

# WEST WALES PARKWAY STATION

## A SCOPING STUDY FOR THE OFFICE OF THE SECRETARY OF STATE FOR WALES



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## **EXECUTIVE SUMMARY: WEST WALES / SWANSEA NORTH PARKWAY STATION**

(References in brackets refer to the main report)

### **Swansea's second railway station on the Swansea District Line**

The Swansea District Line (SDL) runs north of Swansea, between two junctions on the South Wales Main Line between Llanelli and Briton Ferry thus travellers avoid the longer journey via Swansea Central (High Street) station. (*Fig 1a, 1.6, 9.4*)

The proposed West Wales / Swansea North Parkway Station, located at the former Felindre Tinsplate Works conveniently connects passenger trains and the M4 Motorway / A48 at Junction 46 (*Figs 4b, 9d, 9e, 9.4*).

### **Capacity** (*9.1, 9.3, Fig 9a*)

The SDL is of passenger operational standard so no major track investment is required. It currently has four passenger trains daily and several freight paths. There is sufficient capacity for an hourly service or a half – hourly service, timetabled with other services on the South Wales Main Line and platform accommodation at Cardiff Central.

### **Cost Estimate: Station and Trains** (*8.1, 8.2*)

The site is a Welsh Government / City and County of Swansea joint venture.

- Capital cost: £20m for a new station, track and signalling works, car park surfacing and land purchase if required. A 500 space car park is proposed requiring between 2.3 and 3.3 acres. Land value £150,000 per acre.
- Trains cost: £3m each. Additional trains: hourly service 3/4 trains (£9m – £12m); half hourly service 6/8 trains (£18 - £24m).
- Annual subsidy cost: £1.5 – £2.0m.

Further modelling work is required on demand and modal transfer.

### **Journey Time Savings** (*2.2*)

Journey time (predictable if services are reliable) is a key factor in modal choice. Between Carmarthen and Cardiff journeys by car vary between 85 and 100 minutes; by train via Swansea Central Station 106 minute while via the Swansea District Line the estimated 92 minutes is a **saving of 14 minutes** – the shortest predictable journey with a possible further reduction to 84 minutes. Travellers may then choose a relaxing journey or beginning work an hour earlier.

### **Frequency** (*4.6*)

This report argues that an hourly train service frequency is the minimum required for the West Wales / Swansea North Parkway Station (with a half – hourly frequency preferred) to make this a successful, attractive passenger service

In the Swansea context, **Gowerton** station reflects the research findings of higher daily frequency (54 trains) daily, seat availability, timekeeping (giving predictable journey time) and reliability resulting in doubling passenger numbers from 84,000 (2012 – 13) to 167,000 (2016 – 17)

The provision of a two-hourly frequency has not been successful at other P&R stations in the past. Stopping trains at two hourly intervals at Baglan, Llansamlet and Skewen led to the *Swanline* commuter service being ineffective. Demand on many rural lines has similarly been limited. (Figs 4e. 4f. 4g)

### **Markets Served (4.1 – 4.3)**

Based on modal change criteria, there would appear to be suppressed rail passenger demand west of Swansea. Most car users base travel decisions on time not distance thus giving a 30 – 45 miles distant catchment area along the M4. Swansea's northern and western suburbs (e.g. Morriston, Gorseinon) would have more convenient railway station to serve local residents and business. This avoids travelling to / from Swansea Central station on peak time congested roads. Several new Swansea bus routes creating a sustainable public transport network to the Parkway could later become a light rail / tram-train operation.

No significant percentage reduction in passenger numbers is likely for Swansea Central or Neath stations. Carmarthen, Burry Port, Llanelli and Port Talbot stations are likely to see passenger numbers improve following increased frequency.

### **Serving rural areas in the Swansea Bay City Region (5.1 – 5.6)**

Rural area transport projects rarely achieve an acceptable BCR with over dependence on the Economic Case deemed unfair. Strategic goals should be the primary element and the Strategic Outline Business Case is more appropriate for decision making.

The West Wales / Swansea North Parkway can meet those socio-economic criteria providing sustainable employment opportunities in Wales' cities for people living in rural locations and market towns. The proposed services can provide viable and sustainable forms of connectivity for people living in rural south west Wales and help overcome rural depopulation, particularly of working age people.

### **Lessons from Borders Railway – Tweedbank (4.11)**

In September 2015. Transport Scotland re-opened the 40 – mile long Borders Railway between Edinburgh and Galashiels/Tweedbank, Midlothian, the origin of most passengers and where the population per hectare and its distribution is similar to Carmarthenshire and Pembrokeshire

The rationale of car commuters into Edinburgh CBD was the easier / shorter overall journey time into Edinburgh compared with travel by car and a guaranteed park and

ride capacity following a doubling of car parking spaces because of the growth. First year passenger demand for Tweedbank park and ride station was estimated at 22,000 annually; the actual was 300,000; the Line figures were 647,000 passengers predicted; compared with 1,228,000 actual passengers. The Transport Scotland report's cautionary comment below might be relevant in the evaluation context of the West Wales / Swansea North Parkway and the Carmarthen – Cardiff service via the SDL demand.

*“The core Benefit Cost Ratio (BCR) was about 0.6. [This would normally have led to the scheme being rejected.] Wider economic benefits that can't be fully quantified but would come from a railway line of that nature increased that BCR. Strategic objectives progressed the scheme to link up a low-wage, less successful part of Scotland to a very fast-growing, successful, high-wage city in Edinburgh”.*

There was a significant modal shift from the car to public transport, with 57% of users previously making their trip by another mode (2017) with 40,000 saved car journeys. The railway is enabling people to make new journeys (36% of passengers) and take up (particularly leisure) opportunities which they previously could not access.

#### **Parkway Stations Passenger Growth (4.11)**

The report considered passenger growth at five stations with similar characteristics to West Wales / Swansea North Parkway Station, concluding that:

- Parkway stations have all been successful in attracting car using passengers
- The station and car park should be adjacent
- The most likely to be successful are on journeys of one hour or over
- Motorway traffic congestion along the traveller's proposed route is a factor
- The annual growth rate of 3.5% appears to be consistent. There has also been an immediate demand following the opening of a P&R or Parkway station at other locations.

#### **Alternative Locations**

These have been suggested at locations on the M4 / SWML at Baglan; at Coed Darcy (J33) and at Llansamlet (J44) which may serve the SDL and the SWML. Landore (on the SWML) with diversion of some bus services into the P&R and a direct competitor for and threat to Swansea Central (High Street) station. All are of less benefit to south west Wales as:

- they lie within the peak period congestion areas on the M4 or radial routes between the M4 and Swansea
- they are not as closely aligned to the M4 and the railway



## **Overall Comment – West Wales / Swansea North Parkway Station on the Swansea District Line**

The West Wales / Swansea North Parkway Station proposal fits the above Parkway station success criteria. It also provides Swansea, Wales's second city, with a second station serving the north and west areas of the city and more conveniently situated than Swansea Central station. The impact on Swansea Central passenger numbers is small in percentage terms (see section 7.1).

## **The Prospectus**

The Prospectus will examine the case for a West Wales/Swansea North Parkway station on the Swansea District Line, with specific analysis covering the headings below

### **1 INTRODUCTION**

#### **1.1 Areas of Analysis**

- The journey time savings that services could deliver between Carmarthen and Cardiff, calling at the West Wales/Swansea North Parkway station rather than Swansea Central Station. This station would be located on the Swansea District Line (SDL).
- The economic benefits of those journey time savings.
- The increase in demand for rail services that the West Wales/Swansea North Parkway station would create and the economic impacts of this increased demand.
- The potential reduction in traffic on the M4 east of the West Wales/Swansea North Parkway station location that would result from rail users choosing to use the West Wales/Swansea North Parkway station rather than Neath or Port Talbot.
- The impact of the West Wales/Swansea North Parkway station on passenger numbers at nearby stations including Swansea Central, Neath and Port Talbot Parkway.
- The cost of the station development.
- Example service specifications for additional rail services that would be needed to run through the station including an assessment of costs.

The Felindre site is to be developed as a business park and for housing (see section 4.7 for full housing plans). It is possible that a modern station could be self-funded through Section 106 arrangements.

#### **1.2 A new vision for train services in south west Wales - passenger demand opportunities**

This report proposes additional services via the Swansea District Line (SDL) to serve north Swansea, Carmarthenshire, Pembrokeshire, and parts of Neath with a custom built P&R facility, serviced by at least one extra train per hour. Alternatives are suggested via Swansea Central station or via the Landore Loop with a journey time penalty when compared with the SDL route.

Train services into Swansea Central from west Wales could achieve two tph to / from Carmarthen. Between Carmarthen and Cardiff the service could increase to three / four tph, one / two along the currently underused Swansea District Line (SDL) and the lower section of the Heart of Wales Line – planned in 1913 by the GWR to be a fast route for trans-Atlantic passengers from Neyland.

### **1.3 Policy Areas supported by this study**

Improved public transport contributes to several policy areas in South West Wales.

- To improve connectivity between south west Wales (Swansea, Carmarthenshire, Pembrokeshire, south Ceredigion) and Cardiff / London / other major cities through working with rail franchise holders.
- To use rail service improvements as one catalyst to enhance the economy of south west Wales
- A particular policy area relates to the development elsewhere of ‘back office services’ at Swansea north for the world’s largest financial centre – the City of London
- Through this rationale provide a rail service with frequency, reliability and journey time able to support the development of a West Wales / Swansea North Parkway at Felindre on the SDL, reduce journey times between south west Wales and London, and provide Swansea with a second station to the north of the city and on the M4 motorway.
- Reduction in road traffic particularly where there are high levels of congestion especially in peak periods. These peaks may be time of day but in Carmarthenshire may equally be at weekends and during the summer period as the county is an important tourism destination and through route to south west Wales.
- Economic regeneration which invariably has transport within the top four factors used by inward investors’ decisions on location.

### **1.4 West Wales/Swansea North Parkway - Station Development Rationale**

This is a new station proposed on the Swansea District Line

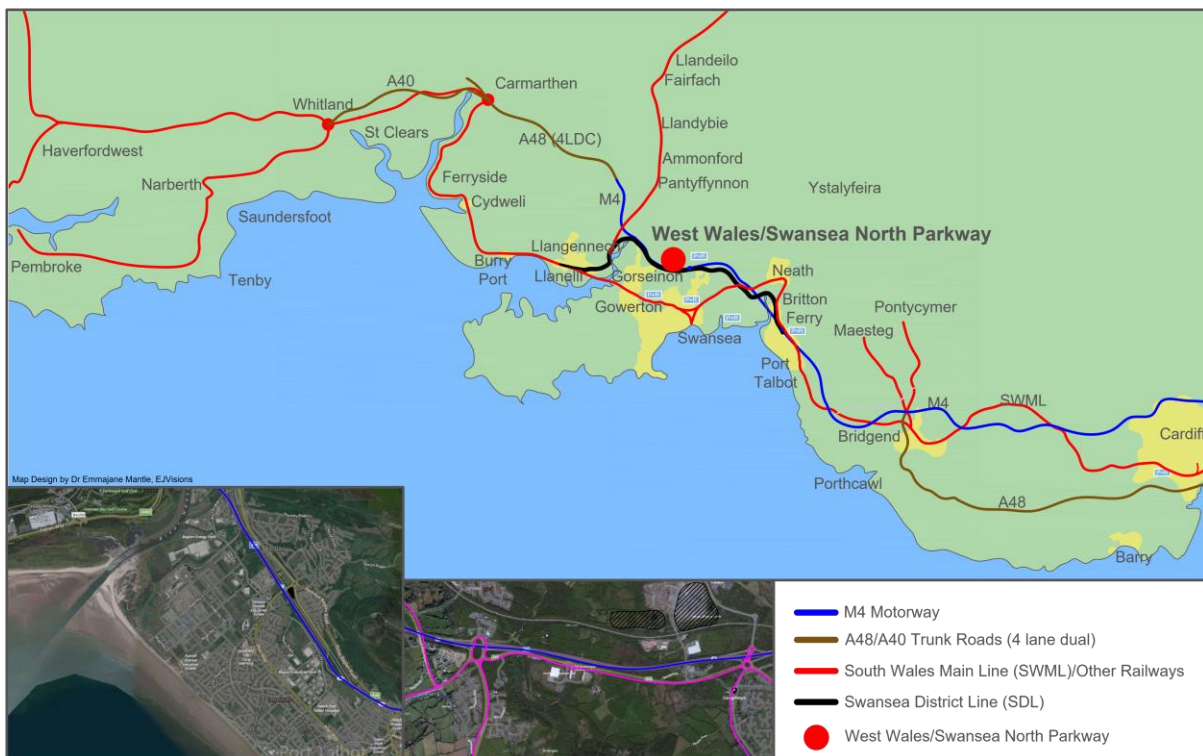
### **1.5 Swansea District Line (SDL) – History**

This was built in 1913 to facilitate a fast route to Carmarthenshire, Pembrokeshire and the Great Western Railway Company’s docks at Neyland. The GWR envisaged direct trains from London to transatlantic steamers at the Neyland docks for passengers en route to the United States; it also had aspirations to repeat the financial successes of the Devon and Cornish Riviera in the Pembrokeshire Riviera. Local stations existed at Llangyfelach and Pontlliw (1923) but closed a year later. The 1923 ABC Railway Guide shows ‘about 4 trains daily’ from Pontlliw to London.

## 1.6 Location of the SDL

Travelling westbound the line diverts from the South Wales Main Line (SWML) at Court Sart junction north of Britton Ferry Station and runs through the north Swansea suburbs, under the SWML and running adjacent to the Velindre Tinplate Works site and J46 on the M4; joining the Heart of Wales Line at Morlais Junction running south through Llangennech to join the SWML east of Llanelli adjacent to the Trostre Tinplate Works.

Fig 1a Study Area Map – Railways and Primary Roads



## **2 JOURNEY TIME SAVINGS**

### **2.1 Introduction – current/future operations**

Rail journey times between south west Wales and Cardiff / London are extended because rail services operate through Swansea (Central) Station – a terminus station. As a result this takes additional time compared with services travelling on Swansea District Line.

Journey times between Carmarthen and Cardiff using the Swansea District Line (SDL) are estimated to reduce by 12-14 minutes. The development of a bus interchange alongside the park and ride facility opens up a further market.

Further track investment into the SDL is not included in this report.

Further journey time savings could be achieved through increased line speeds between Swansea and Cardiff along several long sections of track from 75 mph to 90 mph, although this work is not included in Network Rail's investment plans for the period 2019 – 2024 (CP 6).

(Note in this study the existing Swansea station, previously called Swansea High Street, is referred to as Swansea Central).

### **2.2 Passenger benefits – Journey time savings**

There are overall journey time benefits for rail travellers between west Wales and Cardiff resulting from avoiding travelling into/out of Swansea Central Station.

For many travellers from west Wales to Cardiff and into England, the journey via Swansea Central Station is not the most convenient. Further there is no clear evidence that those train travellers bring added expenditure to Swansea's Central Business District. At peak times road congestion on routes into Swansea can result in low slow journey speeds and increased journey times between Gorseinon / Morriston / Treboeth and Swansea Central Station.

For passengers travelling by rail between West Wales/Swansea North Parkway Station and Cardiff Central, the estimated journey time would be approximately 58 minutes (with stops at Port Talbot and Bridgend).

A car journey along the M4 from Carmarthen to Cardiff could take 85 minutes at peak times (and the unpredictable speeds could increase that to 100 minutes). Slow moving traffic now extends as far west as M4 junction 46 (Llangyfelach) through to J40 Taibach. This generally occurs eastbound in the morning peak and westbound in the evening peak.

A reduction in car travellers on this section of the M4 between Felindre and Cardiff city centre will improve congestion and air quality levels and could reduce an individual's car use by 88 miles per day (440 for a 5-day working week; 19,800 miles for a 45-week working year and consequent reduction in car maintenance costs).

Many of the passengers benefiting from West Wales/Swansea North Parkway Station would be residents of north Swansea and the Swansea Valley who might currently make train journeys via Swansea Central station. A journey time saving of approximately 25 minutes for Swansea Central users including travelling time into Swansea Central Business District (CBD) and parking time.

Many of the benefits therefore apply to Swansea residents from a wide area such as north west Swansea currently using Carmarthen Road (A484, A483), Pontardawe / Swansea Valley roads (A4067, A4217) and Pontarddulais roads (A48).

Table 2a Journey Time savings Carmarthen-Cardiff (peak)

<b>Carmarthen – Cardiff (peak travel am/pm)</b>		
<b>Route</b>	<b>Journey time Minutes</b>	<b>Minutes saved via SDL @ 50 mph</b>
Road (M4) (1)	85/100	-7 / + 8
Rail (via Landore loop)	101	+ 9
Rail (via Swansea High Street Station (current) (2)	106	+ 14
Rail (via SDL; 50 mph) (2)	92	-
Rail (via SDL; up to 70 mph (3)	Down to 84	Up to 22

Notes:

(1) County Hall and City Hall were taken as neutral buildings of origin and destination for road journeys;

(2) Timings based on the working timetable for the SDL;

(3) Operations using faster rolling stock (not Class 150) – e.g. Class 158/175/CAF trains could reduce the journey time by up to a further 8 minutes using the current track (excepting station track work included in the station cost estimate.

A review of the current maximum speed on the existing SDL infrastructure should be undertaken by Network Rail to establish whether a higher speed limit and therefore further journey time savings could be achieved It has been suggested that the maximum operating speed was set when the line was intended primarily for freight traffic and could be increased to up to 70 mph with no infrastructure investment.

The timings shown are typical times but the range of existing timings depends on the number of station calls. For example, the journey time between Carmarthen and Cardiff Central is most frequently 106/107 minutes but due to the variable nature of the journey time it can be 112 minutes and higher on an all stations train.

The same journey via the SDL, with limited stops and the existing maximum speed limit is 92 minutes. The existing services (except two) between Carmarthenshire and Cardiff operate via Swansea Central Station. There is no suggestion that the current frequency of 1 / 2 tph should be reduced. This proposal envisages an hourly or half hourly frequency (see section 9.1) via the SDL.

### **2.3 Development of Increased Frequency Service to / From Carmarthenshire (Via Landore Loop)**

The median time taken to enter and exit Swansea Station is four minutes. There would appear to be little benefit other than a slightly shorter journey time (by 4 / 5 minutes) when using the Landor Loop avoiding Swansea Central.

However, potential congestion at Swansea Central Station at certain times of day makes the Landore Loop option one to be considered if additional trains are to be operated.

The time saving however compares unfavourably with the other option avoiding Swansea Central Station – that of using the SDL.

### **2.4 Development of Increased Frequency Service to / From Carmarthenshire (Via Swansea Central Station) via the SDL**

An alternative is to operate any additional services via Swansea Central. This will achieve the increase in frequency suggested in this report and will increase access to Swansea city centre.

However it does not address the journey time benefits also sought for south west Wales (see Table 1). With a through journey entering and exiting Swansea High Street, a train effectively uses two train paths on the approach. Therefore, it will increase train numbers serving Swansea station which already has a platform capacity shortage at certain times of day, when trains have to be timetabled to share a platform. This is particularly the case for trains to/from West Wales. Two extra tph in the station in order to improve the service westwards will add to the capacity challenge at Swansea Central Station. This is a part of the rationale behind the SDL proposal.

### **3 ECONOMIC BENEFITS OF JOURNEY TIME SAVINGS**

#### **3.1 Need to serve less densely populated areas**

Densely populated areas (Cardiff, Newport, and Swansea) are in general well served by public transport between 0700 and 1800 and with limited frequency in the weekday/Saturday evenings and on Sunday.

Smaller towns adjacent to rural or semi-rural areas may be similarly served (e.g. Llanelli, Carmarthen, and Haverfordwest) though with possibly less frequency.

A strategic approach to rural rail services should be considered as levels of passenger numbers and socio – economic objectives can be quite different to urban towns and cities.

Although some (though not all) trains operating in south west Wales will be brand new the train service has not, at this stage, received any service frequency increase in the 2018 - 2033 Wales and Borders rail franchise.

Track doubling between Cockett and Llanelli (Llandeilo Junction) has certainly increased service reliability and has enabled a more visionary rail strategy to be considered along the South Wales Main Line (SWML) or the SDL.

Where a benefit cost ratio (BCR) of 2:1 (or even 1.5:1) has been seen as acceptable for urban and major interurban rail projects a BCR of 0.5:1 might be seen as more acceptable for a development such as the SDL and the train frequency implications in Carmarthenshire and Pembrokeshire.

The BCR for the Borders Railway was 0.6:1. (see Section 4.11). The scheme was approved on a strategic basis with a reasonable positive BCR. This same approach should be taken on this scheme.

#### **3.2 Costs and Benefits of the SDL Railway Service**

**The elements which should be used in calculating the BCR of re-opening the SDL to regular rail passenger traffic are**

1. Capital cost increase (-)  
infrastructure enhancement (stations, track, bridges, signalling) at Felindre (West Wales/Swansea North Parkway).  
Additional CAF rolling stock.  
Depreciation costs (dependent on alternative rolling stock use)
2. Operating cost increase (-).  
Labour costs  
Fuel costs  
Maintenance costs
3. Reduced income on alternative rail services via Swansea central (-) but reduced platform congestion at those stations (+)



4. Increased cost of additional subsidy from TfW to fund extra train services (-)
5. Increased income to TfW from new or diverted passengers (+)
6. Connecting services (+) (if TrawsCymru connecting services expand passenger demand)
7. Benefits in journey times (+). Car users whose journey time is reduced by transfer to rail services via SDL
8. Journey time reductions (+) where train journeys via SDL will usually be shorter than travelling via Swansea Central between Cardiff and Carmarthenshire
9. Additional journeys made (+) (i.e. increased mobility by individuals; increased use of services westbound from Bridgend/Port Talbot) given the faster journey times
10. Reduced car operating costs (+) from journeys transferred from/to train
11. Reduced road congestion costs (+) from increased passenger flows by train.
12. Reduced road accident costs (+) from decreased traffic flows.
13. Reduced road maintenance costs (+) following modal shift to the SDL rail service.
14. Additional public transport resource costs (-) where new bus services are introduced to the rail interchange at West Wales/Swansea North Parkway.
15. Increased output or GDP per head from employment opportunities (+)
16. Environmental implications. The reduced traffic flow will have a positive effect on the urban and rural environment with reduced noise, pedestrian-vehicle conflict and improved air quality (+).

The (+) represents a benefit. The (-) represents a disbenefit.

## Notes

### 3.3 Calculating the value of time savings

A money value is put on time savings in order to compare these with construction costs and accident and vehicle operating cost savings on an adjacent road route.

Travel time is distinguished between 'in-work' time and 'non-working' time, which includes leisure, education (except on courses in company time) shopping and journeys to and from work. Working time is valued on the basis of wages paid to the travelling employee, because the value of the output produced in working time must

be at least equal to the labour hire cost to the employer. It assumes that savings in work travel time can be used for the production of output by the employee.

This is the resource value of the time savings and is also taken to be the behavioural value perceived by the employee. The cost to the employer is given by the gross wage rate, plus on costs for that type of labour. Wage rate data is derived from the National Earnings Survey and the National Travel Survey. These values are estimated for different types of vehicle occupant, weighted to take account of the variation in mileage travelled by workers with different incomes.

Non-work time normally has no direct market value and so has been derived from studies of how people choose to travel when faced with a choice between a slow, cheap mode and a fast, expensive mode or between a short, expensive car route (such as over a tolled bridge) and a long, cheaper car route. These suggest that on average, in-vehicle non-working time is valued at 25 per cent of gross hourly wages.

These figures will vary from year to year and are related to the levels of personal income, and growth is at the same rate as GDP.

A final assumption is that travellers do no productive work during travel (except transport workers on duty). This is a debatable assumption particularly in view of the 'mobile office' image portrayed by railway companies where 'office type' work may be carried out. This would apply to car users changed to rail on journeys between south west Wales and Cardiff/London and other destinations. The car became productive time and therefore has a resource cost benefit for the traveller and the employer. Modern working methods indicate that some train journey times may be valued as 'in-work' time as many people use the train to read documents, deal with emails and other in-work activities. These cannot be undertaken when driving a car.

The SOBC being prepared by Network Rail/Aecom will provide the value of time savings value based on DfT prices and the time savings per car (using DfT occupancy/vehicle)

#### *Reduced car operating costs*

The introduction of a train service will result in some people transferring from the car especially for their journey to work. This will mean a reduced traffic flow (and therefore reduced congestion) and a possible increase in M4 vehicle speeds, since car operating costs are a function of speed they will be affected by the change in the volume of traffic. The existing user whose car speed will be increased and journey time may be reduced as a result of the traffic transferred to public transport. Here, the reduced cost has to be calculated. The formula for calculating car operating costs takes into account the cost of fuel, oil, tyres, maintenance and depreciation.

An initial estimate is set out here based on the car user numbers transferring as a consequence of reduced travel time.

### *Road cost avoided by an improved rail service*

The introduction of the SDL train service will result in a fall in vehicle flow. This will result in some reduced road maintenance costs, although road track costs vary more with HGV usage than with car usage. The largest benefit will result from the reduced public demand for new or improved roads especially those which are near capacity and particularly at peak journey-to-work times.

There will also be additional capital costs of providing car parking spaces at Felindre but not at more congested/high land cost destinations (e.g. Cardiff). This provides a fall in resource costs but against this must be balanced an increase in resource costs elsewhere in the economy represented by car parking charges.

The cost of the car park may be neutralised either through a DfT capital investment or through land provision (the land is in public sector hands – WG and CCS) or a Section 106 / voluntary payment by housing or business park developers.

### **3.4 Period of evaluation**

The evaluation should be carried out for the whole period over which a subsidy is to be paid (i.e. the date of renewal of the subsidy). This in Wales is to the end of the fifteen year franchise period. A discounted evaluation over a 30-year period should also be carried out for comparison with other transport schemes. Certain costs will apply to particular years and these will be discounted at the factor applicable to that year, e.g. the purchase of new buses for a route every 14 years.

### **3.5 Conclusion on evaluation using BCR**

The Transport Planning Society has suggested the current over dependence on the economic case has limitations when used for rural transport projects (LTT, 2018). The strategic case analysis should identify and filter out any schemes which do not meet objectives such as reducing carbon, improving air quality or promoting active travel.

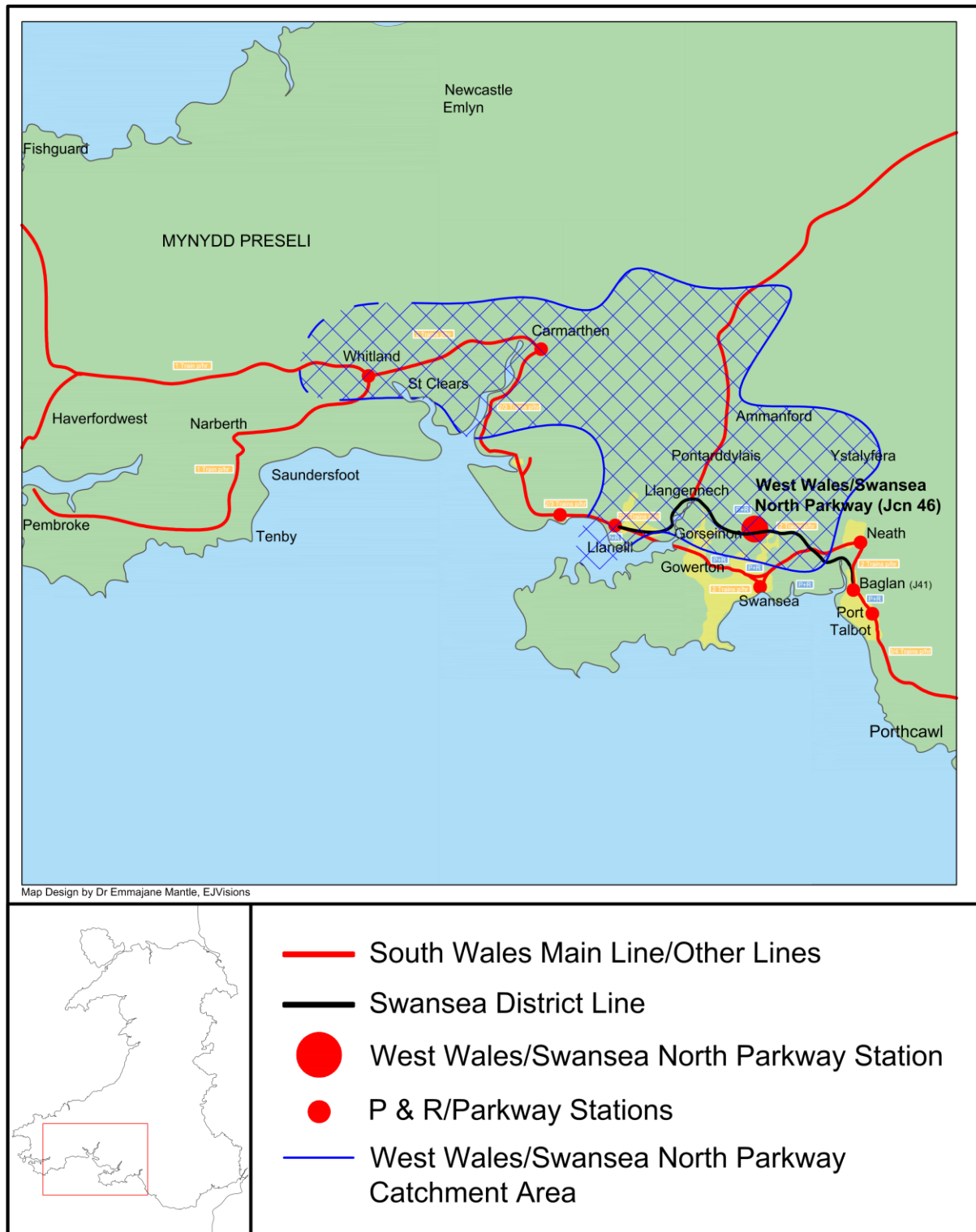
This concurs with the view that rural schemes may in a similar way not achieve an acceptable BCR and that in such cases strategic goals should be the primary element.

The WeITAG format gave a BCR of 0.6:1 for the Borders Railway. This would normally have led to the scheme being rejected. This may also apply to the modal transfer in a rural area and the outputs should therefore be considered carefully.

## 4 INCREASE PASSENGER DEMAND – WEST WALES PARKWAY

### 4.1 Catchment Area by Car, Bus and Cycling with Appropriate Parking / Storage Facilities

Fig 4a : Catchment Areas for Whitland, Carmarthen and Felindre (West Wales) Parkway Stations



The map at Fig 4a shows the estimated catchment area for the West Wales / Swansea North Parkway station. These are all potential locations through which demand for rail services could increase if the increased frequency, reduced journey time (using the SDL) and reliability (and thus predictable journey time) from new trains attracts passengers as surveys referred to above suggest they do.

#### **4.2 Catchment area and demand forecasts**

Two approaches were used:

- **The experience from other new station developments.**

There has been growth in passenger numbers (see Chapter 6) when new stations have opened; however there is only moderately robust research information where those new travellers came from. Assumptions could be made on how many car users would transfer from the M4 i.e. newly generated passengers from outside the railway services. From the small survey in Carmarthenshire a market exists; however the size of that market will require further demand analysis.

Other stations such as Tiverton Parkway (Devon); Tweedbank P&R station on the Borders Railway (Scotland) and Gowerton P&R station were examined for any indication of the passengers' previous mode was discernible. The evidence available suggested that a high proportion were previously car users driving to the same destination as the railway service on the SDL or at West Wales/Swansea North Parkway will provide.

In addition the improved frequency and journey time to / from west Wales towns such as Llanelli or Carmarthen to Cardiff is likely to generate passenger growth at these railway stations.

- **Use of forecasting techniques in the railway Passenger Demand Forecasting Handbook (PDFH, 2006)**

Modelling the elements and the consequent passenger demand for the West Wales/Swansea North Parkway are outside the remit of this scoping study. They could however be modelled by for example Southampton University Transportation Research Group using their PDFH based model.

There will be some abstraction from nearby railway stations such as Swansea, Neath and Port Talbot but more will originate from other sources.

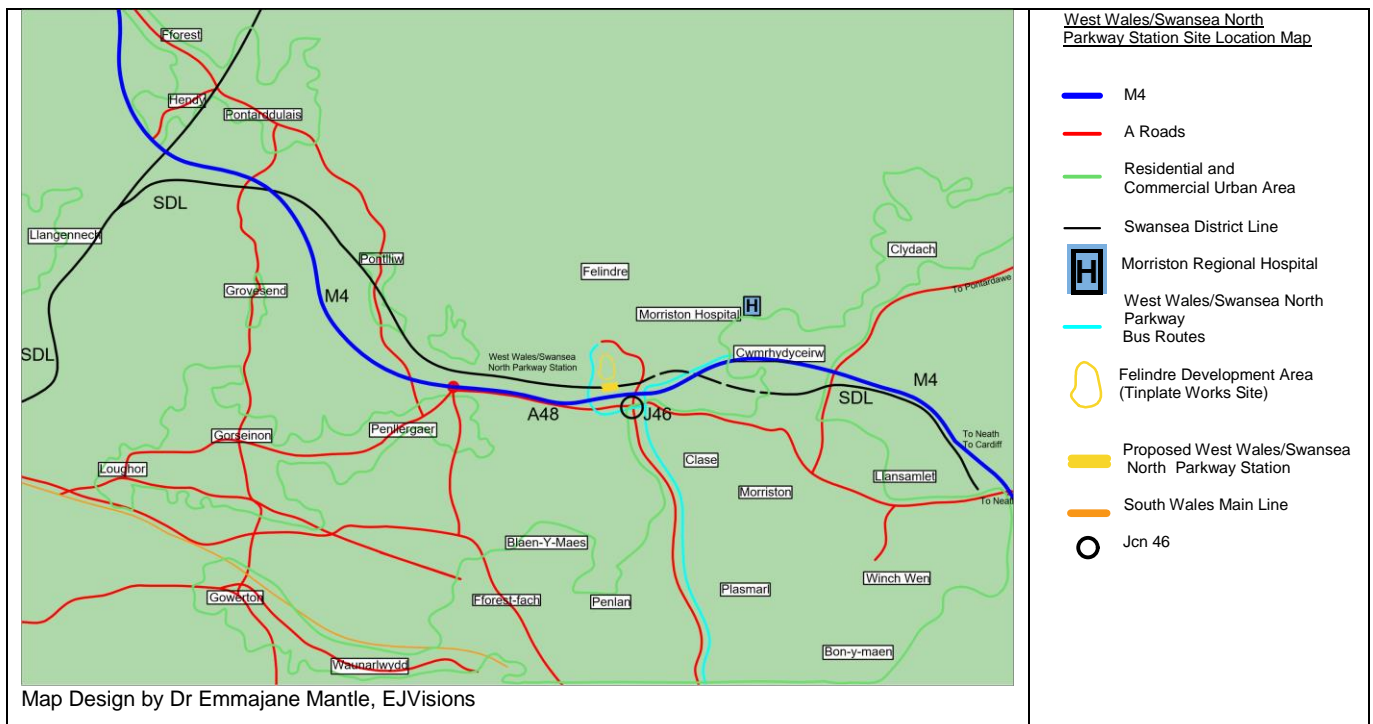
The surveys in Wales referred to (sections 4.4, 4.6) reflect demand modelling using the PDFH guidelines. It treats journey time, frequency and interchange together as a single variable – generalised journey time. This should not be confused with generalised cost which includes these elements and also other factors influencing rail passenger demand – fares, access time and reliability.

Generalised journey time elasticities which could vary between -0.6 and – 1.1 are a more important element in generating demand for West Wales / Swansea North Parkway in terms of the journey time from there to Cardiff compared with a journey time of several hours. Under the principles of the PDFH the 14 minutes saving (and possibly up to an additional 8 minutes) could be a significant influence.

Issues such as crowding, rolling stock quality (new in this proposal) and station facilities will also impact on demand. These include adequate numbers of car / cycle spaces to meet demand and road access by those modes to the station platforms.

This may extend to 1 mile (walking), 1 – 5 miles (Cycle) 1 – 10 miles (bus, car). Recent evidence (Borders Railway, Lothian Region) indicates a rural catchment area of up to 15 miles by car.

Fig. 4b Swansea District Line – Settlements in immediate catchment area



The West Wales/Swansea North Parkway as the name implies serves two markets. Fig 4b shows the north Swansea suburbs and dormitory towns which the station and the SDL could serve. Suburban residents served include Llansamlet, Morryston Close, Blaen y Maes, Penllergaer, Fforestfach, Gorseinon, Loughor, Pontlliw, Gravesend, Pontarddulais – all in the City and County of Swansea (CCS). Travellers from Gowerton and parts of north Gower may be attracted though Swansea Central would expect to retain areas such as Waunarlwydd and Plasmarl. Pontarddulais and Hendy are well connected to the M4 and therefore West Wales/Swansea North Parkway.

In addition several thousand new homes are planned for north and west Swansea in the Local Development Plan (see Fig 4c).

Pontarddulais and east Carmarthenshire have stations as the Heart of Wales Line (HOWL). The working timetable could provide commuters at Llangennech between the HOWL and the SDL, for journeys towards Cardiff and England's cities.

Considerable journey time and convenience benefits for those Swansea residents would result from the train service enhancements and the Parkway station.

### **4.3 Population of the Catchment Area**

The estimated total numbers of residents in the catchment area for West Wales Parkway spread over the northern suburbs of Swansea (shown in Fig 4b) Carmarthenshire and Pembrokeshire is 146,000. The total population for the two county authorities and the city is estimated at 380,000. Some of these residents may be attracted to Carmarthen or Whitland railway stations which would then require an extension of the current parking land.

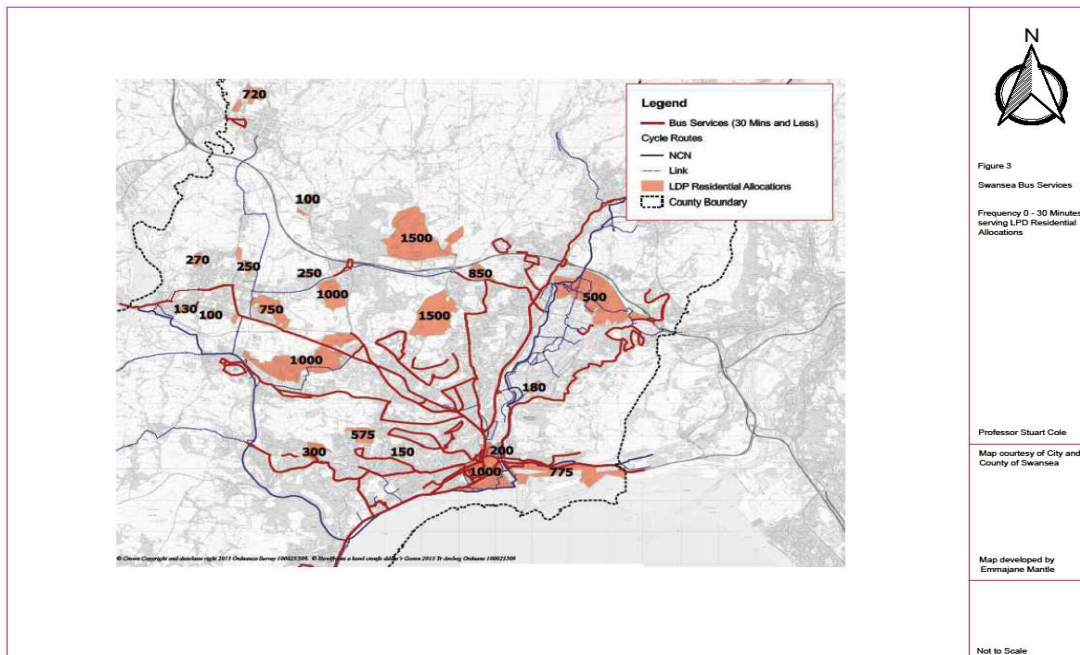
The occupants of these car traffic flows approaching and leaving the M4 motorway between J46 and J49 and the A48 westwards to St Clears / Whitland provide a major potential market for the West Wales / Swansea North Parkway Station.

South-west Wales is one of Wales' most important tourism destinations. Summer Saturday trains frequently have high load factors with standing passengers. These 'temporary residents' a potential source of rail patronage.

### **4.4 Potential Markets – Swansea for West Wales/Swansea North Parkway Station**

The concept is to create a Parkway station on the perimeter of the Felindre site adjacent to the SDL and M4 J46. There are existing plans for a Business Park near this location and outline planning permission has been given for 800 homes. In the Local Development Plan the north and west of Swansea has provision for 9,320 new dwellings within the City and County of Swansea county boundary. (Fig 4c)

Fig 4c: LDP Housing Allocations – City and County of Swansea



Source: City and County of Swansea Local Development Plan; Swansea Public Transport Hubs report, Welsh Government, 2016

This source of custom for the WEST WALES / SWANSEA NORTH PARKWAY is in addition to the M4 related catchment area

Further housing developments are allocated to land in Carmarthenshire. These residents are likely to approach West Wales/Swansea North Parkway by car via the M4 and are included in those estimates.

#### 4.5 Rationale for construction of the West Wales Parkway at Felindre

- To attract car users from the M4 motorway onto the railway through an easy access route from J46 and along the B4296. This would contribute to reduction of traffic flows on the M4 particularly at peak times
- The site could be provided with a Metro-style bus service similar to that currently operated by First Cymru to/from the enlarged hospital at Morriston and Swansea city centre
- The planned homes and work location present a potential for local parking for train services used primarily by travellers to the east (e.g. Cardiff, Newport, Bristol, London and the England Midlands).
- The high employment and hospital visitor/patient numbers could provide commuter and non-peak demand using train and bus public transport links between the SDL/ West Wales/Swansea North Parkway catchment area and the hospital (WG, 2016).
- The DVLA has 5000 employees and is within the near catchment area and has park and share and P&R (bus) facility on CCS owned land at Felindre. This serves car travellers to DVLA; one market would be to attract a portion of these to travel to West Wales / Swansea North Parkway by train. The private



P&R continuation is a matter for DVLA. However the proposed provision of new bus services between West Wales/Swansea North Parkway, Moriston Hospital and Swansea CBD may lead DVLA to make use of those services.

- This also applies to existing residents of north Swansea wishing to travel by train. At present they have extended journey times travelling with the traffic flow into (am) and out of (pm) Swansea, Their journey into the congested city centre with expensive car parking charges would be replaced by free parking adjacent to the station.
- Retail evidence suggests that in cities where the CBD is near to the main railway station, the likelihood of a retail sales impact can be high. Cardiff is an example of this with a wide range of nationally branded stores juxtaposed to commercial employment (primarily offices) and close by the Cardiff Central Station.

Swansea's CBD has moved some way from Swansea Central Station and the impact is unlikely to be noticeable. It is also suggested that passengers to/from Swansea Central Station have travel as their main purpose and the retail impact is restricted to travel related goods (newspapers, magazines, drinks, light food offers). However it may have an impact on traffic flows into the CBD.

- The security provision at the current P&R site for DVLA and Swansea centre park and share would be expected to continue.
- Provision of bus services between West Wales/Swansea North Parkway and Swansea city centre could provide an opportunity for modal transfer (from car/park and share) to bus services with appropriate bus priority measures along the routes (see Fig. 4.8).

A new West Wales/Swansea North Parkway Station (estimated cost £20m) should be built at Felindre adjacent to the SDL and the M4 junction 46. There can be no fixed ratio of spaces/acre as the land areas vary. The initial West Wales/Swansea North Parkway car park size would accommodate 500 cars. Each acre could accommodate 150-200 cars (NR, 2018). Based on evidence from other parkway stations (see section 4.11) it could prove very attractive for inter – modal train / road users with a half - hourly service; somewhat less so with an hourly service interval. It would give residents of north Swansea (avoiding the city centre), Carmarthenshire and Pembrokeshire direct rail access to Cardiff and with a cross platform change at Cardiff Central to Bristol, Birmingham, Manchester and London so avoiding the busiest sections of the M4 between Llandarcy and Newport.

#### **4.6 Factors encouraging rail/bus uses (Surveys)**

Four surveys are referred to here which show the importance of factors such as frequency, reliability and journey time in a traveller's modal choicer decision. Fares play a part but have to be seen in this wider context. In demand models this is referred to as service elasticity.

Of particular interest is the survey of a limited number of business people in Carmarthenshire (2018) carried for this study. (See Section 4.6, Survey 1). This reinforced the other three large sample surveys in emphasising the importance of quality factors.

## Survey 1 Carmarthenshire business travellers (2018 survey)

In connection with this prospectus, a limited survey of fourteen business travellers making regular journeys to/from Cardiff, London and other major English destinations was conducted.

Although the survey sample was too small to be quantified into a firm passenger forecast the respondents' comments are relevant.

### Slow moving traffic/unpredictable journey times

- The journey time to/from Cardiff on the M4 is unpredictable. This can result in either late arrivals or wasted waiting time at the destination.
- The journey time has increased over the last several years primarily because of traffic congestion and slow speeds around J46 to J40 (Llangyfelach-Port Talbot; the Port Talbot elevated section; Taibach and at J33 (M4 to A4232 towards Cardiff Bay).
- There is slow moving traffic in both the morning and evening peaks

### A rail alternative – criteria for use

- Guaranteed seating to enable work to be carried out (lap top stand facility; emails etc) then the working day could begin on board the train
- It is then possible to work when travelling – not so when driving
- Journey time was less than the journey by car
- Parking was guaranteed at West Wales Parkway
- The train frequency – hourly would be questionable; a half hourly frequency from (say) 07:00-19:00 and possibly hourly to 23:30 would be a very attractive proposition to consider
- As the journey from Llanelli (as an example) runs past J46, for the journey time by car consideration would therefore be for West Wales/Swansea North Parkway-Cardiff (City Hall):

Car	60
Train	43 (limited stop)
Minutes saved	17

- Cost of travel – this was only relevant if train fares exceeded car operating costs (primarily fuel is the reference here in surveys of this type. The car itself, depreciation and servicing is seen as £0 as there would be a car available. Only if a second car is involved might these costs be included) and parking charges at the destination.
- Journey time at either end by car/cycle/on foot would be included

The answers from Carmarthenshire businesses reflect the other recent surveys quoted. The factors determining any modal transfer from car to trains are:-

- Journey time (especially predictable journey time)
- Service frequency
- Cost (if significantly at variance with perceived car costs)

A Carmarthen-Cardiff service via SDL does positively satisfy these criteria.

### **Survey 2 Abertawe Bro Morgannwg University Health Board Morriston Hospital (ABMUHB)**

With major expansion at Morriston Hospital, the now replaced Swansea Health Board saw a requirement for a bus service to the hospital and to a P&R site at Felindre as the answer to lack of car parking at the hospital.

The Morriston Hospital Travel Plan staff survey (ABMUHB, 2015) gives a positive view of the potential market for public transport use in the survey when asked ‘what would encourage their use of public transport’, as shown in Table 4a.

Table 4a Factors encouraging public transport use

<b>Service quality elements</b>	<b>%</b>
More frequent services	26
More direct services	37
Better local bus stops	8
Better hospital bus stops	2
Better connections	14
Discounted tickets	18
Nothing would persuade them	44
Source: Abertawe Bro Morgannwg University Health Board	

The conclusion is that more frequent and direct services would be the biggest attractors to public transport.

But the factors given for travel by car (which accounted for 91% of commuters to the hospital) were:

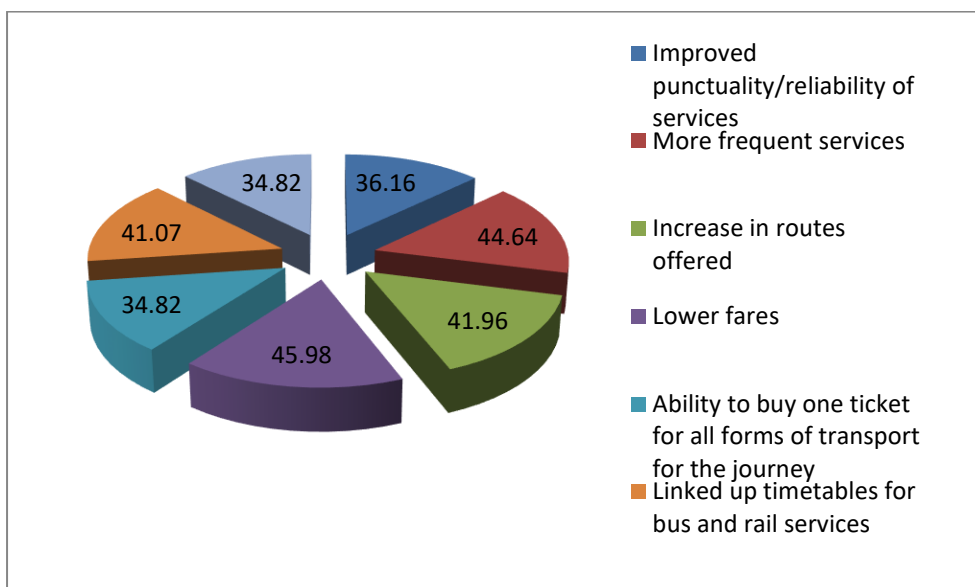
- Convenience (26.6%)
- Reliable (2.3%) – which may be a reflection on the level of congestion on Swansea’s roads.
- Cheap (1.2%) – where the low percentage suggests ticket price would not seem to be a serious issue
- No alternative means (40.9%)

### **Survey 3 Federation of Small Businesses Cymru Wales (FSB, 2015)**

A survey of business travellers (both commuting and in business travel) identified the incentives from the public transport industry which would persuade them to change from car to rail/bus.

Travellers regard reliability and timekeeping (punctuality) as the essential train travel quality factor which would encourage transfer from their car. This relates to the need to arrive at work at a predictable time. The most important individual factor to encourage is lower fares (FSB, 2014) but leading operators have indicated reliability and timekeeping as the criteria they have identified. However, fares would be the next most important (though this is when compared with alternatives). However, for the FSB respondents reflected in Fig. 4d, factors such as integrated ticketing and timetables, frequency and wider area of route coverage (seen often as convenience) are almost equal as criteria for modal change. An interchange at West Wales/Swansea North Parkway Station onto buses operating directly to Morriston Hospital could be a catalyst.

**Fig 4d: Factors attracting transport users onto train / bus**



Source: Federation of Small Business. Wales members survey 2015

### **Survey 4 Passenger priorities for improvement – Transport Passenger Focus 2010**

The survey (although aimed at bus travel had results applicable to rail travel also) covered England only but there was a consistency of ranking throughout that country and in areas reflective of Wales’s urban / rural population split. The ranking was:

1. Timekeeping within five minutes of the timetable
2. More frequent services
3. Tickets are available to travel on all bus / rail / tram services in the local area.
4. Wider range of destinations or easy connections
5. Better value for money and perceived comparable travel costs with the car. However perceived costs often do not reflect the full actual cost of owning / operating a private car

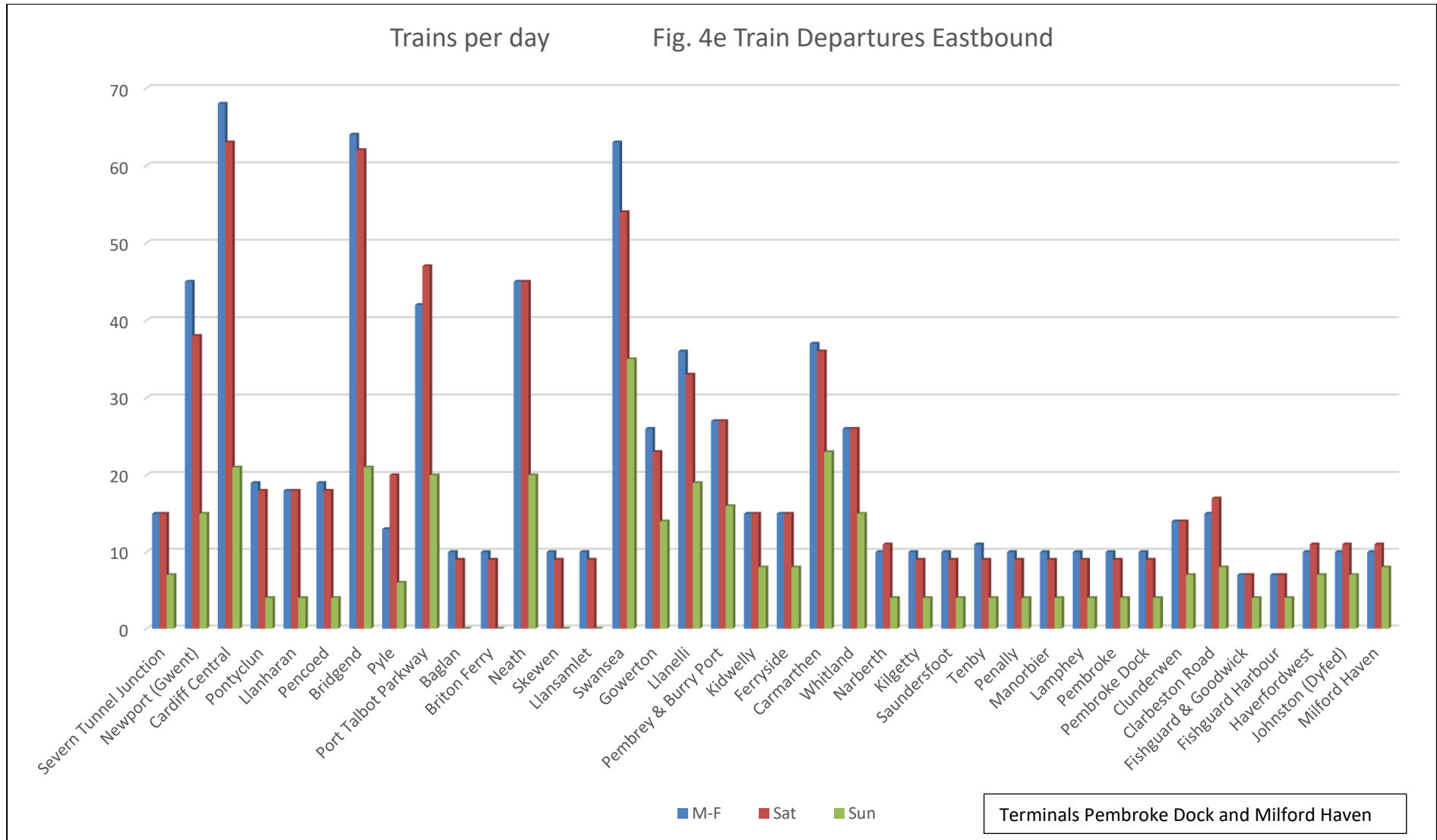
6. Accurate route and timetable information. Real time rail information is provided on line and at railway stations; connecting buses do not always have that facility.

#### **4.7 Train Services Provision by TfW**

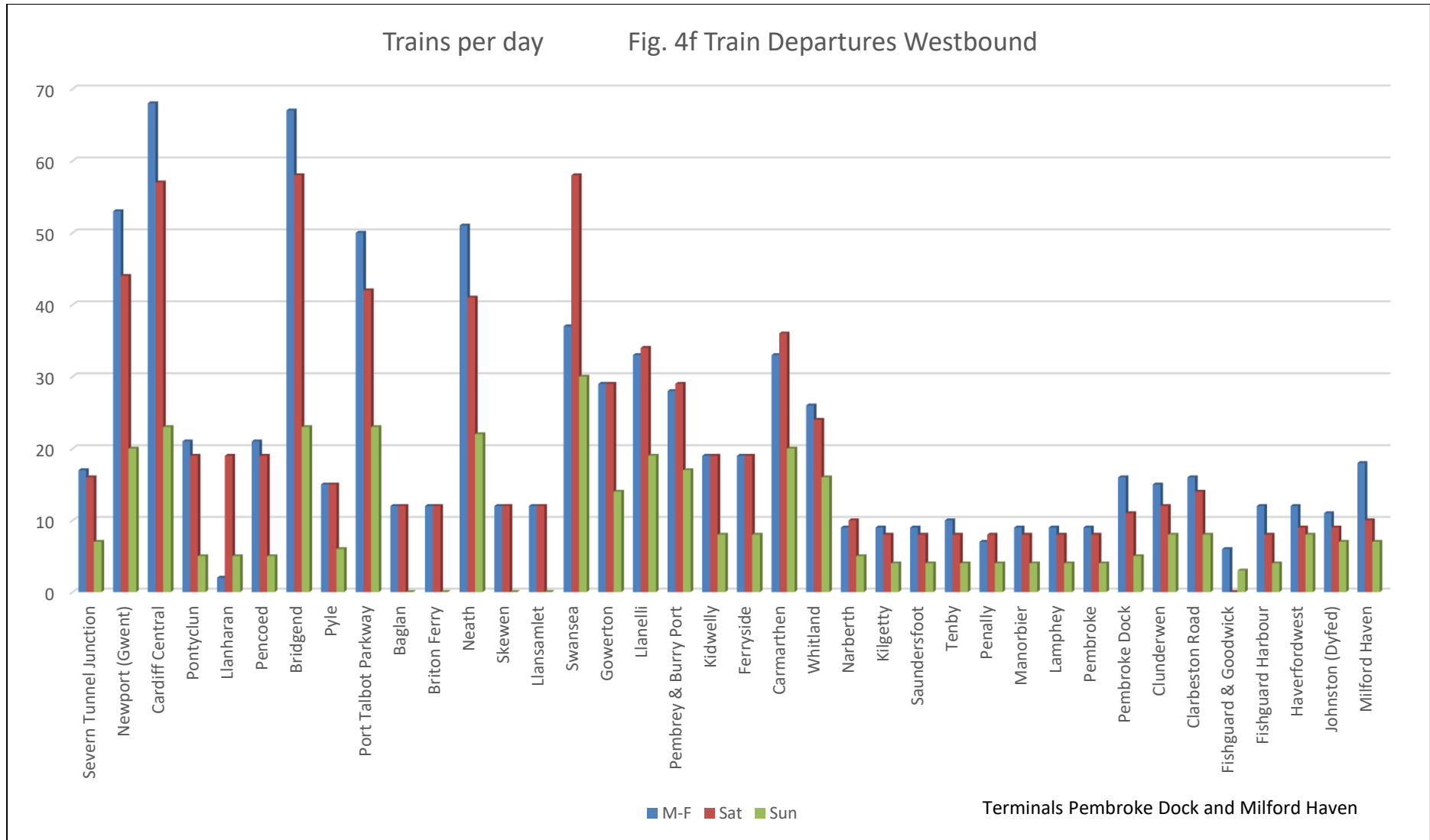
Weekday and Saturday train frequencies west of Bridgend are to remain as at present. In the *Train Services Requirement* (TfW, 2017a) part of the tender invitation to operate services (published recently), bidders were given sixteen priority service improvements which scored differing 'bonus' points. Other weekday proposals would receive zero points. Service improvements west of Swansea (in fact west of Bridgend) fell into this position. Thus they were not specified by the bidders. They would not be considered by TfW.

At present the usual frequency between Carmarthen and Cardiff is one per hour (tph) with an additional train in certain hours; Network Rail is assessing track capacity west of Whitland.

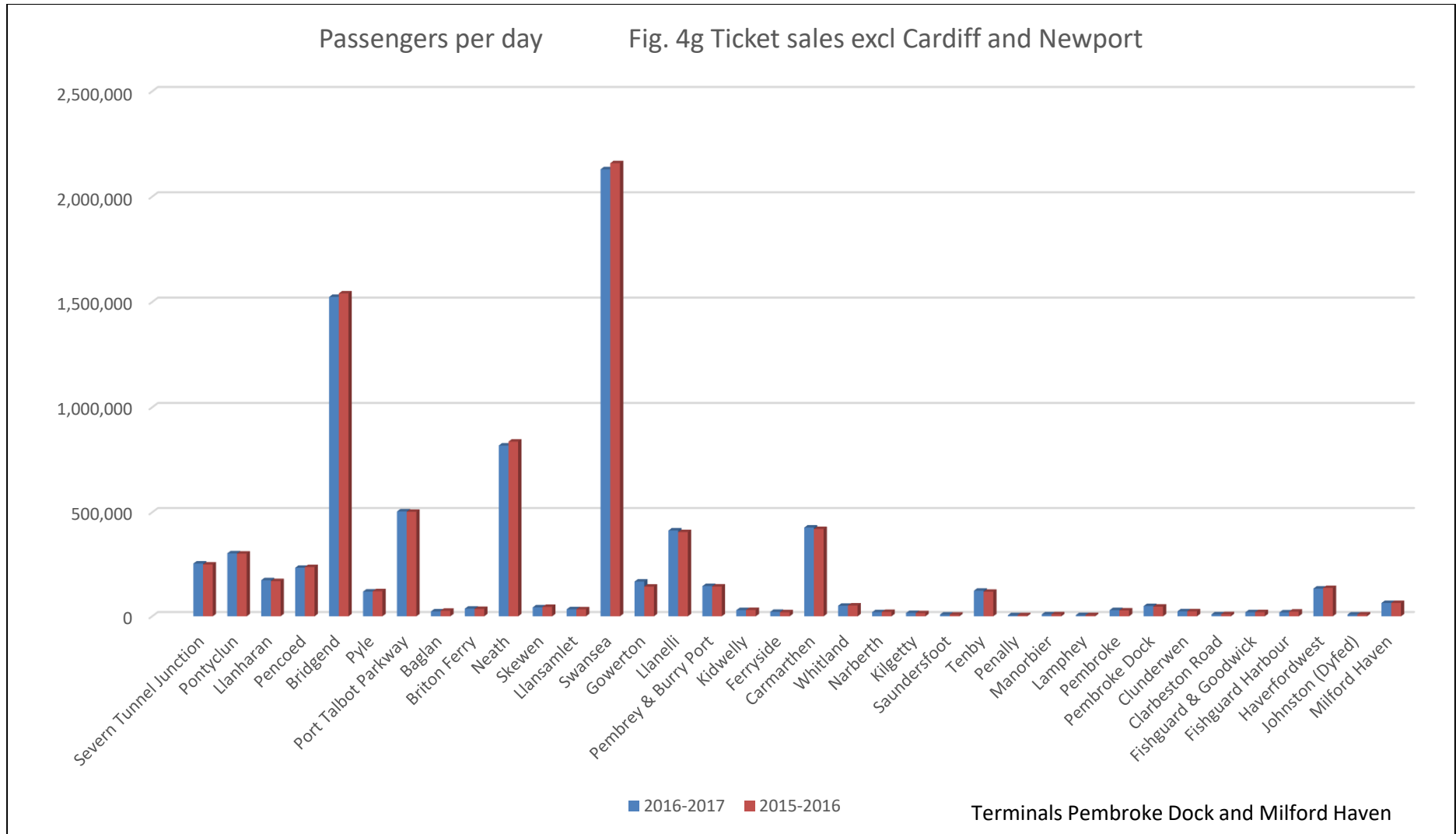
The scoring system used by TfW to determine service levels and enhancements was a comparative exercise of the two remaining bids. Consequently, additional services west of Swansea should now be considered as a new, separate case. The Carmarthenshire and Pembrokeshire travellers (both present and potential modal transfers from cars) have been disadvantaged in social, economic and environmental terms through having low frequency train services which should be increased. Increased frequency and reduced journey time are key elements in increased rail demand. The relationship between passenger demand and frequency is shown graphically in Figs 4e – 4g.



Source: Office of Road and Rail 2017



Source: Office of Road and Rail 2017



Source: Office of Road and Rail 2017



#### 4.8 Train service frequency as a determinant of demand

The passenger usage at stations with a two hourly service interval (frequency) is considerably lower than those with a higher frequency of calling trains. (see Figs 4e-4g)

Stations in Pembrokeshire with 12/14 trains per day have for example on westbound journeys at Clarbeston Road (9,208 annual passengers) and Clunderwen (24,212 annual passengers). It might be argued that this is because they are stations serving a rural area. However Baglan and Briton Ferry stations have 23,776 and 36,900 respectively yet are in densely populated urban areas. They also have 12 trains per day. These station calls represent a two hourly frequency.

When these are compared with Bridgend (1,524,162 annual passengers and 67 trains) and Llanelli (413,062 annual passengers and 34 trains westbound Monday – Friday), the relevance of frequency as a factor in expanding demand is clearly shown.

Therefore the report argues that a one tph frequency is the minimum expected for the West Wales/Swansea North Parkway Station; with half hourly tph preferable.

Full passenger footfalls are shown numerically in Appendix 1. A selection is shown in Table 4b.

In terms of annual passenger figures compared with train departures the correlation is clear although population size and community levels also major factors. Table 4b shows a relationship between train frequency and passenger numbers.

	Train departures (M-F)		Total passengers (m)
	Eastbound	Westbound	
Swansea	63	61	2.130
Neath	45	51	0.818
Port Talbot	42	50	0.504
Carmarthen	37	33	0.426
Llanelli	36	34	0.413
Gowerton	26	29	0.167
Haverfordwest	10	9	0.136
Milford Haven	10	18	0.064
Whitland	26	26	0.052
Skewen	10	12	0.045
Baglan	19	12	0.026
Pembroke Dock	10	16	0.049
Clarbeston Road	15	14	0.009
Manobier	10	9	0.009

\* Note: Westbound services including terminating trains

The frequencies relate to hourly services of

<u>Stations</u>	<u>TPH</u>
Swansea, Neath, Port Talbot	2 (+1)
Llanelli, Carmarthen, Whitland	1 (+1)
All others	1 train/two hours

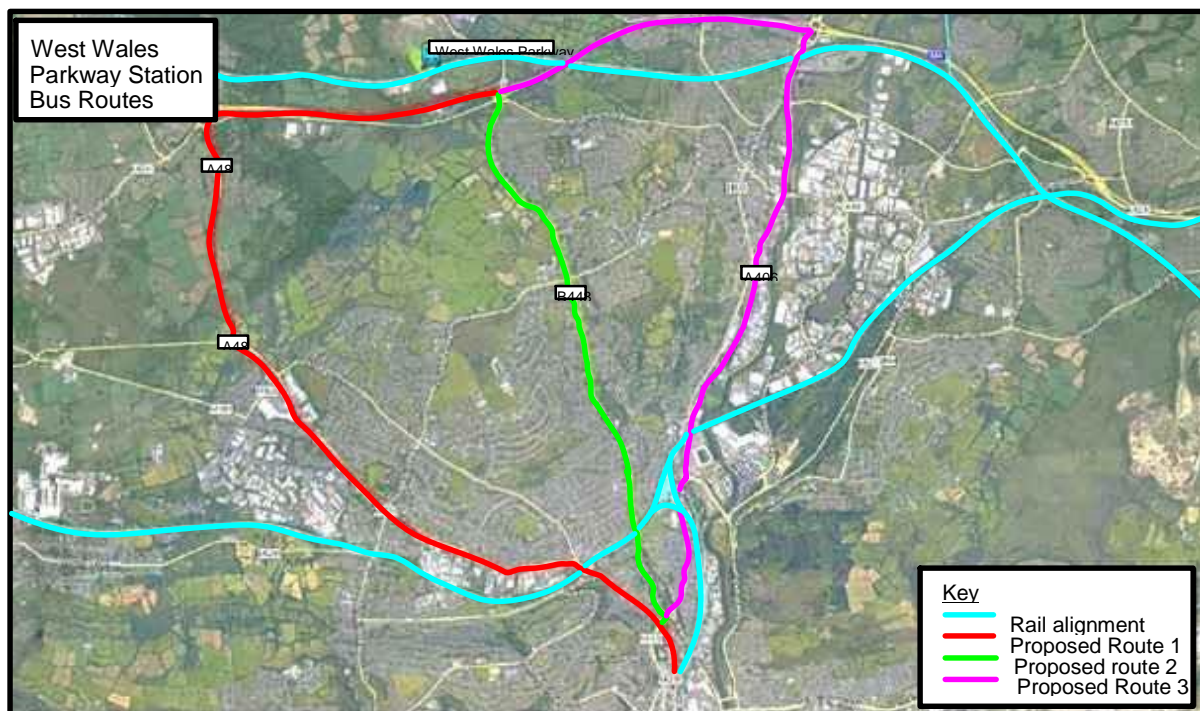
The (+1) in the train frequencies refers to the extra train every two hours which calls at those stations. Its purpose is to provide the two hourly service to Milford Haven and Pembroke Dock.

#### 4.9 Bus service integration (to / from Swansea)

Extending a bus operation similar to the current Morrision Hospital First Metro bus service, with bus priority improvements, integrated into the West Wales / Swansea North Parkway trains could further enhance public transport use on that line so contributing to the introduction of more frequent services.

Suggested possible bus routes serving a new West Wales Parkway / Swansea North Parkway are shown in Fig 4h.

Fig 4h Bus Routes linking North Swansea to West Wales/Swansea North Parkway stations



Source : Costain

A positive response to bus service provision between Swansea City Centre, Tawe Valley business parks, Morrision Hospital and the West Wales/Swansea North Parkway would create a multi modal passenger interchange at Felindre with West Wales/Swansea North Parkway trains, cars and buses improving the travel options

of residents of north Swansea and west Wales. Swansea would also be provided with a second railway station.

Route 1 – City Centre – Carmarthen Road/A483 via Cwmbwrla, Cwmdru, Fforestfach, Penlleger, M4 to West Wales/Swansea North Parkway

Route 2 – City Centre – Llangyfelach (B4489) via Brynhyfryd, Treboeth, Llangyfelach, J46 to West Wales/Swansea North Parkway

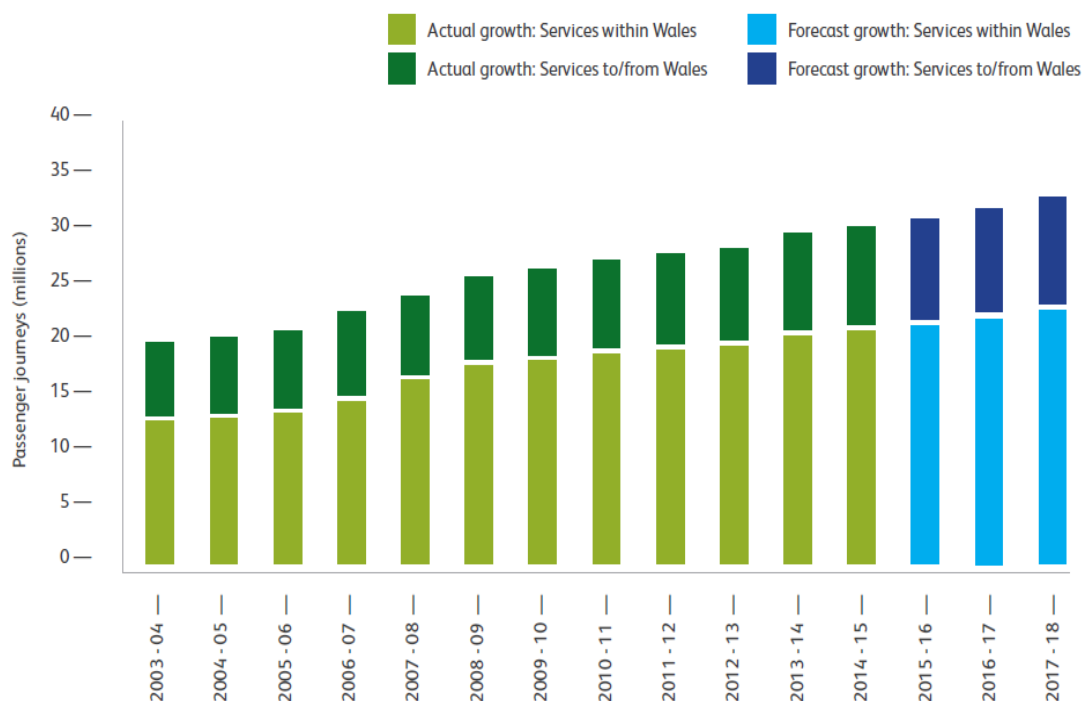
Route 3 - City Centre – Ffordd Cwm Tawe (A4062), Plas Marl, Morryston, Cwmrhydyceirw, M4 (J45-J46 this section of M4 can be heavily congested during morning peak (0700-0800) Ynysforgan to West Wales/Swansea North Parkway.

#### 4.10 Macro level passenger demand trends

The Wales Route Study (NR, 2016) shows the Network Rail predicted growth pattern (see Fig 4i) and the ORR passenger numbers (see Figs 4e – 4f) suggest a need for additional service frequency and capacity in south west Wales to meet future demand (above that provided for though new trains and no-change service patterns in the new Wales & Borders franchise).

#### 4.11 Passenger journey growth

Fig 4i Passenger journeys Wales – 2003/4 to 2018/19



Source: Network Rail

The actual and forecast growth in Wales is discussed in detail below and shows an increase in passenger numbers (actual or forecast) in Wales of 80% between 2003–4 and 2018–19 (NR, 2016); an annual average of 5.3%.

Comparisons over other periods show an average annual passenger growth of 3.4% from 1992 – 2017; and 3.9% between 2007 and 2017. (Fig 4i; Appendix 2).

There is no indication that the future rate of growth will be less. Indeed, improved train quality, timekeeping and reliability and increased frequency (referred to as the whole travel experience) are likely to increase the rate of growth. The Welsh Government's recent statement on fares policy is also encouraging in that fares increases will be capped and many more advanced purchase / saver / super saver tickets will become available. These ticket offers were not widespread in the previous franchise operated by Arriva Trains Wales. Fares are the other element in passenger modal choice.

#### **4.12 Network Rail Wales Route Study: context of adjacent area**

The Wales Route Study (NR, 2016) has assessed demand for passenger and freight services up to 2023 and 2043 in order to identify the long term priorities for rail. It has been summarised here in reference to the West Wales / Swansea North Parkway and rail travel to/from south west Wales. The SDL is not included in this Route Study.

The infrastructure and rolling stock components of the railway system have long asset lives and taking a planning horizon of the period up to 2043, provides the opportunity to inform once in a lifetime investment decisions, starting with the opportunities that present themselves for Control Period 6 (CP6).

The majority of long distance journeys are made for the purposes of business on behalf of an employer and for leisure

Long distance rail travel demand on the south Wales' railways mostly results from business travel, commuting and leisure. Leisure travel is often associated with major sporting / entertainment events primarily in Cardiff or specific one off events e.g. the Ryder Cup at Newport.

The Regional Urban market, in particular commuting into economic centres, is expected to grow with employment and business opportunities. Key priority flows for the Regional Urban market include:

- Commuting to Cardiff
- Commuting to Swansea
- Commuting from South Wales to Greater Bristol area

The relatively long journey time between west Wales and Cardiff implies a preference to travel by car only if an easily accessible or comparable journey time mode is not available.

The Wales Route Study adopted established demand forecasts to indicate future capacity requirements. The time elements are the equivalent referred to already in the West Wales / Swansea North Parkway (current report): West Wales/Swansea North Parkway.

- macro economic factors, such as distribution of employment, income and homes
- micro economic factors, such as the cost of travel by car and rail, car ownership, and competition between modes
- demographics, such as population, age of population and household composition
- consumer tastes, such as the use of travel time and travelling alternatives
- the supply of travel opportunities, such as rail generalised journey times and punctuality.

The proposal for increased frequency rail services to/from south west Wales and the development of the SDL was not included in the analysis. So to provide a growth indicator those in the Wales Route Study referring to routes nearest geographically to the SDL are shown here. (Tables 4c and 4d)

Table 4c Passenger demand growth for commuting into Swansea		
Corridor into Swansea	Estimated growth	
	2023	2043
West of Swansea	24%	78%
Commuting from local stations	30%	87%
Long distance and interurban services	37%	97%
Source: Network Rail		

Table 4d Passenger demand growth for commuting into Cardiff		
Corridor into Cardiff	Estimated growth	
	2023	2043
Swansea	56%	124%
GWML	46%	120%
Source: Network Rail		

These forecasts represent flows into the cities indicated. However they may be used as indicators of passenger growth along the proposed Carmarthen-Cardiff (SDL) corridor when a base figure is established. This base figure will originate from

- Travellers on the M4 corridor
- North Swansea residents
- Employees at a new Felindre business park and possible government hub

The expected growth can be paralleled to the Borders Railway and the Ebbw Vale line where there has been considerable growth following the introduction of an hourly service to/from Cardiff and new station built at Ebbw Vale Town and Pye Corner.

Some of the growth into Swansea or Cardiff could be expected to transfer onto the SDL service as a result of easier access to trains and shorter journey times than existing west Wales services or the M4 route into both cities via local roads.

#### **4.13 Evidence from other Parkway Stations – passenger growth**

##### **Parkway Station Concept**

The original branded 'Parkway' station was on the outskirts of Bristol but fairly close to an M4 interchange was a marketing move to encourage car users to make part of their journey to London by train. Others discussed below were built at Tiverton (Devon) and Warwick (Warwickshire). Two other examples were never intended to be 'Parkway' stations but have in effect become so – at Tweedbank on the Borders Railway into Edinburgh and at Gowerton between Llanelli and Swansea.

The conclusion to be drawn is that markets for parkway stations develop well beyond their initial apparent potential, no matter what the scale of demand

The growth in 'parkway' car parking numbers stems from driver logic: they consider the generalised cost (of journey time; fuel cost v fares); opportunity cost of time; and avoiding the disbenefits of motorway traffic congestion seen as being more unpredictable in the overall journey time.

##### **Bristol Parkway (GWR)**

Bristol Parkway Station north east of Bristol city centre lies on the GWML to south Wales near to M5 Junction 16 and M4 Junction 19. It opened in 2002 initially with 500 spaces and in that year the station served 1.25 m passengers with an additional 0.8m interchange passengers. While interchange passengers have remained at about the same level, the passengers using Bristol Parkway as their railway journey origin or destination points rose to 2.25m by 2012. A new 200 – space car park was built in 2011, but at 500 metres away and was not popular with only 10 cars per week using it. To meet the new demands of 2.4m passengers, in 2014, a multi-storey car park was constructed with 710 additional spaces funded by DfT and Network Rail (£13m) through the Station Commercial Projects Fund. By 2016 – 17 passenger demand at the station had risen to 2.50m, an average increase of 8.3%.

The station also has a purpose built bus station outside its front exit with nine bus routes serving locations such as Aztec West commercial office park, Bristol city centre, Cribbs Causeway shopping centre and University of the West of England.

##### **Tiverton Parkway (GWR)**

Trains had passed through the hinterland of this station since 1844. The Tiverton Junction station was lightly used, with two trains daily each way. The M5 motorway passed nearby and in 1986 Tiverton Parkway station was opened on the site of the Sampford Peverell station (closed 1964) near to Junction 27 and the A361. A small car park was enlarged to meet the demand resulting from increased GWR calling services calling at the new station. Demand has increased gradually since the station opened; in 2012 -13 passenger through put was 0.41m; in 2016 – 17 it was 0.49m –

an increase of 19.5% (or 4.8% annually). An hourly bus service operates from the station to Tiverton and Collompton

### **Warwick Parkway (Chiltern Railways)**

This station on the western outskirts of Warwick (owned unusually by the train operator Chiltern Railway), opened in 2000 with 737 car parking spaces intended to encourage commuters to use the train and compensate for inadequate capacity at Warwick and Leamington Spa stations. Demand has risen annually since it opened; and from 0.58m to 0.66m between 2012 -13 and 2016 – 17 – a rise of 13.7 % (or 3.4% annually). As demand rose 222 places were added in 2012 (costing £2.5m) Chiltern Railways operate trains to Paddington and Birmingham normally on a 30 minute frequency.

Local buses operate to Warwick town centre, Leamington Spa, Kenilworth and Coventry. National Express Services to / from London Heathrow and Gatwick airports call at the station.

### **Borders Railway – Tweedbank (ScotRail)**

Transport Scotland re-opened the Borders Railway between Edinburgh and Galashiels/Tweedbank in September 2015. The line comprises 40 miles of single line with nine stations.

The original passenger forecasts for this line and station was that custom would largely be from those nearer Edinburgh currently travelling on the extensive high frequency Lothian Buses would switch to the new train service. However, the majority of new passengers on Borders Railway came from the Midlothian rural / urban shadow area. The rationale of car commuters into Edinburgh CBD was the easier / shorter overall journey time into Edinburgh compared with travel by car and a guaranteed park and ride capacity following a doubling of car parking spaces because of the growth in passenger numbers.

The passenger demand for Tweedbank park and ride station was estimated at 22,000 annually; the actual was 300,000 in the first year with a requirement for extra carriages on peak trains. The population per hectare and its distribution is not dissimilar in Carmarthenshire; it could therefore be expected to find the same degree of demand for the West Wales / Swansea North Parkway.

Professor Stuart Cole visited the line in 2017 with these discussion outputs.

The annual forecast patronage was 650,000 but demand was far in excess of this. It carried 19.4% of the predicted annual figure in its first operational month. The unexpected level of peak demand led to overcrowding on the two-carriage Class 158 service. Consequently ScotRail operated 4/6 carriage trains at peak times. The surfaced parking areas proved too small and extra land was leased. The surfaced area had a capacity of 235 cars and at times double this number occupy the adjacent sites – primarily commuting traffic.

Table 4e Patronage on Borders Railway

Annual Passenger demand (000's)		
Station	Forecast (000's)	Actual (000's)
	(2012)	(2015-16)
Whole line	647	1,228
Brimstone )	1	165
Newcraighall )		224
Shawfair	62	13
Eskbank	131	128
Newtongrange	53	86
Gorebridge	90	59
Stow	6	40
Galashiels	23	213
Tweedbank	22	300

Transport Scotland's comment was "in terms of the core BCR, [it] was about 0.6. in terms of attempts to quantify wider economic benefits, it was higher than that, but it was a decision taken forward in terms of strategic objectives around trying to link up what is a low-wage, less successful part of Scotland to a very fast-growing, successful, high-wage city in Edinburgh, and a recognition that there are wider economic benefits that can't be fully quantified that would come from a line of that nature. I think it would be fair to say, in an English context, that it would struggle to pass hurdles raised in terms of the types of benefit-cost ratios that would be expected there, and perhaps a slightly narrower approach toward deciding what is taken forward or not".

A number of reports have been published on the Borders Line reopening in Scotland. The year 1 evaluation report highlights that the demand forecasts were significantly exceeded. Passenger numbers originating from Tweedbank and Galashiels are seven and four times the forecast respectively (2017). The report also concludes that re-opening of the Borders Railway has resulted in significant modal shift from the car to public transport, with 57% of users previously making their trip by another mode (2017). It is estimated that the line reopening led to 40,000 saved car journeys in the first year of operation (2017). The data suggests that the railway is enabling people to make new journeys and take up (particularly leisure) opportunities which they previously could not access, with approximately 50,000 (36%) of the estimated annual single trips recorded via the sample defined as 'new trips' (TS, 2018).

### **Gowerton Station - passenger growth**

Gowerton train departures increased to 54 trains per day between eastbound and westbound. This followed doubling of the track between Cockett and Llandeilo Junction (east of Llanelli Station being the HOWL and GWML junction), provision of two longer platforms and new overbridge at Gowerton Station and doubling of the track over Llwhchr viaduct in 2012-13.

Demand has doubled over four years. The extra trains were more reliable as timekeeping was no longer adversely affected by single track working. It is also



evident that trains no longer had standing passengers e.g. eastbound in the morning peak. Demand changes are in Table 4f.

Table 4f Gowerton P&R Station – passenger growth

<b>Year</b>	<b>000 passengers</b>
2012-13	84
2013-14	110
2014-15	131
2015-16	143
2016-17	167

The improved frequency at Gowerton reflects the research findings where passenger numbers increase with increased frequency, seat availability, timekeeping (giving predictable journey time) and reliability.

### **Conclusions on Parkway stations' passenger demand**

The conclusion to be drawn on these 'Parkway' station growth figures are:-

- Parkway stations have all been successful in attracting car using passengers
- The station and car park should be adjacent
- The most likely to be successful are on long journeys (one hour or over could form that category)
- Motorway traffic congestion along the traveller's proposed route is a common feature
- Annual growth rate of 3.5% appears to be consistent. There has also been an immediate demand following the opening of a P&R or Parkway station

The West Wales / Swansea North Parkway proposal fits these criteria. It also provides Swansea, Wales's second city, with a second station serving the north and west areas of the city and which would be more conveniently situated than Swansea Central station. The impact on Swansea Central passenger numbers is small in percentage terms (see Table 4b; Appendix 1).

## 5 THE WIDER ECONOMIC IMPACTS OF INCREASED DEMAND (by Dr Mark Lang, MarkLang Consulting and Cardiff University)

### 5.1 Rationale: Socio-Economic and Ecological Considerations

In Wales, much of the recent discussion concerning rail investment has tended to be concerned with improvements to services in and around major settlements. If rural areas are ignored as part of this agenda however, continued reliance on car transport in rural communities will frustrate local and national efforts to reduce pollution. In addition, as fuel prices continue to rise and private transport becomes less sustainable, generally people living in rural areas will be impacted disproportionately, especially those with lower incomes and the elderly, as alternative modes of transport will continue to be limited<sup>1</sup>. Consequently, rural economies will continue to decline and undermine the future sustainability of communities.

Justification for transport investments generally tends to be based on fairly standardised evaluation/potential impact criteria, such as: travel time savings, accidents, environmental impacts and regional-level economic impacts<sup>2</sup>. The development of evidence-based indicators around wider socio-economic and regional impacts continues to be weak<sup>3</sup>. Furthermore, the tendency has also been that little regard is paid to the spatial location of employment created or protected by rail and transport investments. There is a need to be careful about cause and effect relationships between economic growth, transport investment and transport demand<sup>4</sup>. The set of evaluation criteria used should, therefore, be spatially specific in order to overcome these shortcomings.

The spatial context is critical and we need to investigate the impact of transport investment at three distinct levels: macroeconomic (regional network effects); meso level (agglomeration economies and labour markets); and micro level (localised land and property market effects)<sup>5</sup>.

Efforts to evaluate the impact of improved rail services west of Swansea need to adopt a broader, and more locally specific set of criteria. It is helpful to start from the question:

*What are the specific problems that the proposed rail investment will seek to address, and what are the likely impacts of such proposals?*

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<sup>1</sup> Stokes, G. (2011). *Transport and the Rural Economy*. Oxford: Transport Studies Unit, Oxford University.

<sup>2</sup> Bristow, A. L. and Nellthrop, J. (2000). 'Transport project appraisal in the European Union', *Transport Policy*, 7:51-01.

<sup>3</sup> Vickerman, R. (2000). 'Evaluation methodologies for transport projects in the United Kingdom', *Transport Policy*, 7:7-16.

<sup>4</sup> Banister, D. and Berechman, J. (2000). *Transport Investment and Economic Development*. UCL Press: London.

<sup>5</sup> Banister, D. and Thurstain-Goodwin, M. (2011). 'Quantification of the non-transport benefits resulting from rail investments', *Journal of Transport Geography*, 19:212-223.

## **5.2 Agglomeration Economics**

*– how would the investment assist in efforts to prevent rural depopulation, particularly of younger, working age people, by enhancing options for sustainable commuting to employment opportunities that are argued will emerge from the economic policy being progressed in the Swansea and Cardiff city-regions?*

Stations in more rural locations do appear to expand the catchment areas of urban economies, with train travel providing shorter journey times to more distant locations. This, it is argued, not only enables cities to develop more dense economies, producing agglomeration benefits and ensuring that employers have access to suitable labour markets<sup>6</sup>, but may also enable wider employment opportunities to be available to those living in rural communities. Much appears to depend on the specific investment decisions made, and the set of evaluation criteria used.

## **5.3 Distributed Economics**

*– how would the proposed investment support ‘Green growth’ and/or add resilience in local economies in market towns in rural or semi-rural locations in South West Wales, support sustainable tourism growth and/or support farming diversification strategies?*

The future resilience of towns in Wales will be predicated on a considered and holistic policy response to the challenges faced. The response must encompass the wider economic context, the future location of public services, growing local enterprises, the role of the social sector and communities, as well as retail. There are successful and vibrant towns centres and high streets in Wales, but they tend to be in those locations that are more affluent, offer a vibrant mix of public services, have active retail management, and have a range of transport options which connects them to their catchment populations. Connectivity and public transport should be considered as part of a wider strategic policy response that is necessary to support the continued resilience of town centres and market towns.

## **5.4 Rural Poverty**

*- how would the proposals help overcome rural poverty by improving employment prospects both within rural locations by strengthening local economies, and without rural locations by making employment opportunities available elsewhere more accessible?*

Higher transport costs in rural areas tend to have a disproportionately higher impact for rural poor, vis-à-vis urban poor. It takes longer to travel, and it is more expensive to do so. Lack of basic infrastructure and access to transport services makes it difficult for people living in rural communities to access services. Rural isolation can imprison the elderly and people with disabilities. There is also clear evidence that rural isolation is associated with low productivity. The poorest sectors of society may

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<sup>6</sup> Abrantes, P. and Ellerton, T. (2014). *The Economic Value of Rail in the North of England*. Leeds: pteg Support Unit.

not be able to benefit from improved transport and they may actually be marginalised by the externalities related to that growth<sup>7</sup>.

## 5.5 New Markets

Over the next few years, Swansea Bay City Region is expected to see significant economic and population growth, along with rising tourism volumes, a diversifying business base, and increased demand for skills.

The new south west Wales railway service will make its contribution to that growth. Parallel moves in Scotland's Midlothian and south west England are referenced in this report.

- The proposed railway service connects Cardiff city centre and the Swansea Bay City Region from Port Talbot to Carmarthenshire and Pembrokeshire with significant new development opportunities including planned and in-construction housing and mixed-use projects, business and industrial parks and new visitor attractions, creating opportunities for businesses and investors to take advantage of these growing markets.
- Over 800 new homes and 80,065 sq. m (862,000 sq. ft.) floor space on 16 hectares (40 acres) of commercial land are due to be built in the immediate vicinity of the parkway station. Car parking for the business park development (Parc Felindre) should be considered in part for Parkway car parking. This might be suggested to developers as a key element in supporting the station development for employees and residents of the development
- The new south west Wales plan proposes half hourly services into Cardiff Central making travel for local businesses and their employees faster and more efficient.

The railway passes near the new Wellness centre at Llanelli with 800 employees. It serves the economic growth and therefore travel growth locations in south east Carmarthenshire.

## 5.6 Conclusions

In order to ensure any potential benefits from regional economic initiatives are accrued more spatially equitably, decisions around infrastructure investments need to be based on a broad set of socio-economic criteria designed to aid distributive effects. Such an approach may help make employment opportunities in Wales' cities open to people living in more rural locations. It may also support the development of more distributed and sustainable economic activity in rural locations and market towns.

The rail investment proposals that form the background for this discussion paper seek to broaden the spatial socio-economic impact that may arise from such investments. This is important, not only to open up more viable and sustainable

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<sup>7</sup> Starkey, P. and Hine, J. (2014). *Poverty and Sustainable Transport: How Transport Affects Poor People with Policy Implication for Poverty Reduction*. UN-Habitat, the Overseas Development Institute (ODI) or SLoCaT.

forms of connectivity for people living in rural catchments in Carmarthenshire, Pembrokeshire and Swansea, but also to support the development of an ultimately more sustainable model of distributed economic activity across rural areas and market towns. This will, in turn, help overcome the problems posed by rural depopulation, particularly of working age people.

## 6 M4 TRAFFIC FLOWS AND POTENTIAL MODAL SHIFT TO SDL

### 6.1 About the Data

The Felindre site for the West Wales/Swansea North Parkway (see Figs 1a, 4a, 4b and 9b) is accessed at J46.

Traffic flow data for all vehicles has been provided by the Welsh Government at three count locations along the M4 at Swansea. The count locations include the following M4 junctions (J):

- Lonlas-Ynysforgan J44-J45
- Llangyfelach to Penllergaer J46-J47
- Penllergaer to Hendy J47-J48

No data has been provided for any count locations at Ynysforgan to Llangyfelach J45-J46.

A number of gaps have been identified in the traffic count data provided by Welsh Government. However, it is assumed that this is the best data available and the analysis has been performed on this basis. The following data gaps are highlighted by count site to draw attention to the issues identified upon undertaking this analysis:

- Lonlas-Ynysforgan J44-J45 – No eastbound data. Westbound data only from 01/04/18 to 31/10/18
- Llangyfelach to Penllergaer J46-J47 – No data from the 25/10/18 to 30/11/18. Eastbound and Westbound traffic data from 01/12/17 to 24/10/18
- Penllergaer to Hendy J47-J48 – No data issues. Eastbound and Westbound traffic data from 01/12/17 to 30/11/18.

To supplement the data provided by Welsh Government Annual Average Daily Flow (AADF) data has been downloaded from the Department for Transport (<https://www.dft.gov.uk/traffic-counts/cp.php?la=Swansea>). Data has been analysed at four count sites including:

- 40504: Lonlas-Ynysforgan M4 J44-J45 (Easting 268970, Northing 199000)
- 20504: Ynysforgan to Llangyfelach J45-J46 (Easting 265300, Northing 199340)
- 503: Llangyfelach to Penllergaer M4 J46-J47 (Easting 263100, Northing 199260)
- 30505: Penllergaer to Hendy M4 J47-J48 (Easting 259200, Northing 202550)

These locations (numbers) are indicated in Fig 6a.

Annual data available at each count site includes:

- Average Annual Daily Flow – Counted or estimated
- Break down by vehicle type (Pedal Cycles, Motor cycles, Cars and Taxis, Buses and Coaches, Light Goods Vehicles, HGVs)

Fig 6a(i): Map to show DfT AADF count sites (Source: DfT <https://www.dft.gov.uk/traffic-counts/cp.php?la=Swansea>)

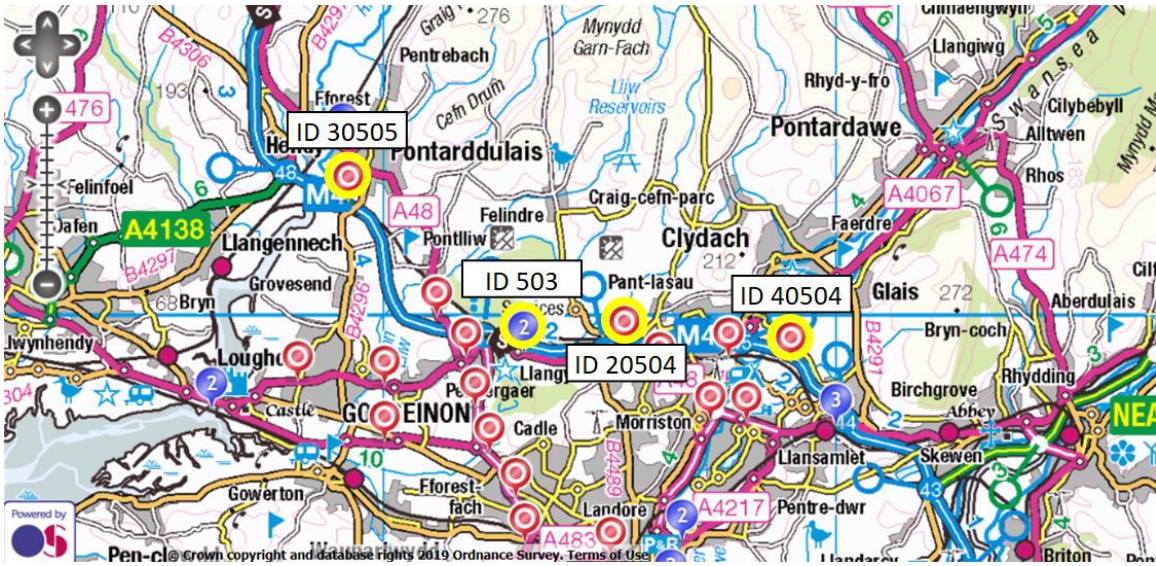
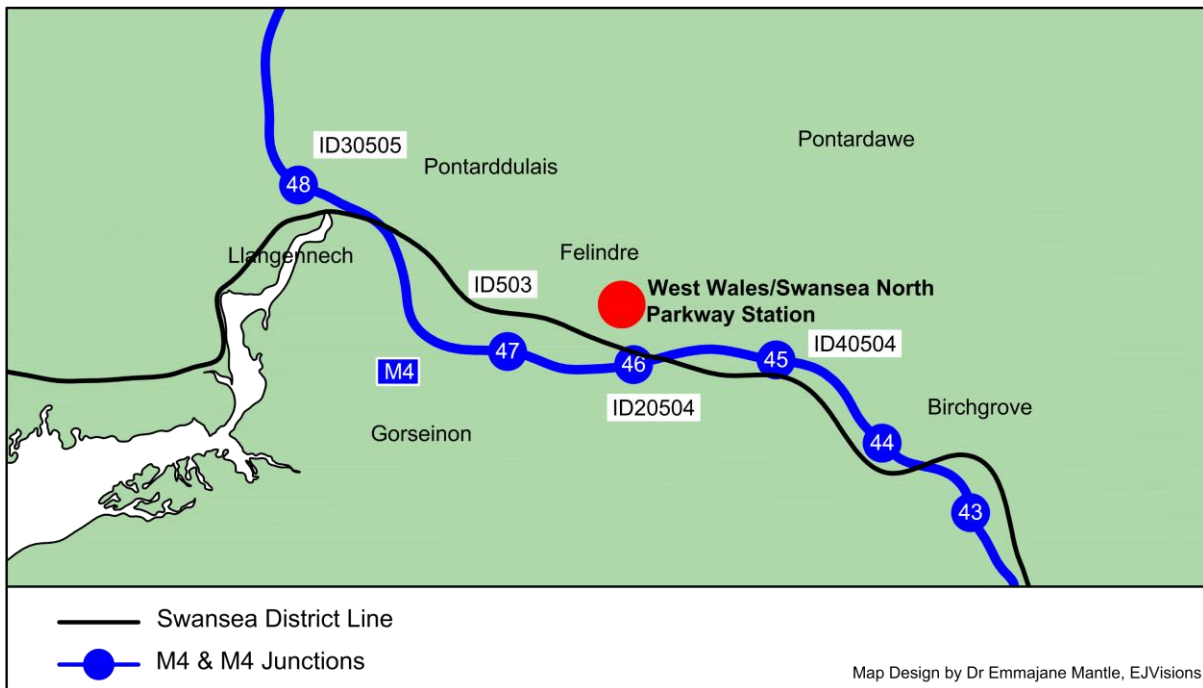


Fig 6a(ii) parallel map – juxtaposition of traffic flow IDs and West Wales / Swansea North Parkway station



Origin and destination surveys would be required to determine where the traffic on the M4 around Swansea is headed. This would be critical data when estimating potential demand for a new Parkway station

It should also be noted that no information regarding the following factors that would impact traffic flows have been taken into account as part of the analysis:

- Major roadworks
- Major accidents resulting in motorway closures
- Bad weather

## 6.2 Average Flow Analysis

Traffic data provided by Welsh Government shows that there are two distinct peaks in traffic flows. These are the am peak period (0700 – 0900 hours) and the pm peak period (1600 – 1800 hours). These are traditionally the times when the majority of people travel to, and from, work or school and is associated with periods of congestion.

During the night, between 2300 – 0500 hours, traffic flows decrease to low levels.

The data also shows that traffic flows increase significantly through the summer months. This reflects the importance of the M4 not only for commuting to work and school, but also accessing popular tourist destinations during the traditional British holiday summer season. Peak average daily flows are recorded in August. The lowest average daily traffic flows are in December.

Weekday average daily flows are higher than at weekends when traffic flows are much lower. Average daily traffic flows are highest on Fridays and lowest on Sundays.

Lonlas-Ynysforgan J44-J45

Data from the DfT shows that between 2010-17 the daily flows at Lonlas-Ynysforgan M4 J44-J45 average 66,999 vehicles. Cars account for 76% of the AADF.

Table 6a: ID 40504: Lonlas-Ynysforgan M4 J44-J45 (Easting 268970, Northing 199000)

Year	Estimation method	Motor cycles	Cars Taxis	Buses Coaches	Light Goods Vehicles	HGVs	AADF
2010	Counted	290	48,623	196	8,974	5,215	63,298
2011	Estimated	284	49,450	223	9,378	5,109	64,444
2012	Counted	174	47,477	179	9,659	4,078	61,567
2013	Estimated	190	47,950	188	10,428	4,190	62,947
2014	Counted	225	53,638	385	9,805	4,338	68,391
2015	Estimated	220	53,780	356	10,911	4,472	69,739
2016	Counted	254	56,649	151	10,935	4,294	72,284
2017	Estimated	236	56,587	148	11,857	4,496	73,324
<b>Ave</b>		<b>234</b>	<b>51,769</b>	<b>228</b>	<b>10,243</b>	<b>4,524</b>	<b>66,999</b>

Source: DfT



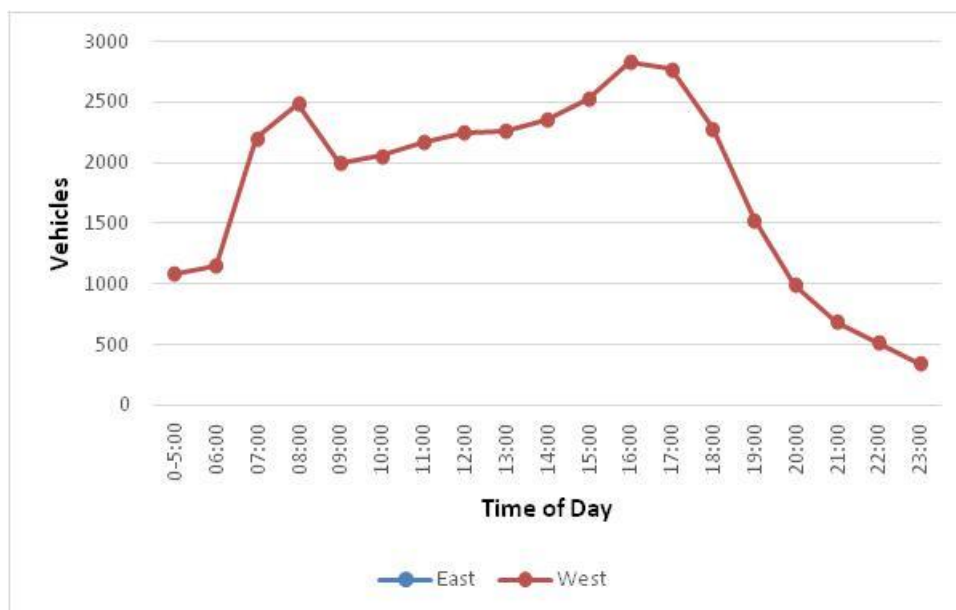
Welsh Government data shows a westbound average daily flow of 34,883 vehicles. Peak westbound flow occurs between 16:00-17:00 with an average 2,834 vehicles passing through the count site.

Table 6b: Lonlas-Ynysforgan J44-J45 (\*westbound data only, 01/04/18 to 31/10/18)

	<b>Average Daily Flow</b>	<b>Morning Peak (07:00 – 09:00) Average Hourly Flow</b>	<b>Evening Peak (16:00 – 18:00) Average Hourly Flow</b>	<b>12 hour (07:00 – 19:00) Average Hourly Flow</b>
East	-	-	-	-
West	34,883	2,344	2,802	2,349
<b>Two-Way</b>	-	-	-	-

Source: Welsh Government

Fig 6b: Lonlas-Ynysforgan J44-J45 (\*westbound data only, 01/04/18 to 31/10/18) - Average Hourly Flow



Source: Welsh Government

Table 6c: Lonlas-Ynysforgan J44-J45 (westbound only 01/04/18 to 31/10/18) – Average Daily Flow by Month

Month	Average Daily Flow
April	32804
May	34704
June	34795
July	35603
August	36361
September	32737
October	34273
<b>Average</b>	<b>34483</b>

Source: Welsh Government

Table 6d: Lonlas-Ynysforgan J44-J45 (westbound only 01/04/18 to 31/10/18) - Average Daily Flow by Day

Day	Average Daily Flow
Sunday	24543
Monday	34635
Tuesday	35337
Wednesday	36244
Thursday	38084
Friday	42558
Saturday	30216
<b>Average</b>	<b>34483</b>

Source: Welsh Government

## Ynysforgan to Llangyfelach J45-J46

Between 2010-17 the AADF at count site Ynysforgan to Llangyfelach J45-J46 (ID 20504) has averaged 69,209. Cars and Taxis account for 78% of traffic at this count site.

Table 6e: ID 20504: Ynysforgan to Llangyfelach J45-J46 (Easting 265300, Northing 199340)

Year	Estimation method	Motor cycles	Cars Taxis	Buses Coaches	Light Goods Vehicles	HGVs	AADF
2010	Counted	297	54,436	231	9,943	4,444	69,351
2011	Counted	273	52,206	219	9,631	4,226	66,555
2012	Counted	194	49,901	176	9,686	3,955	63,911
2013	Counted	248	54,830	242	9,730	3,861	68,911
2014	Counted	297	54,228	218	9,314	4,303	68,359
2015	Estimated	290	54,372	202	10,363	4,476	69,703
2016	Estimated	294	54,816	198	11,006	4,595	70,908
2017	Counted	195	59,520	162	11,288	4,807	75,972
<b>Ave</b>		<b>261</b>	<b>54,289</b>	<b>206</b>	<b>10,120</b>	<b>4,333</b>	<b>69,209</b>

Source: DfT

## Llangyfelach to Penllergaer J46-J47

Between 2010-17 the AADF at count site Llangyfelach to Penllergaer J46-J47 (ID 503) has averaged 65,390. Cars and Taxis account for 78% of traffic at this count site.

Table 6f: ID 503: Llangyfelach to Penllergaer M4 J46-J47 (Easting 263100, Northing 199260)

Year	Estimation method	Motor cycles	Cars Taxis	Buses Coaches	Light Goods Vehicles	HGVs	AADF
2010	Counted	305	49,026	241	8,718	4,028	62,318
2011	Counted	162	49,494	177	9,428	3,856	63,117
2012	Counted	231	51,115	148	9,518	3,810	64,822
2013	Counted	316	49,261	210	9,441	3,810	63,037
2014	Counted	224	50,574	156	9,581	3,993	64,528
2015	Estimated	218	50,709	144	10,662	4,149	65,881
2016	Estimated	221	51,123	141	11,322	4,228	67,035
2017	Counted	131	55,723	154	11,355	5,016	72,378
<b>Ave</b>		<b>226</b>	<b>50,878</b>	<b>171</b>	<b>10,003</b>	<b>4,111</b>	<b>65,390</b>

Source: DfT

Table 6g: Llangyfelach to Penllergaer J46-J47 (01/12/17 to 24/10/18)

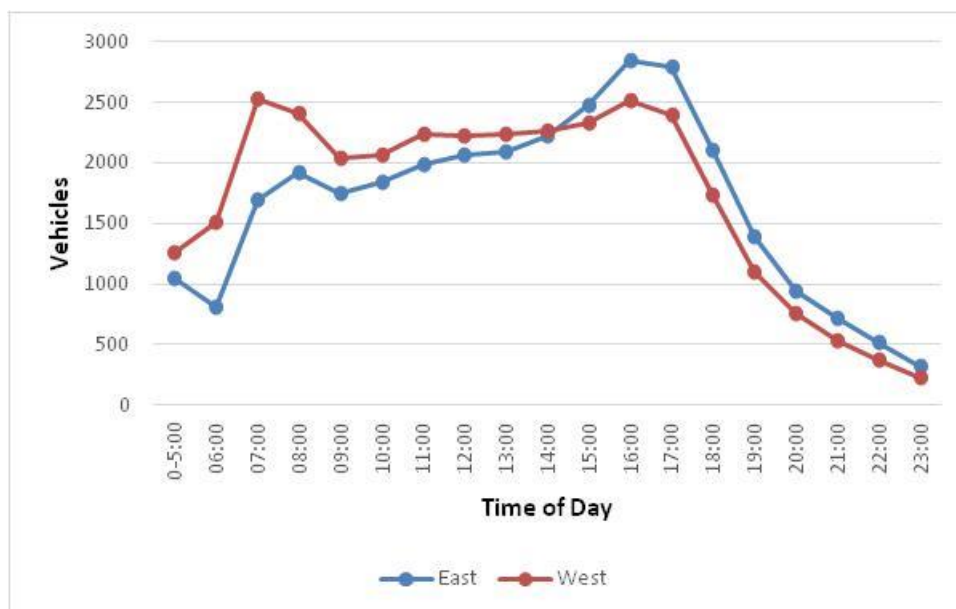
	<b>Average Daily Flow</b>	<b>Morning Peak (07:00 – 09:00) Average Hourly Flow</b>	<b>Evening Peak (16:00 – 18:00) Average Hourly Flow</b>	<b>12 hour (07:00 – 19:00) Average Hourly Flow</b>
East	31,537	1,806	2,819	2,150
West	32,734	2,473	2,457	2,249
<b>Two-Way</b>	<b>64,271</b>	<b>4,279</b>	<b>5,276</b>	<b>4,398</b>

Source: Welsh Government

Peak eastbound flow occurs between 16:00 – 17:00 with an average 2,845 vehicles passing through the count site.

Peak westbound flow occurs between 07:00 – 08:00 with an average 2,533 vehicles passing through the count site.

Fig 6d: Llangyfelach to Penllergaer J46-J47 - Average Hourly Flow (01/12/17 to 24/10/18)



Source: Welsh Government

Table 6h: Llangyfelach to Penllergaer J46-J47 – Average Daily Two Way Flow by Month (01/12/17 to 24/10/18)

<b>Month</b>	<b>Average Daily Flow</b>
December	57,262
January	57,573
February	60,667
March	60,395
April	65,172
May	67,389
June	68,268
July	68,888
August	71,300
September	64,603
October	65,581
Average	64,271

Source: Welsh Government

Table 6i: Llangyfelach to Penllergaer J46-J47 – Average Daily Two Way Flow by Day (01/12/17 to 24/10/18)

<b>Day</b>	<b>Average Daily Flow</b>
Sunday	49,143
Monday	66,151
Tuesday	67,095
Wednesday	68,680
Thursday	70,415
Friday	74,923
Saturday	53,622
Average	64,271

Source: Welsh Government

Penllergaer to Hendy J47-J48

Between 2010-17 the AADF at count site Penllergaer to Hendy J47-J48 (ID 30505) has averaged 52,000. Cars and Taxis account for 76% of traffic at this count site.

Table 6j: ID 30505: Penllergaer to Hendy M4 J47-J48 (Easting 259200, Northing 202550)

Year	Estimation method	Motor cycles	Cars Taxis	Buses Coaches	Light Goods Vehicles	HGVs	AADF
2010	Counted	183	37,148	116	7,676	3,847	48,970
2011	Estimated	179	37,780	132	8,021	3,773	49,885
2012	Counted	114	39,823	215	7,362	3,077	50,590
2013	Estimated	124	40,220	226	7,949	3,145	51,664
2014	Counted	249	39,026	130	8,653	3,663	51,721
2015	Estimated	243	39,130	120	9,629	3,803	52,924
2016	Estimated	246	39,449	118	10,225	3,888	53,927
2017	Counted	247	43,287	89	8,856	3,840	56,318
<b>Ave</b>		<b>198</b>	<b>39,483</b>	<b>143</b>	<b>8,546</b>	<b>3,630</b>	<b>52,000</b>

Source: DfT

Table 6k: Penllergaer to Hendy J47-J48 - Average Hourly Flow (01/12/17 to 30/11/18)

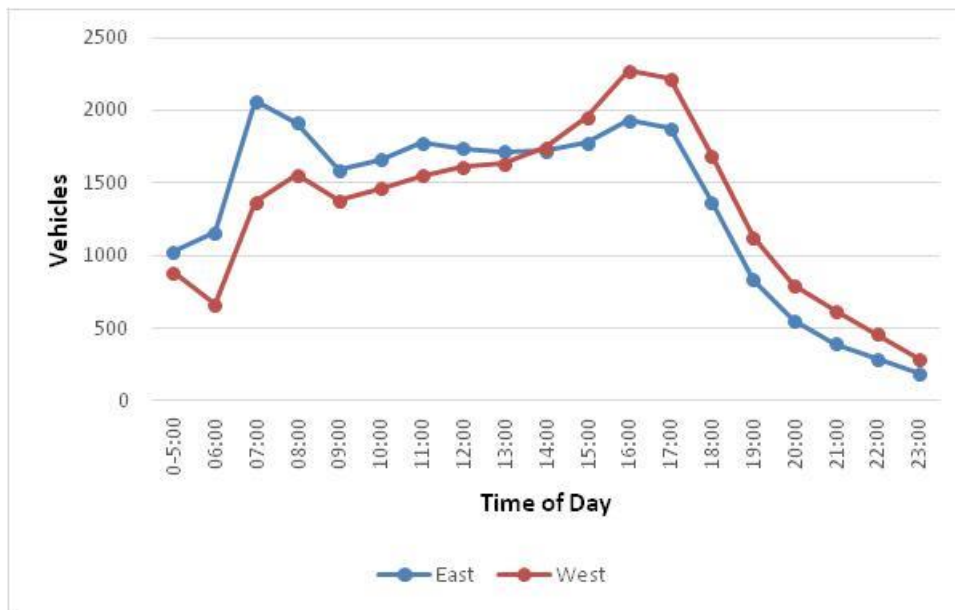
	Average Daily Flow	Morning Peak (07:00 – 09:00) Average Hourly Flow	Evening Peak (16:00 – 18:00) Average Hourly Flow	12 hour (07:00 – 19:00) Average Hourly Flow
East	25,587	1,990	1,901	1,761
West	25,306	1,463	2,245	1,705
<b>Two-Way</b>	<b>50,893</b>	<b>3,453</b>	<b>4,146</b>	<b>3,350</b>

Source: Welsh Government

Peak eastbound flow occurs between 07:00 – 08:00 with an average 2,065 vehicles passing through the count site.

Peak westbound flow occurs between 16:00 – 17:00 with an average 2,270 vehicles passing through the count site.

Fig 6e: Penllergaer to Hendy J47-J48 - Average Hourly Flow (01/12/17 to 30/11/18)



Source: Welsh Government

Table 6l: Penllergaer to Hendy J47-J48 – Average Daily Two Way Flow by Month (01/12/17 to 30/11/18)

Month	Average Daily Flow
December	44,780
January	44,828
February	47,357
March	47,210
April	51,180
May	53,676
June	54,115
July	55,120
August	57,884
September	52,014
October	51,923
November	50,422
Average	50,893

Source: Welsh Government

Table 6m: Penllergaer to Hendy J47-J48 – Average Daily Two Way Flow by Day (01/12/17 to 30/11/18)

Day	Average Daily Flow
Sunday	40,094
Monday	52,323
Tuesday	52,576
Wednesday	53,609
Thursday	55,079
Friday	59,563
Saturday	42,840
Average	50,893

Source: Welsh Government

### 6.3 Demand Forecasting and Potential Modal Shift

A detailed demand forecast for a possible new Swansea parkway station is outside the scope of this initial analysis. A web and library search has been undertaken in order to identify proxy data which could assist make an initial estimate of potential modal shift and station demand.

The search has not identified many published evaluation studies or impact studies relating to new rail stations. However a Strategic Outline Business Case on the SDL is being prepared by Network Rail/DfT.

Section 4.11 presents passenger demand data for Tiverton Parkway station. The average annual daily flow on the M5 at Tiverton between 2010 – 17 at two count sites (6023: M5 J 28-J 27 & 26023: M5 J 27-J 26) is circa 60,000 vehicles (Source DfT). This is similar to the average daily flow on the M4 at Llangyfelach to Penllergaer J46-J47.

In 2016 – 17 passenger through put at Tiverton parkway was 0.49m. With a similar flow of traffic along the M5 as the M4, and similar close proximity to a motorway junction, a new Swansea parkway station could possibly be expected to achieve at least comparable passenger through put as Tiverton parkway, assuming a comparable frequency of service is delivered. However, the catchment for the Swansea parkway would include a larger population base with different socio economic characteristics compared to the catchment for Tiverton. To determine how these factors might impact station demand would require detailed demand forecasting to be undertaken.



Table 6n: 6023: M5 J 28-J 27 (Easting 303700, Northing 112172)

Year	Estimation method	Motor cycles	Cars Taxis	Buses Coaches	Light Goods Vehicles	HGVs	AADF
2010	Counted	154	47,957	246	5,506	4,437	58,300
2011	Estimated	143	46,950	258	5,622	4,508	57,481
2012	Counted	161	43,041	197	7,562	5,373	56,334
2013	Estimated	168	43,954	211	8,054	5,393	57,781
2014	Counted	192	44,259	221	6,668	5,818	57,157
2015	Estimated	196	44,386	205	7,780	6,088	58,654
2016	Estimated	199	44,748	201	8,262	6,197	59,606
2017	Counted	108	51,882	204	9,478	6,062	67,735
<b>Ave</b>		<b>165</b>	<b>45,897</b>	<b>218</b>	<b>7,367</b>	<b>5,485</b>	<b>59,131</b>

Source: DfT

Table 6o: 26023: M5 J 27-J 26 (Easting 310259, Northing 117200)

Year	Estimation method	Motor cycles	Cars Taxis	Buses Coaches	Light Goods Vehicles	HGVs	AADF
2010	Counted	167	47,475	417	6,112	5,547	59,718
2011	Estimated	156	46,478	437	6,241	5,613	58,925
2012	Counted	244	51,245	297	6,713	5,577	64,077
2013	Estimated	255	52,332	318	7,150	5,610	65,666
2014	Counted	120	43,042	207	7,558	6,060	56,987
2015	Estimated	123	43,165	193	8,818	6,332	58,631
2016	Estimated	124	43,518	189	9,365	6,433	59,629
2017	Counted	102	50,785	196	8,838	5,863	65,784
<b>Ave</b>		<b>161</b>	<b>47,255</b>	<b>282</b>	<b>7,599</b>	<b>5,879</b>	<b>61,177</b>

Source: DfT

## **7 WEST WALES / SWANSEA NORTH PARKWAY : IMPACT ON PASSENGER NUMBERS AT NEARBY STATIONS**

### **7.1 Station Demand**

The primary market for a West Wales/Swansea North Parkway at Felindre is likely to come from car drivers/passengers diverting from the M4. A lesser market will come from other nearby railway stations. The passenger demand at these stations (2016 – 17) is shown in Figs 4e – 4f and in Appendix 1.

### **7.2 Swansea Central (High Street)**

Apart from Cardiff and Newport, Swansea is Wales's busiest station with 2,2m passengers (See Figs 4e-4f and Appendix 1) annually. Those passengers are a mix of Swansea and Carmarthenshire longer term residents, students (reflecting Swansea's role as a major education centre), business travellers to the CBD and tourists.

The likely main group of passenger transfers from Swansea Central to West Wales/Swansea North Parkway would be those who currently drive to Swansea station.

There will be no dedicated railway parking when the land used for this purpose opposite Swansea Central Station is developed. The alternative is a multi-storey car park adjacent to the station. This appears to have adequate capacity.

However the West Wales/Swansea North Parkway is most likely to attract passengers from north and west Swansea (see Figs 4a and 4b) and from Carmarthenshire/Pembrokeshire diverting conveniently off the M4 at J46. Passengers currently travelling by train from Gowerton are unlikely to change to SDL services. Some of those travelling from Llanelli westwards are likely to transfer if their destination is eastwards to Port Talbot and beyond. Transfers from M4 bound traffic at J46 and residents of north Swansea are the focused intended market. For north Swansea (e.g. Morriston, Llangyfelach, Treboeth etc) residents West Wales/Swansea North Parkway would be comparatively a more convenient station than Swansea Central.

An initial car park capacity of 500 cars is envisaged at West Wales/Swansea North Parkway. This could envisage 150,000 passengers annually travelling from West Wales/Swansea North Parkway. When many of these will be M4 'diverted' travellers, the impact on Swansea Central passenger numbers at 2.2m would be small.

Other parkway station experience (see Section 4.13) has shown the impact on business travellers though their modal choice criteria should not be underestimated.

Track capacity at Swansea Central is nearing its limit at peak times. To feed more trains through such as an extra two tph might be a disadvantage resulting in unreliability. A proposal recently published to provide in effect a 'low level' station

not at grade with Swansea Central would reduce train service integration and at a high capital cost.

### **7.3 Neath**

At present Neath Station has a park and ride area. The current daily charge is £5.

This capacity does not always match the demand figures and many rail travellers make use of a private car park located beyond the town centre shopping area and with a walking time of approximately 10 minutes.

Car parking at Felindre is expected to be free and those train passengers approaching Neath from the M4 (J46 to the west) are likely to transfer. Similarly there may be some from the Neath Valley (if not the town itself) who will find the West Wales / Swansea North Parkway attractive.

However this will benefit remaining Neath passengers as the station will be less crowded in peak times and dwell times for loading may be reduced.

Neath Station has a robust demand and is included in both the Wales and Borders franchise contract (to 2034) and the proposed Greater Western franchise (to at least 2032). It will remain an intercity and regional Wales and Borders stopping point for two / three tph as at present.

The operation of the SDL and the proposed West Wales / Swansea North Parkway will only benefit Neath Station and its users.

### **7.4 Port Talbot Parkway**

The impact on Port Talbot Parkway is likely to be limited and little effect on the car users transferring to West Wales/Swansea North Parkway.

The concept of 'driving west to go east' has been shown in other research to be unlikely in this type of station development. Port Talbot Parkway has a long established role and clientele. It too will not lose any of its status with the current two tph remaining.

It will however benefit from two further trains per hour following the development proposed here. All SDL trains will stop at Port Talbot Parkway giving it four tph. This may well increase patronage at Port Talbot Parkway station.

## 8 COST OF WEST WALES / SWANSEA NORTH PARKWAY STATION DEVELOPMENT, TRAINS AND SUBSIDY

### 8.1 Overall costs

The prime cost of establishing this proposed service via the SDL are engineering costs at the station site, new train capital costs and as an ongoing annual subsidy. The estimates are set down in Table 8a.

**Table 8a: Estimated Costs – Capital and Revenue Account**

<u>Cost Elements</u>	<u>Capital A/c (£m)</u>	<u>Revenue A/c (£m) Annual</u>
New trains 3-4 units (1)	£9m-£12m	
West Wales/Felindre/Swansea North Parkway Station (2) including land	£20m	
Land acquisition (if required) (3)	£430,000	
Roadways	n/k	
Subsidy (4)		£1.5m - £2.0m

#### Notes

(1) See section 8.2

(2) Adequate station buildings; connecting to bus station and car park; possible engineering track work (see above). A full GRIP has not been carried out so these are estimated costs. The line is included in Network Rail re-signalling plans for Port Talbot West.

(3) The land is in joint public ownership between Welsh Government and CCS. There can be no fixed ratio of spaces/acreage as the land areas and shapes vary. The initial West Wales/Swansea North Parkway car park size would accommodate 500 cars. Each acre could accommodate 150-200 cars. The land value for business use in this area is £150,000 per acre (JLL, 2018).

If the number of car spaces (with standard roadway) is 150 per acre then 3.3 acres are required at a cost approximating £495,000.

If the number of spaces (with standard roadway) is 200 per acre then 2.5 acres are required at a cost approximating £495,000. The RDG (2018) design guide advises that each parking space standard measure is 2.4 metres x 4.8 metres. The driveway width which will affect the number of spaces per acre is for example:

Space at 90° to the driveway : 6.00 metres

Space at 45° to the driveway : 3.60 metres

Other angle/driveway width measures are used (NR, 2018).

(4) Subsidy – the criteria to determine the subsidy required would be the population size within the catchment area, (up to 380,000); the evidence on criteria determining people's modal change (above); the need to grow this new service's market and the proportion of this route within the context of the overall Wales and Borders/South East Wales Metro total 2019-20 subsidy of £171.4m. The estimated subsidy for this service in 2019-20 based on factors such as number of

trains operated, track mileage and total subsidy is approximately £1.5m-£2m per annum. The figure for 2019-20 is based on an assumption that suitable Class 150 'Sprinter', 158 'Express' or 175 'Cordia' train sets being available. The final figure for 2022-23 cannot at present be calculated as no operating cost data is available.

## **8.2 Capital Cost of Trains**

The trains being procured for West Wales operations by TfW are CAF Civity units assembled in Newport. If few or no operating extensions were possible then additional train sets would be required. Assuming the SDL services require all additional trains the capital costs are shown here. A two-car CAF train unit is priced at £2.4m and a three-car set at £3.6m. A middle figure of £3m per train has been used here.

The present operations are a mix of hourly (to Carmarthen) and two hourly frequencies to Pembrokeshire destinations. Consequently train frequencies are described as 'per two hours'. There is an hourly service between Swansea and Carmarthen (the Carmarthen-Manchester trains) and an additional service every two hours.

Operating via the SDL as a stand-alone service, an hourly Carmarthen-Cardiff service would require an estimated 3 / 4 trains (£9m-£12m); a half hourly operation would require an estimated 6 / 8 trains (£18m-£24m).

Operating via Swansea Central using 'diverted' or extended services could be achieved with 1 / 2 trains (£3m-£6m).

Operating via Swansea Central a Carmarthen-Cardiff additional service offering a half hourly frequency has an estimated cost of 3 / 4 trains (£9m-£12m).

These estimates are subject to review. The worst case scenario is presented here.

However while services via Swansea Central or the SDL would provide the increased frequency only the SDL can provide a significant journey time saving of 14/22 minutes (Carmarthen-Cardiff) or 29/37 minutes (Carmarthen-London, with connection at Cardiff).

## 9 SERVICE SPECIFICATIONS FOR ADDITIONAL SERVICES / COST ESTIMATE

### 9.1 Service Levels and trains

This proposal is for a strategic south west Wales railway using existing infrastructure and requiring (using the railway industry formulae for train set requirements against distance and journey time) three or five new trains costing £3m each by 2023. This provides a more immediate solution to modal shift and road congestion while fitting into longer term plans. It is understood that the *New Routes and Services Summary Report* (TfW, 2016a) based on the Network Rail final report *Capability and Capacity Analysis* (NR 2016a) indicates that the Swansea District Line is of the appropriate standard to carry the proposed train frequency. It is a passenger train approved line which currently carries freight and two passenger trains per day (tpd).

An important aspect if such a service improvement is to be achieved in the short term is to minimise the required capital funding and required subsidy. This report has taken a position with no major track investment, a new railway station on the SDL option investment, three/four additional leased CAF trains costing £9-£12m and a one off capital cost is a modest rail subsidy increase – a relatively low cost option.

The TfW order for CAF Civity trains to operate inter-urban trains (outside Cardiff) which would serve west Wales could be increased within the order from TfW. The current order for the CAF trains is:

- 51 x 2 car @ £2.4m each ) train mix cost at £3m per train
- 26 x 3 car @ £3.6m each )

Further detailed strategic, economic and financial evaluation (based on WelTAG) is required for this rail opportunity to provide travel time and economic benefits to north Swansea, Carmarthenshire and Pembrokeshire. This DfT analysis using criteria in a WelTAG Strategic Outline Business Case (SOBC) is currently being carried out by Network Rail for DfT; the GRIP infrastructure evaluation process by Network Rail; and an evaluation of extra trains sets' costs and benefits by TfW and Welsh Government.

It is anticipated that the land available for car parking will be future proofed and subject to the Welsh Government's policy of free railway station parking. Currently some users of Swansea Central and Neath Stations are obliged to use private car parks, although the TfW car parks at these stations make a charge.

There may also be a peak times capacity constraint at Swansea Central station. A regular half hourly frequency above the existing operation could either:

- Not be accommodated in every hour
- be accommodated but operational efficiency would be tight

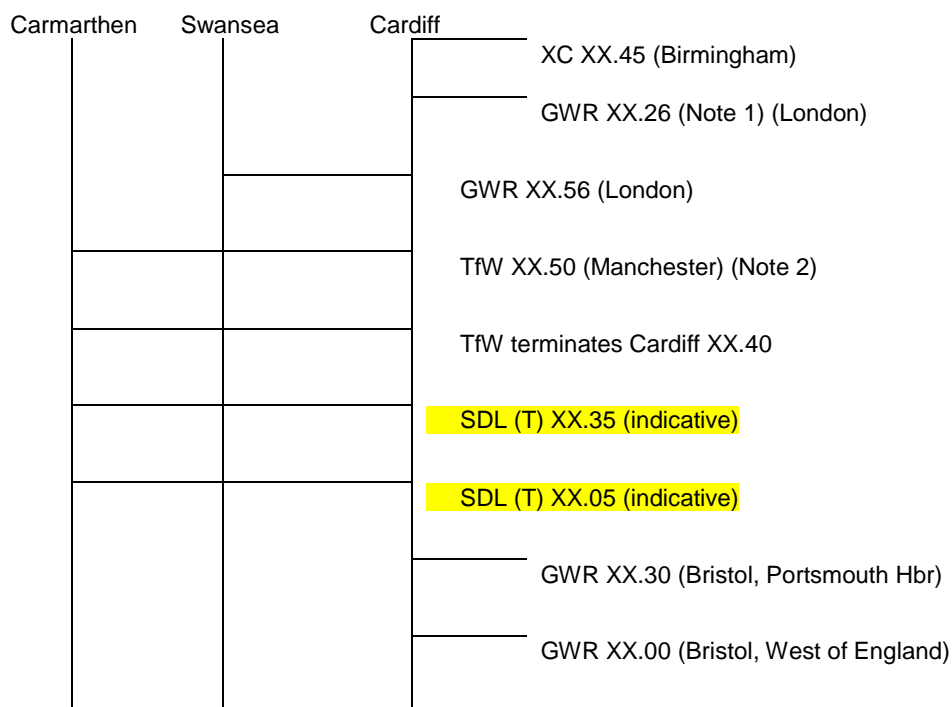
This principle of a relatively high frequency (for an area such as south west Wales) train service and good timekeeping are particularly effective service elasticity

elements in increasing passenger demand. A similar impact could be expected at West Wales/Swansea North Parkway Station.

It retains all existing train services serving Swansea (Central) Station, Neath and Cardiff. The proposal will bring added services for residents of the City and County of Swansea; indeed for those in the north of the city's urban area a new West Wales / Swansea North Parkway station will reduce their journey time (especially in peak periods) to the nearest railhead.

## 9.2 Capacity /Timetables

Fig 9a Indicative train paths



- GWR - service to London
- MCR - TfW service to Manchester
- XC - Cross Country service to Birmingham/England east Midlands
- T - every other hour service to Cardiff
- SDL - extra services operated by TfW
- Note 1 - GWR (07.30 ex Carmarthen arr Cardiff 09.23)
- Note 2 - TfW Manchester service XX.08 from Milford Haven

There are also connecting services at Cardiff to Liverpool.

Any journey time reduction would only be achieved via the SDL.

As referred to in paragraph 2.2 (and Fig 2a), a journey time saving of up to 22 minutes could be achieved travelling from Carmarthen to Cardiff via SDL; the time saving to London would be up to 37 minutes (with GWML electrification).

## **Speed Limits**

An increased speed limit to 60mph or 70mph could reduce the Carmarthen-Cardiff journey time by up to 8 minutes (see section 2.2). Timings at present on the SDL are based on Class 150 train speeds. There is sufficient capacity available on the SDL and generally on the GWML to Cardiff. Network Rail are currently examining the possibility of increasing maximum line speeds on the SDL.

## **Freight Train Paths - impact**

Freight services have reserved paths on the SDL and GWML (mostly Port Talbot/Trostre Steel and Milford Haven oil) which they have a right to retain. It might be possible to agree with the freight operators to move these (or some) to the off peak. Not all the paths are in regular use. There are circumstances of non-use where the ORR may transfer them to passenger use. However, the timing of these flows vary while passenger services would operate a clock face (regular times past the hour) service.

On the line between Court Sart Junction and Cardiff, new services would have to fit in with train paths reserved for GWR and TfW services. Generally there is no capacity constraint on the GWML.

An hourly service between Carmarthen and Cardiff for eastbound travellers (via the SDL or Swansea Central) might fit into GWR and Cross Country departures from Cardiff with a 'near enough' transfer time to be attractive for same/cross platform interchange at Cardiff.

The pattern would expect to increase from 3 trains every 2 hours increased to 4 trains every 2 hours (hourly service to/ from Carmarthen) or 5 trains every 2 hours (half hourly service to/from Carmarthen). On the eastbound service the pattern is in Fig 9a.



### 9.3 West Wales/Swansea North Parkway Site

The potential site lies alongside the SDL at Felindre (a closed tinplate works) easily accessed from the M4 Junction 46 and the A48. (Figs 9b, 9g)

Fig 9b Proposed Station Location



Source: Costain

Fig 9c Station Layout Plan

West Wales Parkway Sectional Appendix Extract	Route Description		ELR	Route	Last Updated
	Jn/Up Flying Loop Jn to Morlais Jn		SDI	Western	30/01/2016
	Mileage M	Ch	Running lines & speed restrictions		Signalling & Remarks
Former site of Felin Fran Jn	2	25			TCB RA8 Port Talbot SB (PT) GSM-R
Llangyfelach Tunnel (1786m, 1953yds)	4 03 to 5 13	* * T			
Swansea Parkway	5	20			
Penllergaer Tunnel (260m, 284yds)	6 45 to 6 58				

Source: Costain

The catchment area of the site is shown in Fig 4a above, extending across north Swansea, west Swansea, Swansea Valley and south west Wales far into Carmarthenshire along the M4, A48, A40. The site for the platforms is on Network Rail land, the station site is within a 200 acre brownfield site jointly owned by the City and County of Swansea (CCS) and Welsh Government.

There are two access points to the site.

- Directly off the M4 at J46 via a high quality access road over the SDL with no current housing. This road connects to an existing business park road network which could be linked to the site. There is currently a DVLA coach served P&R location and a public park and share on the site. (Figs 9b, 9g)
- From the A48 via Bryntywod (a small settlement) and an M4 under bridge road. Other activities are industrial and the road is a standard carriageway width. It accesses the site via an SDL over bridge. This bridge is at right angles to the station site and might be used as the station footbridge thus reducing the costs. Twenty-four hour parking restrictions on this roadway would be required (9d, 9e).



Fig 9d West Wales / Swansea North Parkway approach road via Bryntywod



Fig 9e Link road from M4-J46 to Felindre Business Park (adjacent to West Wales / Swansea North Parkway)



Fig 9f SDL looking east over station site



Fig 9g West Wales / Swansea North Parkway – part of site

#### **9.4 Potential Land Developments at Felindre**

Land value at Felindre is estimated at £150k per acre; higher values have been suggested in the west of Swansea. However the land is jointly held by Welsh Government and the City and County of Swansea (CCS). (Fig 9b, 9g).

The cooperation of both governmental agencies is therefore important for the development of this station. Any site will have similar capital costs.

The possibility of a governmental hub developing at the site has been suggested. This could involve parallel developments for Swansea Vale offices (1500 staff), Land Registry, HMRC, Maritime Agency / Coastguard. West Wales / Swansea North Parkway at Felindre brings an easy public transport connection to / from London at around 2h 45m (with 15 minutes cross platform connection at Cardiff).

In addition the DVLA offices employing 5000 people and the major enlarged Morriston Hospital are within the West Wales / Swansea North Parkway catchment area.

#### **9.5 Other possible sites**

These have been suggested at locations on the M4 / SWML at Baglan; at Coed Darcy (J33) and at Llansamlet (J44) which may serve the SDL and the SWML. Landore (on the SWML) with diversion of some bus services into the P&R and a direct competitor for and threat to Swansea Central (High Street) station. All are of less benefit to south west Wales as:

- they lie within the peak period congestion areas on the M4 or radial routes between the M4 and Swansea

- they are not as closely aligned to the M4 and the railway

Costs of construction and train provision would be similar for any of the locations.

These however are:

- Not as convenient for both the M4 and the SDL
- Lie within the heavily peak congested lengths of the M4 (J45 – J40)

The City and County of Swansea Local Development Plan has the site in mind for the Felindre Development Plan to include a railway station at the southern end of the site about 900m west of this proposal (CCS, 2012b); and housing and commercial developments.

The site has considerable potential for passenger demand.

## **9.6 Engineering Commentary – West Wales / Swansea North Parkway Station**

This requires further technical engineering work by Network Rail. However, it appears to comply with track gradient and track curvature requirements for new stations and a platform of up to 100m. (Figs 9c, 9f)

The SDL may be used for passenger trains and is currently used by passenger trains on a regular (not diversionary), though infrequent, basis. The line speed is between 50mph-60mph. A further study is recommended to estimate the cost of increasing the line speed to provide further journey time reduction benefits for passengers.

## **9.7 Current operations**

The line currently has:

- Two passenger trains daily. There is therefore considerable capacity for additional passenger trains including a half hourly train
- A number of freight trains each day. Freight trains use 10 of the 17 allocated paths at peak time and 3 of 4 paths at the least busy times. There is sufficient capacity for additional passenger trains on a half hourly basis. The line is to be re-signalled under the Port Talbot West plan in Control Period (CP) 5.
- A 50 mph speed along its length, the result it is suggested of the curvature of the track
- A capability for passenger trains
- No stations currently in operation
- On the SWML between Port Talbot and Cardiff there is (from Network Rail) assured capacity for two extra trains per hour. From Bridgend the SDL trains could contribute one or two to the 4 tph service provided in the new rail franchise by TfW

**Professor Stuart Cole CBE**  
**29 January 2019 (v17)**

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## **GLOSSARY**

CBD	Central Business District
CCS	City and County of Swansea (Council)
GWML	Great Western Main Line
GWR	Great Western Railway
HOWL	Heart of Wales Line
LDP	Local Development Plan
NR	Network Rail
P&R	Park and Ride car parking facility
SDL	Swansea District Line
SWML	South Wales Main Line
TfW	Trafnidiaeth Cymru/Transport for Wales
tpd	Trains per day
tph	Trains per hour
WG	Welsh Government

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Arriva Trains Wales Ltd

**Appendix 1 Passenger numbers (by weekday, Saturday, Sunday) – All stations on SWML**

Station	All types of tickets		West bound						East bound					
	2016-2017 entries and exits	2015-2016 entries and exits	M-F	M-F Term	Sat	Sat Term	Sun	Sun Term	M-F	M-F Term	Sat	M-F Term	Sun	Sun Term
Severn Tunnel Junction	253,918	249,156	17	0	16	0	7	0	15	0	15	0	7	0
Newport (Gwent)	2,614,150	2,560,868	53	0	44	0	20	0	42	3	33	5	14	1
Cardiff Central	12,534,884	12,744,582	68	0	57	0	23	0	51	17	51	12	19	2
Pontyclun	302,896	301,474	21		19		5		19		18		4	
Llanharan	173,626	169,428	2		19		5		18		18		4	
Pencoed	233,420	236,902	21		19		5		19		18		4	
Bridgend	1,524,162	1,540,674	67		58		23		64		62		21	
Pyle	118,910	120,732	15		15		6		13		20		6	
Port Talbot Parkway	504,524	502,742	50		42		23		42		47		20	
Baglan	23,776	26,882	12		12		0		10		9		0	
Briton Ferry	36,900	35,224	12		12		0		10		9		0	
Neath	818,584	837,116	51		41		22		45		45		20	
Skewen	43,180	45,172	12		12		0		10		9		0	
Llansamlet	33,982	33,862	12		12		0		10		9		0	
Swansea	2,130,154	2,158,992	37	27	36	22	18	12	46	17	44	10	23	12
Gowerton	167,184	142,836	29		29		14		26		23		14	
Llanelli	413,062	405,230	33		34		19		36		33		19	
Pembrey & Burry Port	145,426	143,382	28		29		17		27		27		16	
Kidwelly	29,992	30,644	19		19		8		15		15		8	
Ferryside	21,572	19,608	19		19		8		15		15		8	
Carmarthen	426,890	419,794	24	9	25	11	15	5	29	8	27	9	18	5
Whitland	50,932	52,118	26		24		16		26		26		15	
Narberth	19,924	20,922	9		10		5		10		11		4	
Kilgetty	16,194	15,438	9		8		4		10		9		4	
Saundersfoot	8,384	7,900	9		8		4		10		9		4	
Tenby	123,314	118,338	10		8		4		11		9		4	
Penally	5,332	5,444	7		8		4		10		9		4	
Manorbier	9,428	9,648	9		8		4		10		9		4	
Lamphey	5,556	5,732	9		8		4		10		9		4	
Pembroke	29,844	28,446	9		8		4		10		9		4	
Pembroke Dock	49,362	46,710	7	9	2	9	1	4	10	0	9	0	4	0
Clunderwen	24,212	24,128	15		12		8		14		14		7	
Clarbeston Road	9,208	10,138	16		14		8		15		17		8	
Fishguard & Goodwick	19,600	19,946	6		0		3		7		7		4	
Fishguard Harbour	18,600	22,646	6	6	1	7	0	4	7	0	7	0	4	0
Haverfordwest	133,496	136,346	12		9		8		10		11		7	
Johnston (Dyfed)	8,364	8,704	11		9		7		10		11		7	
Milford Haven	64,092	64,034	7	11	0	10	0	7	10	0	11	0	8	0
<b>TOTAL</b>	<b>23,147,034</b>	<b>23,321,938</b>	<b>779</b>	<b>62</b>	<b>706</b>	<b>59</b>	<b>322</b>	<b>32</b>	<b>752</b>	<b>45</b>	<b>734</b>	<b>36</b>	<b>321</b>	<b>20</b>
All numbers are extracted from Timetable 3 (20 May to 8 December 2018) published by Trafnidiaeth Cymru														
M-F = Mondays to Fridays			Sat = Saturdays			Sun = Sundays								
M-F Term = Mondays to Fridays terminating trains			Sat Term = Saturdays terminating trains			Sun Term = Sundays terminating trains								

(Source: Office of Road and Rail)



## Appendix 2 Rail passenger journeys to, from or within Wales and total journeys in Great Britain by year (000's)

	Total journeys in Wales				Total GB journeys
	From Wales to rest of GB	To Wales from rest of GB	Within Wales	Total journeys in Wales	Total GB journeys
1992-93	2,476	2,510	11,472	16,458	628,237
1993-94	2,540	2,558	10,758	15,856	618,136
1994-95	2,368	2,386	9,232	13,986	556,086
1995-96	2,541	2,556	9,390	14,487	589,499
1996-97	2,658	2,671	9,553	14,882	627,917
1997-98	2,795	2,805	9,747	15,347	671,119
1998-99	2,838	2,849	9,674	15,360	704,997
1999-00	2,922	2,922	10,766	16,609	747,560
2000-01	2,894	2,897	11,203	16,994	755,077
2001-02	3,017	3,020	12,104	18,141	758,628
2002-03	3,128	3,135	12,426	18,689	775,315
2003-04	3,336	3,339	12,863	19,538	791,395
2004-05	3,364	3,370	13,156	19,890	808,484
2005-06	3,463	3,475	13,491	20,428	827,395
2006-07	3,640	3,839	14,596	21,875	984,035
2007-08	3,827	3,808	16,236	23,882	1,018,053
2008-09	3,970	3,970	17,385	25,325	1,074,163
2009-10	4,023	4,023	18,000	26,045	1,065,392
2010-11	4,295	4,295	18,685	27,274	1,160,429
2011-12	4,530	4,530		28,098	1,222,018
2012-13	4,587	4,587	19,232	28,405	1,269,040
2013-14	4,527	4,527	19,792	28,846	1,332,634
2014-15	4,677	4,677	19,972	29,326	1,392,601
2015-16	4,804	4,804	20,706	30,313	1,463,777
2016-17	4,616	4,616	21,218	30,451	1,469,676

Source: Statistics Wales(2018)