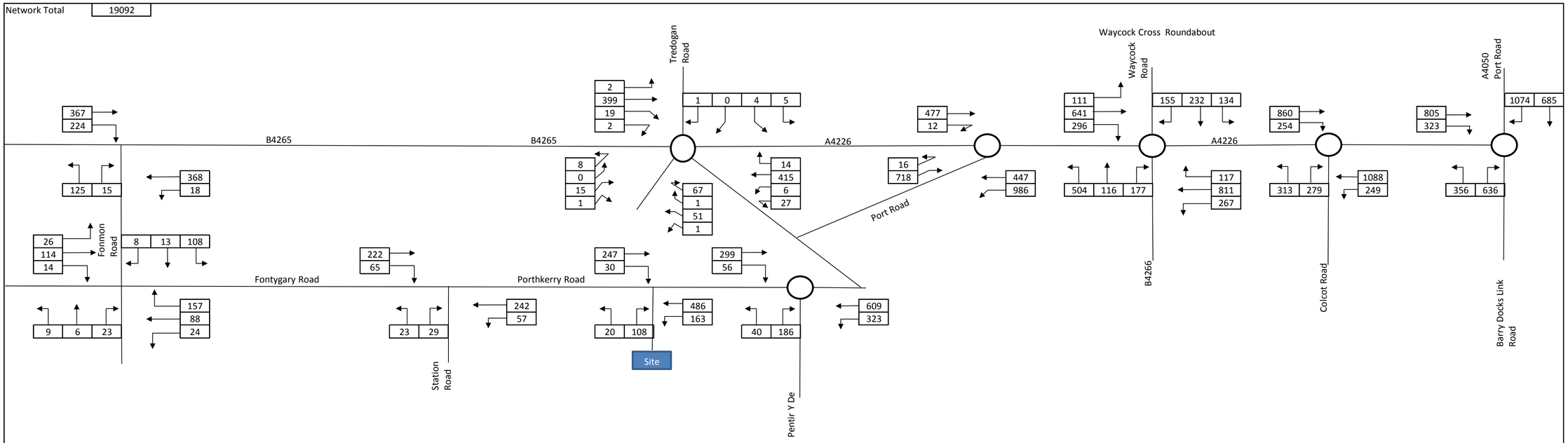
		Project: Porthkerry Road, Rhoose	Waterman Transport and Development 38 Cathedral Road Cardiff CF11 9LL Telephone: (029) 2038 4400 Facsimile: (029) 2038 4544
Figure No.: 6.7	Flow Diagram.xls	Client: South Wales Land Development	
15342		Title: Forecast Year Without LDP Traffic Scenario AM (Excluding Barry Waterfront Traffic)	



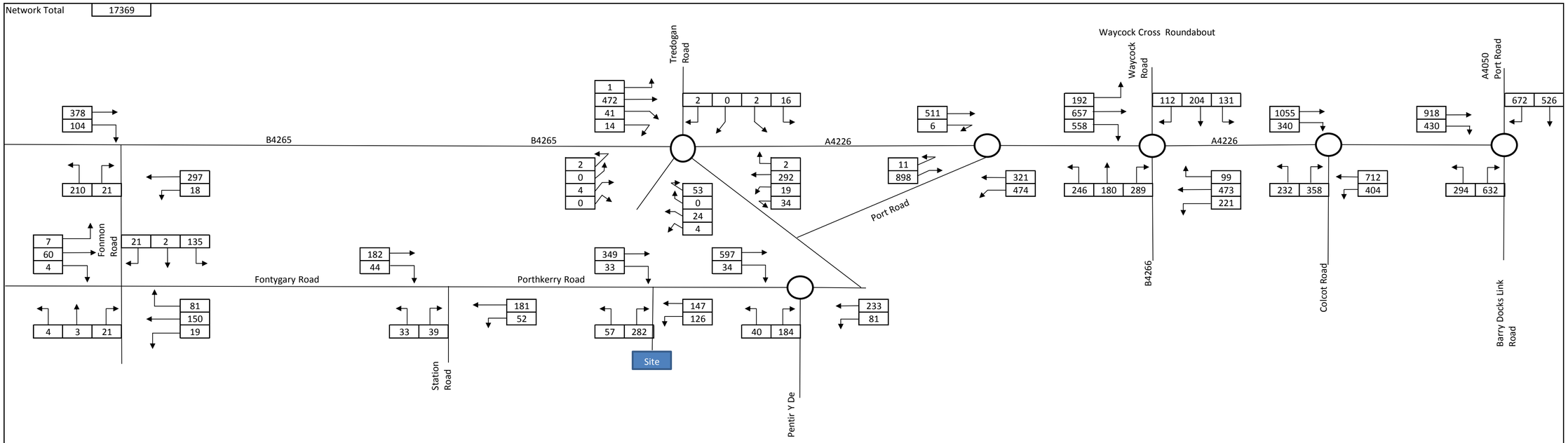
		Project: Porthkerry Road, Rhoose	Waterman Transport and Development 38 Cathedral Road Cardiff CF11 9LL Telephone: (029) 2038 4400 Facsimile: (029) 2038 4544
Figure No.: 6.8	Flow DiagramPM.xls	Client: South Wales Land Development	
15342		Title: Forecast Year Without LDP Traffic Scenario PM (Excluding Barry Waterfront Traffic)	



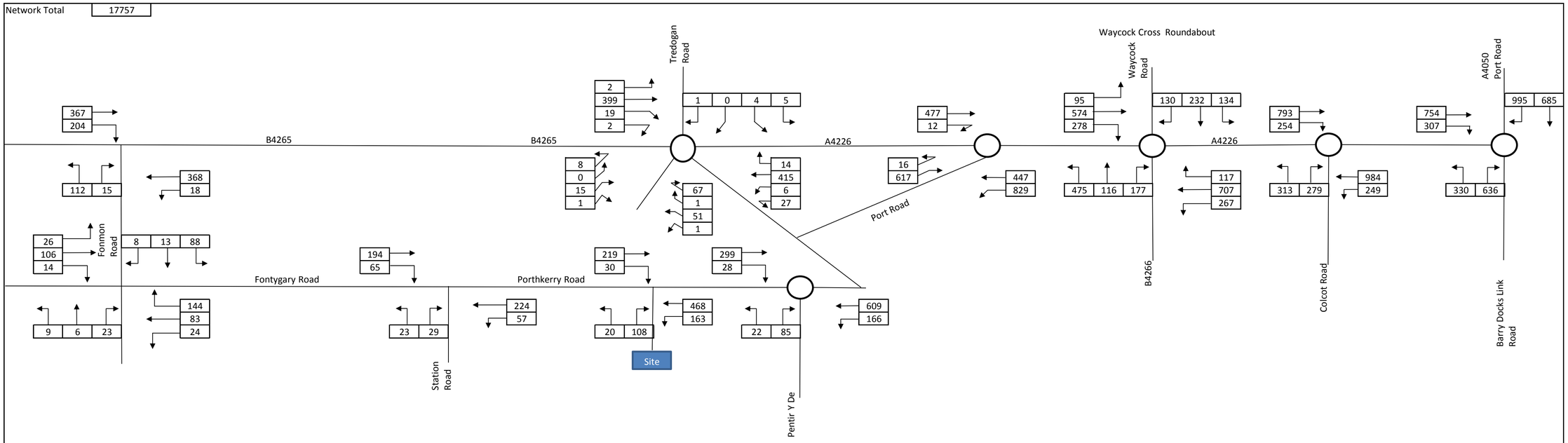
		Project: Porthkerry Road, Rhoose	Waterman Transport and Development 38 Cathedral Road Cardiff CF11 9LL Telephone: (029) 2038 4400 Facsimile: (029) 2038 4544
Figure No.: 6.9	Flow Diagram.xls	Client: South Wales Land Development	
15342		Title: Forecast Year With LDP Traffic Scenario AM (Excluding Barry Waterfront Traffic)	



		Project: Porthkerry Road, Rhoose	Waterman Transport and Development 38 Cathedral Road Cardiff CF11 9LL
Figure No.: 6.10	Flow DiagramPM.xls	Client: South Wales Land Development	
15342		Title: Forecast Year With LDP Traffic Scenario PM (Excluding Barry Waterfront Traffic)	Telephone: (029) 2038 4400 Facsimile: (029) 2038 4544



		Project: Porthkerry Road, Rhoose	Waterman Transport and Development 38 Cathedral Road Cardiff CF11 9LL
Figure No.: 6.11	Flow Diagram.xls	Client: South Wales Land Development	
15342		Title: Forecast Year With Development Traffic Scenario AM (Excluding Barry Waterfront and Bellway / Persimmon Proposals Traffic)	Telephone: (029) 2038 4400 Facsimile: (029) 2038 4544



		Project: Porthkerry Road, Rhoose	Waterman Transport and Development 38 Cathedral Road Cardiff CF11 9LL
Figure No.: 6.12	Flow DiagramPM.xls	Client: South Wales Land Development	
15342		Title: Forecast Year With Development Traffic Scenario PM (Excluding Barry Waterfront and Bellway / Persimmon Proposals Traffic)	Telephone: (029) 2038 4400 Facsimile: (029) 2038 4544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