



Route 15 South Wales Valleys

Today's route

The arteries of the Valleys route radiate northwards, southwards and westwards from Cardiff. The four main components running northwards are:

- the 'Taff Vale' section from Cardiff to Pontypridd and Merthyr;
- the Rhondda valley section from Pontypridd to Treherbert;
- the Cynon valley section, from Abercynon to Aberdare, plus the freight-only section beyond Aberdare to Hirwaun; and
- the Rhymney valley section from Cardiff to Rhymney, off which a short branch diverges at Heath Junction to Coryton (which is within the Cardiff city area), plus the freight only line from Ystrad Mynach to Cwmbargoed.

Southwards and westwards components comprise:

- the short branch from Cardiff Queen Street to Cardiff Bay;
- Cardiff to Cogan, Barry and Bridgend;
- Cogan Junction to Penarth;
- Barry to Barry Island;
- Ninian Park to Radyr via the 'City Line'; and
- Bridgend to Tondy and Maesteg.

The valleys route comprise Strategic Route Section 15.03, with the exception of the Bridgend to Maesteg branch (15.01) and the freight only lines (15.02).

15 15

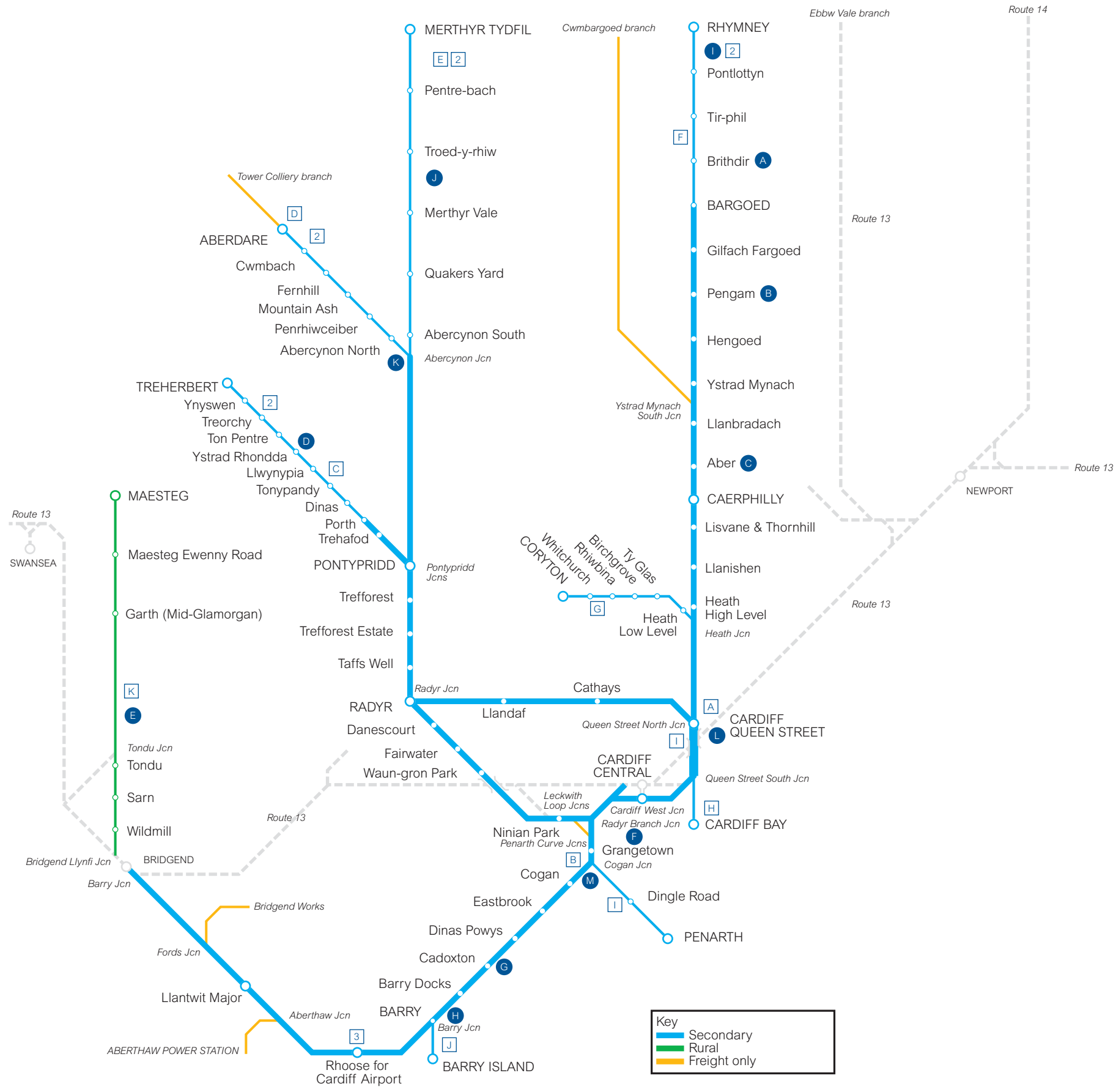
Route context

The South Wales Valleys route is essentially a busy urban passenger network radiating from the Welsh capital city of Cardiff, and which has been experiencing gradual expansion since the late 1980's. The most recent addition to this local network has been that of the nineteen-mile long "Vale of Glamorgan" line which, from June 2005, gained hourly services linking Cardiff with Bridgend via Barry serving two new stations at Rhoose (for Cardiff International Airport) and at Llantwit Major. A key strength of the route is its excellent penetration of the City centre of Cardiff, for retail and employment purposes,

as the majority of trains serve both Cardiff Central and Cardiff Queen Street stations, also giving easy interchange with longer-distance east-west services on the Great Western Main Line at the former. The rapidly growing Cardiff Bay area to the south of the city centre is also linked to the Valleys network by means of a shuttle service to and from Queen Street station.

A Wales Rail Planning Assessment will be undertaken in 2006, to be followed by a Wales RUS, to cover all of Wales.

Route 15 South Wales Valleys



Key	
—	Secondary
—	Rural
—	Freight only

Passenger and freight demand

Passenger numbers carried have grown by 62% over the period between 1998 and 2004. The two main stations at Cardiff (Central and Queen St) account for 67% of all passenger demand within the route, with significant secondary volumes carried to Pontypridd, Caerphilly, Barry and Bridgend. The underlying basis of demand has been that as heavy industry in the Cardiff Valleys has declined, the freight traffic which once dominated movements has virtually disappeared, making possible the expansion of passenger services on routes where demand for travel to Cardiff has grown in line with increased job/leisure opportunities in the capital, and employment loss in the valleys themselves.

The coal-fired power station at Aberthaw continues as a key power generator in Wales, and attracts traffic from a variety of sources which include Tower Colliery, on the freight line north of Aberdare. Some aggregates traffic also moves on the Cynon Valley section from Hirwaun down to Abercynon and beyond. After a period of disuse, coal traffic from Cwmbargoed to Aberthaw has restarted over the freight-only branch line from the Rhymney Valley at Ystrad Mynach.

Current services

Valley Lines services are operated by Arriva Trains Wales. The operation is characterised by most services being linked across Cardiff thus catering for demand to both main stations, and the introduction of the 'Standard Pattern Timetable' (from December 2005) simplified the range of pairings of north-south origins and destinations further, as well as bringing Rhymney valley services (south of Bargoed) up to a four trains per hour frequency following enhancement of signalling arrangements. The bulk of Valley Lines services are self-contained to the local network, radiating from Cardiff Queen Street, although Maesteg services run over the Great Western main line from Cardiff Central to Bridgend, and are provided in conjunction with other secondary main line services. When major events are staged at the Cardiff Millennium stadium adjacent to Cardiff Central station, special timetable arrangements are necessary to cater for the substantially increased demand created across the Valleys network.

The 'inner' sections of the Valleys route now all enjoy a minimum weekday frequency of four trains per hour, as far out as Pontypridd, Bargoed, Penarth and Barry. Some 'outer' sections have two trains per hour, namely Treherbert and Aberdare, as well as the City Line and Coryton branches, the others having hourly (Maesteg, Bridgend via the Vale of Glamorgan line, Rhymney and Merthyr).

Figure 1 and Figure 2 show the current level of service.

Figure 1 Current train service level (trains per hour)

Valley Lines service	
Treherbert – Cardiff Central	2 peak/2 off peak
Aberdare – Barry Island	2 peak/2 off peak
Pontypridd – Barry Island	1 peak/1 off peak
Merthyr Tydfil – Bridgend (via vale of Glamorgan)	1 peak/1 off peak
Coryton – Cardiff Central	2 peak/2 off peak
Rhymney – Penarth	1 peak/1 off peak
Bargoed – Penarth	3 peak/3 off peak
Cardiff Queen St – Cardiff Bay	4 peak/4 off peak

Figure 2 Current train service level (trains per hour)

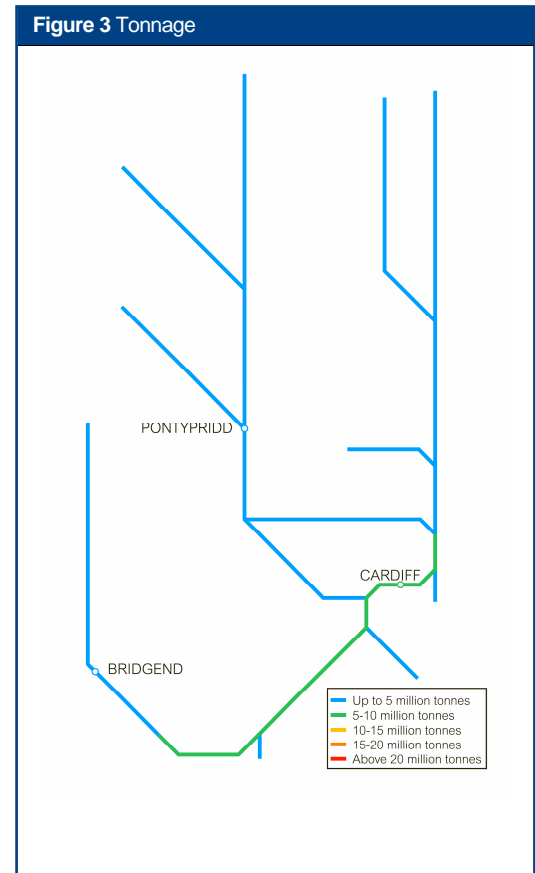
Regional/Rural Services	Trains per hour each way
Maesteg – Bridgend (to Gloucester via SWML)	1

Current traffic

Steadily growing passenger volumes in recent years have led to gradual fleet expansion which has put pressure on the main Cardiff Canton depot both for maintenance and stabling purposes. Additional diesel multiple-unit stock has been leased and, with the introduction of the Standard Pattern Timetable, further steps have been taken towards standardisation on these types which will eventually enable elimination of peak hour locomotive hauled workings on the Rhymney Valley section.

The highest growth rates for passenger traffic have been experienced on the Cynon Valley section, between Aberdare and Abercynon, and platform lengthening was carried out in 2005/06 such that four-car formations can now be handled at all stations on the route. Lower traffic volumes on the Coryton and City Line sections are such that these can be linked and simply served by two-car formations consistent with the shorter platforms, with the Cardiff Bay section reduced to shuttle only status from Cardiff Queen Street after the cessation of through running from various north of Cardiff originating points.

Figure 3 shows the tonnage levels on the route.

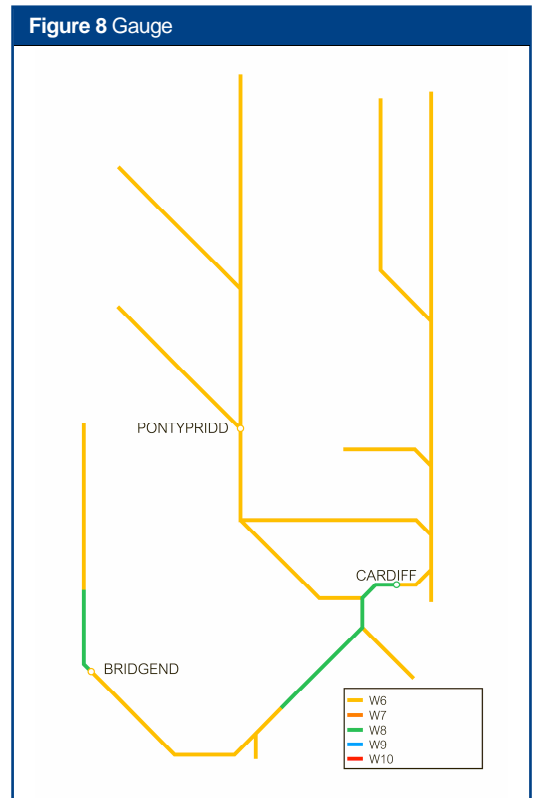
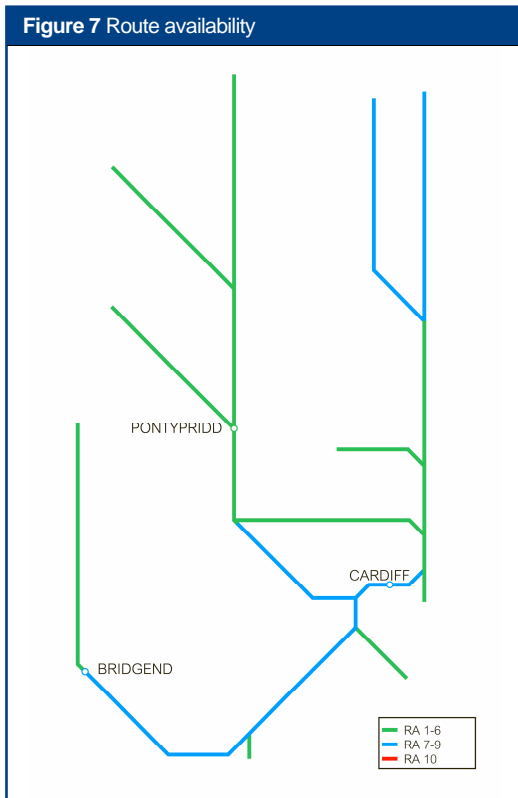
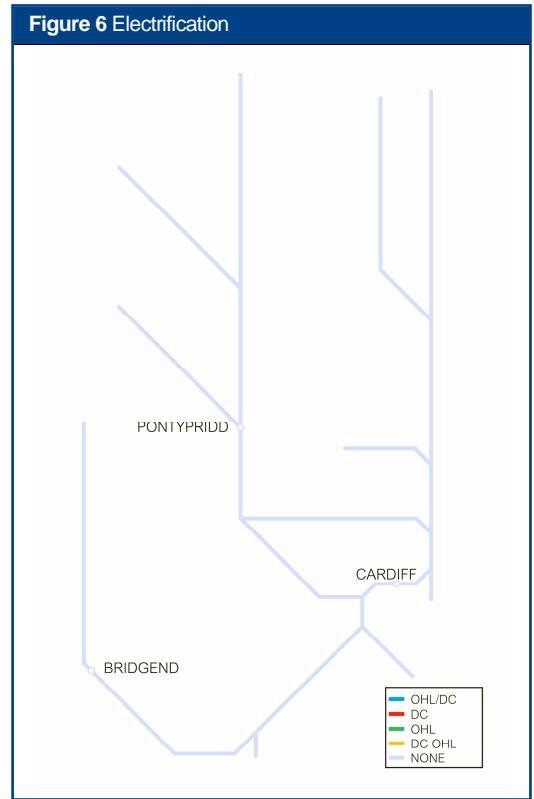
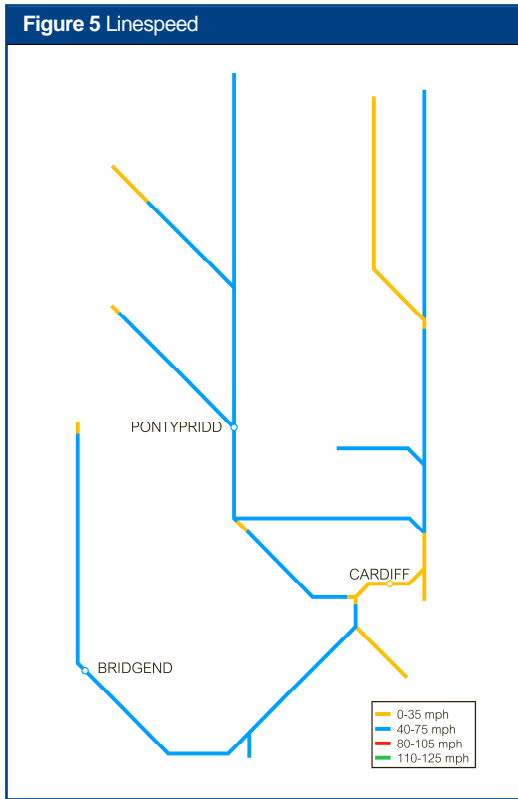


Traffic volumes are summarised in Figure 4.

Figure 4 Current use			
	Passenger	Freight	Total
Train km per year (millions)	4	0	4
Train tonne km per year (millions)	269	204	473

Current infrastructure capability

The following maps set out the capability of the current network:



Current capacity

The northern extremities of the Valleys routes are single track, with double track south of Porth, Abercynon and Bargoed. The Cardiff Bay branch, the Coryton branch, Cogan Junction to Penarth, Barry to Barry Island and Bridgend to Maesteg are also single track. Passenger services are provided wholly by Arriva Trains Wales, and in many cases the paths utilised now fully consume available capacity particularly over the single-track stretches of most routes at their outer extremities and the through the 'bottleneck' at Cardiff Queen Street. Whilst the basic train size is a 2 car diesel multiple-unit, increasing numbers of trains are scheduled for 4 car operation, particularly in the peak hours, although certain route-sections (Maesteg, Coryton, and the City Line) are limited by 2 car length platforms.

The expansion of the Valleys passenger services has been such that at peak hours network capacity is practically fully taken up. Freight traffic generated in the area has declined but regular coal and aggregates flows remain in the Cynon valley, whilst the major power station at Aberthaw receives coal from within the route as well as from further afield.

Figure 9 shows the peak trains per hour trains on key sections of the route.

Current performance

Figure 10 shows the current PPM for the main TOC running along the route.

The Great Western Joint Board generally meets at three-monthly intervals and comprises representatives of Network Rail, all TOCs using Western route infrastructure, DfT and ORR, and focuses particularly on performance issues at a strategic level. An example is the provision of a greatly enhanced planned and emergency response maintenance regime over the critical

section between Cogan Junction and Cardiff Queen Street station, known as the 'Golden Mile'

The Network Rail Route Director, in conjunction with the Territory Maintenance Director, has set up the Western Accelerated Recovery (WAR) project to target poor performing assets and implement 'quick win' remedial action.

To improve operational management an integrated control centre at Cardiff has been introduced and a new signalling centre for South Wales is proposed.

Future requirements

Strategic direction

The Welsh Assembly Government will be undertaking the Wales Rail Planning Assessment during 2006, which will inform the Route Utilisation Strategy for Wales. We will start baselining work for the RUS in January 2007.

Sewta (the South East Wales Transport Alliance) is a consortium of ten unitary authorities and works in partnership with the Welsh Assembly Government and Network Rail and the transport operators towards the development of transportation strategies for the region, and coordinates third-party enhancement schemes on the route. There is continuing interest in providing greater capacity and reduced journey times, to offer improved frequencies as an attractive alternative to road, particularly in the congested A470 corridor between Pontypridd and Cardiff and thereby seeking to actively increase rail market share. During 2005 a strategic review of Sewta rail policy was carried out, in order to create a framework for future investment over the period 2009–2018. The review took account of existing network utilisation and performance issues whilst considering how growth trends might trigger the need for selective enhancement and its coordination with the emerging signalling renewals plans for the Cardiff area.

Future demand

Figure 9 Current train service level (peak trains per hour)

Route Section	Number of trains
'Taff Vale' section, Pontypridd to Radyr	6
Rhymney valley, Heath Junction to Cardiff Q.St.	6
Cardiff Queen Street to Cardiff Central	12
Grangetown to Cardiff Central	8
Cardiff Queen Street to Cardiff Bay	4
Maesteg to Bridgend	1

Figure 10 Current PPM MAA (2005/06)

TOC	MAA	As at period
Arriva Trains Wales	80.4%	10

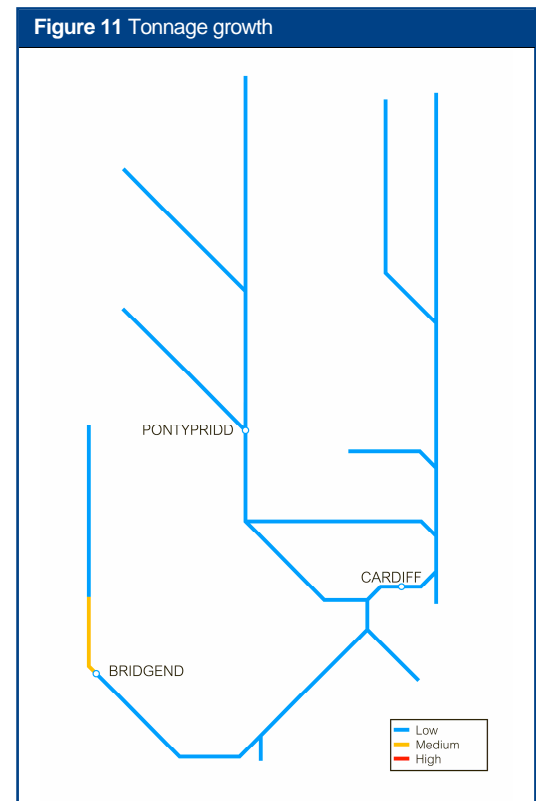
There is clear recognition within the Sewta strategy that for enhanced service frequencies to be offered through the Cardiff Queen Street bottleneck then additional infrastructure capacity will be required to move beyond the currently saturated position. In the shorter-term demand is expected to be catered for by adjusting train length within existing frequencies. At the rate of growth projected within the strategy, 5% year on year, the need for more paths is expected to become a critical issue by 2013-2014. The principal options under consideration are for additional platforms at both Cardiff Central and Cardiff Queen Street stations and greater operational flexibility for Valleys services if some element of bi-directional working is introduced between these two key stations. Preliminary development of these options within the Cardiff Area re-signalling scheme was initiated in 2005 in the expectation of progressing towards option refinement in 2006-2007 which will enable Sewta objectives to be implemented in conjunction within the planned renewals in 2009-2010 in a cost-effective manner, subject to agreement with the Welsh Assembly Government over incremental funding arrangements.

The longer-term aspiration for frequency increase north of Cardiff is for the Merthyr line, which would also necessitate remodelling at Abercynon and the construction of a passing-loop between there and Merthyr Tydfil. South of Cardiff Sewta anticipate improved frequencies on the Vale of Glamorgan section between Barry and Bridgend. These changes to cater for long-term demand growth are consistent with the basic Standard Pattern Timetable for the Valleys introduced in December 2005, and would build on the recent programme of platform lengthening on the Aberdare line as well as planned lengthening on the Rhymney line.

Future capability

In order to meet the Sewta Rail Strategy Study's growth forecast for the Valley Lines until 2018, of 5 % year on year, the next stage after train lengthening will be to increase capacity at the known capacity constraints of Cardiff Queen Street and Cardiff Central stations. This rate of growth triggers the need for additional train paths, from 12 per hour currently to 16 per hour through the Cardiff Queen Street – Cardiff Central corridor and remodelling of both stations will be necessary.

Figure 11 indicates the forecast percentage change in tonnage to 2015.



Future capacity

In order to meet the increase of train paths, from 12 per hour currently to 16 per hour through the Cardiff Queen Street – Cardiff Central corridor remodelling of both stations will be necessary. This will require the reinstatement of the upside disused platform, increased bi-directional signalling through the station area, the reconfiguration of Queen Street North junction and an additional track over Newport Road, for which an Order under the Transport and Works Act will be required.

We believe that the provision of an additional Valley Lines platform and connection to a main line platform at Cardiff Central would act as a pressure release for Queen Street and provide the capacity and operational flexibility required to accommodate the forecast number of trains required.

Provision for these works will be made in the Cardiff Area Signalling Renewal planned for 2010.

Figure 12 Forecast reduction in delay minutes

	2006/07	2007/08	2008/09
% reduction in delay minutes	4%	10%	17%

Future performance

We are embarking on a programme to remove Temporary Speed Restrictions, imposed due to the poor condition of track, by the end of March 2009.

In addition to continued improvement in asset reliability, a major focus of attention going forward is the work necessary to devise more robust train timetables. Network Rail is working closely with Arriva Trains Wales to gain operational experience of its Standard Pattern Timetable introduced in December 2005 and to support and improve its performance. Resource plans that are robust in terms of recovery from incidents are being developed.

Figure 12 shows the forecast reduction in Network Rail delay minutes compared with 2005/06.

Figure 13 shows the forecast PPM for the main TOC running along the route

Engineering access

For engineering access purposes the Cardiff Valleys route divides broadly into two sections, north and south of the Great Western Main Line at Cardiff Central. On the northern sections, from Cardiff up the Rhymney, Taff, Cynon and Rhondda valleys, midweek nights access can generally be granted. The main route from Cardiff Queen Street to Radyr (via Llandaff) will not be closed at the same time as the City Line (via Fairwater) between Penarth Curve North and Radyr, which offers a diversionary capability. On that part of the southern

Cardiff Valleys route between Cardiff, Barry and Bridgend (via the Vale of Glamorgan line) closure is not permitted when diversions from the GWML between Cardiff and Bridgend via Pontyclun are planned, although midweek nights access can also generally be granted on the branches to Cardiff Bay, Penarth and Barry Island, as well as on the detached Bridgend to Maesteg section. In any event access to Aberthaw Power station, on the Vale of Glamorgan line, must be maintained either from the east or the west.

Opportunities and challenges

We believe that the solution to passenger growth and future capacity requirements for the section of the route with the highest capacity utilisation can be met by a combination of several initiatives:

- train lengthening, and where appropriate supported by platform lengthening;
- incremental enhancements (which can be delivered as improvements to planned track, structures and signalling renewals) and certain limited stand alone enhancements. These have the potential to improve performance (necessary for growth), enable specific increases in train paths and facilitate timetable restructuring, these include:
 - remodelling of Cardiff Queen Street station and its approaches;
 - revised signalling arrangements between Cardiff Queen Street and Cardiff Central stations as part of the Cardiff Area Signalling Renewal;
 - additional Valley Lines platform and connection to a main line platform to improve operational flexibility at Cardiff Central; and
 - remodelling Cogan Junction.

Figure 13 Forecast PPM MAA

TOC	2006/07	2007/08	2008/09
Arriva Trains Wales	83.6%	84.5%	85.2%

Delivering future requirements Expenditure

The age of rail and sleepers on the route is amongst the highest on the national network and varies between 30 and 40 years old and to address this we are implementing a track renewals strategy which matches the traffic usage of the route. This will mainly include targeted renewals and ballast cleaning.

The table below shows the planned level of expenditure on renewals on this route over the next three years. The most significant individual renewal items are outlined in the individual asset sections, which follow. However, the precise timing and scope of renewals remains subject to review to enable us to meet our overall obligations as efficiently as possible consistent with the reasonable requirements of operators and other stakeholders.

Figure 14 Forecast expenditure

£m (05/06 prices)	2006/07	2007/08	2008/09
Renewals			
Track			
Plain line	1	1	1
S&C	0	0	0
Track Total	1	1	1
Civils			
Underbridges	0	1	2
Overbridges	–	1	1
Bridgeguard 3	0	1	–
Footbridges	–	–	0
Earthworks	0	2	–
Retaining walls	0	0	–
Civils Total	1	5	2
Signalling			
Resignalling	3	8	22
Minor works/other	4	0	0
Signalling Total	6	8	22
Plant and machinery			
Fixed plant	0	0	0
Plant Total	0	0	0
Operational property			
stations	0	1	–
Operational property Total	0	1	–
Total Renewals	9	14	26

Enhancements (funded by)			
Welsh Assembly			
Maesteg frequency enhancements	0	5	15
Merthyr line frequency enhancements	2	8	–
South Wales platform extensions	3	5	8
Other	1	0	–
Welsh Assembly Total	5	18	23
Other Third Party			
Other	0	–	–
Other Third Party Total	0	–	–
Total Enhancements	5	18	23

The planned volume of renewals is detailed in Figure 16. It should be noted that in order to manage the deliverability of our Civils, Signalling & Electrification plans we have included an element of overplanning in our work banks. As a consequence the sum of our route plans exceeds our plan for the network as a whole. It is likely that a small proportion of the activities in these areas will slip to subsequent years.

Maintenance

Figure 15 shows the planned level of expenditure on maintenance on this route over the next three years.

Figure 16 Forecast volumes

	2006/07	2007/08	2008/09
Track			
Rail (km)	2	2	2
Sleepers (km)	2	2	2
Ballast (km)	2	2	2
Switches & crossings (no)			
Abandonment	5	6	6
Civils			
Underbridges (square metres)	198	808	1,331
Overbridges (square metres)	–	404	409
Footbridge (square metres)	–	–	118
Embankments (square metres)	1,465	3,200	–
Retaining walls (square metres)	75	120	–

Figure 15 Forecast expenditure

£m (05/06 prices)	2006/07	2007/08	2008/09
Maintenance	6	5	5

Infrastructure investment

Figure 17 highlights committed schemes that are planned for completion in the financial year shown.

Figure 17 Planned infrastructure investment							
Project	Scope	Enhancement or output change	Main asset type(s)	Third Party funding	GRIP Stage	Completion year	
A	Rhymney – Penarth Platform extensions	Accommodation of 6 x 20m cars	Civils	Welsh Assembly Government	3	2006	
B	Bargoed – Ystrad Mynach Additional and relocated signals with absolute block controlled by axle counters	Increased capacity	Signals	Welsh Assembly Government	6	2006	
C	Ystrad Mynach – Caerphilly Additional and relocated signals with absolute block controlled by axle counters	Increased capacity	Signals	Welsh Assembly Government	6	2006	
D	Treherbert – Cardiff Queen St Platform extensions	Accommodation of 6 x 20m cars	Civils	Welsh Assembly Government	3	2006	
E	Maesteg – Bridgend Platform extensions	Accommodation of 4 x 20m cars	Civils	Welsh Assembly Government	3	2006	
F	Cardiff PSB SPT concentrator renewal	Improved reliability of asset	Telecoms	None	1	2008/09	
G	Cadoxton Turn back signal	Ability to turn round south bound services at Cadoxton	Signals	None	1	2007	
H	Barry Turn back signal	Ability to turn round south bound services at Barry	Signals	None	1	2007	
I	Sebastopol Embankment stabilisation	Improved asset reliability and removal of speed restriction	Civils	None	1	2007/08	

Figure 17 Planned infrastructure investment

Project	Scope	Enhancement or output change	Main asset type(s)	Third Party funding	GRIP Stage	Completion year
• Merthyr Tydfil – Abercynon	Track circuit block signalling controlled by axle counters with passing loop	Train service frequency enhancement	Signals, track	Welsh Assembly Government	2	2008
• Abercynon South	Station expansion to encompass Abercynon North	One station for Abercynon	Civils	Welsh Assembly Government	2	2008
• Abercynon North	Station combined with Abercynon South	Close	Civils	Welsh Assembly Government	2	2008
• Cardiff area including the Rhymney and Vale of Glamorgan lines	Cardiff Area Signalling Renewal (CASR)	Rhymney and Vale of Glamorgan lines centrally controlled Improved capacity and performance particularly in the Queen St – Cogan Junction corridor	Signals	None	2	2012

Figure 18 highlights uncommitted schemes under development

Figure 18 Infrastructure investment under consideration				
Project	Scope	Enhancement or output change	Main asset types	Status
E	Maesteg – Bridgend line Extend and convert to passenger use Llynfi goods loop	Accommodate half hourly train service aspiration	Track and signals	Proposed under Sewta rail strategy
F	Cardiff Central station Additional Valley Lines platform	Improved capacity and performance	Civils and signals	Under consideration and aligned to the Cardiff Area Signalling Renewal
L	Cardiff Queen Street station Capacity and performance enhancement	Accommodate 16 trains per hour from the current 12	Track, civils and signals	Proposed under Sewta rail strategy and aligned to the Cardiff Area Signalling Renewal
M	Cogan Junction Capacity and performance enhancement	Remodelled junction with enhanced capacity and performance	Track and signals	Proposed under Sewta rail strategy and aligned to the Cardiff Area Signalling Renewal

Non infrastructure developments

Figure 19 timetable schemes for the route are under development.

Figure 19 Timetable development					
Description	Key issues	Actions or options being developed	Benefits	Start date	
Arriva Trains Wales' Standard Pattern Timetable	Capacity requirements to meet future growth	Train service alterations and Class 143 Pacer unit fleet replacement	Current and future growth requirements met	December 2005	
Arriva Trains Wales' Standard Pattern Timetable	Merthyr – Abercynon timetable study	Capacity issues at Cardiff Queen St station, including freight.	Identification of capacity enhancement requirements	February 2006	

Appendix

Figure 20 Strategic route sections												
Predominant aspect recorded (secondary aspects recorded in brackets) ELR is Engineers Line Reference and RA is Route Availability												
SRS	SRS Name	ELR	Classification	Funding	Community Rail	Freight Gauge	RA	Speed	Electrification	Signalling Type	Signalling Headway	No of Tracks
15.01	Maesteg – Bridgend	"BAL	Rural	DfT	Yes	W6A	6	40	none	TCB/OTW	(AB)	1
15.02	Freight Lines			DfT	No				none			
15.03	South Wales Valleys	multiple	Secondary	DfT	No	W6A		50	none	TCB/mech	"3 to 6	single/2

Capacity and operational constraints

- | | |
|----------|--|
| A | Capacity constraint at Cardiff Queen Street station |
| B | Capacity constraint at Cogan Junction |
| C | Single line between Porth and Treherbert |
| D | Single line between Abercynon and Aberdare |
| E | Single line between Abercynon and Merthyr Tydfil |
| F | Single line between Bargoed and Rhymney |
| G | Single line between Heath Junction and Coryton |
| H | Single line between Cardiff Queen Street and Cardiff Bay |
| I | Single line between Cogan Junction and Penarth |
| J | Single line between Barry and Barry Island |
| K | Single line between Bridgend, Tondy and Maesteg |

Other issues on the route

- | | |
|----------|---|
| 1 | City of Cardiff expansion and road congestion |
| 2 | Employment profile changes throughout the south Wales valleys |
| 3 | Expansion of Cardiff airport |