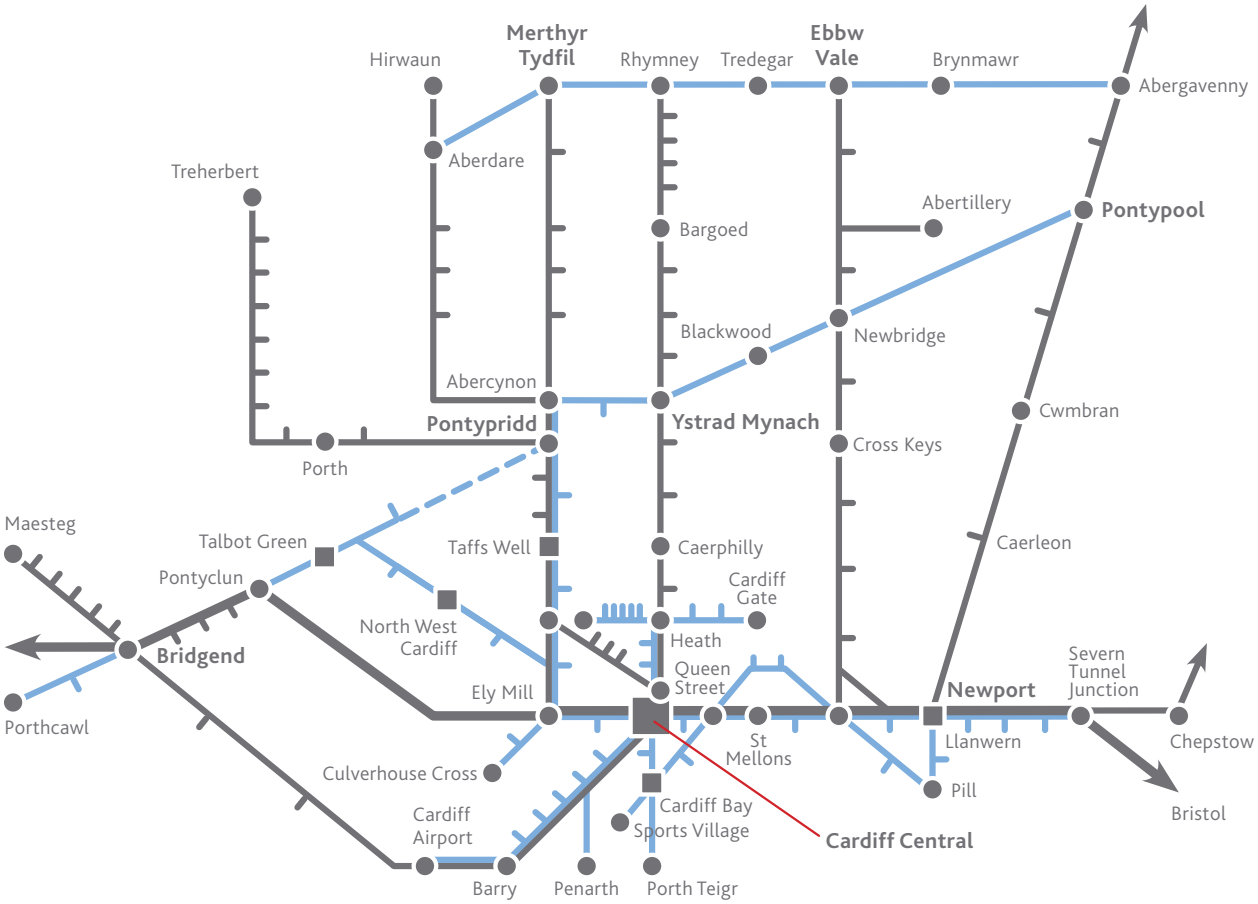
Report to the Minister for Economy, Science and Transport



A Cardiff Capital Region Metro:

Impact Study

October 2013

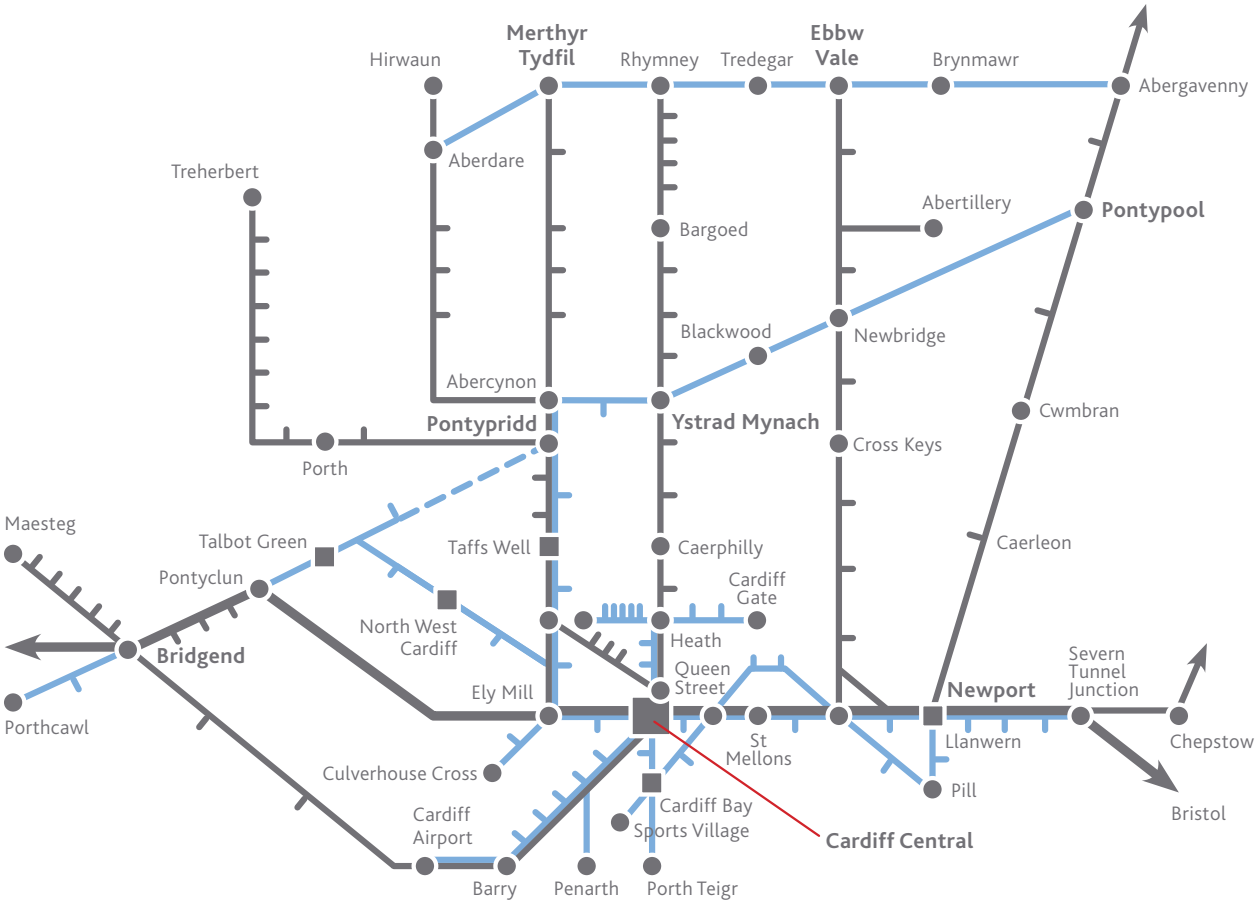
Jones Lang LaSalle

the urbanists a powelldobson company

M&G Barry Consulting

CAPITA

steer davies gleave



A Cardiff Capital Region Metro...

"Connecting more people to more places"

"Enabling development and regeneration"

"Creating a more liveable and economically dynamic region"

A Cardiff Capital Region Metro: Foreword

Wales is changing; we are at last showing the confidence to embrace the biggest opportunities. Three years ago no-one really expected the valley lines to be electrified, let alone contemplation of a Metro in South East Wales. This is now a real prospect and I was delighted that the Minister for Economy, Science and Transport, Edwina Hart, asked me to lead this Metro study to help frame the development of what will be the most important project in Wales for a generation.

In taking on this work I was committed, as were my colleagues, to include informed consideration of the economic development and regeneration opportunities that could be aligned and integrated into Metro. This is the embodiment of the '*transform* | *regenerate* | *connect*' strapline The Metro Consortium presented earlier this year.

Our aim was to develop a strategic regional plan for Metro that can inform and direct the more detailed work that is ultimately required. In doing so, we have drawn upon much of the work recently completed by other bodies. However, we also saw the need to look at the big picture and for the first time begin to present a coherent regional plan that much more effectively integrates the development of the regions public transport network with economic development and regeneration.

Working with colleagues at Capita Symonds, Jones Lang LaSalle, Powell Dobson Urbanists and Steer Davies Gleave and drawing on the work of Welsh Government, South East Wales Transport Alliance (SEWTA), Arriva Trains Wales (ATW) and Network Rail, we have prepared a vision for Metro and some of its wider economic and regeneration benefits.

This is not a locally focussed or detailed plan, rather it is a broad regional analysis that sets out the priorities for investment; it can also be used to stimulate further strategic discussion, as more data and the influence of a dynamic market dictate.

The production of this report provided an opportunity to observe the progress that can be made with a small focussed team that embodies a range of expertise and experience from the property, regeneration and transport sectors. Together with Welsh Government and the rail industry we have all been ready to apply our experience and expertise pragmatically to make progress. I'd like to thank all my colleagues for their effort, energy and imagination.

There are also some hard realities to address in progressing with the Metro. The capital costs demand that we augment traditional sources with a range of more imaginative funding mechanisms. Perhaps more challenging will be the development of a system that can minimise operating costs and on-going subsidies. A closer and cooperative relationship between operators, industry and Government will be needed to address this challenge. In doing so we also need to take a long term view, recognising that early capital investment may be required to secure long term cost reductions in operations; this assessment must also factor in the longer term and wider economic benefits that can accrue from investment in transport. We must also be prepared to consider new ways of delivering transport services.

We are now at a key decision point; having developed a regional vision for Metro, we now need to undertake the more detailed work that is required to fully appraise all the priority Metro projects identified. This work will explore engineering feasibility, transport modelling, business case development, financing, rolling stock, station design, operating costs, place making, planning, land assembly, branding, engagement etc. Work will also need to be accelerated on issues of integration; especially as regards multi-modal services, ticketing and customer information. Whilst these were not within the scope of this study, addressing current integration challenges are fundamental to the long term success of the Metro.

This project is also pivotal to the emerging City Region as it provides, perhaps more than any another initiative, the physical embodiment of the concept. The team that prepared this report all recognise the need to create a more economically effective and cohesive region. I hope this work can help move that debate toward a pragmatic conclusion.

On a related subject, readers of the document will notice a range of different names being used to describe the Metro: The Metro, The Cardiff City Region Metro, The Capital Region Metro, The South Wales Metro, The Cardiff Capital Region Metro, The Valleys Metro, etc. It matters less what we call it – it matters that we do it.

The development of the Metro concept has drawn on the effort and input from those directly involved in the preparation of this report and the group assembled to guide and challenge the work of the team, as well as those from national and local government, the rail industry and the wider business and academic community, who have provided input and/or support over the last two years.

Whilst they won't all agree on all aspects presented, I would like to thank them; they include: Alan Davies, Jon Fox, David McCallum, Steph Malson, Michelle North, Alison Walker, Carolyn Dyer, Antony Hyde, Colin Wood, Richard McCarthy, James Brown, Liam Hopkins, Martin Sullivan, Chris Sutton, Patricia Freeth, Chris Whitehouse, Simon Ellis, Chris Busch, Jim Steer, Jeff Collins, Tim James, Mark Langman, Ian Bullock, Mike Bagshaw, Claire Falkiner, Janice Morphet, Stuart Cole, Chris Gibb, Brian Morgan, Calvin Jones, Francesca Sartorio, Kevin Morgan, IOD, CBI, South Wales Chambers, Cardiff Business Partnership, Roy Thomas, David Stevens, Graham Morgan, Sian Callaghan, Lynda Campbell, Nick Griffith, Nigel Roberts, Elizabeth Haywood, Institute of Welsh Affairs, Stuart Watkins, Roddy Beynon, Stephen Bussell, Dan Saville, Andrew Davies, Jon Duddridge, Roger Tanner, Alex Smart, David Llewellyn, Victoria Winkler, David Eggleton, Robert Chapman, David Swallow, John Osmond, Mark Youngman, Ian Courtney, Martin Buckle, Geraint Talfan Davies, Lee Waters, Henk Broekma, Robert John, Terry Morgan, Jonathan Adams and many more. I apologise for those I have omitted.

I believe this report clearly signposts the way forward for Cardiff and South East Wales, we just need the confidence and ambition to make Metro a reality.

Mark Dafydd Barry
September 2013

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Supporting documents:

- Appendices to main report
- Metro Interventions Appraisal Report
- Metro Modal Study
- Metro Spatial Map
- Regeneration and The Metro
- Station Design Guidelines (Ebbw Vale)
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- Metro Economic Impacts

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Executive Summary

What Metro Can Deliver For South East Wales

The Metro provides an opportunity to improve the economy of the Cardiff Capital Region. By delivering a once-in-a-generation project to create a more dynamic, connected and liveable region we can improve our GVA/Capita which currently stands at 80% of the UK average. However, this can only be realised if we are unconstrained in our ambition…

Building the City Region: transform | regenerate | connect

Half the population of Wales, 1.49M people, live within 20 miles of the centre of Cardiff. In order to secure the benefits of this critical mass, South East Wales needs to operate as a cohesive city region. This is especially relevant given that, globally, cities are increasingly becoming the dominant engines of both economic activity and societal change.

The Metro provides an opportunity to physically embody the developing city region concept and deliver economic benefits across all south east Wales[1]:

- City regions can deliver three main economic benefits: larger and more efficient labour markets; larger potential for goods and services; and a greater exchange of knowledge.
- A connected city region makes it possible for different parts of the region to specialise in a particular offering; whether housing, manufacturing, bioscience, business services or leisure facilities and in doing so attract labour from across the region.
- For example, by maximising the pool of available skilled labour across the region, Cardiff will be able deliver projects and inward investment that the rest of the region cannot. Cardiff can look to be economic driver of the region with enhanced Metro connectivity helping to spread prosperity across the region.
- Metro will allow for opportunities to be maximised for investment and economic growth in our more disadvantaged communities through greater connectivity to Cardiff's prime markets for labour, outsourcing of services from the centre to the sub-region and the increased attractiveness of regional living and commuting.

Metro can help deliver long term economic benefits:

Delivering the Cardiff Capital Region Metro by 2030 will:

- Support the creation of **7,000 jobs**.
- Over 30 years contribute an additional **£4Bn** to the regional economy.
- Deliver a one-off construction impact from Metro and contingent developments of **£4Bn**.

This will be achieved as a result of:

- Increasing the catchment of the regional transport network by **420,000 or 60%**.
- Reducing average door to door journey times across the region.
- Better connecting people to major employment and development locations.

1 Welsh Government City Regions Report 2012.

EXECUTIVE SUMMARY

Metro can help create a liveable City Region

Not only is it important for the City Region to operate based upon its scale, it also needs to operate based upon its *quality*. There are hundreds of other cities than are far larger than the Welsh Capital City Region so it is therefore essential that the *quality of life* is what makes the Capital City Region special. The Metro is a unique opportunity to create a city which has a high quality of life, often referred to (indeed measured globally) as *liveability*.

Metro Network

"The Metro is a turn up and go integrated transport network that will connect over 70% of the population of the Cardiff City Region, developed in a way that enables and/or enhances developments at strategic sites, maximises economic benefits & facilitates regeneration"

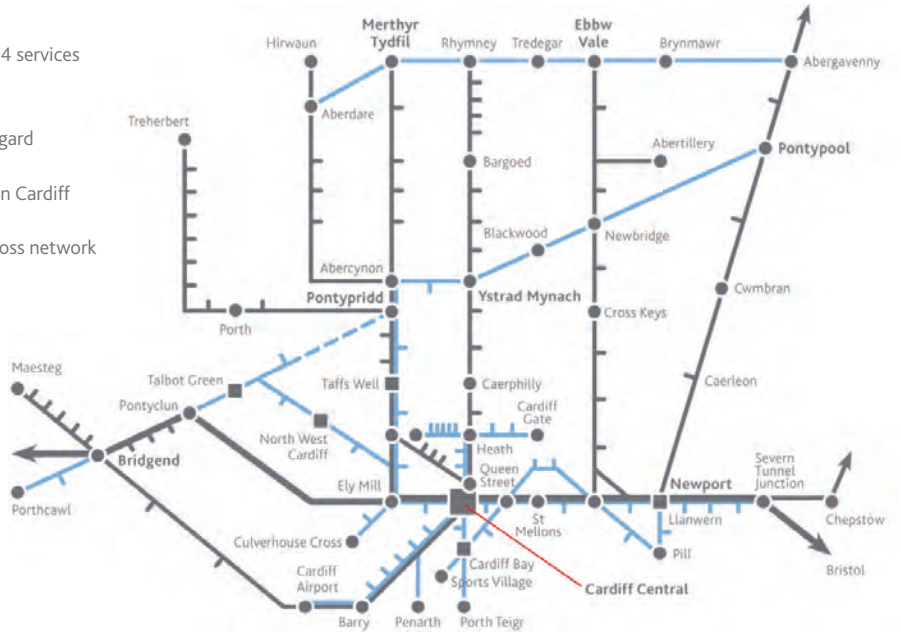
The transport component of this Metro vision will be delivered incrementally to 2030 by:

- Enhancing infrastructure to support higher frequencies and more stations on the existing rail network.
- Adding new routes & stations to serve the most disconnected and densely populated communities, and to better connect the region's strategic development sites.
- Improving integration of rail and bus services.

The potential Metro network is illustrated in Figure 1.

Metro Key Features:

- Mixed mode system with at least 4 services per hour
- Widespread park & ride
- All modes fully integrated with regard to tickets and timetables
- Economic development focused on Cardiff Central and strategic sites
- Station focussed regeneration across network



Metro will help stimulate a region wide economic regeneration:

- A connected, polycentric city region of 1.6m people
- A strategic city region plan for housing, transport and the economy
- A major modal shift delivering reduced congestion and CO_2 emissions

Key:

- Major Station/Interchange
- Strategic Development Site
- Electrified Heavy Rail or LRT
- Tram/Tram-Train/Bus Rapid Transit

Figure 1: Illustration of overall Metro network

Wider benefits of the Metro include:

transform |

- Enable and/or enhance economic development - at strategic sites across the region which, by 2030, could add £270M per year to the regional economy and support the creation of 7,000 jobs. For example:

  - Sites contingent upon transport investment - This includes new residential and mixed use development in the NW of Cardiff and into RCT (Figure 9), Cardiff Bay and major development opportunities along the M4 corridor.

  - Sites where improved transport can enhance economic output - these will include Central Cardiff Enterprise Zone, Cardiff Bay, St Athan-Cardiff Airport and Ebbw Vale Enterprise Zones and town centres such as Newport, Pontypridd and Talbot Green.

  A 10% contribution from Metro to the ability of the Central Cardiff EZ to support employment by increasing its Travel to Work Area (TTWA) would add £30M annually to the regional economy. Cardiff Bay could benefit proportionately more because of the significant improved connectivity to the wider region; a 20% contribution delivering another £30M pa to the regional economy.

  These benefits alone, when considered over an assessment period of 30 years would likely be circa £4B on the conservative assumption that no benefit will accrue during the first 15 years of construction.

- Construction Multiplier - implementation of the Metro itself and some of the contingent developments, would result in one off impacts. The construction of a £2Bn Metro would generate an impact of £3.5B and the construction of 5,000 houses in NW Cardiff, £0.9B.

- Encourages Metro Planning Policy - influence local authorities and developers so that, in future, major developments are aligned to the Metro network.

regenerate |

- Station Focussed Development and Regeneration - across the region Metro can help facilitate and/or enable regeneration at key stations on the network that themselves can become sub regional transport hubs (Caerphilly, Ystrad Mynach, Bridgend).

- Community Regeneration - Metro will give many communities, especially in the valleys, a new lease of life with stronger commuter settlements able to support a wider range of secondary services.

- Environmental and Sustainability Benefits - through modal shift and reduced car journeys, road congestion and CO_2 emissions; by 2030 the Metro could support over 80,000 daily passengers vs 40,000 today, contributing to greater use of public transport.

EXECUTIVE SUMMARY

connect |

- Direct Economic Impact - a by providing easier access to employment across the region.

  The Metro will increase by 60% the number of people who can easily access the regional public transport network; this will benefit both commuters by increasing their employment choices and employers by increasing their catchment area, reducing churn in recruitment and improving staff retention.

  An average reduction of 5mins in generalised journey times for 100,000 commuters into Cardiff and Newport could be worth £30Mpa.

- Agglomerative Economic Impact - Making it easier for people across the region to interact and access more places of work will increase the net effective density of the city region and deliver circa 20% in additional benefits on top of the direct transport benefits.

- Address the Region's Existing Transport Problems - including congestion at key points on the road network (M4 J32-34, Newport & the A470 into Cardiff) and minimise the need for further congestion measures; avoiding costs of potentially hundreds of millions to 2030.

- Support Population Growth - to provide capacity to accommodate continued population growth in the region which will reach 1.6M by 2030 vs 1.49M today and especially a further 80,000 people in Cardiff by 2030.

Delivering these benefits, aligned with complementary economic development interventions, will enhance the image of Cardiff and the wider city region to the rest of the world. This will help attract, retain and nurture high value jobs and companies to improve both Cardiff and the wider region's GVA/Capita Vs the UK. In short, the Metro can help shake off the legacy of a century of industrial decline and create a cohesive city region that can compete effectively on the international stage.

Metro Study Approach

The Metro vision presented in this report and illustrated below, has been developed by:

- Identifying the most densely populated communities over 800m and over 1.2Km away from a rail station *(Section 5)*.
- Appraising strategic development opportunities across the region *(Section 4)*.
- Assessing the regions existing transport problems *(Section 3)*.
- Reviewing strategic policy objectives and initiatives, for example the role or Cardiff Airport in the regional economy *(Section 10)*.

The baseline used for the connectivity assessment is the rail network that will be in place as a result of Valley Line Electrification (VLE) and the Cardiff Area Signalling and Renewal Project (CASR). To ensure rapid progress and facilitate completion of this report, the assessment methodology adopted relied on the qualitative experience and expertise of the team, as well the quantitative analysis undertaken.

The largest, most densely populated and disconnected communities are in suburban Cardiff and Newport, parts of Torfaen, Caerphilly, Blaenau Gwent and Lower Rhondda Cynon Taf (RCT) (Figure 2).

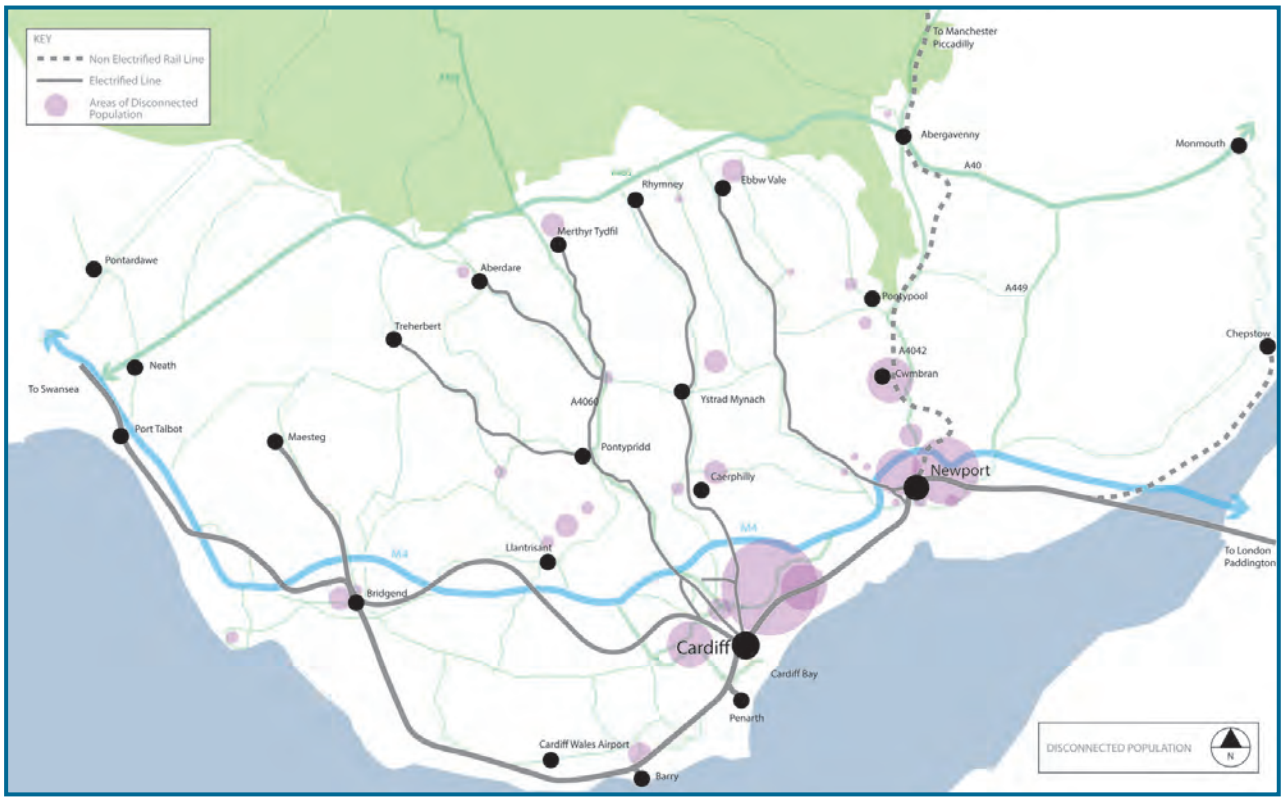


Figure 2: Metro most densely populated and disconnected places

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Sian Callaghan, Director of Regional Corporate Affairs, Centrica

"As a major employer in Cardiff, Centrica staff travel from all over the region to our office adjacent to Cardiff Central Station. Good public transport for our people is vital to our business, and to our future development. Better connecting people to places of work is vital, not just for companies like us, but for the economic well-being of the wider region. However, the current transport infrastructure is in need of major enhancement as it presents challenges for those travelling to work.

Our staff tell us every day of challenges they face travelling, not only from the Heads of the Valleys to Cardiff but also from places within Cardiff like St Mellons. So, using the decision to electrify the valley lines as a foundation, we are most supportive of plans for a Rapid Transit network in Cardiff as part of a Metro for the wider Cardiff City Region."

The most commercially viable and strategic development sites are along the M4 corridor and include the Central Cardiff Enterprise Zone(6), Cardiff Bay(7), North West Cardiff (9), Talbot Green/Llantrisant(16), Newport City Centre (12) and Taffs Well/Treforest (17). *Figure 3*

Figure 3: Metro strategic sites

Figure 4: Metro existing trunk road/motorway congestion

The primary points of road congestion in the region are on the M4 around Newport, the M4 to the NW of Cardiff between J32 and J34, the A470 approaching Cardiff and urban congestion within Cardiff itself. *Figure 4*

EXECUTIVE SUMMARY

Metro Priorities

This process has identified the strategic priorities for Metro, as illustrated in Figure 5, as:

- Priority enhancement of the Existing Network - new stations, higher frequency services, P&R and station/ interchange enhancements. Early scope defined within quick wins. Will include infrastructure enhancements to enable higher frequencies and new stations (1).
- Ebbw Vale Town to Newport - enhancements to deliver at least 2 trains per hour (tph) and a service to Newport (2).
- Cardiff North West Corridor - new routes and stations to facilitate the medium term expansion of Cardiff, from Cardiff Bay to RCT via Creigiau and a link to Taffs Well to support redevelopment and help alleviate congestion on the A470. Explore early conversion of the City and Coryton lines to Tram-train operation as part of first phase linking to Cardiff Bay (3).
- M4 Corridor - new routes and stations to provide a commuter network for East Cardiff and Newport by introducing rail/tram-train services on the electrified relief lines between Cardiff and Severn Tunnel Junction (STJ) and the use of Bus Rapid Transit (BRT) (4).
- Cardiff Airport – new/upgraded station able to support local and interregional service (9).
- Mid Valley Corridor - BRT between Pontypridd and Pontypool/Cwmbran (8).

Figure 5: Metro Priorities

Cardiff Business Partnership

"High quality and dependable connectivity between major employers and their workforce is one of the defining characteristics of successful city regions. To that end, the vision for the Metro, which the Cardiff Business Partnership helped shape, must be a fundamental component of Welsh Government Economic Policy well into the 2020s."

Delivering the Metro not only makes it easier for someone in Pontypridd, Blackwood, St Mellons, Caerleon, Ely or Roath to access work in Cardiff city centre, but also work in Newport, Talbot Green, Cardiff Bay, Pontypridd and Taffs Well.

Economic benefits can also be secured by businesses locating or expanding at the strategic sites as their potential catchment population is increased significantly. Additional services to Ebbw Vale and Merthyr can help make these locations more accessible and attractive to employers as well reducing average journey times for commuters to Cardiff and Newport.

In particular, Newport can benefit from increased connectivity to help address its current poor rail access. Metro will deliver new stations on the east and west of the city and at Caerleon (Figure 6) and potentially a link to Pill and Mon Bank using tram-train technology to help underpin regeneration in that part of the city.

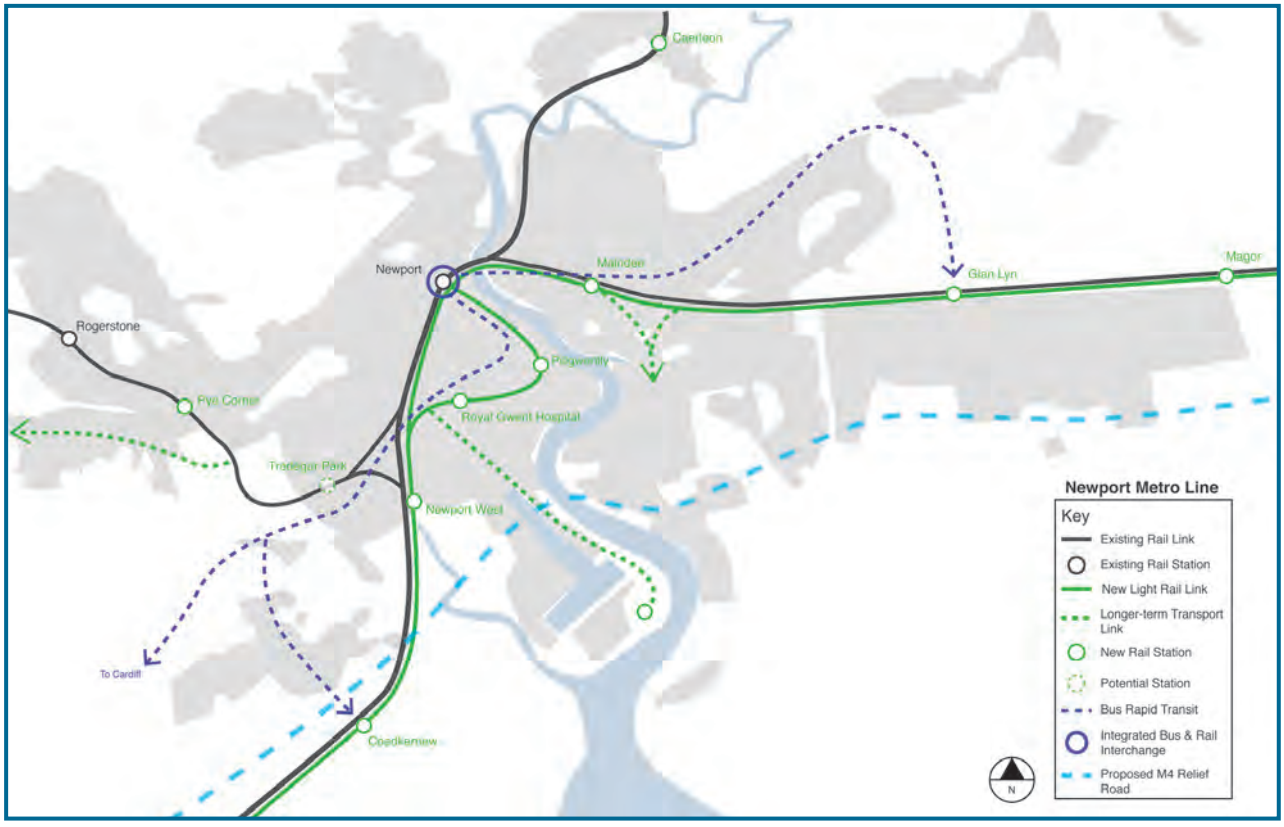

Figure 6: Newport enhanced Metro connectivity

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These are described in more detail in Section 6. Several other strategic interventions have been identified including: Cross Valley BRT from Aberdare to Abergavenny, Rapid Transit (RT) in Cardiff and Newport, enhancement and electrification of the Newport Abergavenny line. These are explored more fully in the main body of the report. A range of wider regeneration benefits of the Metro are also explored in Section 8.

Emma Watkins, Director, CBI Wales

"Improving the quality and reliability of infrastructure can be a catalyst for the economic development and regeneration of South Wales. This year's CBI/KPMG Infrastructure Survey once again has shown how much emphasis businesses put on the standard of infrastructure when making investment decisions.

High quality infrastructure is a critical component in economic development and will also be the decisive factor in attracting private investment into an area. In terms of the provision of employment property, developers recognise that businesses, and the people that work in them, increasingly require commercial property that is well connected and will not take the risk of backing schemes without strong transport links."

Quick Wins

To make rapid progress, a number of early Metro projects have also been identified (Figure 7) that can be delivered incrementally from now until the completion of VLE in 2020.

Figure 7: Metro Quick Wins

These are:

- Within the scope of the current proposed programme to 2015:
  - Enhancements under the National Stations Improvement Programme (NSIP) - at Bargoed, Merthyr Tydfil, Porth, Rhymney, Treherbert, Treforest Industrial Estate and Ystrad Mynach.
  - Enhancements - to the Ebbw Vale line to enable new stations at Ebbw Vale Town & Pye Corner, an additional hourly service from Ebbw Vale Town to Newport and a passing loop on the Maesteg line to allow 2tph.
- From within Metro Interventions (1), Enhancement to Core VLE network
  - New stations on the existing network - at Roath Park/Wedal Rd, Crwys Rd, Gabalfa, Maindy, Ely Mill/ Victoria Park, St Mellons, Llanwern and Cardiff Airport(May require infrastructure enhancements to deliver some of these, eg capacity/signalling).
  - Park and Ride (P&R) - at Bargoed, Treforest, Pontypool & New Inn, Pencoed, Chepstow, Taffs Well, Porth, Pyle, Llanbradach, Severn Tunnel Junction, Pontyclun, Pentrebach and Abergavenny.

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  - Bus/rail integration improvements - at Barry Docks, Cardiff Central, Merthyr, Porth, Pontypridd, Newport, Bridgend, Pontyclun, Abercynon, Pengam, Pontypool, Taffs Well, Chepstow and Abergavenny.
- Cross Valley BRT - from Pontypridd to Pontypool. The potential to include this service within the scope of the next "rail/Metro" franchise from 2018 should be explored.
- Tram-train pilot (as first phase of NW Corridor project) - between Cardiff Bay & City Centre with the conversion and extension of the current Queen St - Bay rail link. A new spur to Central station, new stations at Herbert St and South Loudon Square (Figure 8) and penetration further into Cardiff bay to Wales Millennium Centre (WMC) are recommended; this pilot should also include consideration of the early conversion of City and/or Coryton lines to 'tram-train' operation.

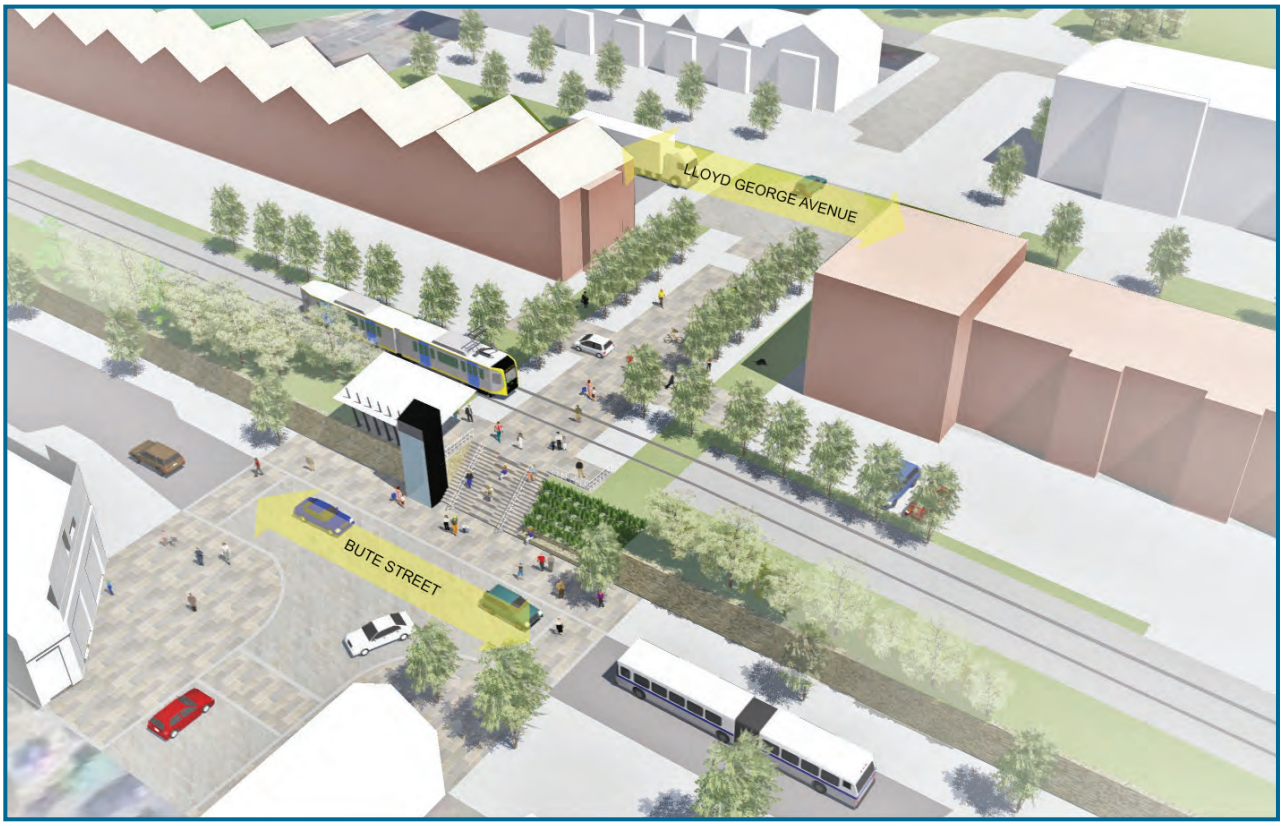

Figure 8: Illustration of potential tram-train station at South Loudon Square on Bute Street

Robert Lloyd Griffiths, Director, IOD Wales

"To fully exploit the potential of the Metro, it is essential that strategic land use planning and economic development across the region are incorporated into plans for its development and delivery."

North West Corridor: Priority Metro Project for Economic Development

Of all the Metro interventions proposed, the project to connect Cardiff Bay via the City Centre to NW Cardiff and Llantrisant/Talbot Green has been identified, by the assessment process adopted in this study (described earlier), as the highest priority.

This one scheme will impact five strategic development sites, enhance regional connectivity and enable the sustainable expansion of Cardiff (Figure 9). Whilst costing an estimated £400M, the economic impact from the strategic sites benefitting from the project could, by 2030 be circa £100M per annum and 3,000 jobs and a construction impact of circa £1.6Bn (from both Metro £700M and associated housing £900M). This project will:

- Utilise tram-train technology (subject to further investigation) on a 20km route from Cardiff bay to Pontyclun via Creigiau/J33. Spur to serve Beddau and/or Llantwit Fardre.
- Enhance and/or enable developments at Waterhall, J33, Creigiau, Talbot Green/Llantrisant as well as further sites not yet subject to formal plans.
- Encourage denser residential development focussed around stations on the route, in particular Talbot Green/ Llantrisant in RCT; this could also support higher value land use.
- The route to Taffs Well will be explored as part of a comprehensive Masterplan from Coryton J32 to Treforest that should explore land use (and potential for more and higher density mixed use development), major P&R and new/relocated stations.
- Include a major P&R at J33 on the M4 and an expanded P&R at Taffs Well on the A470 both of which can provide a source of revenue for new tram-train services. By enabling mode shift the P&R can also help ease congestion on the A470, the M4 and in Cardiff.
- Improve access to a number of existing communities in the west of Cardiff by providing more than 4tph to the City Centre, Bay and RCT.
- Option to segregate and by pass Cardiff West rail junction (fly-over or on street), this will help relieve congestion at the core of the rail network.
- Provide a Metro station to the new development at Ely Mill and Victoria Park.
- Provide opportunities for integration with local bus services at a number of locations.
- Provide a major interchange at Pontyclun to give commuters from RCT the option of accessing employment opportunities to the west at Bridgend and Swansea and vice versa.
- It will also make it easier to access the Central Cardiff EZ and increase its TTWA and therefore its ability to secure high quality tenants looking to attract well qualified employees from access the region.
- The link to Cardiff Bay also addresses the issue of connectivity between the city centre and the bay – this can form an early phase of the project (see Quick Wins) - help support further development in and around Cardiff Bay. This should subject to early investigation and aligned with work planned on Valley Lines electrification.
- Can be linked to the proposal to operate new services on the relief to Newport and STJ.

EXECUTIVE SUMMARY

South Wales Chambers

"Business opinion solicited by South Wales Chamber of Commerce has consistently indicated a creative solution to providing for the transportation needs of South East Wales is critical to on-going economic development. A fully integrated metro system offering local station connectivity would not only provide an easy solution for employees to efficiently access their place of work but equally be a key part of Inward Investment strategy."

"Many businesses with International links have applauded the quality and skill within the Welsh work force and if this can be complemented by making it really attractive to draw the skills of a constantly changing modern business to an environment yielding the very best in work/life balance it can certainly place Wales in a visibly attractive competitive position. Getting government support for this strategically important infrastructure investment alongside electrification/HS3 has to be a common determination for all involved in the private sector in Wales."

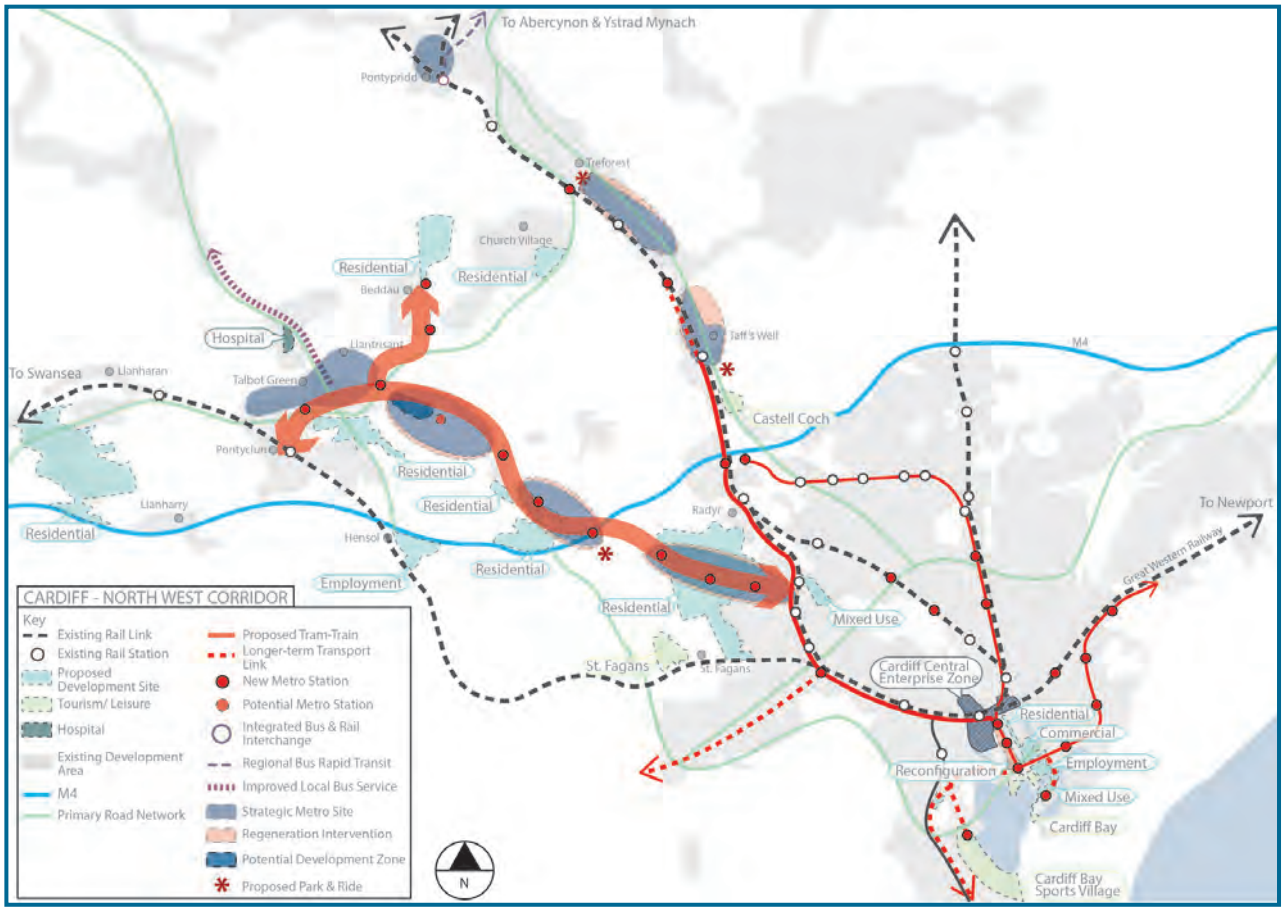

Figure 9: Spatial illustration of NW Corridor Intervention

Economic opportunities at key regional centres

The Metro will provide an opportunity to enhance the economic potential of the primary centres across the region. For example:

Cardiff

Commensurate with its growing size and potential, Cardiff contains one of the UK's leading research universities and member of the Russell Group, Cardiff University. For example, the Neuroscience and Mental Health Research Institute[2] ranks alongside Cambridge as one of world's leading academic centres in this field of study. There have also been initiatives and some early success, in exploiting this intellectual base in terms of commercialisation with a number of biotech companies established based in part on Intellectual Property from the University. Recently, Welsh Government initiatives in the Life Science sector have also had an impact with the New Welsh Life Science Fund investing in leading companies in this fields adding to a growing list of Life Science and Healthcare companies in the region.

The city also boasts a FTSE100 company from the financial service sector, which the Welsh Government has targeted for support by creating The Central Cardiff Enterprise Zone. The ambition is to provide 90,000M^2 of high quality office space adjacent to Cardiff Central. By 2020, with GWML electrification, Western Access to Heathrow[3] and Crossrail the Cardiff EZ will be only two hours from Canary Wharf and one hour 45mins from both Paddington and Heathrow.

The creative and media industries are also well represented in Cardiff with the BBC recently establishing a major production facility in Cardiff Bay. These developments all demonstrate the potential of the city, and the region, to support and grow the high value jobs the region needs.

Newport

As the third largest city in Wales, Newport is the economic hub and driver for a sub-region of over 400,000 which also includes Torfaen, Blaenau Gwent, Monmouthshire and part of Caerphilly. Newport's hinterland and especially Blaenau Gwent, suffer from economic inactivity rates of 30%, amongst the highest in the UK. However, Newport itself has demonstrated an ability to attract and nurture successful export generating technology, manufacturing and financial service organisations. More recently the University of South Wales established a campus in the city centre. If Newport's connectivity to its hinterland, especially by rail, is improved it will help deliver economic and social benefits enabling Newport to play a full role in the regeneration of the wider city region by connecting people more effectively with places of work, learning, healthcare and leisure.

Pontypridd

Pontypridd is located in a pivotal position in the region acting as the natural focus for both the Taff and Rhondda Valleys. Current rail network connectivity will be improved even further with Valley Lines Electrification. Metro will deliver more north-south services and cross valley BRT that will enhance this connectivity. The challenge is to exploit this improvement to better connect Pontypridd to both its local hinterland and to Cardiff to enable more development in and around the centre of Pontypridd and on the A470 south towards Cardiff.

2 www.cardiff.ac.uk/research/neuroscience
3 http://thamesvalleyberkshire.co.uk/wrath/

EXECUTIVE SUMMARY

Cardiff Airport

There is much evidence that demonstrates a link between the economic performance of a region and its level of international connectivity[4]. Whilst better access to Heathrow and its extensive range of long haul flights is essential to the economy of South East Wales, so is the need to provide access to international markets from Cardiff Airport. Such connectivity will support the case for inward investment to the region. Whilst Cardiff airport has a limited natural catchment area, it can be extended with the appropriate investment in transport infrastructure. This may help the airport secure untapped demand for services to destinations in the Middle East, some European cities and locations in the US & Canada (predominantly served via Heathrow and Bristol).

Elsewhere in the region

Across the region other key centres can play a more prominent role in the regional economy (Bridgend, Caerphilly, Ystrad Mynach, Merthyr, and Ebbw Vale). The Welsh Government's Enterprise Zone policy can also help focus both public and private sector investment at key locations. The Metro, by better connecting these places, can be a key component of economic growth across the entire Cardiff City Region.

Wider Regeneration Opportunities

Metro can help enhance the impact of regeneration initiatives to help address long standing problems faced by many communities across the region – not least poor connectivity. It can also allow us to intervene in a way that enables the region to compete properly in a new context that is now dominated by mega-cities and globalization.

The Metro has the potential to transform the communities, settlements and economies of the Capital City Region by:

- Enabling the region to compete nationally, continentally and internationally for investment.
- Removing barriers to employment.
- Transforming perceptions that have previously inhibited development viability.
- Responding to changes in business practice that require greater flexibility, collaboration and innovation.
- Supporting the vitality and diversification of land uses in traditional town centres.
- Reinforcing regional character, culture and identity through sensitive design.
- Supporting tourism by celebrating regional distinctiveness and connecting regional visitor destinations.
- Encouraging healthier lifestyles by integrating active travel into the transport network especially as regards station design to encourage safe pedestrian and cycle access.
- Considering Metro stations as important civic buildings that are key parts of the town centre environment.
- Stimulating the development of new places to live and work that are designed in development patterns that promote the use of public transport.
- Making a significant contribution to national carbon reduction targets.

Regeneration opportunities covered in more detail in Sections 9 and 8 and comprehensively in sub report, 'Regeneration and The Metro'.

4 M&G Barry Consulting, 2013, Cardiff Airport, Strategic Regional Context

Malcolm Wilson, Deputy Chief Executive & Commercial Director, RCT Homes

"RCT Homes is committed to much more than simply managing housing and collecting rent. We promote community involvement and support economic regeneration and development of the communities that we serve. Within this role, we support our tenants and encourage them into employment. Poor connectivity and the cost of travel is a major barrier to employment for many of our tenants. The proposed Metro has the potential to transform many of the neighbourhoods that we manage by connecting them to employment opportunities throughout the region by a sustainable and efficient transport system. We endorse the concept of the Metro along with any initiative that will improve the delivery of sustainable employment in the valleys and look forward to optimising the new opportunities it can create for our tenants."

Modal Study

The Metro aims to provide the region with a high quality, high capacity, 'turn up and go' transport network. The main operational implications of this are:

- Increased rolling stock requirement due to higher frequencies and new services.
- A requirement for new types of rolling stock optimised around urban mass transit high frequency/ frequent stopping characteristics in the form of BRT, Tram Train and LRT.

This study identified the principal corridors in the region which form the strategic network, and assessed the most appropriate mode to perform the strategic public transport function at a regional scale. This is as distinct from the denser network of local bus services and with which the Metro network will need to interface.

Two future network scenarios have been developed; Scenario 1 is largely based on the 'status quo' with majority of services remaining integrated with the heavy rail network with the development of a number of 'tram-train' services and limited separation on routes into Cardiff and along the South Wales main line relief lines to Newport.

Scenario 2, considers the merits and potential benefits of separation of elements of the Valleys rail network from other areas of the rail network. This could enable the introduction and use of different classes of rolling stock on the segregated elements; these could include lighter trains and tram-train solutions. Scenario 2 could be a development of Scenario 1.

There are also a number of network wide issues and implications resulting from the introduction of new modes to existing bus and heavy rail routes. These need to be addressed and include:

- For the existing network - determine the degree of separation that is possible and could be introduced and the benefits that could be obtained. Benefits could include not only those relating to operation and maintenance of the network but also those associated with the procurement, operation and maintenance of rolling-stock. For new networks, the question of appropriate governance, ownership, operation and maintenance would also need to be considered.

- Rolling stock requirements and fit with existing Valley Lines Electrification and planned Diesel Multiple Unit (DMU) Fleet replacement timescales. In particular, the opportunity to replace proposed cascaded stock with new tram – train and light rail transit over its remaining lifespan and whether tram train could replace some heavy rail stock at commencement of electric services.

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More detailed future passenger demand modelling and capacity calculations are required to ensure future network proposals fit with demand levels. This will assist in determining fleet requirements to meet peak demand over the next 20-40 years. There are also detailed technical considerations associated with each corridor which need to be explored. These will need to be considered together with the preparation of business cases to confirm a final decision on the preferred mode by corridor.

More details presented later in this report and comprehensively in subordinate report, "Metro Modal Study".

EMU – Electric Multiple Unit. Standard 'heavy rail' Electric Commuter Trains in widespread use across the UK and likely to be rolled out on some/all of the valley lines network following electrification by 2020.

Tram-train : A hybrid train used in parts of Europe, able to run on normal electrified rail lines and also in 'tram' mode on street enabling lower cost extension of rail services. Could work well in Cardiff to link City and Coryton lines to Cardiff Bay and beyond, as well as potential extension to the North West of Cardiff and RCT. The best known example is Karlsruhe in Germany. Currently being trialled in Sheffield.

LRT – Light Rail Transit. Lighter Electric Trains better suited to operating high frequency services with close stop spacings than EMUs. The best example in the UK is perhaps the Newcastle Metro. Could be considered on the core Valley lines network instead of EMUs.

BRT – Bus Rapid Transit. Range of technologies involving full or partial segregation of high quality bus network away from other road users. Operation and performance more akin to light rail/tram rather local bus service with fewer stops/shorter journey times. In the UK The Cambridge guided bus way is perhaps the best example.

Estimated Costs, Development and Delivery

The Metro has a potential total cost of £2Bn and can be delivered incrementally in the period to 2030. The projects identified below can benefit the entire region and mark the beginning of a period of long term sustainable economic growth across the region. The estimated capital costs to implement the primary Metro components are as follows:

METRO COMPONENT	EST. CAPEX £M	NOTE
Valley Lines and South Wales Main Line Electrification Cardiff Area Signalling and Renewals		Already committed
Current programme proposals		Includes NSIP/DDA station enhancements and extension to Ebbw Vale Town with 2tph; allocation for further Metro development.
1. Enhancements to core network	£470M	Quick win components to be priority for early development but remainder phased to 2030.
2. Ebbw Vale Newport Corridor	£30M	Priority for early development (some work in current programme above).
3. North West Cardiff Corridor	£390M	Priority for early development and to be complete by 2022.
4. M4/Relief Lines Corridor	£250M	Priority for early development and to be complete by 2025.
5. Other Rapid Transit in Cardiff	£450M	Majority to be delivered later in the programme post 2025.
6. Rapid Transit to/in Newport	£70M	Medium term to 2025.
7. Newport - Abergavenny Corridor	£70M	Likely to be 2025-2030.
8. Regional BRT	£70M	Prioritise Pontypool - Pontypridd BRT.
9. Cardiff Airport	£60M	Priority for early development.
10. Nelson Newport Corridor	£110M	Long Term 2035-2030.
Total for all new Metro schemes	**£1,970M**	

Note: These costs have not been based on a detailed engineering assessment but on desk research and use of previous studies and reports. The margin of error in some cases is likely to be significant. Further and more detailed analysis and assessment will be required as the schemes are developed further.

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Within the above programme are a number of 'quick wins' that can be developed and delivered by 2020. Subject to the results of more detailed engineering assessment, these will cost of the order of £350M. Similarly, estimates for the priority projects (which include the quick wins) to 2025 suggest a total cost £1.3Bn.

In addition to the capital costs estimated above, further work will be required to explore costs for:

- Additional rolling stock.
- Station Design and Placemaking.
- On-going operating costs and potential subsidies; this will require more detail modelling of service patterns, mode options, etc on a route by route basis.
- Systems and wider integration measures (ticketing, services and customer information).
- Longer term operating and administration costs to support potential dedicated Metro development/delivery team/function.

An illustrative programme for delivery has been set out which will enable the benefits to be delivered incrementally from 2015 to 2030 as illustrated *Figure 10*.

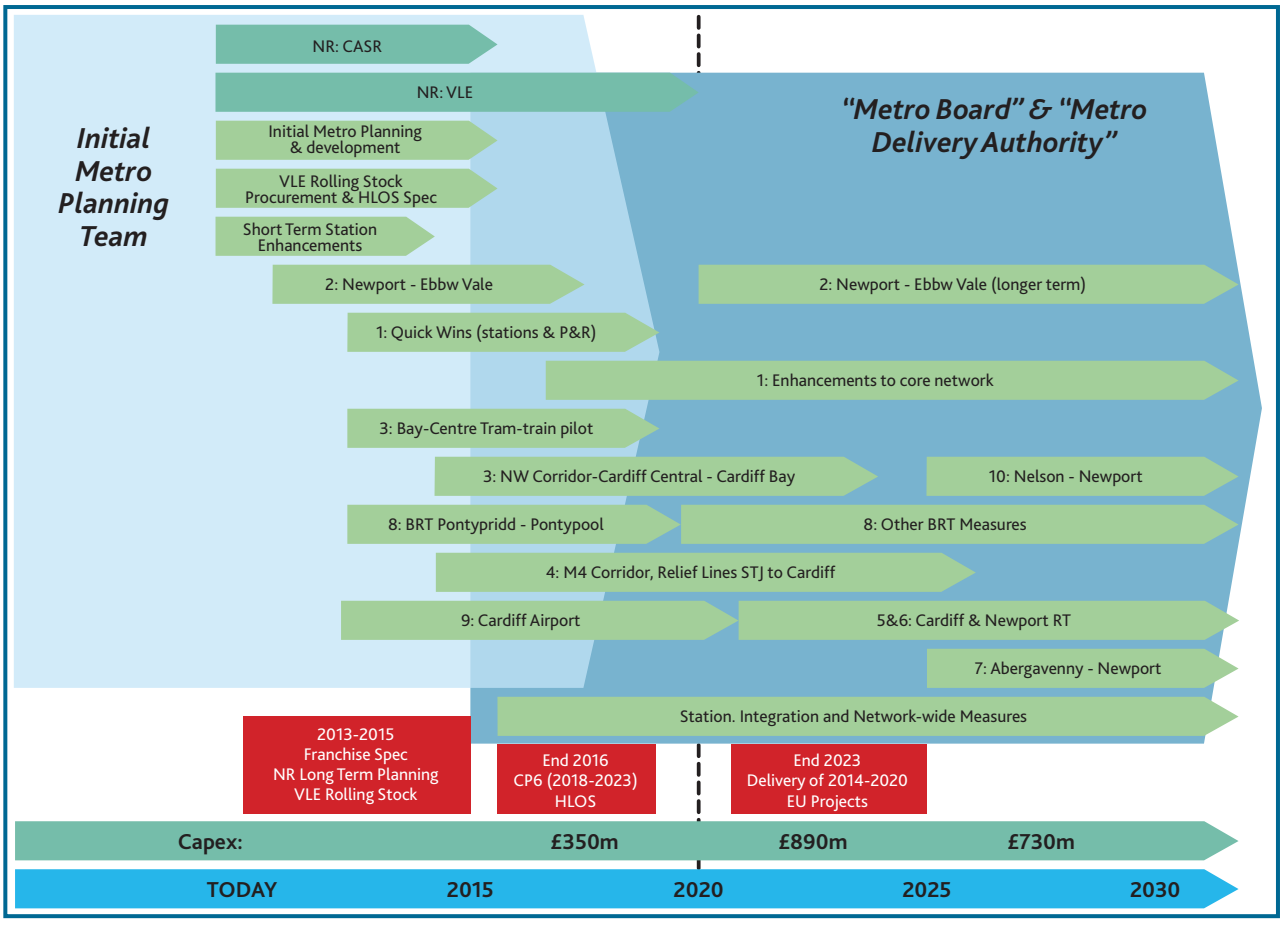

Figure 10: Illustrative Metro Implementation Plan to 2030

Metro Funding Sources

The investigation of funding undertaken and a review of the work completed as part of earlier studies, clearly presents the need for a range of funding mechanisms to be developed and applied to the Metro.

This will include consideration of: direct Government capital, borrowing, developer contributions, the rail industry's High Level Output Specification (HLOS) funding, borrowing vs Network Rail's Regulated Asset Base (RAB), opportunities provided by the next Wales and Borders franchise, EU Cohesion funding, local authority contributions, BIDs, the use of business rates and possible Tax Increment Financing (TiF), the use of other financial instruments supported with ring fenced revenue (eg car park charges) and fare box revenue.

In particular EU Cohesion funding for a programme that satisfies European Urban Mobility[5] policy objectives can provide a major component of the total funding package.

Special purpose vehicles could also be established to coordinate, focus and execute the provision of funds. These could be to raise or borrow money, as a vehicle to exploit assets that will secure value uplift as a result of the Metro, or as a Public Private Partnership (PPP) arrangement to develop, implement and operate the Metro.

There is a possibility that some of the components will need an operational subsidy, on an on-going basis. However the timing and quanta of any revenue support can only be determined after more detailed modelling of demand and passenger flows for each identified Metro intervention.

Each of the Metro components will also have a different funding profile. The next stage of work on transport modelling/ appraisal and business case development will also explore fully the appropriate funding profile (Capex and Opex) of each Metro scheme.

Some of the funding considerations are explored in more detail in subordinate report, "Metro Funding and Financing Independent Advice"

5 http://ec.europa.eu/transport/themes/urban/urban_mobility/index_en.htm

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Governance Principles

Whilst conceptual and detailed design can continue under the auspices of a dedicated Welsh Government team in the short term, the development and implementation of a comprehensive Metro programme over 15+ years will require a different approach. The 'city region' nature of the Metro and the potential for some form of local government re-organisation in the coming years will have an influence how this is addressed. Given that that process has some time to run, with a number of potential outcomes, it is timely to set out below the key governance principles that should be considered for the Metro project.

- **Develop and Agree a Clear Vision for Metro**
  To realise the Metro project there must, from the outset, be an agreed vision and goal allied to an appropriate governance structure which spans the 3 key and inter-related areas of: Design, Development and Delivery to ensure appropriate coordination from start to finish.
- **Separate Strategic and Operational Responsibilities**
  It is considered essential to have both a strategic leadership group the 'Metro Board' and an operational delivery group the 'Metro Delivery Authority'. This is an approach that allows a clear separation of roles and responsibilities, with a delivery team left to focus entirely on the implementation of the agreed project across size, scope, timescale and cost.
- **Establish a Metro Planning Team**
  To move the debate forward and start to crystallise the vision, scope, timescale, budget and governance arrangements a small focused planning team should be created to initiate an outline plan over the next 1-2 years. This team would initially support the minister in defining the Metro in more detail and then become an integral part of the formal Metro Board structure.

Support from the Business Community

Over the last few years, the development of the Metro concept has secured widespread political support. Perhaps more importantly, support has also come from leading employers like Centrica and Admiral as well as the region's leading business groups including The Cardiff Business Partnership, CBI Wales, IOD Wales and The South Wales Chambers.

Their support is most welcome and has been an essential foundation for the successful development of the Metro concept to date. It is important therefore, to nurture and maintain the input and support of the wider business community in the on-going development of the Metro.

Recommendations

1. Establish a dedicated team and supporting resources to further develop each of the priority interventions:
    a. Formal planning stage will be undertaken, including the development and publication of an associated Strategic Environmental Appraisal.
    b. Detailed engineering feasibility, transport modelling/options appraisal and business case development.
    c. Exploration of passenger demand, operating costs, revenues and potential on-going subsidy implication.
    d. Early assessment to determine scope for segregating some of the network.
    e. Funding strategy for each phase (bringing in expertise to the team as required).
    f. Operating model for each phase.
    g. Detailed location focussed regeneration plans.
    h. Land use/transport masterplan development and regeneration frameworks for key sites (in partnership with local authorities where applicable), including
        - Treforest/Taffs Well,
        - Creigiau/Talbot Green/Llantrisant,
        - Cardiff EZ to Cardiff Bay
        - Newport Pill/Mon bank.
2. Develop regional multi modal demand and accessibility model to support Metro development and appraisal.
3. Progress with planned short term measures and hand over to 'Delivery team'.
4. Fully explore quick wins and develop implementation plan; in doing so work with relevant local authorities and developers.
5. In developing Metro, priority to be given to increased connectivity (including more stations on existing network), higher frequencies and modal integration over absolute point to point journey times. The former will help reduce generalised journey times across the region. With faster rolling stock, accommodating new stations on existing network has the potential to increase revenues without adding to operating costs.
6. Position Metro as a national project and prioritise it for EU and Wales Infrastructure Fund investment.
7. Align Metro implementation and development opportunities with M4 Relief Road design.
8. Work with industry partners to continue to reduce industry costs, and specifically the high level of subsidy per passenger mile; recognising that a review of fares policy maybe needed; consideration of the opex impact will be a factor in detailed appraisal of Metro projects.
9. Plan more formal consultation process for Metro proposals.

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10. Prepare formal Metro input to Wales and borders (or other relevant) franchise specification, the High Level Output Specification (HLOS) for CP6 and CP7 and Network Rail's long term planning.

11. Within the constraints of the VLE Rolling Stock procurement programme timetable and in light of this Metro study and mode review, explore:

    a. If any proposal can be realistically included in current procurement timetable; especially for the 'Scenario 2' with widespread use of Light Rail and/or Tram-train on core valley network.

    b. If the implementation risk is too great, for valley lines electrification adopt EMUs (new and/or cascaded) on flexible terms to allow phased implementation of more appropriate LRT/tram-train vehicle on primary valley line corridors in the 2020s.

    c. As a minimum explore potential to operate tram-train on the Bay, City and Coryton lines as part of the Bay-Centre pilot before extending to the Cardiff NW Corridor priority project.

    d. Ensure that procurement choices and operational model provides maximum flexibility for Metro to introduce stations and services on the existing network.

12. Progress with work to develop and deliver an integrated multi modal and single ticket network.

13. In the context of taking forward the preferred solutions in the region and any future transport interventions, determine the most appropriate arrangements for developing and implementing policies for integrated and efficient transport facilities in the SE Wales region.

14. In the medium term, establish a new organisation to fully develop, deliver and ensure effective operation of the Metro and ensure these are aligned with the emerging consensus on city regions and the potential for new PTA/PTE arrangements in south east Wales.

15. Work to ensure Metro priorities set out in this report are integrated into policies across other government departments and local authorities.

16. Develop a set of guidelines, which should be applied to the development of a brief for a new Metro intervention to ensure that the wider benefits are captured. This will include guidance on design, permeability, scoping development potential, evaluating viability of mixed use developments etc.

17. Identify (with support of stakeholders) a pilot project which brings together:

    a. Transport planning and engineering;
    b. Placemaking;
    c. Active travel and health;
    d. Housing development;
    e. Employment development;
    f. Skills; and
    g. Tourism.

This pilot project could take place in conjunction with one of the quick win Metro interventions

18. Specifically, ensure Metro design principles are incorporated into the development of new stations at Ebbw Vale town and enhancement as part of the NSIP.
19. Determine potential development sites that would benefit from some form of supplementary planning guidance that would help deliver Metro compliant developments.
20. Undertake further research to identify private and not for profit sector partners that could provide expertise and investment for Metro-led regeneration projects. These might include, Developers, Registered Social Landlords and certain commercial operators.
21. Work with CREW, Welsh Government and the Welsh Local Government Association (and other relevant stakeholders) to develop mechanisms which could work alongside future Metro delivery organisations to ensure regional coordination of Metro-led regeneration to avoid duplication.

1 Metro Context

1.1 Background

The concept of investing in transport to help the regional economy is not new as these quotes from 1936 and 1946 aptly demonstrate…

> *…it seems that a more rapid movement of population up and down the valleys must be encouraged, so as to save the inhabitants of the northern towns and villages from economic isolation. How that rapidity of movement can best be secured should of course be decided by an authority responsible for a co-ordinated transport service throughout the Region. No such authority exists. In its absence perhaps the Ministry of Transport could be asked to report whether it would be best to electrify the railways…the government could assist in precisely the same manner that it is now assisting the electrification of main railway lines in London … With rapid transport, it should be no more difficult for workers from Aberdare or Ebbw Vale to reach Cardiff or Newport than it is for clerks to travel to their daily work in the City of London from Wimbledon or Ealing*

> *…political and social institutions have failed to adopt themselves with sufficient rapidity to the economic changes that have taken place. One small symptom of this is the maintenance of local government boundaries which have long lost their significance and of authorities which are inadequate to the larger tasks which need to be undertaken.*[6]

> *The main need is for a better transport service. On the railways faster local services are needed; the present slow services are largely responsible for what one report calls the 'invisible line across mid-Glamorgan beyond which industrialists are reluctant to go'. Electrification would probably prove to be the main step towards a solution.*[7]

Since then, many bodies and individuals such as The Welsh Government, The Cardiff Bay Development Corporation, The Wales Transport Research Centre, Welsh Select Committees, Ministerial Advisory Groups, etc have all made a contribution to the development of the concept. For example:

- Professor Stuart Cole and the Wales Transport Strategy Group outlined a rail vision in their 2009 Paper Railway Infrastructure in Wales, The Challenges of the Next 25 Years. [8]
- The Welsh Government's Ministerial Advisory Group on the Economy and Transport, in their 2009 Phase 2 Transport Report, said that transport policy is overly subservient to social and environmental considerations. They concluded there was too little emphasis on transport's primary function to support the economy. The Ministerial Advisory Group also identified an urgent need to restore capacity and reliability to the main east-west strategic corridors, as well as tackling urban congestion, both of which seem to have fallen in priority.

6 HA Marquand, George Allen & Unwin Ltd, 1936, South Wales Needs a Plan,
7 MO Fogarty, Methuen, 1946, Prospects of Industrial Areas of Great Britain
8 University of Glamorgan, Wales Transport Research Centre, 2009, Rail Infrastructures in Wales, Challenges of the next 25 Years"
9 Welsh Government, 2008, Wales Spatial Plan.

- The 2008 Wales Spatial Plan update also made a positive statement of intent in these terms as regards transport in the Cardiff City Region:

  "A fully integrated high quality transport system is necessary... Over the 20 year horizon of the Wales Spatial Plan, all the area's key settlements should be linked to Cardiff or Newport by suitable high capacity public transport." [9]

The opportunity has clearly been in existence for many years, yet until now it has not been grasped.

1.2 Lessons from Outside Wales

What is new today, is a widespread recognition, especially across both the business and political community in Wales, that the economy of South East Wales needs major investment in its infrastructure to help address a long term decline in its economic fortunes and to help it play a more equitable role in the economy of the UK and to compete more effectively on the world stage.

There is also recognition that major transport and engineering projects can help project a positive and dynamic image for a region. Schemes like Crossrail and Thameslink in London, the Metrolink in Manchester, and the upgrade of Birmingham New Street station have projected an energy and dynamism for those cities that has made them more attractive to investors and developers.

A range of recent studies exploring the relationship between transport investment and a regional economy also lend weight to the Metro concept:

- The importance of transport to the economy was underlined by the key findings of Sir Rod Eddington's transport study commissioned by the UK Government in 2006[10]. This identified a lack of capacity on transport networks, particularly in the UK's principal city-regions, as a major impediment to business investment and growth. To tackle these problems and reduce the cost of congestion, Eddington recommended that central and local government should include a focus on Travel to work patterns in those urban areas that make the biggest contribution to the economy and are experiencing the most rapid growth.
- These recommendations were re-enforced by two reports published by the Centre for Cities in 2010, *Beyond the Boundaries* and *On Track*[11]. In particular, they argued the case for investment in rail infrastructure to support the economy and emphasised the importance of a regional focus for strategic matters like transport and economic development.
- Studies on the impact of Dublin's Light Rail system on the economy and urban development of its city region also present positive findings[12]. The metro system increased the use of public transport and reduced car dependant urban sprawl. It also stimulated regeneration of local centres as a result of increases to land values, and created more housing, and other commercial activity near metro stations.

10 'Eddington Transport Study', Dec 2006, commissioned by UK Chancellor of the Exchequer and the Secretary of State for Transport.
11 Centre for Cities, Right Track and Beyond The Boundaries, 2010.
12 Urban Institute Ireland-School of Geography, Planning, and Environmental Policy, Economic Evaluation of the Impacts of New Rapid Rail Investments and Consequential Forms of Urban Development within the Greater Dublin Area, University College Dublin, 2009.

- In March 2010, the Passenger Transport Executive Group, which represents the passenger transport executives for Liverpool, Newcastle, Leeds, Birmingham, Sheffield and Manchester, launched a further study[13] that presented their case for the close connection between transport investment and city region economic performance.
- An exercise undertaken in 2010 by Crossrail to assess the agglomeration economic impact of increased regional connectivity identified additional benefits of 25% on top of those calculated through traditional transport appraisals)[14].
- What light rail can do for cities, a report commissioned by the Passenger Transport Executive Group, showed that light rail has removed 22 million car journeys a year from the UK's roads and is generally six times more effective than buses in tackling traffic congestion[15]. Additionally, it showed that where there was significant investment in light rail the result was a peak time shift from car to tram of around 20 per cent, while road traffic was cut by up to 14 per cent.
- In another 2010 report, Network Rail also argued that wider economic issues and benefits such as those highlighted above, need to be included when making decisions on investment in rail and transport infrastructure[16]. The report contends that a new approach to investment decisions must:
    - Capture how investments can change the size, location and type of economic activity.
    - Consider how an investment attracts unemployed people into the workforce.
    - Provide a level playing field for closely related sectors in the pursuit of economic objectives, so that transport, regeneration and housing can be compared against each other and combined to maximise economic returns.
- In a 2012 report, Bridging the Gap, the CBI argued for investment in infrastructure to support the economy[17]. They found that each £1 spent on infrastructure would generate £2.84 of activity in the wider economy.
- The European Union have specific policies as regards Urban Mobility[18] and have identified better, smarter and more integrated urban transport as a key policy objectives to address issues of congestion, pollution and to help economic growth and employment:
    - A large majority of European citizens live in an urban environment, with over 60% living in urban areas of over 10,000 inhabitants. Urban mobility accounts for 40% of all CO2 emissions of road transport and up to 70% of other pollutants from transport.
    - Congestion in the EU is often located in and around urban areas and costs nearly 100 billion Euro, or 1% of the EU's GDP, annually. Cities themselves are usually in the best position to find the right responses to these challenges, taking into account their specific circumstances.
    - Mobility in urban areas is also an important facilitator for growth and employment and for sustainable development in the EU areas.

13 PTEG, 2013, Transport works the case for investing in the city regions A report by pteg

14 TfL & MIT, 2010, Jenkins, Salvucci & Colella, "Agglomeration benefits and transportation projects: a review of theory, measurement, and application"

15 Passenger Transport Executive Group, What Light Rail can do for Cities – A Review of the Evidence, February 2005.

16 Network Rail, Prioritising Investment to Support Our Economy, September 2010.

17 CBI, 2012, Bridging The Gap

18 http://ec.europa.eu/transport/themes/urban/urban_mobility/index_en.htm

Since then, many leading UK city regions have developed strategic and economically focussed regional transport plans. For example, in 2011 Transport for Greater Manchester identified the benefits of its 10 year £1.5Bn transport investment programme, much of it allocated to public transport and the extension of its Metro network, will include more than 21,000 jobs and an extra £1.3 billion a year for the region's economy[19].

1.3 Re-emergence of the Metro Concept in South East Wales

The current Metro concept was set out in the 2011 Cardiff Business Partnership and Institute of Welsh Affairs publication, *A Metro for Wales' Capital City Region*[20], which in turn drew in part on a number of earlier studies - including some of those referenced in this report. The concept presented focussed on the role of transport in supporting economic development and regeneration. It was presented as a catalyst for the implementation of a strategic regional plan as illustrated in Figure 11 and recommended that plans for major development locations should be complementary to transport plans and contribute to the overall economic performance of the region.

In the two years since that report was published, the concept of a south Wales Metro has secured widespread political and governmental support. A cross party motion secured unanimous support for the Metro concept in the National Assembly in December 2011 and led to the establishment of the cross party rail Working Group in February 2012.

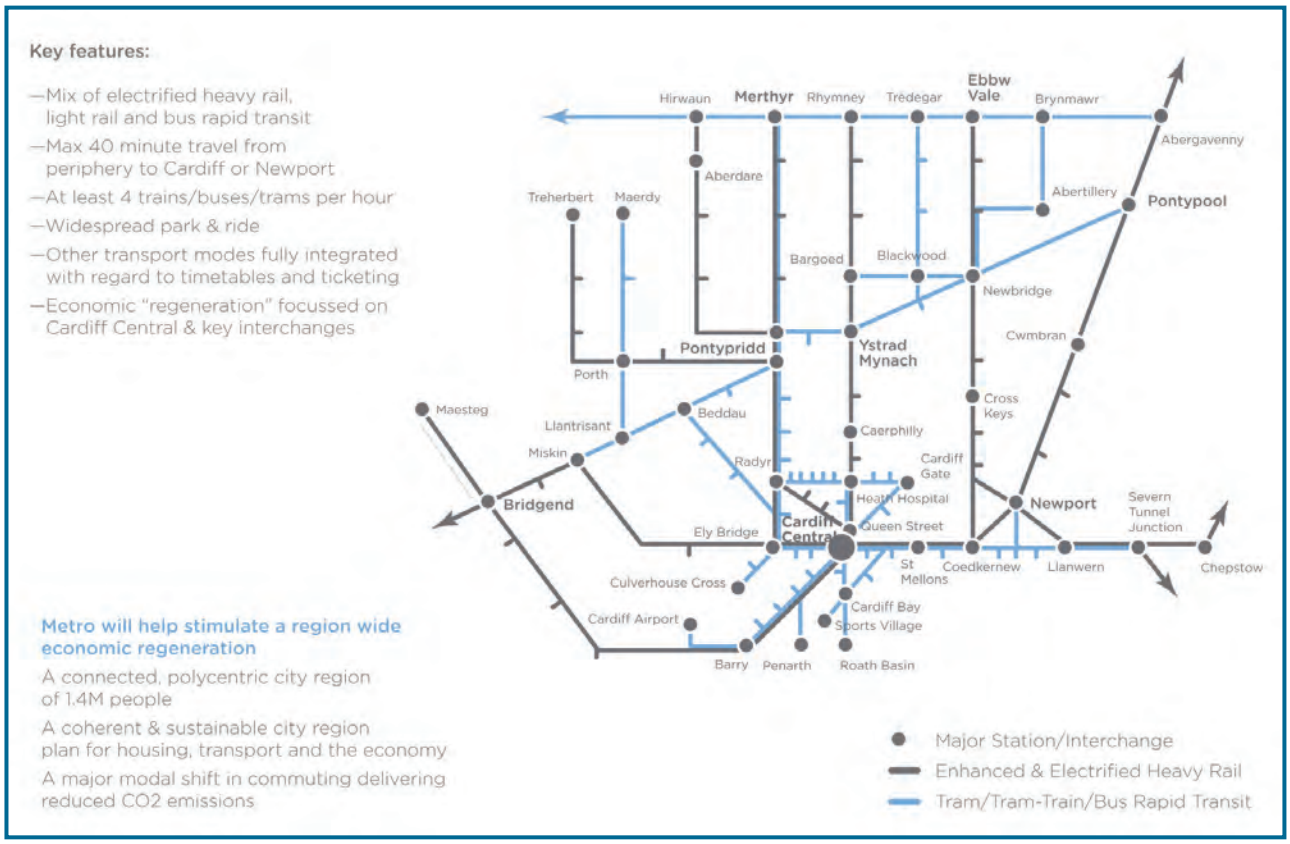


Figure 11: South Wales Metro concept from Metro Consortium.

19 Transport for Greater Manchester, 2011/2012 Annual Report

20 Cardiff Business Partnership, IWA, Mark Barry, February 2011, "A Metro for Wales' Capital City Region – Connecting Cardiff, Newport and the Valleys".

The Metro concept was also included in the Ministerial statement accompanying the revised National Transport Plan published in December 2011. In March 2012 the South East Wales Transport Alliance (SEWTA) formally adopted the Metro concept. In July 2012 a Welsh Government Task Force on the economic potential of city regions[21], chaired by Dr Elizabeth Haywood, also highlighted regional transport – and the Metro concept – as being fundamental to the development of a Cardiff City Region.

1.4 Metro Phase 1 – Valley Lines Electrification, CASR and Quick Wins

In part due to these previous studies, in July 2012 the Department of Transport announced, in its High Level Output Specification for England and Wales, its intention to proceed with the electrification of the entire Valley Lines network[22]. This decision represents the most significant rail investment in Wales since the Severn Tunnel opened. More importantly, it delivers the first phase of the south Wales Metro. According to Network Rail's Strategic plan electrification of the Valley lines should be substantially completed by 2020[23].

As part of the longer-term Metro project, work on electrification and renewal project (CASR) are part of Metro Phase 1. This phase also includes additional short term interventions such as station improvements, new stations at Energlyn, Ebbw Vale Town and Pye Corner, capacity enhancements on the Ebbw Vale Line as well as the quick wins identified as part of this study.

1.5 Current Metro Concept Development

More recently, SEWTA[24] and the Integrated Transport Task Force[25] instigated by previous Transport Minister Carl Sargeant, have also made positive contributions to the development of the Metro concept in their reports; and earlier in 2013, The Metro Consortium published, 'A Metro for the Cardiff City Region: transform | regenerate | connect', an update of the 2011 CBP/IWA report[26]. Collectively these all provide a compelling case for action.

Whilst these reports do not all overlap entirely in their findings and recommendations, one can distil some common themes that will be pivotal to the development of a Metro in South East Wales over the next 10~20 years. These include:

- In particular, whilst transport investment is essential to a successful and dynamic regional economy, it can only have an impact alongside a range of complementary interventions including improving education, supporting access to capital, encouraging innovation and entrepreneurship, developing a high quality urban environment and aligning economic development initiatives. This approach acknowledges the increasing importance of cities and city regions in driving economic growth, as set out by the likes of Richard Florida[27], The Work Foundation[28] and the European Commission[29].

21 Welsh Government, July 2012, City Regions Final Report
22 Department for Transport, July 2012, "HLOS for England Wales CP5 (2014-2019)".
23 Network Rail, January 2013, "Strategic Plan 2014-2019".
24 SEWTA, December 2012, "A Transport Strategy for Regional Development (ARUP)"
25 South East Wales Integrated Transport Task Force, March 2013, "Proposal for the Delivery of Future Transport Network"
26 Metro Consortium, Mark Barry, March 2013, "A Cardiff City Region Metro: transform | regenerate | connect"
27 Richard Florida, Basic Books, 2002, "The rise of the Creative Class".
28 The Work Foundation,2006, "Ideopolis – Knowledge City Regions".
29 European Commission, May 2007 "The State of European Cities Report"

- It is also necessary to much more effectively integrate strategic land use planning and transport planning on a regional basis so that the public investment in transport can secure/enable the maximum economic impact and private sector investment - either directly or indirectly. This may mean discarding allocated site that have a local interest but do not and cannot, attract commercial interest.
- Ultimately we need to the vast majority of the population to live and work near a Metro station. This will require a significant change in approach to local and regional planning, in particular development plans should encourage higher density and mixed-use development near public transport nodes, or near corridors well served by public transport as set out in the recently published, *Planning Policy Wales*[30]. A good example of the kind of integrated transport/development approach needed can be seen in the work in Ireland to assess where and what type of residential development should occur in Dublin[31].
- It is also clear that the ultimate aim of an integrated, single ticket, multi-modal, turn up and go Metro system will require a much closer and strategic management of the transport network and cover not just existing/new transit routes but integrated ticketing, customer information systems, bus services and active travel. Whilst not a focus of this report, this aspect will need to be addressed as the Metro is developed and implemented.
- Finally, all the reports acknowledge that to develop, deliver and operate a transformative regional project such as the Metro, will require a new approach and governance philosophy supported by appropriate statutory powers and funding sources.

In short, a Cardiff City Region Metro can deliver effective intra-regional transport and enable people to move between home and work quickly, cheaply and sustainably. The Metro can also provide a cohesive framework to embody the city region and enable it to behave as a single entity and help it enhance economic performance.

An ambitious Metro scheme will send out a message that South East Wales means business and is able to compete with other leading city regions across Europe.

30 Welsh Government, November 2012, "Planning Policy Wales", Chapter 8
31 National Transport Authority, May 2013, "Planning and Development of Large Scale, Rail Focussed Residential Areas in Dublin"

1.6 Interregional Links

Many of the previous reports also touch on the importance of links outside South Wales. This includes to Swansea/ West Wales, Bristol/SW England, The Midlands and most importantly to London and Heathrow. As a point of concern is the potential of HS2 to bring most English cities much closer to London in terms of travel time than Cardiff. Even with the welcome electrification of the GWML, Cardiff will be 1hr 45mins from London; HS2 could deliver Manchester - London journeys of less than 1hr 20min.

The potential economic impact of HSR was assessed by KPMG/Greengauge in 2010[32] and found that the economies of Wales and SW England would be negatively impacted by HSR. That study suggested that Wales cold have 20,000 fewer jobs and £600 lower annual income by 2040. The recent DfT commissioned KPMG update of that work[33], whilst not presenting specific data for Wales (included in "rest of UK" analysis) suggests, in Figure 12 from that report, that SE Wales will suffer a dis-benefit as a result of HS2 – it is assumed that analysis (as in 2010) used Cardiff London journey times of 1hr 45min.

There is a need therefore, alongside Metro, for S Wales and SW England to ensure that GWML continues to receive investment in incremental upgrade post electrification to enhance capacity and reduce journey times to London and Heathrow – we should aim to see journeys of <90mins between Cardiff and London by the time the first section of HS2 is operational.

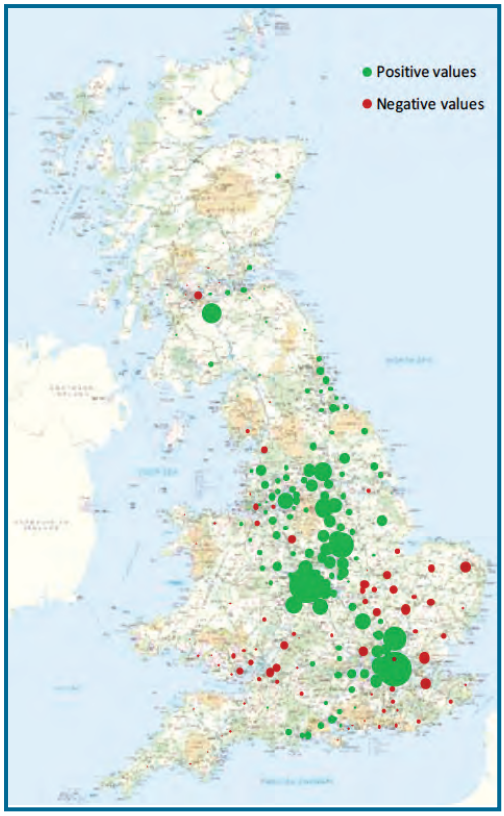


Figure 12:
Potential distribution of economic output in 2037 after investment in HS2

32 Greengauge21, KPMG, 2010, "The consequences for employment and economic growth
33 DfT, 2013, HS2 Regional Economic Impacts

1.7 The Project and This Report

In May 2013, the Minister for Economy, Science and Transport, Edwina Hart, commissioned this study to further develop the Metro concept, identify the priority Metro interventions and establish a direction of travel for future Metro development.

Using all the previous work undertaken as a foundation this study sought to:

- Develop a strategic region wide plan for Metro to 2030.
- Identify the priority Metro interventions.
- Align strategic development opportunities with Metro planning.
- Present a range of wider regeneration proposals aligned to the development of Metro.
- Assess the overall potential high level economic impact of the Metro.
- Identify a number of quick win Metro projects that can be delivered at the same time, or before, VLE is completed.

Work started on this report in May 2013 and was completed at the end of September 2013. Full details of the scope and approach of the project can be found in Section 13.

The totality of this report is made of up of several documents and appendices as follows:

- Main Report and Appendices (with content prepared by M&G Barry Consulting, Jones Lang LaSalle, Steer Davies Gleave, Powell Dobson Urbanists and Capita Symonds).
- Separate Executive Summary.
- Capita Symonds: Metro Interventions Appraisal Report.
- Capita Symonds: Metro Modal Study.
- Capita Symonds: Metro Spatial Map.
- PDU: Regeneration and The Metro.
- PDU: Station Design Guidelines (Ebbw Vale).
- SDG: Metro Funding and Financing Independent Advice.
- SDG: Economic Impacts.

2 Overview of Regional Economy

South East Wales/Cardiff City Region Economy not realising its potential

- 1.49M Population in South East Wales (Blaenau Gwent, Bridgend, Cardiff, Newport, Vale of Glamorgan, Rhondda Cynon Taf, Merthyr Tydfil, Caerphilly, Torfaen and Monmouthshire).
- 348,000 people in Cardiff in 2012, up from 310,00 in 2011 and projected to increase to 430,000 by 2030; more limited or no population growth elsewhere in the region.
- GVA per capita of the region 80% of UK avg; Cardiff 102% to Gwent Valleys 55%; Wales 75%.
- GDHI of region 88% of UK average.
- Workplace employment 620,000 with a third in Cardiff.
- Commuting across entire region, with 78,000 into Cardiff up 14% in ten years.
- Cardiff performing less well than comparable UK cities (inc. Bristol, Edinburgh, Nottingham).

Much of the economic context relevant to the Metro has been set out in a range of previous studies and/or statistical publications from ONS, Welsh Government, independent bodies and academia. It is clear that the economic challenge facing the region is as great today as it ever was.

Rather than represent this other work in detail, this section presents a snapshot of key data sets to provide the context within which the Metro will be developed over the next 20 years.

2.1 Economic Indices

The economy of both Cardiff and the wider city region has scope for significant development and improvement to bring it line with other comparable cities and regions of the UK.

- GVA per capita in the Cardiff City Region (Figure 13) is about 80 per cent of the UK average (Vs 75% for Wales as a whole[34]; the lowest of all regions & nations of the UK).
- This ranges from 102% in Cardiff (down from 110% in 2000) to 55% in the Gwent Valleys.
- GVA per capita for Gwent Valleys, Monmouthshire and Central Valleys unchanged or small change since 2001 (<2 index points) – Cardiff & Vale has fallen by 7 index points. The fall in Cardiff has been the major reason for the fall for the region as a whole since 2001.
- The differences in GDHI are not so stark (Figure 15), with Cardiff and the Vale at 92% and the Gwent Valley at 82% and the region as a whole at 88% of the UK average.

34 ONS/Welsh Government, July 2013, "Regional Economic and Labour Market Profiles SE Wales"

- This is because GVA assesses workplace impact whereas GDHI is based on where people live; the difference, in part, highlights the impact of commuting. Later the relative differences between Cardiff and SE Wales and some other regions (core city and periphery) are explored to provide a broader context rather than focusing on simple comparisons within the region.
- Economic inactivity rates in some of the upper Valleys are more than 25 per cent - in Blaenau Gwent, Caerphilly, Merthyr, Torfaen, and Rhondda Cynon Taf - and around 20 per cent in Cardiff, Newport and The Vale of Glamorgan.
- Youth unemployment doubled from 14% in 2001 to 28% in 2012 (Figure 16); this is a UK wide issue.
- LSOAs with high levels of WIMD exist in many of the upper valleys; even larger clusters exist in parts of Cardiff and Newport.
- Wales has lowest level of value generating business activities (Research & Development, exporting, corporate Headquarters)[35] and lowest levels of mergers and acquisitions activity (venture capital investment, listed companies, start-ups)[36].

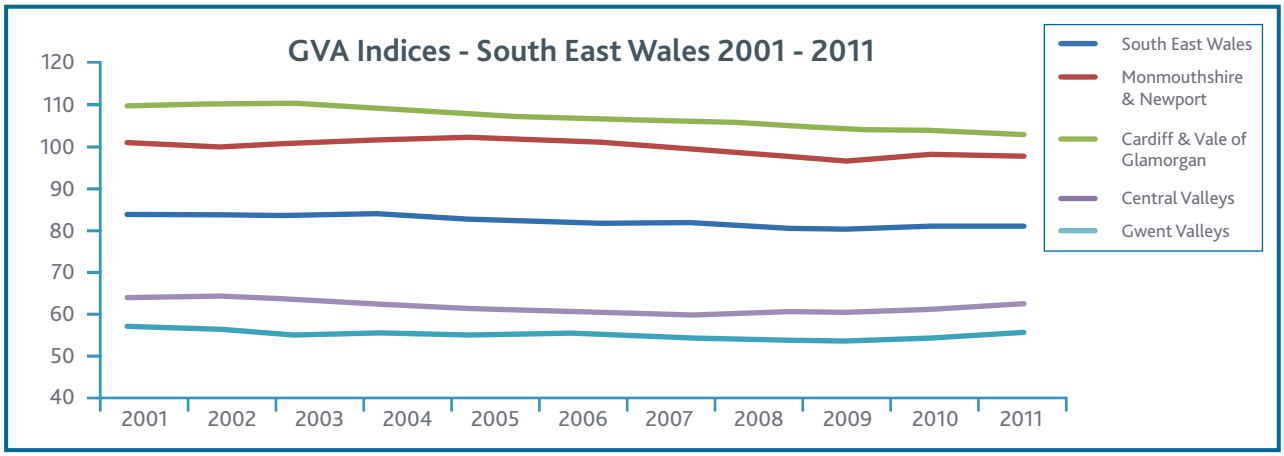


Figure 13: GVA per capita for South East Wales

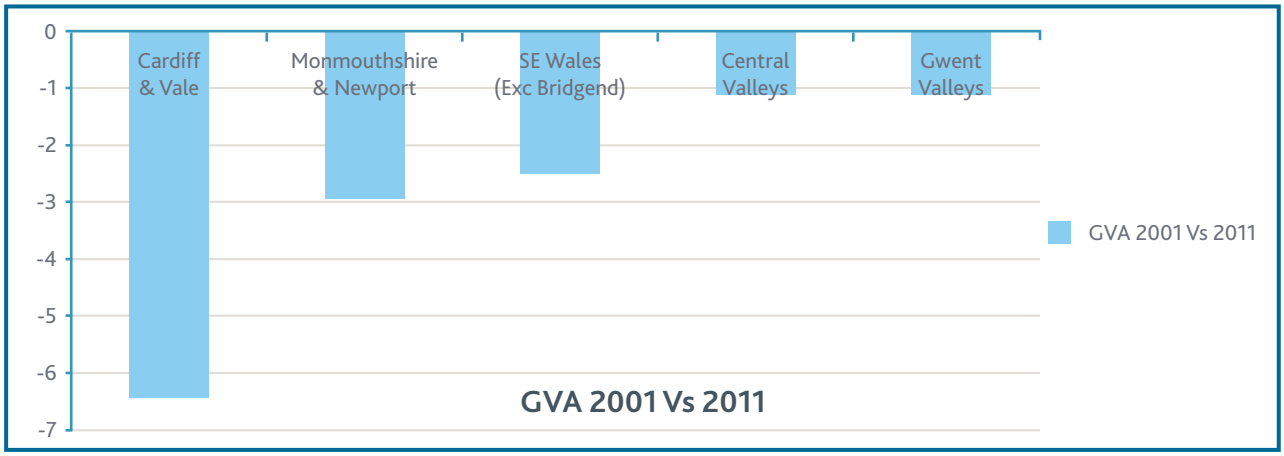


Figure 14: Change in GVA/Capita Index 2001 Vs 2011

35 UWIC, Huggins & Piers Thompson , 2010, "UK Competitiveness Index,

36 British Private Equity and Venture Capital Association, 2011, "Report on Investment Activity 2011"

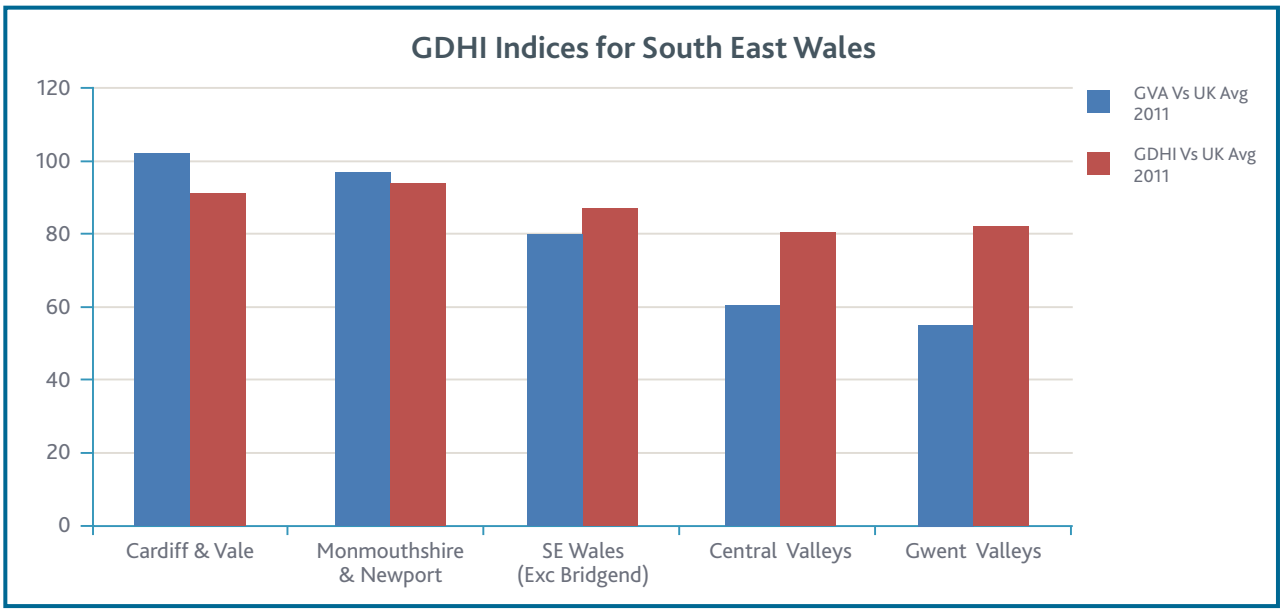


Figure 15: GDHI Indices for SE Wales 2011

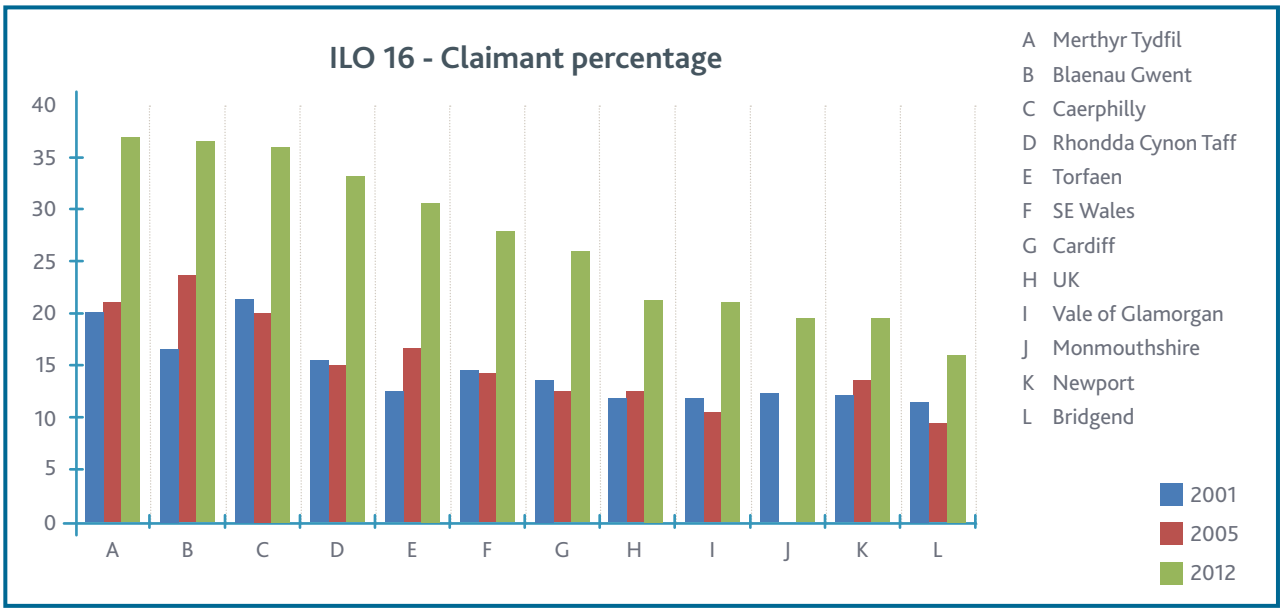


Figure 16: ILO %age Claimant count for 16-25 year olds 2001-2012 (Stats Wales)

2.2 Population

By 2030 the Metro will need to support a Cardiff population of 430,000 (120,000 higher than it was in 2001) at the heart of a city region of >1.6M.

- The Cardiff City Region includes ten local authorities: Cardiff, Newport, Vale of Glamorgan, Rhondda Cynon Taf, Caerphilly Bridgend, Merthyr, Blaenau Gwent, Torfaen and Monmouth. Together they had a population in 2012 of over 1.49 million, all within 20 miles of Cardiff - that's half the population of Wales.
- Based on the 2012 Mid-Year Estimates, Cardiff has a population of 348,000, which is about 12 per cent higher than the 310,000 recorded in 2001.[37]
- Approximately 45% of Cardiff's population growth has been concentrated in just three areas of the city: Butetown, Cathays and Grangetown. The population of Butetown more than doubled, from under 5,000 in 2001 to over 10,000 in 2011. In Cathays (with the highest concentration of students) the population increased by 42% from 14,169 in 2001 to 20,062 in 2011[38].
- There has been more modest population growth of three to seven per cent (that is 5-10,000) in Newport, Bridgend, Merthyr, Vale of Glamorgan, Caerphilly and Monmouthshire. On the other hand Blaenau Gwent, Rhondda Cynon Taf and Torfaen have seen virtually no change, as shown in Figure 17.
- The City Region's population is expected to grow significantly over the next 25 years, with the vast majority of that increase in Cardiff, which the Welsh Government projects will reach about 460,000 by 2036[39]. These figures have been challenged in recent years; however a recent report by Cardiff CC[40] for its LDP supports the Welsh Government's revised projections and presents a mid-range estimate of just under 400,000 by 2026. A figure of 430,000 by 2030 is entirely plausible and should be a key component of Metro planning.

37 ONS/Welsh Government, Junes 2013, "Mid-Year Estimates for 2012"
38 Cardiff CC, Edge Analytics, June 2013, "Population and Household Forecasts"
39 ONS/Welsh Government, July 2013, "2011 based Local Authority Population Projections to 2033 (SDR 116/2013)"
40 Cardiff CC, Edge Analytics, Junes 2013, "Cardiff Population and Householder Forecast"

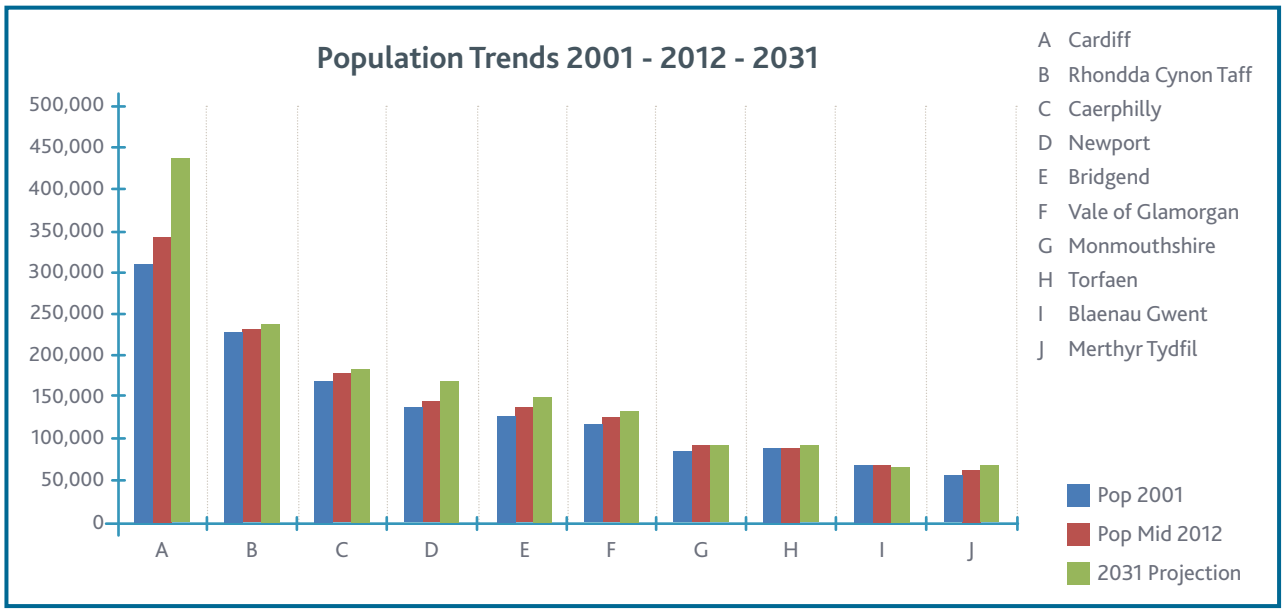


Figure 17: Change in population by local authority 2001-2011-2036

2.3 Workplace Employment

Since 2001 vast Majority of regional employment growth has been in Cardiff

- According to Stats Wales, there was a 17 per cent increase of over 30,000 people employed in Cardiff from about 180,000 to 210,000 between 2001 and 2011 (Figure 18)[41]. This is over 80 per cent of the net total increase for all of South East Wales (Figure 19).
- The only other local authorities that experienced growth in employment were the Vale of Glamorgan (5,000, or 13 per cent), with small rises of about 5 per cent (1,000) in both Merthyr and Torfaen. Some local authorities actually experienced a fall in employment, for example Blaenau Gwent and Newport.
- Cardiff also experienced the highest growth in service industry employment (Figure 20)

41 Stats Wales, July 2013, " Workplace Employment by Local Authority 2001 – 2011"

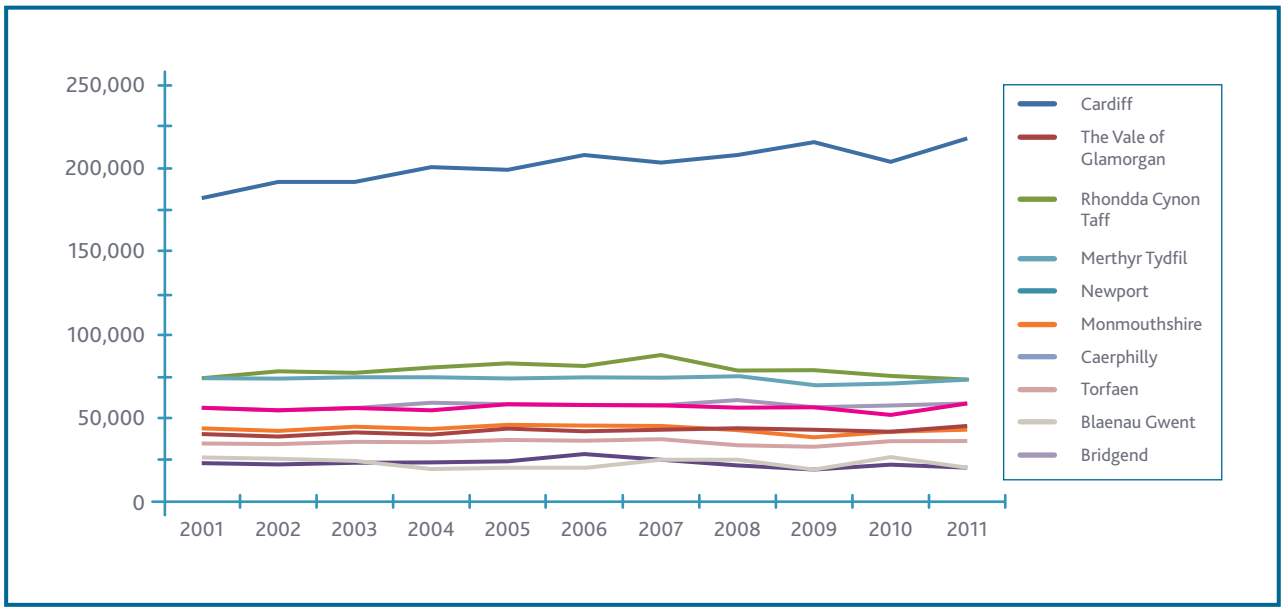


Figure 18: Change in workplace employment by local authority 2001-2011 (Stats Wales)

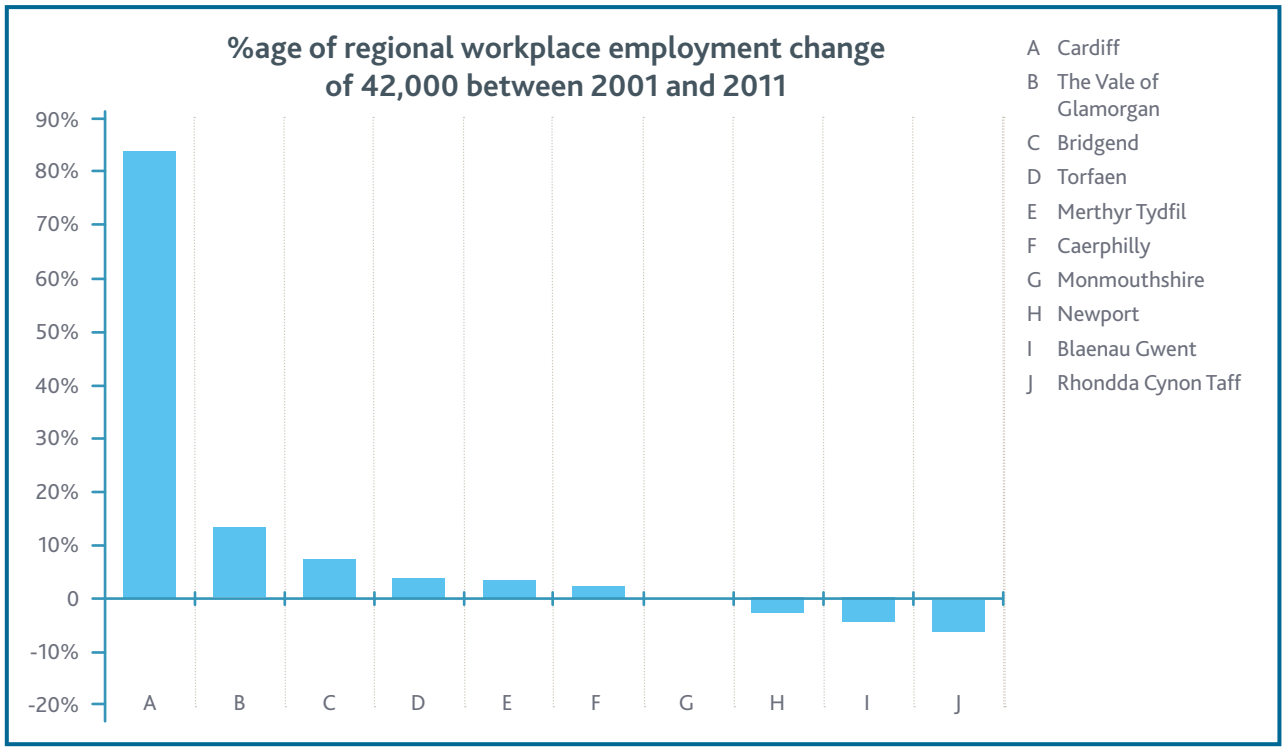


Figure 19: Percentage of Jobs created across the region by local authority 2001-2011[42]

42 Stats Wales (003028, 2013, "Workplace Employment by Broad Industry and Local Authority 2001 – 2011"

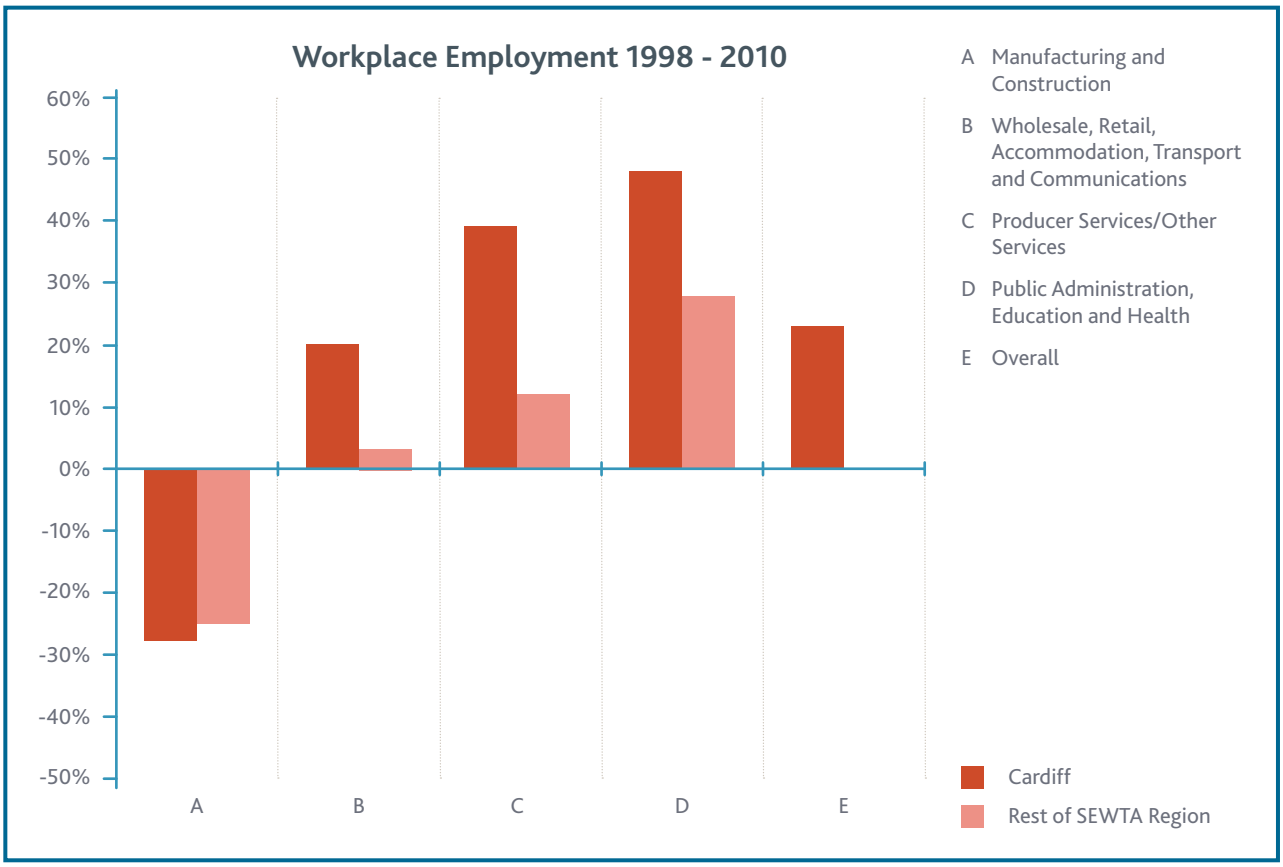


Figure 20: Change in workplace employment by industry 1998-2010, Cardiff Vs region[43]

- A recent report by Tym & Partners[44] for Cardiff CC presented the importance of Cardiff as a source of employment for the entire city region (providing 33% of all jobs). The dependence on Cardiff was found to be even higher (>40%) for professional and managerial occupations. Figure 21 and Figure 22.
- Other significant clusters of these higher value jobs exist in Newport and Bridgend.
- If recent trends were to continue, Cardiff's share of regional employment would increase to 37% by 2020 and 40% by 2030. This will require investment in infrastructure to cater for such growth. But, this increase in centralisation should be tempered by the fact that although the significant pole of growth is likely to be in Cardiff the majority of jobs will still be located outside Cardiff[45], although these will be more geographically dispersed.

43 Integrated Transport Task Force, March 2013
44 Cardiff CC, Tym & Partners, October 2011, "Strategic Planning for the Cardiff City Region"
45 Integrated Transport Task Force, March 2013

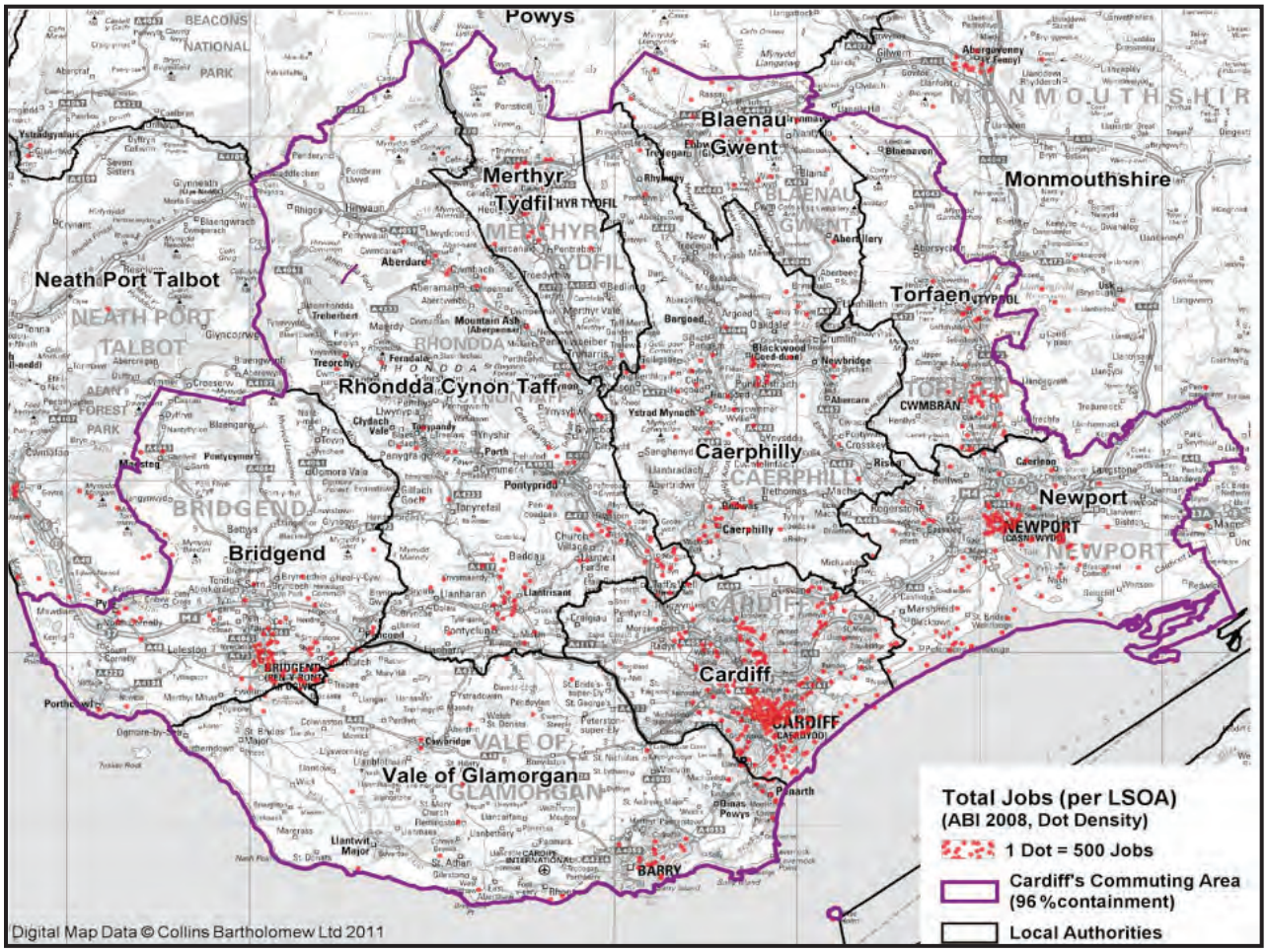


Figure 21: Spatial distribution of all jobs in SE Wales 2008

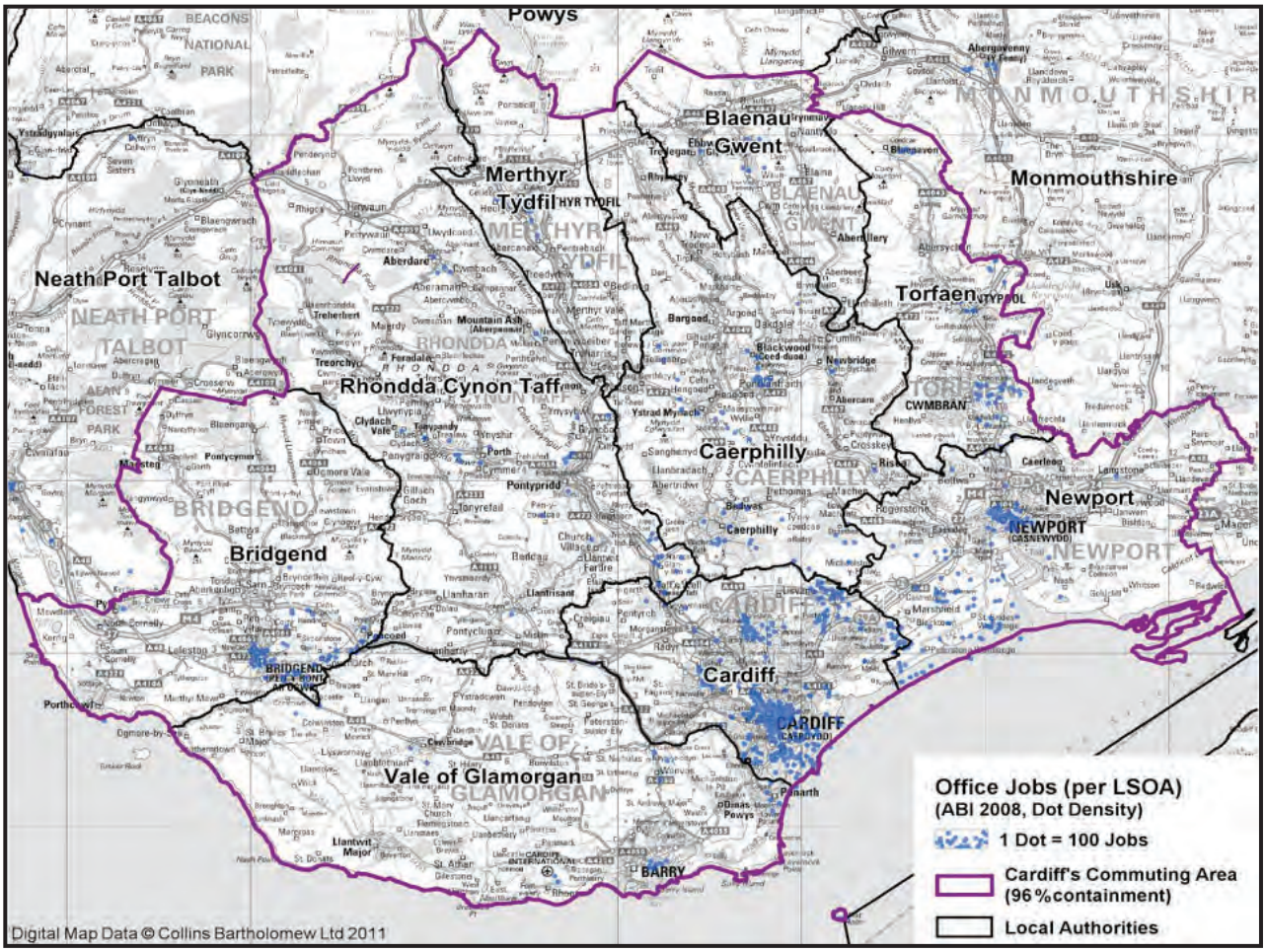


Figure 22: Spatial distribution of office based jobs in SE Wales 2008

2.4 Commuting Statistics

Complex pattern of commuting across the region with majority focussed on routes into Cardiff.

Both the economic statistics and workplace employment trends are reflected in commuting flows across the region. These can be summarised as follows:

- Nearly 80,000 people commute into Cardiff every day, up by about 10,000 (or 14 per cent) since 2001. A further 30,000 travel out of the city and 120,000 commute within the city, as shown in Figure 23[46].
- Whilst 210,000 work in Cardiff a further 400,000 work across the rest of region as demonstrated by the regional commuting patterns. These show movement between all local authorities, although the largest (and growing) movements are between Cardiff and its adjacent local authorities.
- Taken from a recent report for SEWTA the complexity of commuting patterns across the region can also be seen. Figure 24 and Figure 25 show the commuting patterns between key settlements in the City Region by car and public transport respectively from the 2001 Census data (The 2011 Census datasets are not yet published). The maps show the routes with the line widths indicating the volume of movement and the colour indicating the average speed.

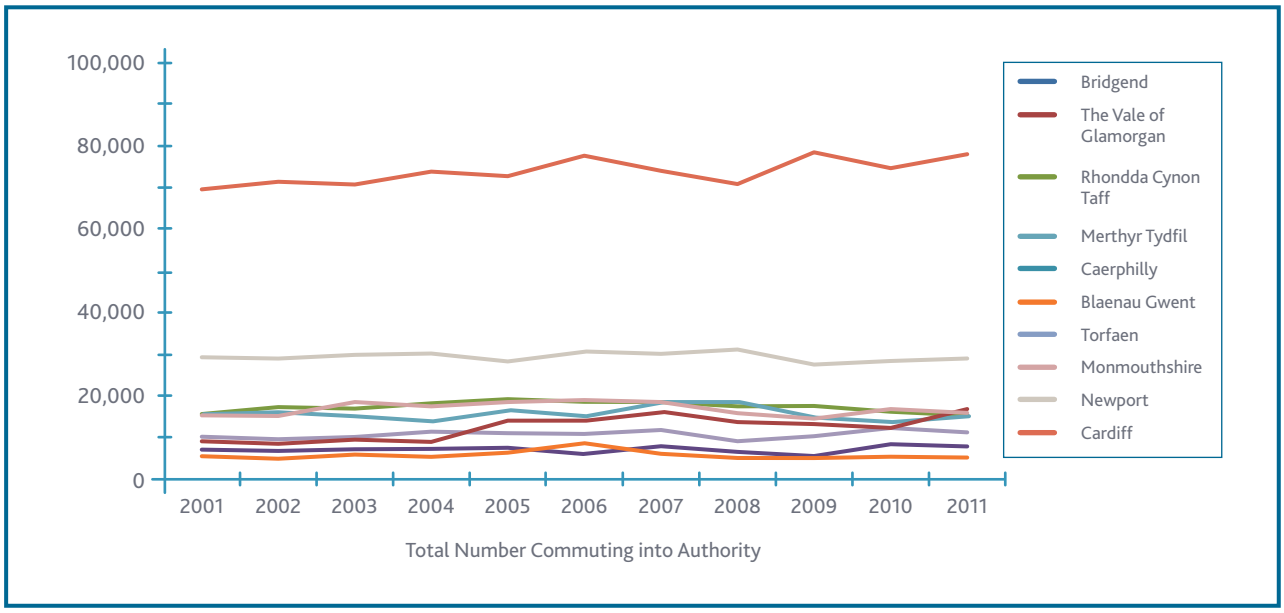


Figure 23: Numbers commuting into each local authority 2001-2011

46 Stats Wales, December 2012, " Stats on Commuting in Wales 2011, SB124/2012"

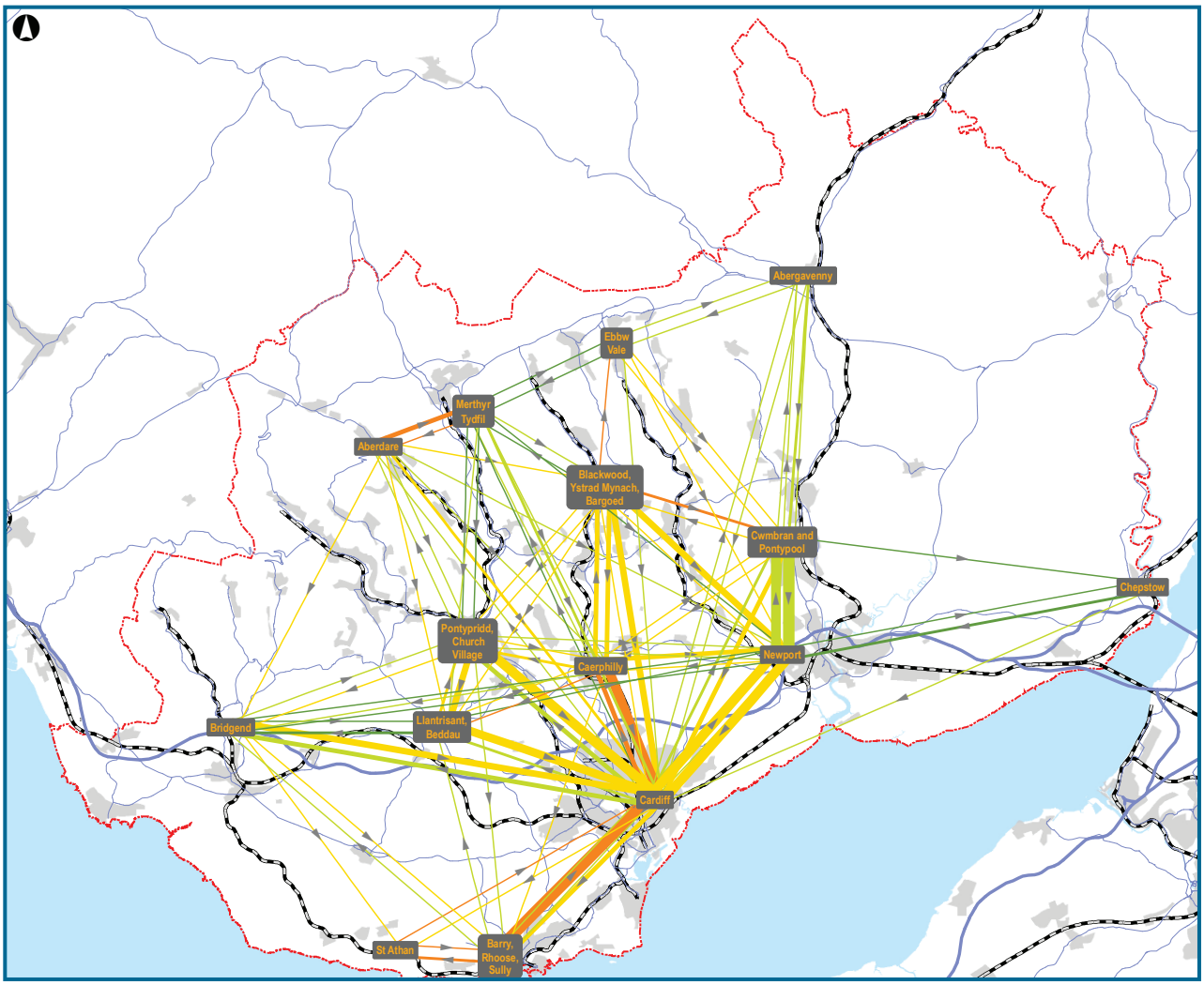
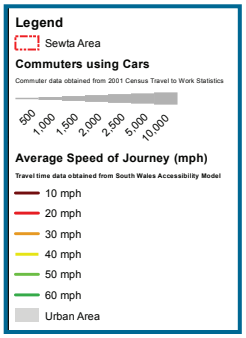


Figure 24: Commuting using Car across SE Wales (2001 based) (from ARUP/SEWTA)



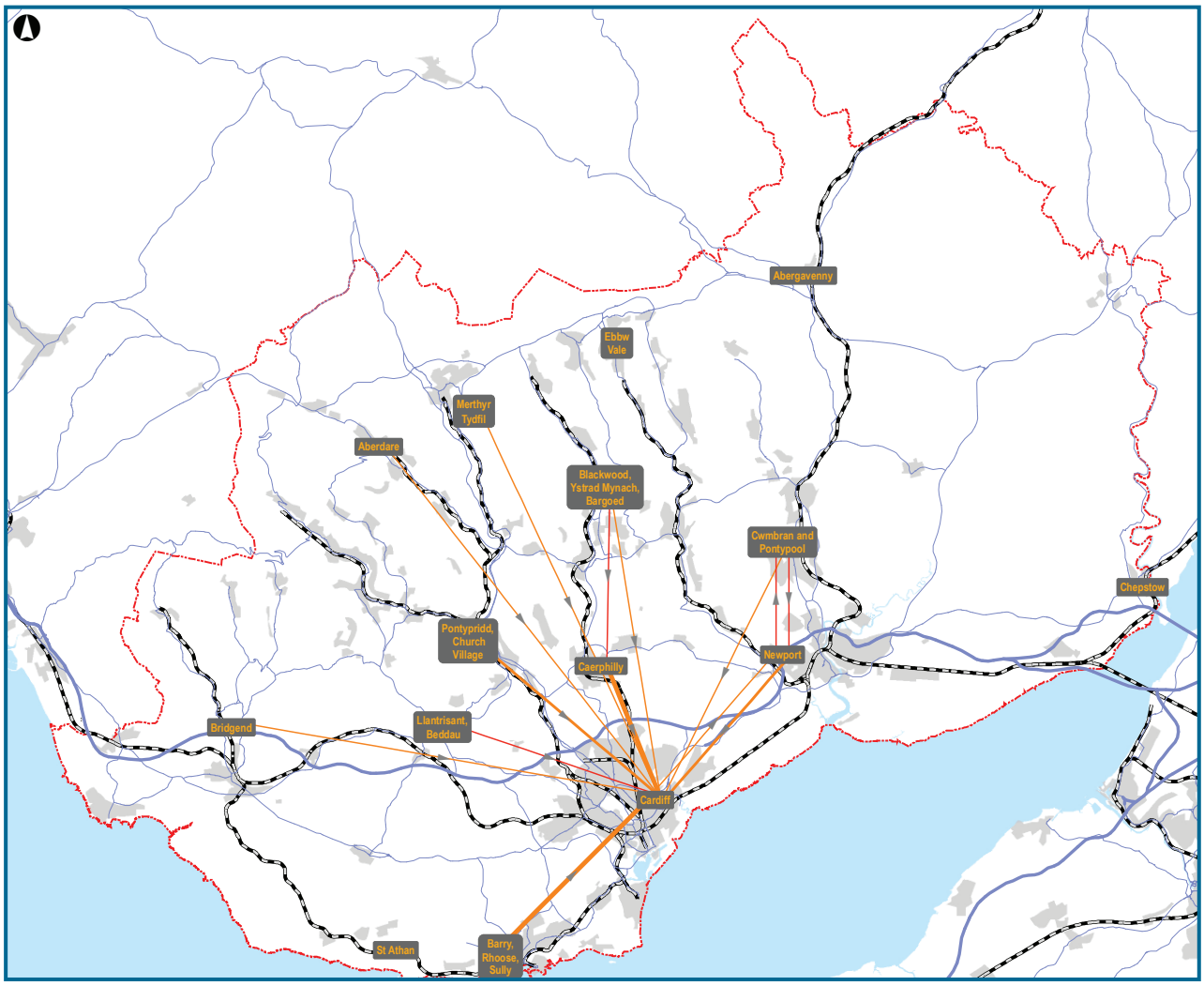
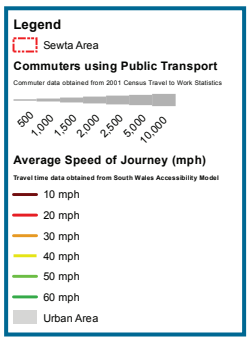


Figure 25: Commuting by public transport across SE Wales (2001 based) (from ARUP/SEWTA)



2.5 Comparisons with other UK City Regions

- Cardiff's regional economy is not perhaps as developed as other UK city regions; this is manifested in its lower GVA/Capita Vs UK and by lower levels of in commuting Vs other major UK cities.
- As the regional economy develops transport planners need to factor in this impact on projections for demand to travel across the region.

Whilst Cardiff's economy may have done reasonably well when compared with the region as a whole, we must also be aware that in UK terms, Cardiff's GVA per capita at 102 percent of the UK average in 2011, still falls some way behind places like Nottingham (119 percent), Bristol (125 percent), Belfast (159 percent), and Edinburgh (164 percent)[47].

In fact, the economic challenge facing the wider city region is as much to do with Cardiff's underperformance, compared with leading towns and cities of the other regions of the UK, as it is to do with economic inactivity in some Valley communities (Figure 26).

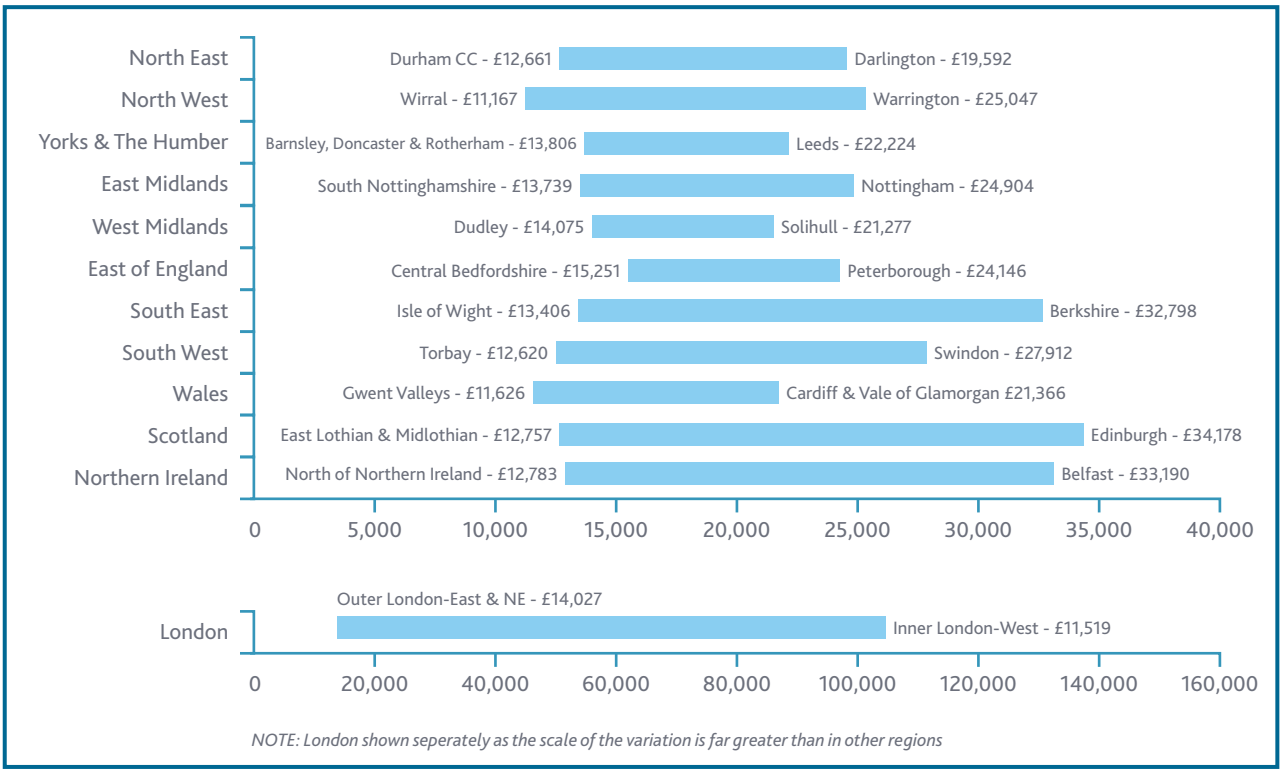


Figure 26: NUTS3: GVA per head variation within NUTS1 region[48].

47 ONS, July 2013, " Regional, sub-regional and local Gross Value Added December 2011"
48 ONS, December 2012, "Regional Gross Value Added (Income Approach)"

It is difficult to compare cities and city regions across the UK as they all have their own unique characteristics and vary between being more mono-centric (eg Bristol) to being more dispersed and/or polycentric (eg Tyneside) as the resident and workplace populations indicated in Table 1.

REGION/CORE CITY	ESTIMATED REGIONAL POPULATION	% POPULATION IN CORE CITY	% EMPLOYMENT IN CORE CITY
Lothian/Edinburgh	0.8M	58%	71%
Gtr Bristol/Bristol	1.1M	40%	44%
West Yorkshire/Leeds	2.2M	34%	41%
Tyneside/Newcastle	1.1M	25%	35%
SE Wales/Cardiff	1.5M	23%	33%
Gtr Manchester/Manchester	2.6M	19%	26%

Table 1: Selected city/region populations & workforce percentage[49]

We also need to be aware that Cardiff's GVA figure is in fact for Cardiff and the Vale of Glamorgan (whereas some of the commuting and workplace stats relate to Cardiff alone); given the levels of in-commuting to Cardiff from the Vale the GVA/capita figure for Cardiff alone is likely to be higher than the combined figure for Cardiff and the Vale.

So, whilst it is clearly difficult to draw absolute conclusions from the data across the UK, a comparison may help to frame the economic geography of the wider Cardiff City Region Vs other comparable regions of the UK. The data sets below, particularly the trends over ten years, may provide some further insight in this regard.

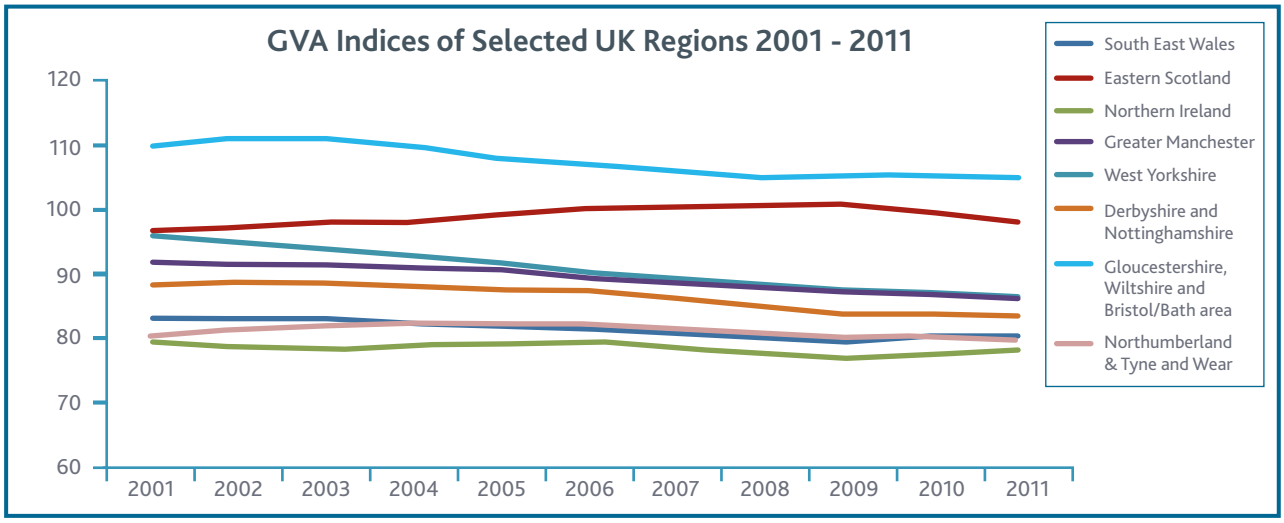


Figure 27: GVA/Capita Indices for selected UK region 2001 -2011

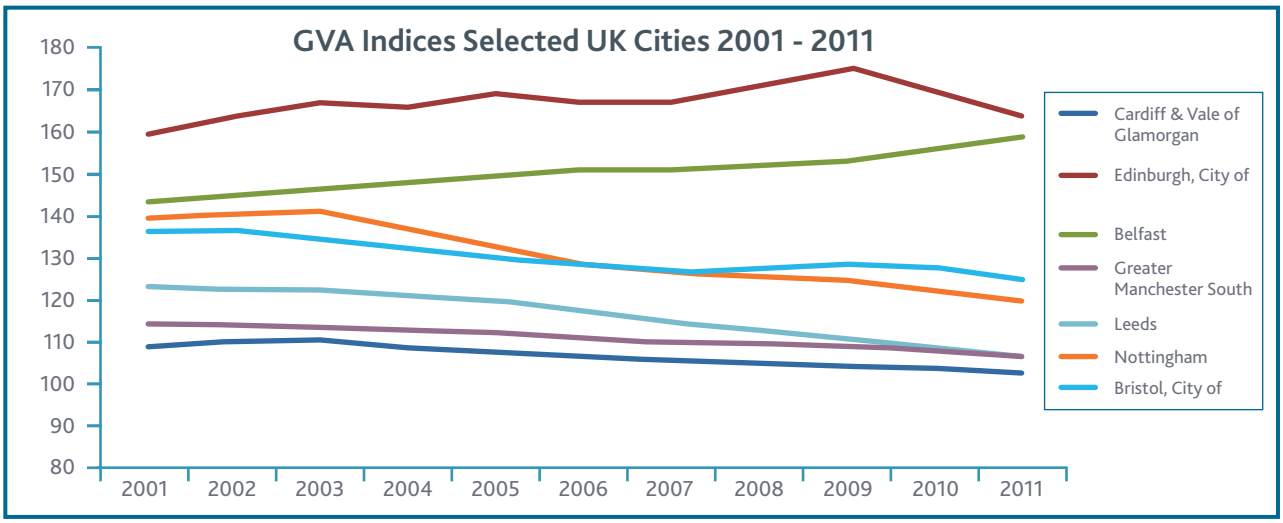


Figure 28: GVA indices of selected UK cities 2001 - 2011

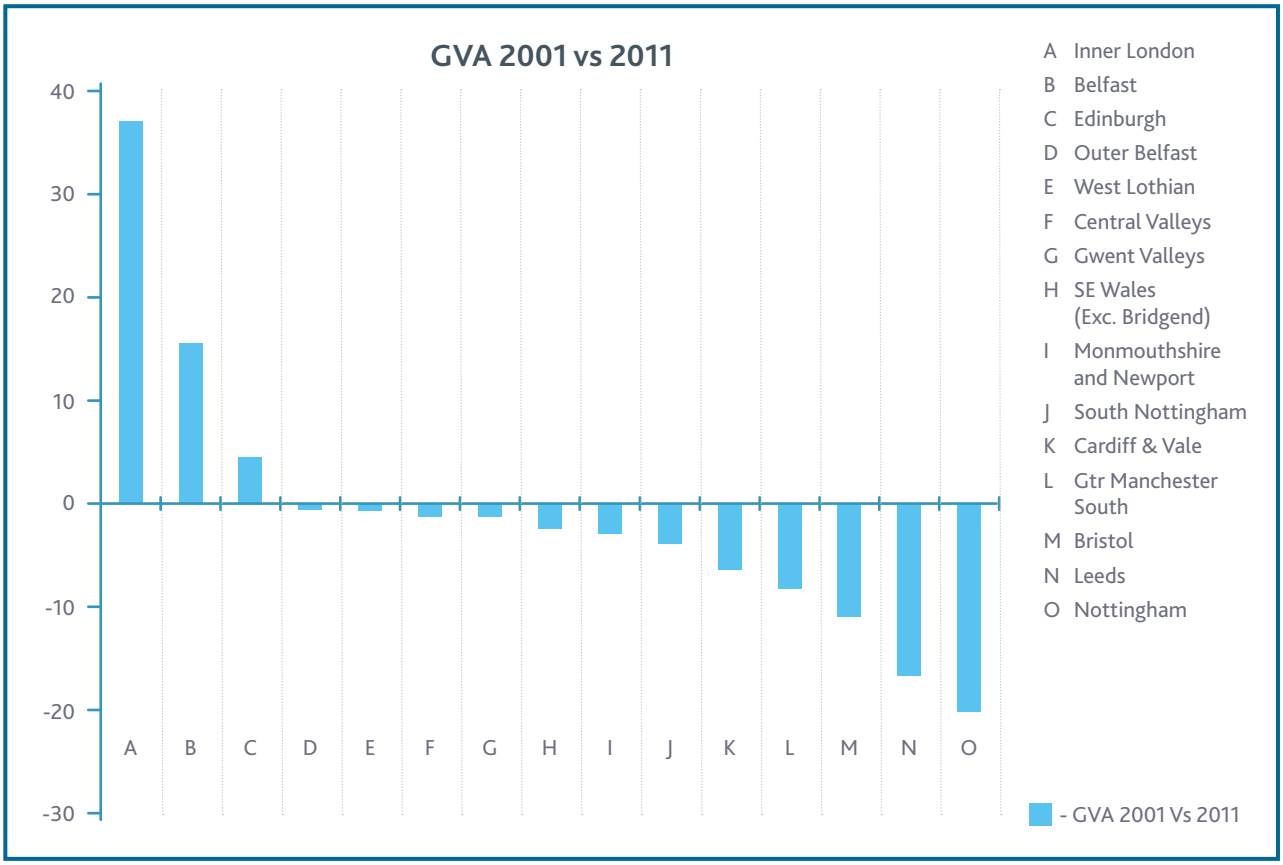


Figure 29: Change in GVA 2001 Vs 2011 for selected UK cities/regions

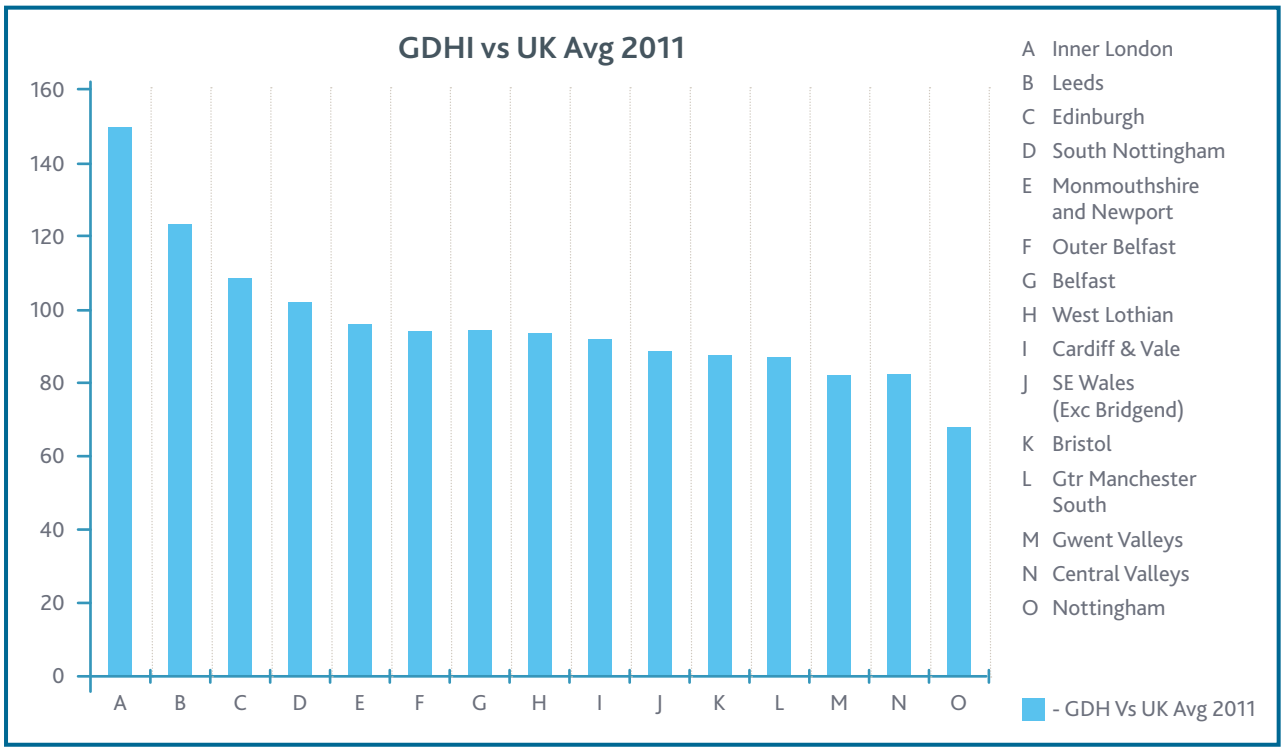


Figure 30: GDHI Indices for selected UK cities/regions 2011

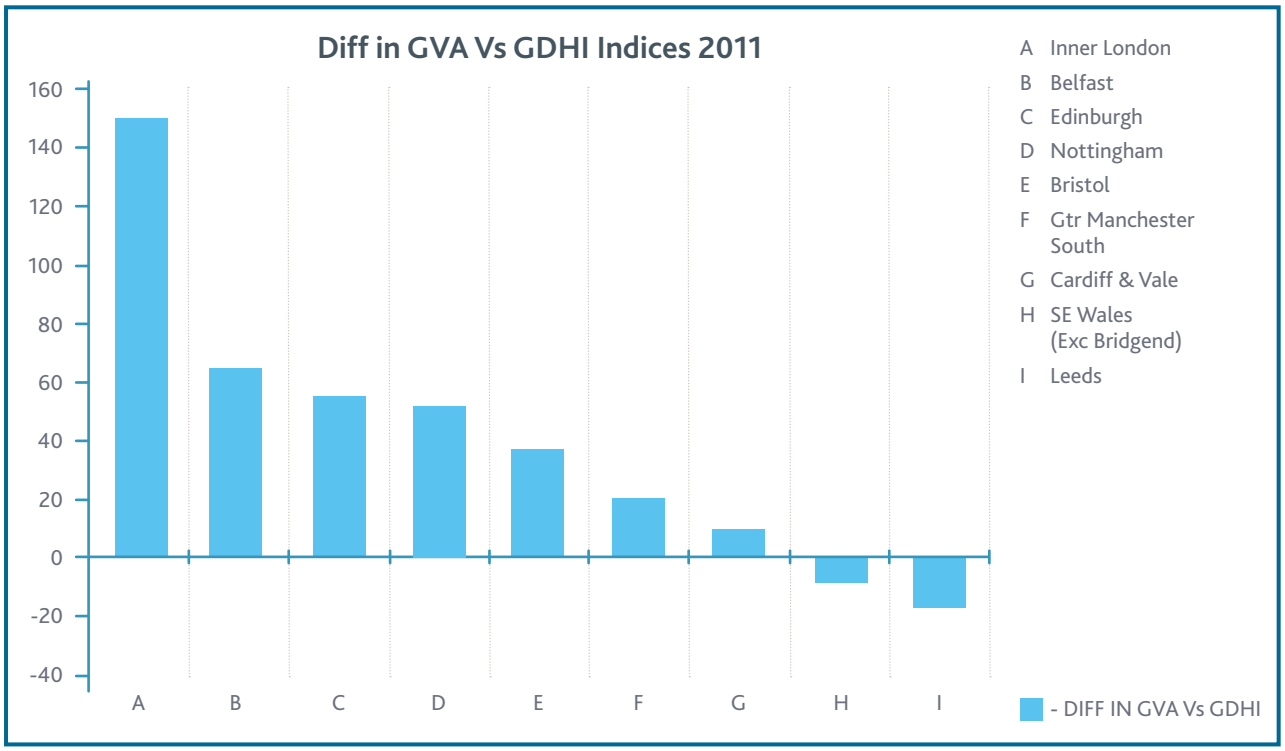


Figure 31: Difference between GVA and GDHI Indices for selected cities and regions

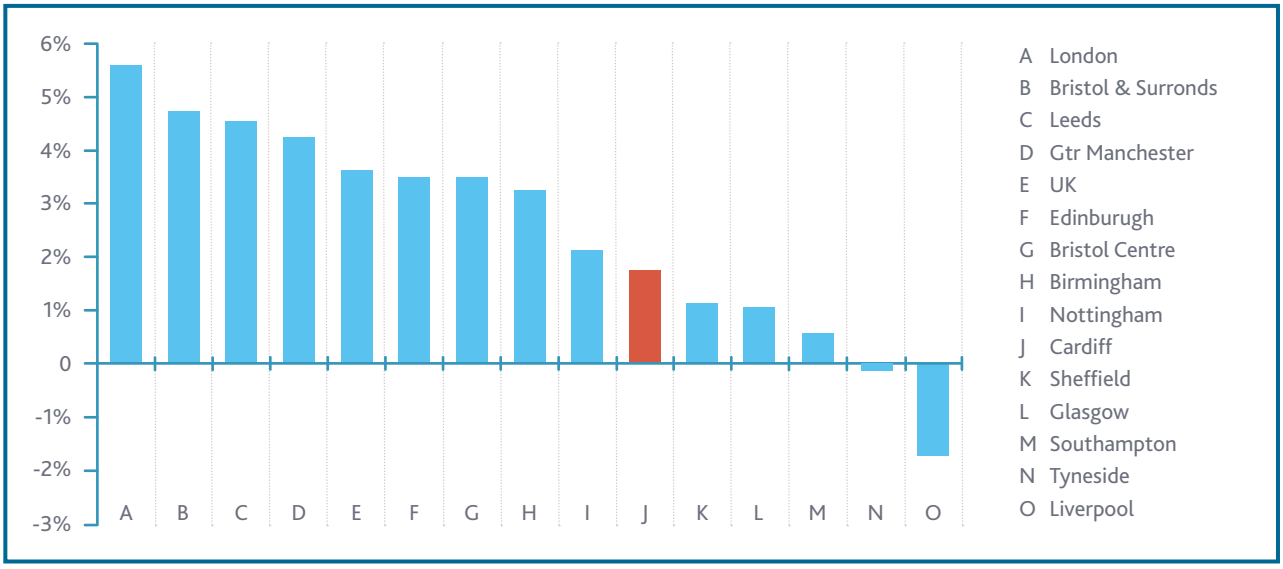


Figure 32: Growth in high value Jobs 2012-2107 (Oxford Economics / JLL 2013)

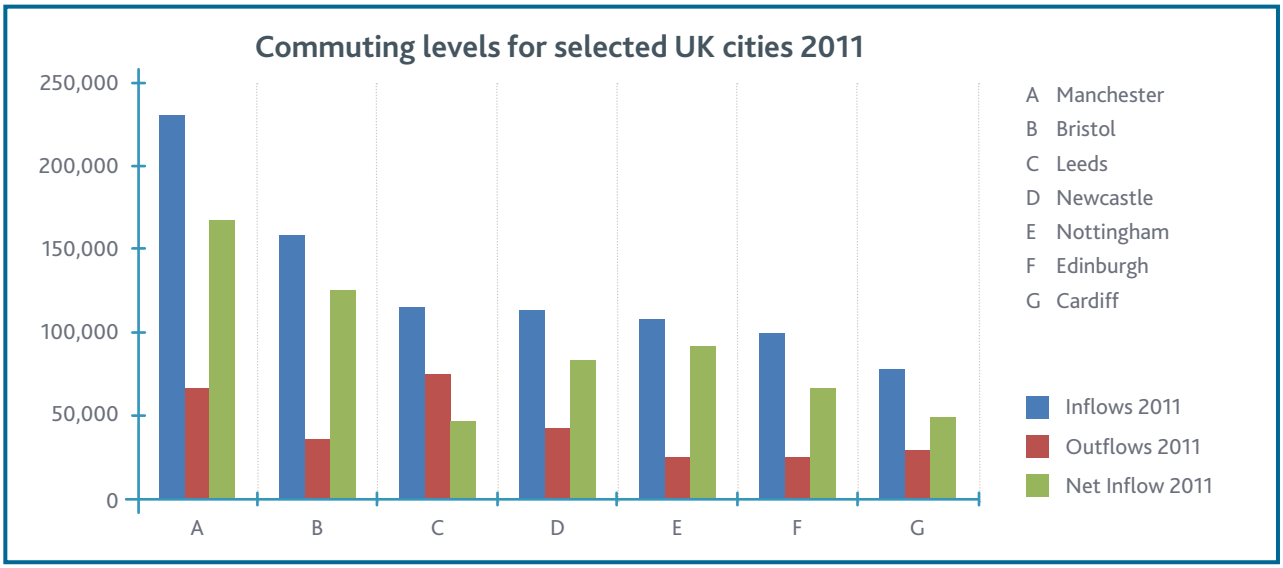


Figure 33: Commuting levels for selected UK cities 2011

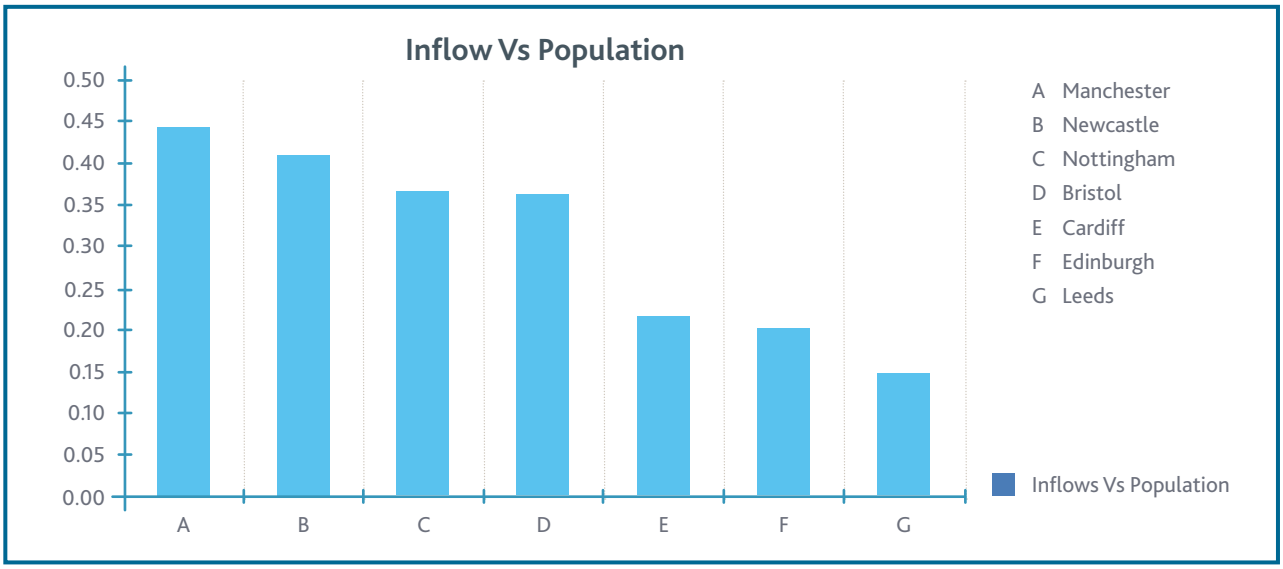


Figure 34: Ratio commuting inflow V's city population

Comparing these data sets we can perhaps conclude that:

- SE Wales is one of the weakest UK regions in terms of GVA Vs UK average, only Northern Ireland is lower (Figure 27).
- Whilst the economic downturn has affected other cities more than Cardiff, its economy is still less developed than a number of comparable UK cities (Figure 29).
- Even with an increase in workplace employment in Cardiff since 2001, its GVA/Capita performance Vs the rest of the UK has fallen back suggesting that Cardiff still needs to focus on creating higher value employment. This is borne out in research from JLL which predicts that high value job growth in Cardiff will lag behind other UK cities such as Leeds, Edinburgh and Bristol (Figure 32).
- On GDHI Measures (Figure 30), Cardiff performs better than some other comparable UK cities.
- The wider variance between index values for GVA and GDHI for places like Belfast, Edinburgh, Nottingham and Bristol (see Figure 31) suggest those cities are part of more dynamic regional economies that support higher levels of in-commuting to their core cities as well as higher value activities in those cities. This is borne out in the levels of in-commuting (Figure 33 and Figure 34).
- In fact, with the wider city region populations of Edinburgh, Bristol, Nottingham and Cardiff being broadly similar at 1~1.5M, it is Cardiff perhaps that is underperforming in terms of providing a regional focus for higher value employment. This in turn could well be a contributory factor for the lower GVA of the wider Cardiff City region vs comparable regions.
- Whilst Edinburgh has a slightly lower number of inward commuter vs population than Cardiff, it does, nonetheless, have a much higher GVA/Capita – almost entirely due to the more productive activities (banking, finance, etc) that occur within the city and served by more of its local resident population. Leeds can be viewed similarly but does have a much higher population in its local authority than either Cardiff or Edinburgh; Leeds also has a higher proportion of out commuting which may also contribute to the fact that its GDHI Vs the UK average is actually higher that its GVA Vs UK average.
- It is also instructive to look at ORR figures for Peak Crowding and Passenger Demand in 2010 at a number of major stations across the UK. At Bristol, the numbers arriving between 07:00 and 10:00 were 8,300, at Cardiff 10,200 and at Manchester 25,800. Given the populations of the wider city regions of Cardiff 1.4M, Bristol 1.1M and Greater Manchester 2.6M it seems, that even allowing for population differences, that Manchester has about 30% more inward rail commuters than either Bristol or Cardiff. Cardiff has a more developed regional rail network than Bristol which is also a factor. Nonetheless, Manchester's more developed regional economy and the strength of its centre suggests that as Cardiff develops its wider city region economy then the level of inward commuting is likely to grow above trend.
- Whilst the data does not present a completely coherent picture one can perhaps infer that investment in the capacity and reach of the SE Wales transport network could help support not just more employment across the region, but more 'higher value' employment, especially in Cardiff which is best suited to attract and support such activities.

3 Regional Transport Constraints

In developing a strategic plan for Metro it will be necessary to address some of the region's existing transport problems and the key trends likely to exacerbate those problems. Analysis of these problems, constraints and trends has already been undertaken to a large extent, by bodies such as SEWTA and the Integrated Transport Task Force. The details presented here, summarise their findings in addition to considerations developed during the current study. Some of the other studies referenced include:

- March 2013, Integrated Transport Task Force (ARUP).
- November 2013, SEWTA, A Transport Strategy for Regional Development (ARUP).
- March 2013, SEWTA Rail Strategy 2013, (Jacobs).
- February 2013, Welsh Government M4 Corridor Enhancement Measures (M4CEM) WelTAG Appraisal Report Stage 1 (Strategy Level).

The primary issues identified in these reports are:

- Road congestion on M4 around Newport & between J32-J34 and on A470 north of Cardiff.
- Rail capacity issues south of Pontypridd and Caerphilly and on lines with limited capacity or frequency constraints (Maesteg/Ebbw Valley/Merthyr).
- Rail capacity constraints between Cardiff Central and Queen St (even after CASR).
- Lack of connectivity for towns and communities not on the Valleys rail network and so will not benefit from Valley Lines electrification.
- Limited capacity and connectivity between Ebbw Vale and Newport.
- Poor east-west cross-valley connectivity.
- Limited public transport connectivity between lower Rhondda Cynon Taf and Cardiff, in particular Llantrisant, Church Village and Beddau.
- Lack of regional rail connectivity in many parts of Cardiff and Newport.
- Urban congestion becoming an issue within Cardiff.
- Limited integration between rail and bus services.
- Problems many people in the region encounter in accessing work, education and healthcare because of lack of available, affordable transport.
- Limited public transport access to some of the region's major hospitals, schools and other public services.
- Continuing above trend growth of rail patronage

3.1 Overall Levels of Accessibility

The key findings as regards overall levels of accessibility are:

- The pattern of movement in the region is complex. Whilst Newport and Cardiff are significant economic centres the polycentric nature of the region results in a complex pattern of movement (Figure 24 and Figure 25 in Section 2.4).
- The linear settlement pattern and topography lends itself to the dominant radial pattern of north-south commuting patterns but make cross-valley travel by all modes of transport difficult.
- Parts of Cardiff and Newport are equivalent in size to other key regional centres, requiring a specific approach to suburban links in both Cardiff and Newport.
- Bus and rail are generally competitive for short north-south journeys, but become less so for longer distance journeys such as Merthyr Tydfil to Cardiff outside peak hours.
- Public transport is uncompetitive for the majority of east-west movements north of the M4 corridor, such as Aberdare to Abergavenny.
- In the more densely populated coastal belt, issues of congestion and capacity, combined with higher levels of public transport services mean that journey times by public transport become more competitive.
- Whilst local bus services provide access to the centre of Cardiff and Newport from across those cities, the lack of regional connectivity makes travel by public transport elsewhere in the region (esp. to the valleys, St Mellons to Pontypridd, etc) much more difficult and so inhibits the development potential of locations away from Cardiff and Newport.
- We also need to acknowledge issues of the affordability of transport. A recent report by Sustrans states, "Transport is key to enabling people to find and sustain employment; two out of five jobseekers say lack of affordable transport is a barrier to getting a job"[51].
- A report by the Welsh Government earlier in 2013 also explored the impact of rail fares on economic inactivity post VLE[52] identified travel costs as a potential barrier to the most economically inactive.

51 Sustrans, 2012, Access Denied – Transport Poverty in Wales http://www.sustrans.org.uk/assets/files/Wales%20Policy%20Docs/Transport%20Poverty%20Briefing%20English.pdf

52 Welsh Government, 2013, Abrahams, "Will the VLE Strategy reduce the barriers to employment for the economically inactive in the poorest parts of the valleys?"

3.2 Rail Network and Services

One legacy of the coal industry has provided the Cardiff City Region with a large, compact, rail network that forms the basis of one of the most extensive urban rail networks outside London.

- There are currently good frequencies on many of the Valley Lines with the exception of Maesteg, Vale of Glamorgan, Ebbw Vale and Welsh Marches Line, which generally have one train per hour.
- Centres such as Caerphilly and Pontypridd have a very frequent service into and out of Cardiff, with a 'turn up and go' service level of up to six trains per hour.
- Recent investment in capacity through the Cardiff Area Signalling Renewal project (CASR) and the proposed electrification of Valley Lines and Great Western Mainline services will enhance the level of services.
- These improvements will also help mitigate current capacity issues south of Pontypridd and Caerphilly as well as providing the option of increasing services on those lines with limited capacity/frequency, for example Maesteg and Ebbw Valley.
- However, even after CASR/VLE some of the peripheral stations on the network will only have at best 2tph.
- There are also physical constraints on the City and Coryton (currently 2tph) lines in Cardiff which are more suited to higher frequency type 'Metro' services.

3.3 Rail Commitments and Work in Progress

There are already a number of welcome rail investments either underway or planned. These all provide a foundation and essentially a phase one of a South Wales Metro.

- The Cardiff Area Signalling Renewal and Enhancement Project (CASR) is a £200 million investment to 2016 that will deliver a major upgrade in capacity and reliability for the south Wales rail network by 2016. It also provides an essential foundation for the electrification project. Once complete, it could enable up 16 trains per hour to travel between Cardiff Central and Queen Street.
- In July 2012 the Department of Transport announced, in its High Level Output Specification for England and Wales, its intention to proceed with the electrification of the entire Valley Lines network[53]. This decision represents the most significant rail investment in Wales since the Severn Tunnel opened. More importantly it delivers the first phase of the south Wales Metro. According to Network Rail's Strategic plan electrification of the Valley lines should be substantially completed by 2020.

53 Department for Transport, July 2012, " HLOS for England Wales CP5 (2014-2019)".

Figure 35: Scope of Valley Lines Electrification

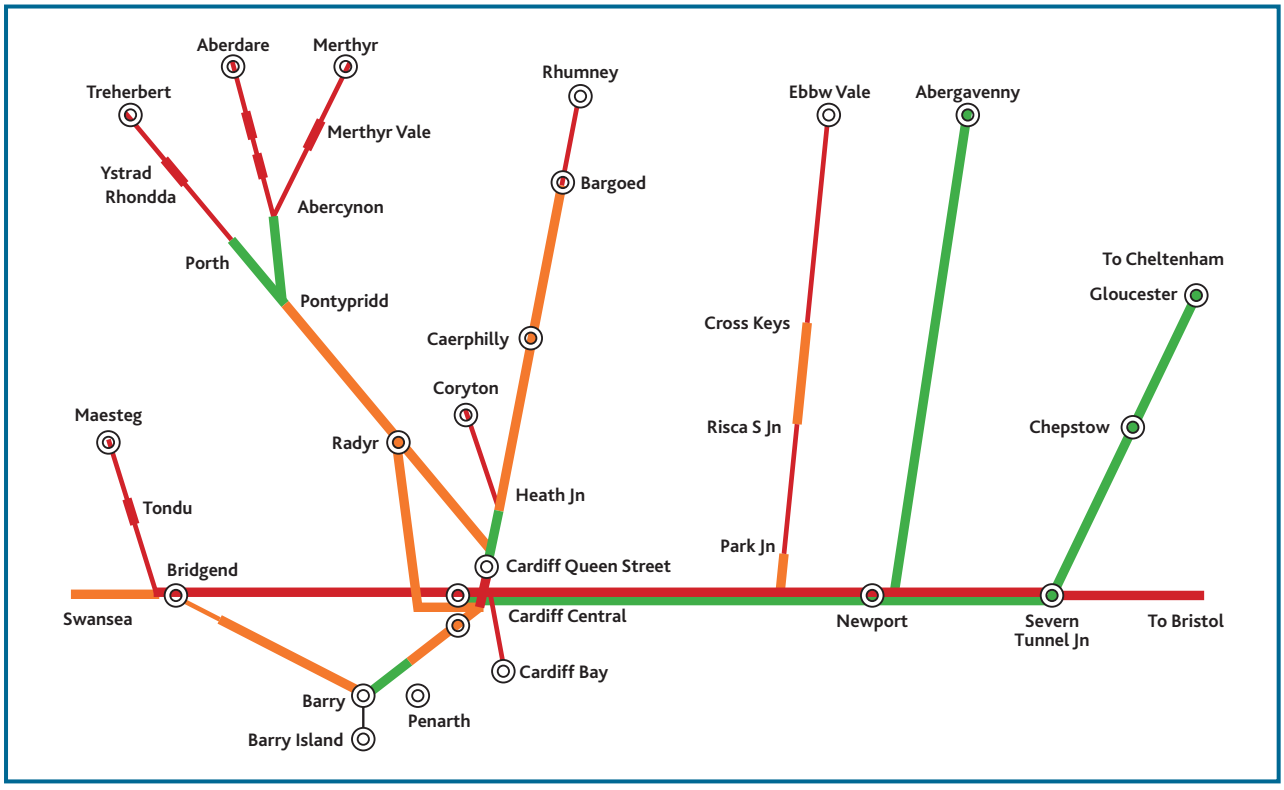


Figure 36: Existing Rail Network Capacity Constraints[54]

Electrification will deliver clear operational benefits for the rail network and these formed the key component of the positive business case. In addition, the investment will enable faster journey times from the network periphery to Cardiff and/or the introduction of additional stations.

There are however constraints on the network (Figure 36), that even after CASR will need to be addressed to provide the foundation for Metro and more particularly, allow additional stations to be added to the existing network. This will require infrastructure interventions (for example to increase capacity between the Cardiff West rail junction just to the west of Cardiff Central and the junction just north of Queen St) and/or rolling stock performance enhancements (currently subject to review as part of VLE Rolling Stock programme).

3.4 Rail Patronage and Trends

- Need to plan for >6% average annual trend growth in rail use across SE Wales to 2030.
- Also need to accommodate an increase in catchment population for Metro of up to %60 which will increase demand on the network even further.

In planning the Metro to 2030, it is important to identify and quantify the key trends that will influence demand on the network. A number of bodies have calculated and/or presented data as regards past and project patronage of the rail network. Whilst this data is not entirely consistent it does clearly indicate the on-going and continuing increase in demand (often above trend) for rail services across SE Wales. These figures and estimates have also been calculated without considering the potential impact of Metro which given a potential 60% increase in catchment population (See Section 6) will increase the demand in further. Some of the key data sets are:

- CCC Study[55] predicts a further 29,000 commuters will be coming into Cardiff by 2026. This gives a total of some 110,000 inward commuters compared with about 80,000 today. In rail terms this could mean nearly 40% more demand on the rail network.
- By 2030 the population of Cardiff will be approx 430,000. That is 120,000 more than it was in 2001. Clearly a key challenge for the Metro is to provide additional capacity within Cardiff to service this dramatically increased demand. This could mean much more demand for rail services within Cardiff as well as for those wishing to commute/travel into the city.
- The proposed new urban extension to the NW of Cardiff will also need to be integrated with transport. This presents an opportunity to use a new rail line to enable this major housing expansion - a comparison with for the role of Metropolitan line in enabling the urban expansion of London to its North West in the 1920s and 1930s is not misplaced.
- The Wales Rail Planning Assessment (RPA) study identified that the rail services in the region have the highest proportions of business/commuting ticket types in Wales. 50% of Valley Lines journeys relate to commuting and 52% of Cardiff originating journeys are commuting, leading to high peak period demands and overcrowding[56]. The study acknowledged that Cardiff and Valley Lines trains were on average 114% full in the

54 SEWTA, Jacobs March 2013 "Rail Strategy"
55 Cardiff CC, Oct 2011, " Executive Report on the Local Development Plan,(Cardiff Council Annual Patronage Surveys)"
56 SEWTA, Jacobs, March 2013, " Rail Strategy"

morning/evening peaks and that station car parks are full. However, individual peak trains can be significantly overloaded to 160%.

- Rail patronage in the region increased at an average rate of 6% per annum between 2000 and 2009. There was higher growth on the Valley Lines services than other regional and Inter-City services. The Wales RPA estimated a 25.1% passenger growth between 2006 and 2016 and 40.6% by 2026. Three quarters of this growth will be trips to and from Cardiff (40%) and on the Valley Lines (25%) and other South East Wales Destinations (9%).
- A Cardiff Council study found that travel on services to the city centre's Queen Street, Cardiff Central, Cathay and Cardiff Bay stations increased by 73 per cent between 1996 and 2010[57].
- Travel on rail services into Cardiff has increased considerably, with passenger numbers at Cardiff stations having increased by 82% between 2001 and 2011. Cardiff Central and Cardiff Queen Street Station alone experienced an increase in patronage during this period of 100% and 53%, respectively.
- Traffic on Cardiff's roads grew on average by 9% between 2002 and 2012 (Cardiff Annual Traffic Flow Surveys, calculated using 5 year Rolling Averages). Around 56% of employed Cardiff residents travel to work by car; with 17% walking; 10% travelling by bus; 10% by cycle; 6% by rail; and the remaining 1% by other means[58].
- Network Rail has stated that 26 million people used the railways in Wales in 2010 – up 65 per cent since 2000. A further 31 per cent growth is expected by 2019. In 2011 there were more than 11 million entries and exits at Cardiff Central.
- According to Arriva Train Wales (ATW), the total patronage of Valley Line services has increased by approx. 55 per cent from 9M in 2003 to 14M in 2012 – or about 4.6% per year.
- The VLE Outline Business Case presented average growth of 4.3% per annum between 2000 and 2010 and planning for VLE rolling stock is assuming that passenger demand on the current rail network will double by 2045.
- Passenger rail services between Ebbw Vale Parkway and Cardiff were re-established in 2008. Since then the line has proved a great success; actual usage for its first year of operation of 570,000 outstripped the 400,000 anticipated significantly[59]. The figures for 2011 were 676,000[60], a 69% increase on original estimates.
- By the end of the decade with Valley lines electrification and faster services to London on the electrified Great Western Mail Line, on top of a predicted 31 per cent growth, it is possible that Cardiff Central will be handling between 15-20 million entries and exits per year. That is same level of passengers currently handled by stations like Edinburgh Waverly, Liverpool Central and Manchester Piccadilly.
- Network Rail's 2009 Wales Route Utilisation Strategy (RUS) included projections for future growth or 3.4% pa until 2018[61].

57 Cardiff CC, Oct 2011, ' Executive Report on the Local Development Plan,(Cardiff Council Annual Patronage Surveys)'
58 Cardiff CC, September 2013, Draft LDP
59 Capita Symonds: http://www.capitasymonds.co.uk/projects/all_projects/ebbw_valley_railway,_s_wales.aspx
60 ATW SEWTA Update March 2012
61 Network Rail , 2008,'Wales RUS'

Metro will have a significant impact on the baselines used in all the above analysis and projections. The potential for Metro to increase the catchment of the 'Metro/rail' network by up to 60% by 2030 will require a major revision of industry planning in SE Wales. It is proposed that this report is made available to Network Rail's Long Term planning team.

3.5 Road Congestion

A number of sections of highway are at or near operational capacity with easily identifiable pinch points on the trunk road network (Figure 37), these include:

- The M4 around Newport; and between J32 and 34.
- Southern section of the A470 (Pontypridd to Cardiff).
- Sections of the A465 (Heads of the Valleys Road).

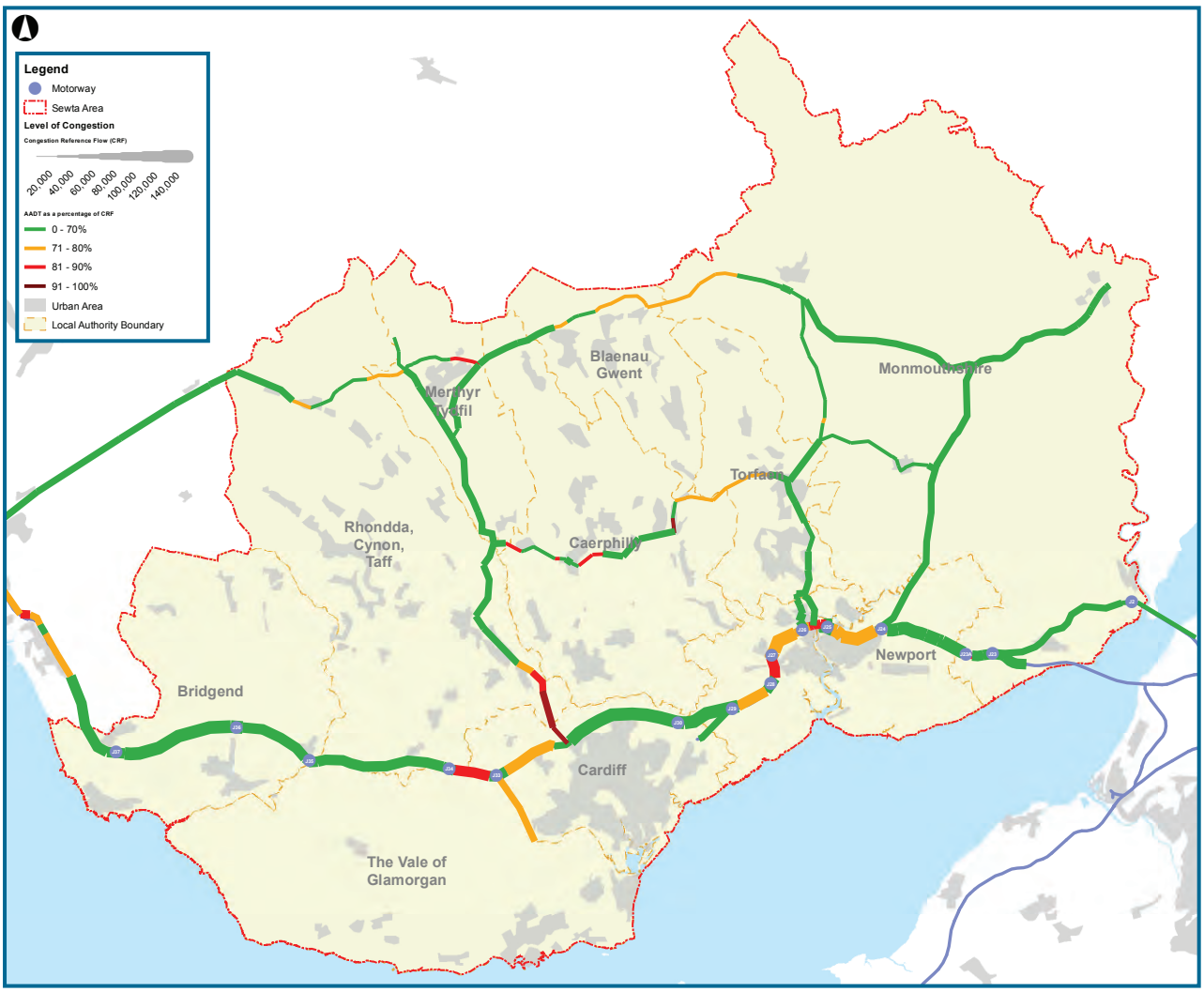


Figure 37: Capacity Constraints on Primary Road Network[62] (from ARUP/SEWTA)

62 Integrated Transport Task Force, March 2013, SEWTA, ARUP

In 2010, these stretches of road were often operating at a ratio of Demand to Capacity of over 80%. This results in disruption to traffic flow due to sheer volume of traffic leading to wider congestion on the road network. These issues result in long and less reliable journey times. Historic patterns also indicate a relationship between traffic volumes and economic conditions and hence, following the recent recession, it might be expected that improving economic conditions could further exacerbate periods and areas of congestion and delay.

3.6 Major Road Schemes in Development

A number of strategic schemes under construction or consideration include the M4 relief road, A465 sections and The Eastern Bay Link. However, even with these in place there will still be a need to provide a more robust public transport alternative – especially for access into Cardiff from the north/north west and along the M4 corridor. The M4 Capacity Enhancement Measure programme identified a major upgrade of public transport provision (more services, stations and P&R) on the M4 corridor as a key intervention to reduce both demand and congestion on the road network[63].

It will also be important to develop Metro synergistically with these schemes and where possible provide access to major P&R, and potentially provides bus priority measures at junctions and perhaps on downgraded sections of the original M4 north of Newport. Access to St Mellons and the planned business park and potential P&R needs to be considered – with a potential exit from the A48(M) from vehicles travelling from the east.

3.7 Bus Network and Services

Buses in the region are operated by a variety of private operators who range in their scale of operations. There are dominant municipal operators running good services in Cardiff and Newport, however, elsewhere there is generally a mixture of operators.

The majority of bus services serve local needs and journeys and cater poorly for longer distance trips. There are notable exceptions to this such as the Cardiff – Pontypridd, Cardiff - Newport and Cardiff – Merthyr Tydfil express services which offer competitive journey times with limited stops. These express and regional services are understood to operate on a commercial basis.

A key component of Metro will be the integration of local bus services in what is currently a deregulated market. In January 2013, the Welsh Government announced a new mechanism to provide subsidies to bus operators - the Regional Transport Support Grant[64]. This has the potential to deliver a more integrated public transport network with integrated services, timetables and ticketing across transport modes.

Whilst the local bus network is not part of this study, once a Metro network is defined there will be need for all stakeholders to work together to ensure the local bus network integrates with the Metro network and takes advantage of any change in the regulatory environment.

63 February 2013, Welsh Government M4 Corridor Enhancement Measures WelTAG Appraisal Report Stage 1 (Strategy Level)
64 http://new.wales.gov.uk/newsroom/transport/2013/130117new-bus-funding-scheme/?lang=en

3.8 Accessibility and Planning Policy

A major impediment to regional growth and development has been the lack of effective integration between regional transport planning and major land use allocations and development. This has led to a range of problems, for example:

- Housing - many new housing developments in places only accessible by car. Particularly in places like Church Village and Llantwit Fardre in lower RCT and Pontprennau and St Mellons in Cardiff
- Public Services - new schools, hospitals and offices have been developed away from public transport interchanges and stops. For example, the Heath Hospital is the largest hospital in Wales and draws patients and employees from a wide area beyond Cardiff. However, it is only accessible from Cardiff city centre by bus and is not easily accessible from outside Cardiff by public transport. The new Coleg Morganwg Campus at Nantgarw is not ideally suited for access to the rail network.
- Employment Land - an oversupply in some parts of the region of employment land in locations the market will not support. The result is that land in areas the market may be willing to support is devalued. An over-supply of low-grade sites and property which further devalues the overall offer across the region.
- Transport - bus stations in some cases have been developed away from the rail network making integration of public transport difficult.

Some of these issues will be addressed by the Welsh Governments' recently published, *Planning Policy Wales*[65]. For instance, it contains the following recommendations:

- *"… near major public transport interchanges in city, town and district centres, planning authorities should allocate available sites for uses that maximise the accessibility potential of the site, including high density residential development, employment, shopping and leisure uses. Local authorities should identify in development plans and Regional Transport Plans66 the need for additional interchange sites and improvements to existing interchanges…"*
- *"… development plans should also encourage higher density and mixed-use development near public transport nodes, or near corridors well served by public transport."*
- *"… local authorities should identify in development plans and Regional Transport Plans the need for additional interchange sites and improvement to existing interchanges."*

The Metro provides an opportunity to satisfy some of these transport planning policy objectives by enabling a range of strategic developments projects across the region.

65 Welsh Government, November 2012, " Planning Policy Wales", Chapter 8
66 Produced by the four regional transport consortia in Wales.

4 Strategic Development Locations

This section has been prepared by Jones Lang LaSalle

In addition to addressing transport issues, the Metro can also be a catalyst to stimulate development and regeneration across the region. Key to delivery will be to ensure that Welsh Government and key stake holders engage with the private sector to maximise development opportunities. Whilst the wider economic and regeneration benefits are tangible, they are difficult to quantify using traditional transport appraisal techniques.

This report has attempted to identity a number of the most viable and strategic development opportunities within South East Wales (as set out below) in a way that can help inform Metro planning. This schedule of sites will provide a base line illustration as to the potential range of interventions and how economic development can be aligned with investment in transport infrastructure. The sites considered range from brownfield regeneration of former or existing, industrial sites, mixed use schemes, residential urban growth zones as well as the regeneration of existing industrial estates and business parks. However, this list is by no means exhaustive and there will be opportunity to fully consider additional locations within the region in the future.

Whilst this process has identified 22 strategic opportunities across South East Wales (as set out in Table 4), we would draw your attention to a first 'cut' of six sites which combine significant scale, market demand and are of strategic regional importance. All of these sites would benefit from the proposed Metro and have been used to help establish some of the Metro priorities in this report.

They are:

- Central Cardiff Enterprise Zone.
- Cardiff Bay.
- North West Cardiff.
- Newport City Centre.
- Llantrisant/Talbot Green.
- Treforest/Taffs Well.

4.1 Approach

A comprehensive list of strategic sites, both current and proposed, has been developed. This involved the mapping and classification of existing development sites together with major existing employment locations in each Local Authority. We then categorised sites in terms of project type, deliverability, density, demand, together with current and potential Metro access.

4.2 Analysis of Sites and Existing Employment Centres

Initial Appraisal

In the first instance, Jones Lang LaSalle (JLL) reviewed all ten Local Authority areas within South East Wales and catalogued existing allocated or consented development sites in excess of five acres. Each Local Authority Local Development Plan (LDP), adopted or draft, as at June 2013 was examined. These were cross-referenced with the Welsh Government's Wales Property Database, JLL employment land survey records and the market knowledge of the project team. Where significant sites are not in the LDP but have regional significance (e.g. Circuit of Wales, Ebbw Vale) these have also been included.

Attached as Appendix 1 is a Schedule of Available Development Sites within the Metro Area.

JLL identified major existing centres of employment, using as a benchmark a critical mass of 500,000 sq ft of employment floorspace, as well as district, regional and larger out of town retail centres.

Appendix 2 is a Schedule of all Existing Major Employment Locations within the Metro Area. The schedules in Appendices 1 and 2 incorporate the following site data:

LOCAL AUTHORITY	POTENTIAL DEVELOPMENT SITES 5 ACRES+ (2.02 HA+)	SIGNIFICANT EMPLOYMENT LOCATIONS
Blaenau Gwent	16	8
Bridgend	16	9
Caerphilly	19	11
Cardiff	17	16
Merthyr Tydfil	15	6
Monmouthshire	8	6
Newport	17	8
Rhondda Cynon Taff	17	8
Torfaen	13	7
Vale of Glamorgan	19	8
Total	**157**	**87**

Table 1: Summary Schedule of Sites and Employment Locations by Local Authority

List of Assumptions

The attached schedules are arranged by Local Authority. We have included sites over 5 acres (2.02 ha), however, there should be some caution with regard to the cataloguing of sites on this basis as actual net developable areas may vary considerably from site to site.

Sites may also be materially affected by abnormal development constraints and, in the main; this information is not readily available. However, where specific information is available we have defined site readiness as:

A - No constraints on development

B - Some constraints

C - Major constraints on development

4.3 Delivery of Local Development Plans – June 2013

We referred to draft or adopted LDPs for each Local Authority and set out below the status as at June 2013, when this site study was carried out.

LOCAL AUTHORITY	LDP STATUS	CURRENT POSITION
Blaenau Gwent	Completed.	Adopted 22nd November 2012.
Bridgend	-	Deposit draft, Inspector's report Summer 2013.
Caerphilly	Completed.	Adopted November 2010.
Cardiff	-	Deposit draft, adoption anticipated October 2015.
Merthyr Tydfil	Completed.	Adopted May 2011.
Monmouthshire	-	Deposit draft September 2011, completion anticipated July 2013.
Newport	-	Revised deposit to be considered June 2013.
Rhondda Cynon Taff	Completed.	Adopted March 2011.
Torfaen	-	Deposit draft, adoption expected October 2013.
Vale of Glamorgan	-	New deposit draft expected Autumn 2013.

Table 2: Status, as at June 2013, of Local Development Plans in SE Wales

4.4 Review by Local Authority Area

Following the compilation of the 'long lists' of existing development sites and existing employment centres, the project team held two workshops to consider all of the above sites and identify strategic opportunities across the region where regeneration or economic development could be combined with investment in transport infrastructure.

These sites were then mapped against the current rail, and road, infrastructure together with potential new Metro interventions to create a priority list for intervention.

- The largest and most commercially attractive development opportunities in the region are generally found along the coastal belt and gateways to the lower Valleys. These included sites in and around Cardiff, parts of Newport, the Cwmbran area and lower RCT (including Llantrisant).
- The largest existing employment centres are again found on the coastal belt. However, there are also important regional centres within the valleys. The Metro presents an opportunity to lead regeneration and intensify density in all of these centres.
- Development sites in the mid and upper Valleys were noted to be generally smaller in scale, due largely to topography. Valleys sites are mainly brownfield and subject to more development constraints which, combined with weaker market forces, makes viability more of an issue.
- Within the Valleys, growth/development opportunities can be explored at Ebbw Vale (aligned to the Enterprise Zone) Merthyr Tydfil, the mid Valleys and Pontypridd - although delivery of these schemes may be constrained by site constraints and a lack of private sector engagement.

Set out below is a table indicating key issues and opportunities arising from our workshops, set out by Local Authority area:

LOCAL AUTHORITY	CURRENT POSITION
Blaenau Gwent	• Significant opportunities in Ebbw Vale to build upon The Works, however the key will be to attract private sector investment and occupiers to complement on-going public sector investment. • The Northern Gateway site lies between the town centre and the A465 Heads of the Valleys Road. • Difficult to create rail linkage to Northern Gateway and the Circuit of Wales proposal. • Tredegar and Brynmawr have no rail connection. • Abertillery offers no significant sites and is constrained by topography.
Bridgend	• Major industrial cluster, however these predominantly manufacturing and warehousing industries are primarily served by road. • Bridgend Valleys (Maesteg) can become more accessible to both Bridgend and Cardiff.

Table 3: Summary of property issues and opportunities by Local Authority

LOCAL AUTHORITY	CURRENT POSITION
Cardiff	• Strong demand perspective. • Central Cardiff Enterprise Zone linked to Financial & Professional Services Sector Panel. • City Centre – Cardiff Bay link offers 'rapid transit' options. • Eastern Cardiff offers rail corridor opportunities, particularly at St Mellons and Wentloog. The proposed Eastern Bay Link would further enhance communications in this area of the Capital. • LDP proposes major growth in the North-west corridor, which offers potential to link into further growth in lower RCT. • Development potential at J33, possibly combined with business park. • LDP growth projections in North East Cardiff are less Metro compliant being some distance from the rail network • Major business locations at Coryton/Forest Farm/Greenmeadow and Llanishen. • Strong secondary retail centre at Crwys Road/Albany Road/City Road not served by rail. • Major developments underway at 'Sports Village', which is remote from rail network. • There are further opportunities for new stations at Ely Mill, Gabalfa, St Mellons, Wentloog, Crwys Road and/or Wedal Road.
Caerphilly	• Caerphilly is the county town however there are only limited development opportunities. • Mid Valleys (Ystrad Mynach / Nelson / Blackwood) has a sense of growth prospects, however, Blackwood is not rail connected. • Upper Rhymney Valley is connected but a weak development opportunity. • Senghenydd isolated and not connected.
Merthyr Tydfil	• Focus upon Merthyr Tydfil and opportunity to promote as the dominant town in the Heads of the Valleys (complimented by Ebbw Vale). Improve connectivity to Cardiff and Pontypridd. • Opportunities to grow Merthyr Tydfil town centre although this is challenged by Cyfartha Retail Park (M&S the latest occupier). • Potential growth node around Pentrebach, based upon regeneration. • Little or no development options in Taff Valley south of Pentrebach.
Monmouthshire	• Magor is a potential growth node. • Chepstow, Abergavenny and Monmouth are strong market towns. The first two are rail connected, Monmouth is not. Large industrial site in the centre of Chepstow offers opportunity for a rail connected development.

Table 3: Summary of property issues and opportunities by Local Authority...continued

LOCAL AUTHORITY	CURRENT POSITION
Newport	• Opportunity to bolster city centre where there are significant development opportunities. • A key driver for City Centre activity would be to increase footfall through the development of new stations in the suburban areas of Newport together with connecting the Ebbw Vale line to Newport City Centre. • Regeneration opportunities in south Newport (Pill), connected with new development zones around Old Town Dock, Whitehead Steelworks and Mon Bank Sidings. • Park and Ride opportunities in Llanwern and Imperial Park/Celtic Springs. • Links to development corridor in St Mellons and east Cardiff. • Route of new M4 Relief Road and potential junctions can be integrated with commercial development and public transport enhancements between Cardiff and Newport.
Rhondda Cynon Taff	• Growth zone in lower RCT, around Llantrisant and links to Cardiff North West corridor. • Opportunity to relocate Treforest Estate station; potentially to Upper Boat/ Power Station Hill. However, consideration should also be given to a station at the southern end of estate at Nantgarw. • Taffs Well station offers opportunity to develop a large park and ride just to the north of the M4 motorway, to relieve the congested A470 corridor. • Regeneration opportunity for Pontypridd as the county town. • Demand focus upon Taff Valley. • Limited opportunity in the Rhondda due to lack of larger development sites. • Aberdare / Robertstown offers opportunities however serving mainly local market.
Torfaen	• South Torfaen (Cwmbran) offers growth and economic development prospects for wider region. • Opportunity for new business park/employment site provision in this corridor. • Sebastopol is a potential urban growth zone. • Mamhilad is a potential urban growth zone. • Limited commercial development prospects in Blaenavon Valley.
Vale of Glamorgan	• St Athan and Cardiff Airport Enterprise Zone offer employment growth prospects. • The Airport would benefit from further improvements in public transport. • Barry is a potential growth area, however it is a challenging commercial market. • Linkage with growth in south RCT.

Table 3: Summary of property issues and opportunities by Local Authority...continued

4.5 Strategic Sites within the Metro Region

Assumptions

In proposing an illustrative short list of strategic sites, we have focussed upon those that fulfil the following criteria:

- Scale - ideally, those sites with a minimum area of 20 hectares (50 acres) or key economic centres.
- Deliverability - short to medium term deliverability. The only exceptions are those very large urban growth zones which require long term master planning, including transport.
- Economic Impact - those sites which have the ability to create a 'step change' in economic performance of the wider sub-region.

Summary Schedule of Strategic Sites

The short list of strategic sites is wide ranging, across the South East Wales Metro region, and broadly falls into the following categories:

1. Town Centre Regeneration - of sub regional town and city centres (e.g. Pontypridd town centre, Newport city centre).
2. Residential Regeneration - of those brownfield industrial sites located in close proximity to the rail network, for predominantly residential purposes (e.g. Pentrebach, Merthyr Tydfil, or Fairfield Mabey, Chepstow).
3. Revitalisation of Employment Zones - improve access to major employment zones which will allow the revitalisation of strategic employment zones (e.g. Bridgend Industrial Estate, Treforest Industrial Estate).
4. Improved Access to Major Employment Sites - for example, to Enterprise Zones (e.g. Central Cardiff, The Works Ebbw Vale and St Athan/Airport).
5. Development of New Growth Corridors - extension of our existing settlements (e.g. Ystrad Mynach/Nelson or Northern Gateway, Ebbw Vale).
6. Major Urban Growth Zones - provision of access to large scale future residential zones (e.g. Cardiff extensions and large sites in Torfaen).

Set out as Appendix 3 are summary data sheets for each of the strategic sites identified above and these are summarised in Table 4.

Table 4: Summary List of Strategic Development Sites (Categorised A, B, C)

REF	LOCATION	PROJECT TYPE	SCALE HA.	DELIVERABILITY SHORT/MED/ LONG TERM	DENSITY H/M/L	DEMAND H/M/L	CURRENT METRO ACCESS H/M/L	POTENTIAL METRO ACCESS H/M/L	REMARKS	CAT.
BLAENAU GWENT										
1	The Works	Site - Mixed Use	72	Short term	M	M	H	H	New station confirmed at Ebbw Vale Town.	B
2	Northern Gateway	Site - Mixed Use	78	Medium term	M	L	M	M	Will need bus link via Ebbw Vale Town.	C
BRIDGEND										
3	Bridgend Industrial Estate	Existing industrial estate	79	Short term	M	M	L	H	New station proposed.	C
CAERPHILLY										
4	Caerphilly Town Centre	Regeneration – town centre	-	Short term	M	M	H	H	Local Hub and good bus integration.	C
5	Ystrad Mynach / Nelson	Urban growth zone	-	Medium/Long	M	M	M/L	H	Freight line conversion or BRT link.	C
CARDIFF										
6	Central Cardiff Enterprise Zone	Enterprise Zone	56	Short term	H	H	H	H	Hub of Metro network.	A
7	Cardiff Bay	Regeneration / mixed use	-	Short term	H	H	M	H	Rapid transit option.	A
8	North East expansion	Urban growth zone	-	Long term	M	H	L	M	Rail connectivity difficult – BRT may offer solution.	C
9	North West expansion	Urban growth zone	97	Long term	M	H	L	H	Potential new line.	A

Table 4: Summary List of Strategic Development Sites (Categorised A, B, C)...continued

REF	LOCATION	PROJECT TYPE	SCALE HA.	DELIVERABILITY SHORT/MED/ LONG TERM	DENSITY H/M/L	DEMAND H/M/L	CURRENT METRO ACCESS H/M/L	POTENTIAL METRO ACCESS H/M/L	REMARKS	CAT.
MERTHYR TYDFIL										
10	Pentrebach	Regeneration - residential	20	Short/Medium	M	L	H	H	Next to existing station with P&R potential.	B
MONMOUTHSHIRE										
11	Chepstow - Fairfield Mabey	Regeneration - residential	-	Medium term	M	H	H	H	Next to existing station with P&R potential.	C
NEWPORT										
12	Newport City Centre	Regeneration – city centre	-	Short term	H	M	H	H	Network sub-hub and focus of regeneration initiative.	A
13	Pill / South Newport	Regeneration – city fringe	-	Medium term	H	L	L	H	Rapid transit option.	B
14	Glan Llyn/Celtic Business Park	Site – Residential & Employment	242	Medium term	M	H	L	H	Potential for new station - although large site may need local BRT as well.	B
15	Duffryn / Celtic Lakes	Residential / Business Park	80	Medium term	M	H	L	H	Potential for new station; Lack of density on site will still present connectivity challenges so BRT may be required.	B
RHONDDA CYNON TAFF										
16	Llantrisant / Talbot Green	Urban growth zone	-	Medium term	M	H	L	H	Line extension.	A

Table 4: Summary List of Strategic Development Sites (Categorised A, B, C)...continued

REF	LOCATION	PROJECT TYPE	SCALE HA.	DELIVERABILITY SHORT/MED/ LONG TERM	DENSITY H/M/L	DEMAND H/M/L	CURRENT METRO ACCESS H/M/L	POTENTIAL METRO ACCESS H/M/L	REMARKS	CAT.
17	Treforest Ind Estate/Taffs Well	Existing industrial estate	-	Short term	M	H	M	H	Station relocation potential; review land use in wider area.	A
18	Pontypridd Town Centre	Regeneration - town centre	-	Short term	H	M	H	H	Next to existing station Sub-regional Hub and focus for regeneration and development?	B
TORFAEN										
19	Sebastopol	Site - residential	-	Long term	M	M	L	H/M	Potential new station aligned to development.	C
20	Mamhilad	Site - residential	-	Long term	M	M	L	H/M	Potential new station aligned to development.	C
VALE OF GLAMORGAN										
21	Barry Town Centre/ Waterfront	Regeneration / new housing site	-	Short term	H	M	H	H	Next to existing stations.	C
22	St Athan /Airport Ent. Zone	Enterprise Zone	-	Short term	L	M	M/L	M	Station access upgrade; new rail access/station for Cardiff Airport?	B

Potential Development at Strategic Sites

A broad brush assessment has been made of the potential development capacity of some of the key sites. These are proposals are by no means guaranteed and will be subject to market conditions, developer interest and a supportive local planning environment. They have been "suggested" to illustrate the potential.

STRATEGIC SITE	POTENTIAL DEVELOPMENT
A LIST	
Central Cardiff Enterprise Zone	Ambition for 1million sq ft of office accommodation of which 260,000 sq ft is under construction or in the pipeline. Potential for new conference centre and indoor arena. Potential for additional housing, particularly along Dumballs Road/Curran Road, circa 1,500 units?
Cardiff Bay	Potential for 500,000 sq ft of office accommodation plus 500,000 sq ft of B1 employment space (creative, media, life sciences). Potential for significant additional residential development, say, circa 2,000 apartments.
North West Cardiff	Draft LDP proposes 5,000 homes in north west Cardiff (Fairwater/St Fagans) and 2,000 homes north of junction 33. In addition, we can assume ancillary retail, employment and other community uses and suggest 250,000 B1 employment, 250,000 sq ft food/non-food retail and 250,000 sq ft of community uses (health, education etc.).
Newport City Centre	No formal figures are available; however, we could assume additional employment, retail and residential development in the order of 500,000 sq ft of offices, 200,000 sq ft of retail and 1,000 residential units.
Llantrisant/ Talbot Green	No figures available. Adopted LDP proposes new town centre development in Talbot Green. Assume 250,000 sq ft food/non-food retail, 500,000 sq ft employment (B1) and circa 1,100 residential units. Potential for significantly more housing to be developed in this area, extending the NW Cardiff corridor.
Treforest/Taffs Well	Assume intensification of existing employment uses on the 150 acre Treforest Industrial Estate with further office, B1 and industrial development together with a retail centre and frontage/trade counter uses. This could amount to 500,000 sq ft of employment floorspace and 250,000 sq ft of retail, leisure and trade counter development. Taffs Well comprises c.30 acres of employment uses which could be redeveloped for residential and retail alongside a new, larger, park and ride facility. Assuming 20 acres of residential, this would provide c.250 residential units.

Table 5 Potential Development Capacity at Key Strategic Sites

STRATEGIC SITE	POTENTIAL DEVELOPMENT
B LIST	
The Works, Ebbw Vale	The total master plan relates to 180 acres part of which has already been developed. The proposed mixed use scheme comprises "new hospital, learning zone, leisure centre, playing pitches, arts centre, approximately 520 homes, business hub, family history visitor centre, environmental resource centre and wetland park". We should assume that there is an additional 15 acres of employment land to be developed (200,000 sq ft of B1/B2 floorspace) and 520 homes.
Pentrebach, Merthyr Tydfil	Circa 50 acres capable of accommodating 600+ residential units plus ancillary retail/community uses of c.50,000 sq ft.
Pill/South Newport	No specific development proposals, however, this would intensify the existing commercial area of south Newport and provide greater connectivity for the proposed Redrow scheme on the former Whitehead Steelworks/Mon Bank sidings In addition, there remain c.20 acres of employment sites available for development along the river frontage and adjacent to the A4042.
Glan Llyn/ Celtic Business Park	Master plan agreed for 4,250 residential units and 100 acres of employment land (capable of accommodating 1,500,000 sq ft of B1/B2/B8 employment floor space. Persimmon on site developing the first phase of residential.
Duffryn / Celtic Lakes	Circa 150 acres of employment land available for development capable of accommodating 2.25 million sq ft of B1/B2 and B8 employment floorspace. In addition, the potential to develop further residential schemes of c.500 units.
Pontypridd Town Centre	No formal proposals, however, the opportunity to intensify and upgrade the existing retail and commercial development in the town centre. Potentially, also introducing more residential development. The Taff Vale shopping centre site offers an immediate opportunity for development. Overall, assume 200,000 sq ft of retail/leisure, 50,000 sq ft of offices and c.200 residential units.
St Athan/Airport EZ	Significant employment land available both with air-side access and land fronting the airport access road suitable for business park development. Assume 500,000 sq ft of B1/B2 employment floorspace.

Table 5 Potential Development Capacity at Key Strategic Sites...continued

STRATEGIC SITE	POTENTIAL DEVELOPMENT
C LIST	
Northern Gateway, Ebbw Vale	Proposed mixed use development of "805 homes, a commercial hub, road side services, employment, a strategic mixed use employment site and a network of green links" Assume 150,000 sq ft of B1/B2 employment floorspace, 200,000 sq ft of retail/ leisure and 805 homes.
Bridgend Industrial Estate	Intensification of existing employment uses on established industrial site. Assume 500,000 sq ft of B1/B2/B8 employment floorspace and 50,000 sq ft of retail/leisure.
Caerphilly Town Centre	Intensification of existing retail, commercial and residential centre and potential for 50,000 sq ft of offices and 100-200 residential units.
Ystrad Mynach/Nelson	Proposed employment site at Ty Du capable of accommodating 300-400,000 sq ft of B1/B2 employment floorspace. Additional potential for urban growth corridor and assume 1,000 residential units.
North East Cardiff	Draft LDP proposes 4,500 homes in North East Cardiff (Pontprennau) and a further 1,300 homes located East of Pontprennau Link Road. Additional employment and community uses – suggest 200,000 sq ft of B1 offices and 100,000 sq ft retail, community uses.
Chepstow	Draft LDP proposes 240 No. residential units and 7.5 acres of industrial or business related development (assume 75,000 sq ft of B1 offices).
Sebastopol, Torfaen	Deposit draft envisages 1,200 homes (690 to be delivered during the plan period. Assume 100,000 sq ft of ancillary development (retail, leisure, community).
Mamhilad, Torfaen	Deposit draft envisages 1,700 homes (690 to be delivered during the plan period. Assume 150,000 sq ft of ancillary development (retail, leisure, education, community).
Barry Town Centre/ Waterfront	Intensification and upgrading of existing town centre – assume 50,000 sq ft of employment (B1 offices) and 100 residential units. Barry Waterfront vision proposes 800 homes and ancillary A1/3 (retail, bars & restaurants), C1 (hotel) and B1 (offices). Assume 100,000 sq ft retail and leisure and 50,000 sq ft B1 offices.

Table 5 Potential Development Capacity at Key Strategic Sites...continued

5 Metro Accessibility

Full details of accessibility analysis can be found in the sub report: Metro Spatial Map

5.1 Accessibility

Rail stations provide a level of regional connectivity that a local bus service does not, both in terms of travel time and the ability to access the wider region. So a key part of this study was to analyse and assess levels of connectivity Vs what the rail network will deliver in terms of services once CASR and VLE are completed by 2019/2020. This focussed on identifying:

- The largest and most densely populated areas most poorly served by the rail network.
- The major Healthcare, Further Education (FE), Higher Education (HE) and other public services poorly served by the rail network.
- The major tourism and other "visitor" attractions most poorly served by the rail network.
- Strategic development sites (Section 4).

A comprehensive multi-layered model has been created to assess the impact of all the candidate Metro interventions. This is provided in more detail in a Sub Report, 'Metro Spatial Map'.

5.2 Demographic Analysis

This was undertaken using LSOAs across SE Wales and 2011 Census population data. There are 939 each with an average population of 1,578. Using this data, each LSOA was measured in terms of its distance (using a centroid for the LSOA) from a rail station; the analysis was undertaken for all LSOAs and the most densely populated LSOAs as shown in Table 6 (overleaf).

The Red, Amber, Green (RAG) analysis was based on distances of:

- Green - <800M,
- Amber - 800~1,200m
- Red - >1.2Km.

					Percentage V's Total		
PRE METRO	**GREEN**	**AMBER**	**RED**	**TOTAL**	**GREEN**	**AMBER**	**RED**
Cardiff	77	39	98	214	28%	30%	18%
Rhondda Cynon Taff	54	21	79	154	20%	16%	15%
Caerphilly	39	17	54	110	14%	13%	10%
Newport	12	8	75	95	4%	6%	14%
Bridgend	26	18	44	88	9%	14%	8%
The Vale of Glamorgan	36	14	29	79	13%	11%	5%
Torfaen	6	6	48	60	2%	5%	9%
Monmouthshire	6	5	45	56	2%	4%	8%
Blaenau Gwent	7	1	39	47	3%	1%	7%
Merthyr Tydfil	12	3	21	36	4%	2%	4%
	275	**132**	**532**	**939**	**100%**	**100%**	**100%**

					Percentage V's Total		
DENSELY POPULATED PRE METRO	**GREEN**	**AMBER**	**RED**	**TOTAL**	**GREEN**	**AMBER**	**RED**
Cardiff	66	34	83	183	40%	38%	32%
Rhondda Cynon Taff	6	8	55	69	4%	9%	21%
Caerphilly	22	11	26	59	13%	12%	10%
Newport	15	9	20	44	9%	10%	8%
Bridgend	16	8	20	44	10%	9%	8%
The Vale of Glamorgan	4	3	23	30	2%	3%	9%
Torfaen	26	10	8	44	16%	11%	3%
Monmouthshire	2	1	10	13	1%	1%	4%
Blaenau Gwent	3	5	6	14	2%	6%	2%
Merthyr Tydfil	4	1	9	14	2%	1%	3%
	164	**90**	**260**	**514**	**100%**	**100%**	**100%**

RAG based on number of LSOA centroids falling within 800m (green), 1.2km (amber) or 2km (red) of railway station

		PRE METRO			
ALL LSOA's	**TOTAL**	<800m	800m - 1.2km	>1.2km	>800m
LSOA Centroid Distance from Station	939	275	132	532	664
Percentage of Population		29%	14%	57%	71%
Estimated number of people	1,481,742	433,930	208,296	839,496	1,047,792
DENSELY POPULATED LSOA's	**TOTAL**	<800m	800m - 1.2km	>1.2km	>800m
LSOA Centroid Distance from Station	514	164	90	260	350
Percentage of Population		32%	18%	51%	68%
Estimated number of people	811,092	258,792	142,020	410,280	552,300

Table 6: RAG Analysis for LSOAs Pre Metro

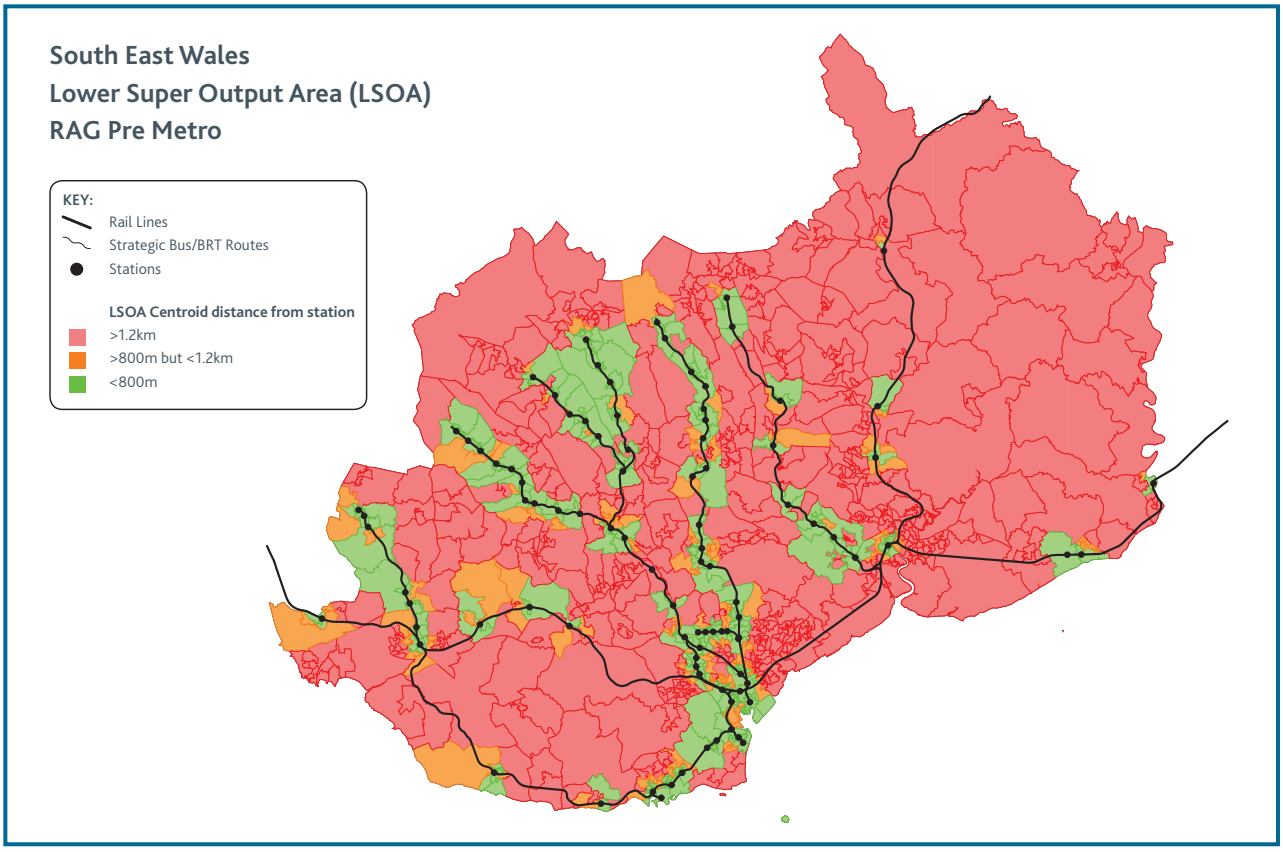


Figure 38: Most disconnected LSOAs – Pre Metro

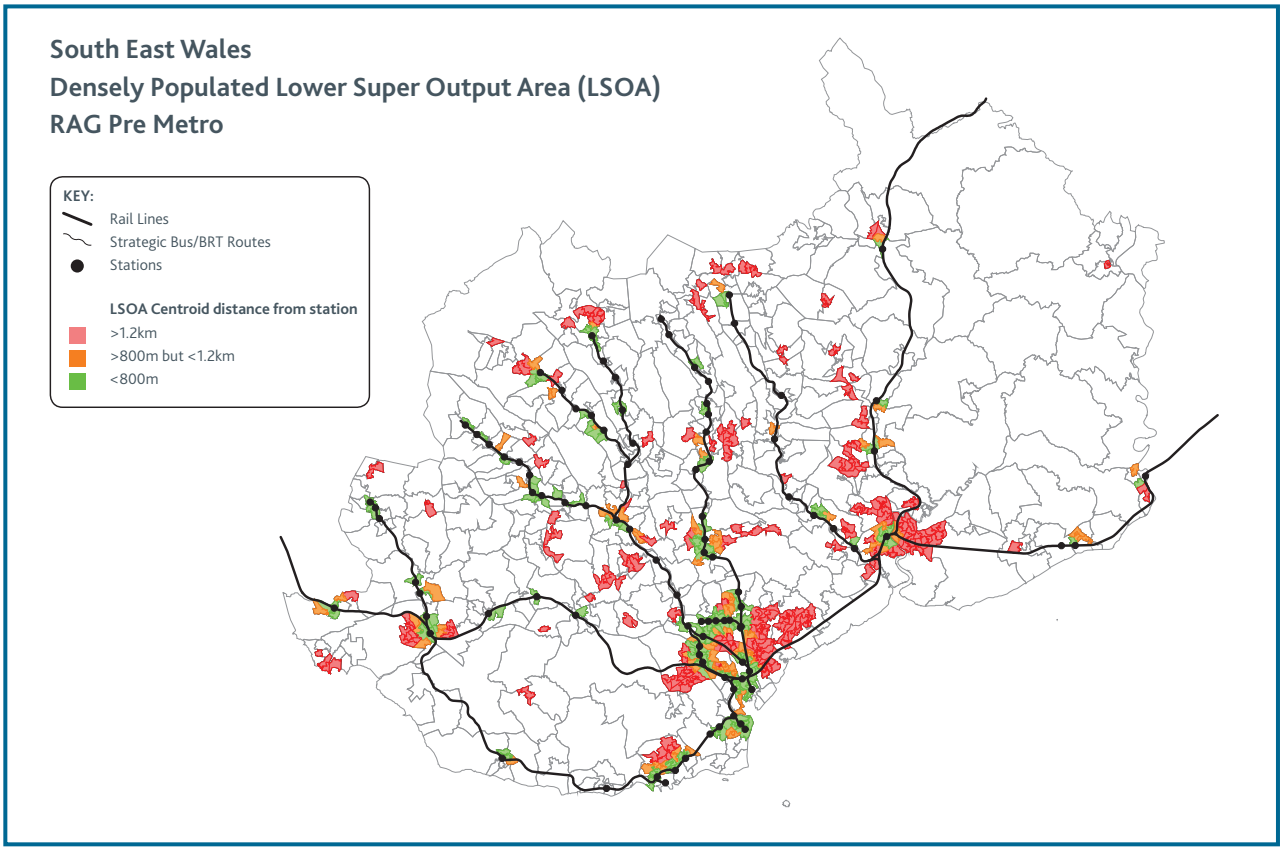


Figure 39: Most densely populated and disconnected LSOAs - Pre Metro

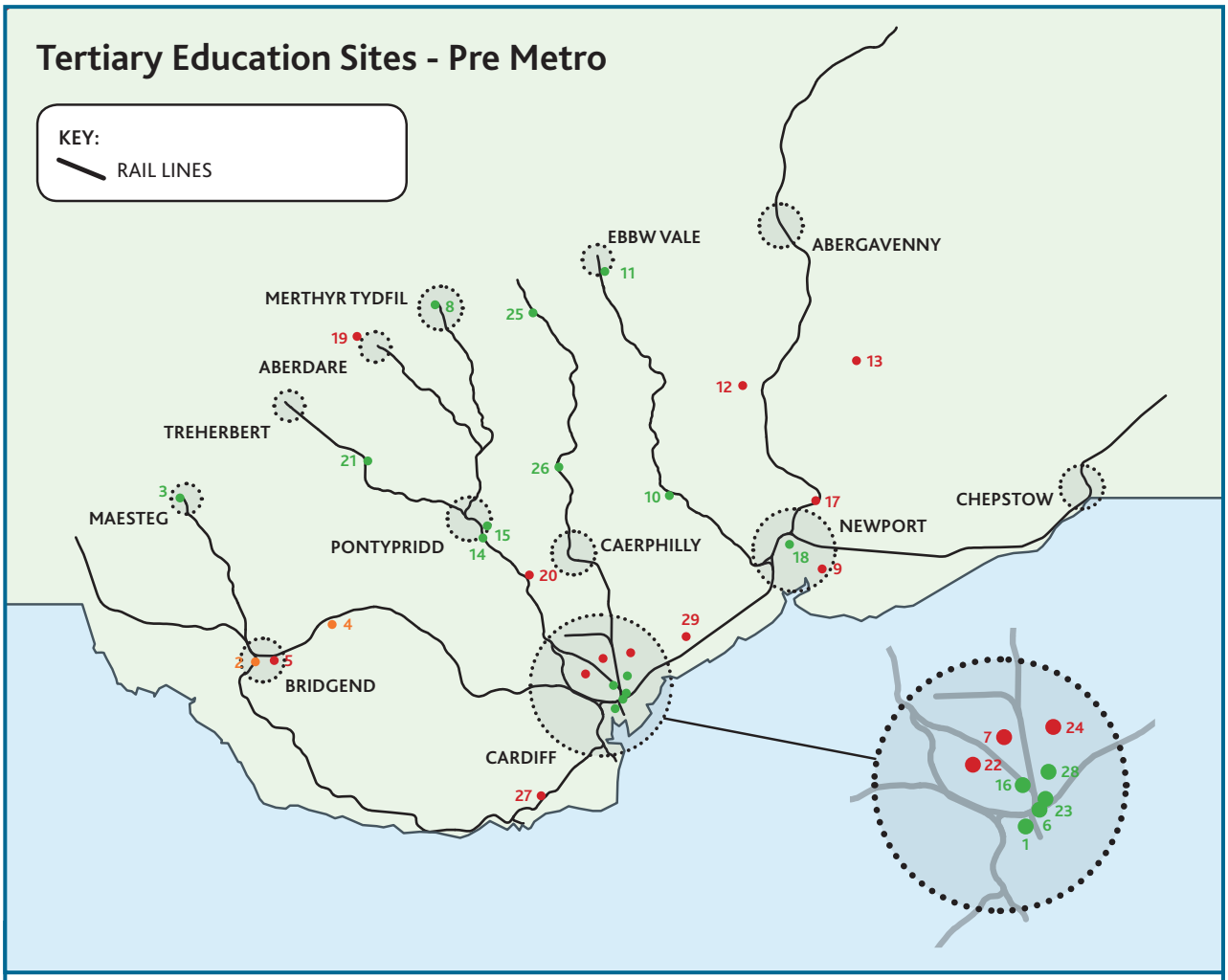
The accessibility analysis shows that the heavy rail network provides good coverage for some of the city-region with approximately 440,000 of the population of South East Wales living within 800m of a station, with a further 210,000 within 1.2km. However that leaves 840,000 not on the rail network – well over half the population as shown in in Figure 39 . This includes:

- Much of suburban Cardiff and Newport – particularly east Cardiff, Cardiff Bay, and suburban areas of Newport.
- Large parts of Caerphilly (esp. Blackwood area).
- Lower RCT (Church Village and Beddau).
- Parts of Torfaen and Blaenau Gwent.
- Some towns, e.g. Tredegar, Blackwood, Blaenavon, Porthcawl, Pontypool, Monmouth, Hirwaun, Tonyrefail and Abertillery.
- Particular Valleys: Garw Valley, Ogmore Vale, Rhondda Fach and Ebbw Fach.

Other disconnected LSOAs with less dense populations exist in the region. However, their population densities, being lower, makes it more difficult to provide cost effect public transport. In assessing the Metro interventions, those schemes that had the potential to "connect" the largest and most densely populated centres were prioritised.

5.3 Major HE/FE and Healthcare Sites

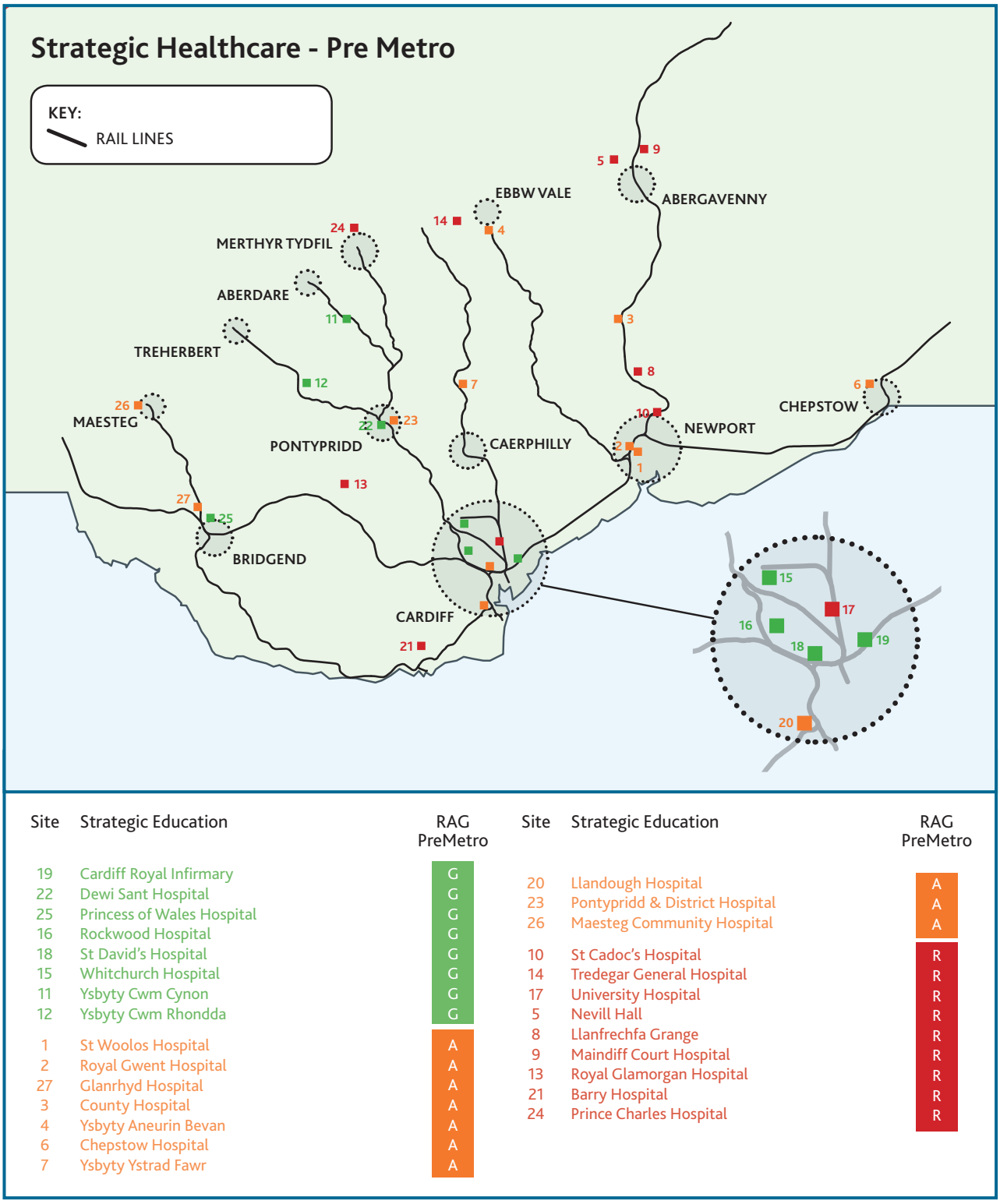
A parallel analysis was also undertake to RAG key FE, HE and Healthcare sites as illustrated in Figure 40 and Figure 41. This analysis demonstrates that there are a significant number of major healthcare and educational facilities that are poorly connected. The process to assess priority Metro interventions will include consideration of this data.



Site	Strategic Education	RAG PreMetro
1	Bridgend College Site - Arts Acadamey	G
3	Bridgend College Site - Maesteg Campus	G
6	Cardiff University - Cathays	G
28	CAVC Coleg Glan Hafren - The Parade	G
11	Coleg Gwent - Blaenau Gwent Learning Zone	G
10	Coleg Gwent - Crosskeys Campus	G
21	Coleg Morgannwg - Rhondda Campus	G
8	Merthyr Tydfil College	G
25	The College Rhymney	G
14	University of South Wales - Treforest Campus	G
15	University of South Wales - Glyntaff Campus	G
16	University of South Wales - Cardiff Campus	G
18	University of South Wales - Newport City Campus	G
23	UWIC - Howard Gardens Campus	G
26	College Ystrad Mynach	G

Site	Strategic Education	RAG PreMetro
2	Bridgend College Site - Bridgend Campus	A
4	Bridgend College Site - Pencoed Campus	A
5	Bridgend College Site - Queens Road Campus	R
7	Cardiff University - Heath	R
27	CAVC Barry College	R
29	CAVC Coleg Glan Hafren - Trowbridge	R
9	Coleg Gwent - City of Newport Campus	R
12	Coleg Gwent - Pontypool Campus	R
13	Coleg Gwent - Usk Campus	R
19	Coleg Morgannwg - Aberdare Campus	R
20	Coleg Morgannwg - Nantgarw Campus	R
17	University of South Wales - Caerleon Campus	R
24	UWIC - Cyncoed Campus	R
22	UWIC - Llandaff Campus	R

Figure 40: RAG Analysis Pre-Metro Major Education Facilities



Site	Strategic Education	RAG PreMetro
19	Cardiff Royal Infirmary	G
22	Dewi Sant Hospital	G
25	Princess of Wales Hospital	G
16	Rockwood Hospital	G
18	St David's Hospital	G
15	Whitchurch Hospital	G
11	Ysbyty Cwm Cynon	G
12	Ysbyty Cwm Rhondda	G
1	St Woolos Hospital	A
2	Royal Gwent Hospital	A
27	Glanrhyd Hospital	A
3	County Hospital	A
4	Ysbyty Aneurin Bevan	A
6	Chepstow Hospital	A
7	Ysbyty Ystrad Fawr	A

Site	Strategic Education	RAG PreMetro
20	Llandough Hospital	A
23	Pontypridd & District Hospital	A
26	Maesteg Community Hospital	A
10	St Cadoc's Hospital	R
14	Tredegar General Hospital	R
17	University Hospital	R
5	Nevill Hall	R
8	Llanfrechfa Grange	R
9	Maindiff Court Hospital	R
13	Royal Glamorgan Hospital	R
21	Barry Hospital	R
24	Prince Charles Hospital	R

Figure 41: RAG Analysis Pre Metro - Major Healthcare Facilities

5.4 Commercial and Industrial Sites

A comprehensive assessment was also undertaken for all LDP employment, retail, etc sites; these are included in the Spatial Analysis sub report. The schedule of these sites is in the appendix to the main report.

6 Study Methodology And Accessibility Impact

Full details can be found in Metro Interventions Appraisal Report

The primary focus was the spatial and connectivity analysis informed by strategic development opportunities. The details of the appraisal process are included in the, Metro Intervention Appraisals Report; this section summarises that process.

6.1 Metro Analysis

The overall strategic plan for Metro has been developed using both a qualitative and quantitative assessment of potential schemes and consideration of:

- Demographic accessibility – those largest and most densely populated parts of the region most disconnected from VLE were identified.
- The most disconnected HE/FE and Healthcare locations.
- The region's most strategic tourist assets.
- The region's current transport constraints.
- An assessment of engineering feasibility and deliverability.
- Consideration of other related strategic policy objectives and initiatives.
- Previous schemes and proposals from earlier studies and report.
- The most strategic and commercially viable development sites.

This approach is illustrated in the Executive Summary in *Figure 2, Figure 3, Figure 4 & Figure 5*. The process also relied upon the qualitative expertise and experience of the team as well the quantitative analysis undertaken.

This process identified the totality of Metro Interventions as illustrated Figure 42.

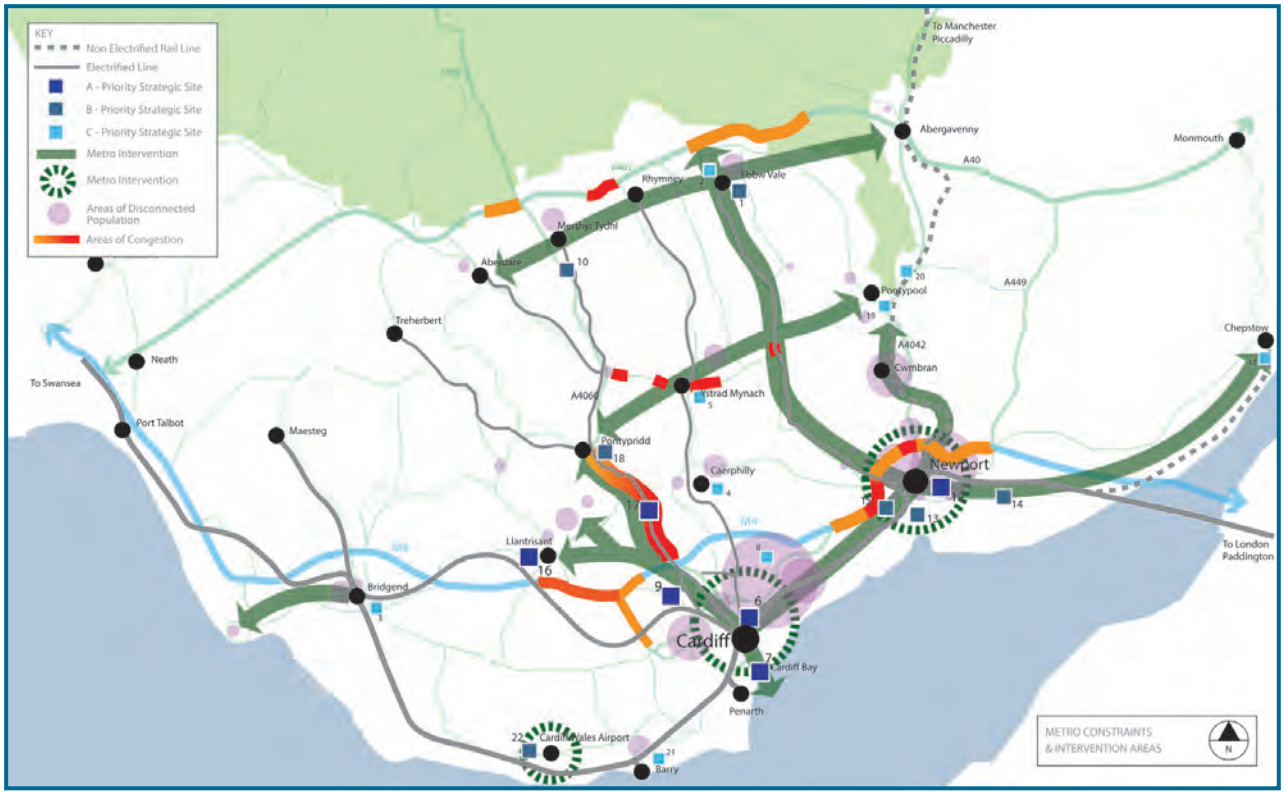


Figure 42: All Metro Interventions

This process also identified strategic priorities for Metro as illustrated in Figure 43 to be:

- Enhancement of the existing network: New stations, higher frequency services, P&R and station/interchange enhancements; early scope within quick wins. This will include infrastructure enhancements to enable higher frequencies and additional stations (1); Priority enhancements include within "Quick Wins".
- Ebbw Vale Town to Newport: Enhancements to deliver at least 2 trains per hour (tph) and a service to Newport (2).
- Cardiff NW Corridor: New routes and stations to facilitate the medium term expansion of Cardiff, from Cardiff Bay to RCT via Creigiau and a link to Taffs Well to support redevelopment and help alleviate congestion on the A470. Explore early conversion of the City and Coryton lines to Tram-train operation as part of first phase linking to Cardiff Bay(3).
- M4 Corridor: New routes & stations to provide a commuter network for East Cardiff and Newport by introducing rail/tram-train services on the electrified relief lines between Cardiff and Severn Tunnel Junction (STJ) and the use of complementary Bus Rapid Transit (4).
- Cardiff Airport: New/upgraded station able to support local and interregional services (9).
- Mid Valley Corridor: Bus Rapid Transit between Pontypridd and Pontypool/Cwmbran (8).

These are described in more detail in Section 7. Several other strategic interventions have been identified including: Cross Valley BRT from Aberdare to Abergavenny, Rapid Transit (RT) in Cardiff and Newport, interchange enhancements. These are explored more fully in the main body of the report. A range of wider regeneration benefits of the Metro are also explored in Section 8.

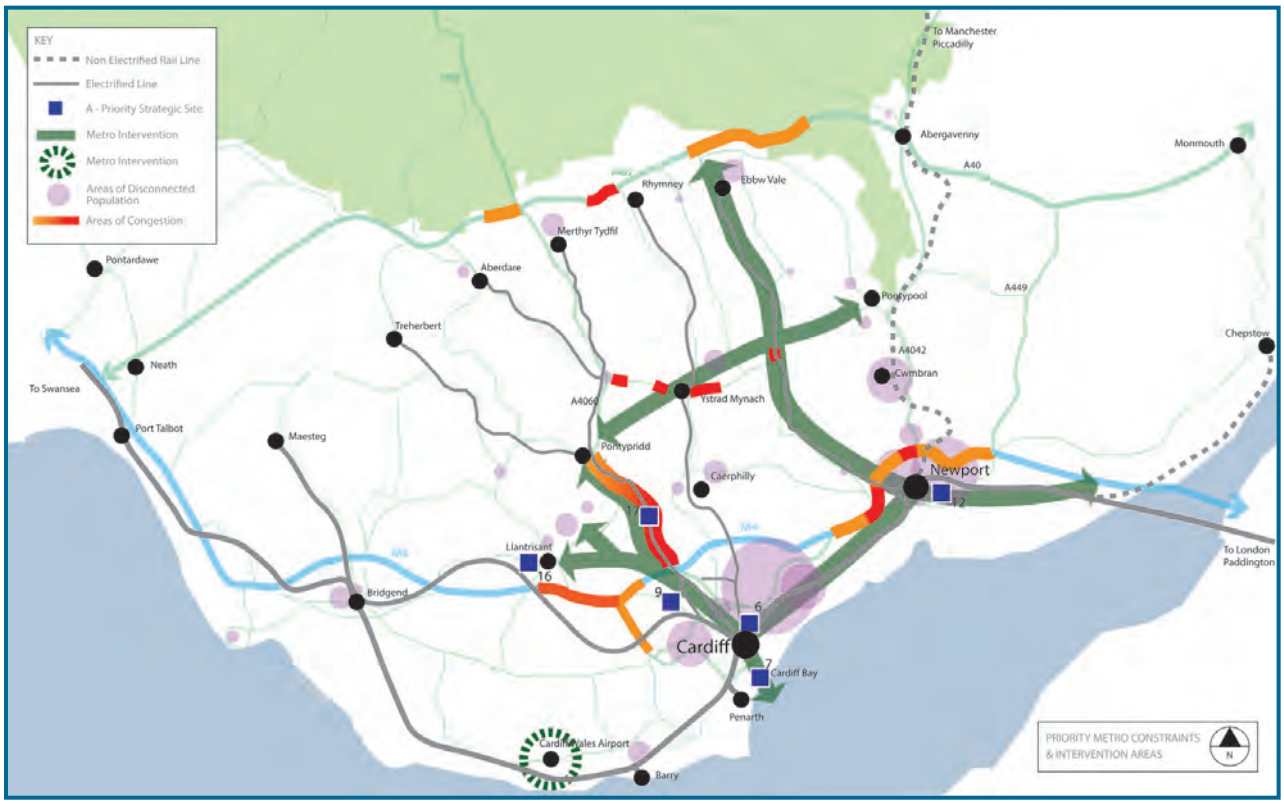


Figure 43: Priority Metro Interventions

	PRIORITY (A) STRATEGIC SITES						OTHER EZs	
	NW CARDIFF	CARDIFF EZ	CARDIFF BAY	NEWPORT	TALBOT GREEN	TAFFS WELL	EBBW VALE	AIRPORT
Core Network Enhancements		Y		Y		Y	Y	Y
Newport - Ebbw Vale				Y			Y	
NW Corridor to RCT	Y	Y	Y		Y	Y		
M4 Corridor/Relief Lines		Y	Y	Y				
Cardiff Rapid Transit		Y	Y					
Newport Rapid Transit				Y				
Newport - Abergavenny				Y				
BRT (Pontypridd - Pontypool)								
Cardiff Airport		Y					Y	
Nelson - Newport				Y				

Table 7: Relationship between Metro Interventions and Strategic Sites

Table 7 shows the relationship between all the Metro Interventions in Section 8 and the Strategic Sites identified in Section 4. This was a major consideration in the assessment prioritisation process.

6.2 Connectivity Impact of Metro - RAG Analysis

- Brings 420,000 more people within 1.2Km of a Metro station & 330,000 more within 800m.
- By 2030, 70% of population will be within 1.2Km of Metro station Vs 40% today.

The overall Metro schemes proposed (See Metro Interventions Appraisal and Metro Spatial Map) have been analysed in relation to connectivity to assess the increased catchment population of Metro in 2030 (when all schemes are delivered) vs the baseline (which is the VLE network). The before and after are illustrated in Figure 44 and Figure 45.

The totality of the schemes proposed will bring a further 330,000 people within 800M (up to 760,000 from 430,000 or 76%) and a further 420,000 within 1.2Km (up to 1.06M from 640,000 or by 65%).This is illustrated in Figure 45, Figure 46 & Table 8.

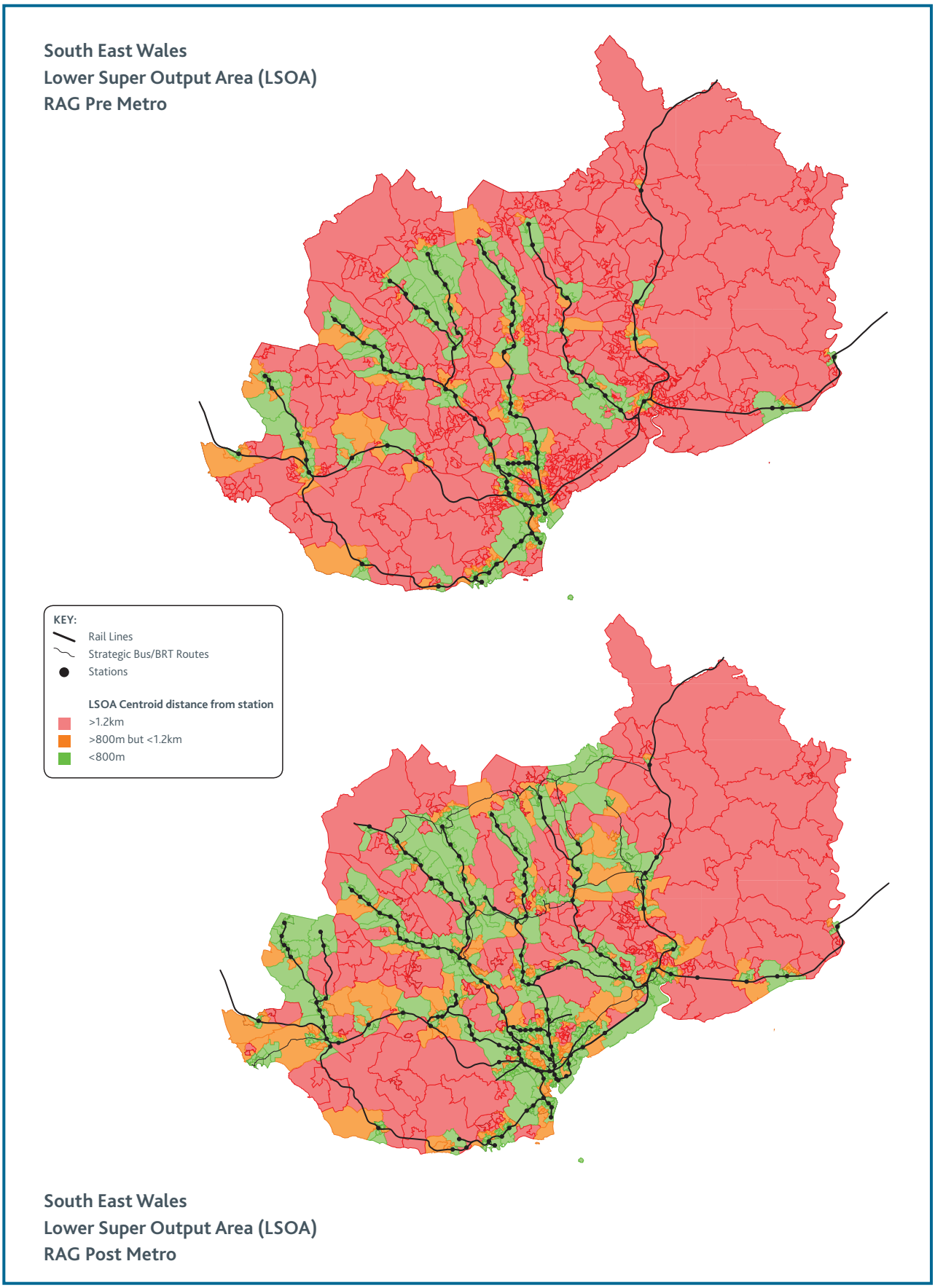
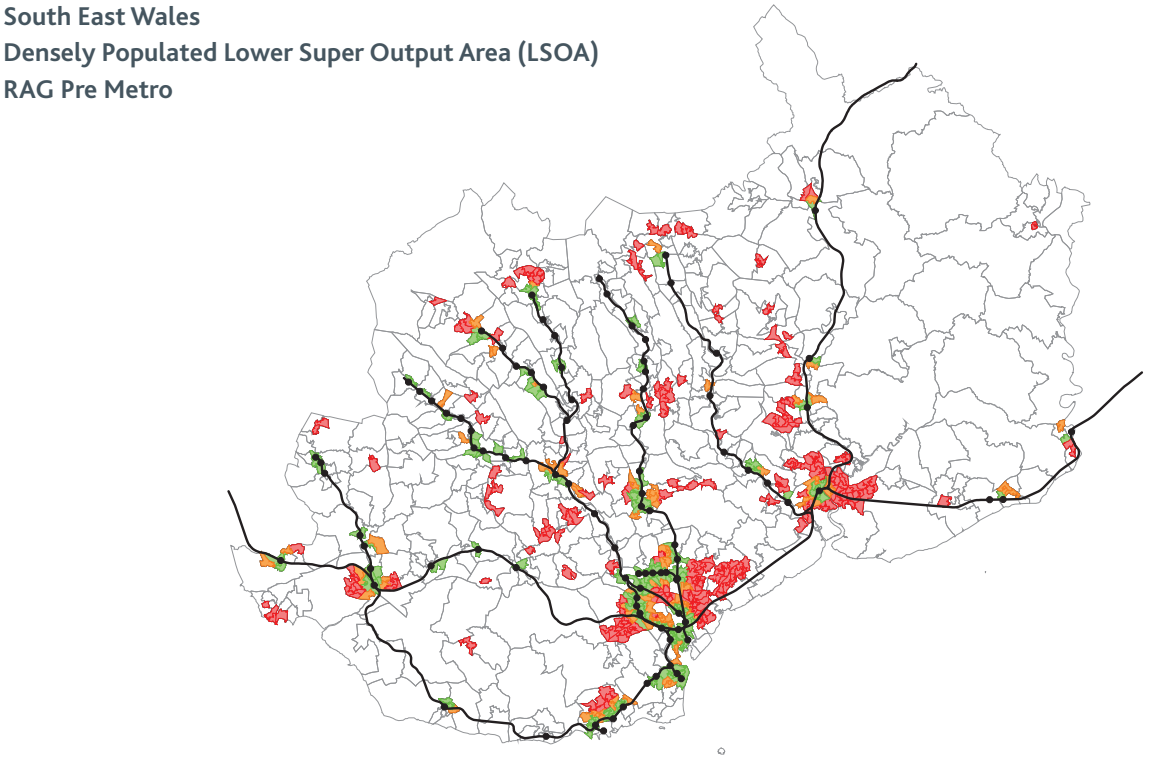
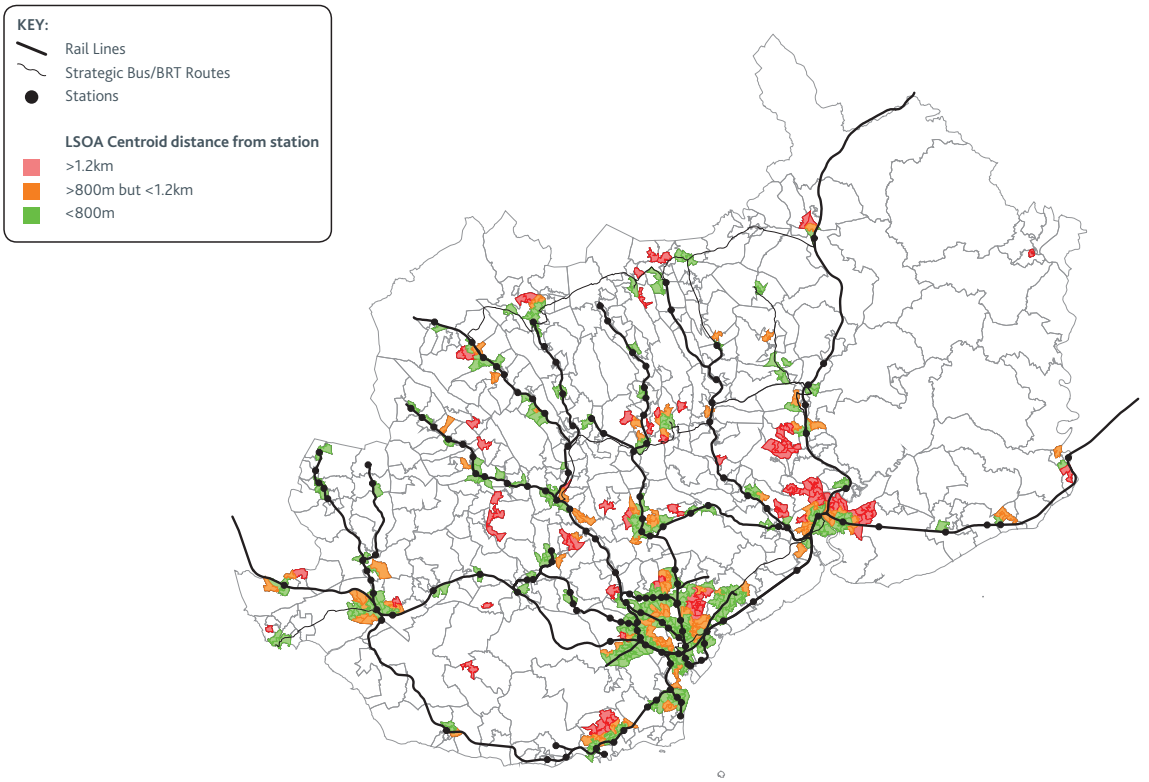


Figure 44: Pre Pre/post Metro impact on accessibility: All LSOAs

South East Wales
Densely Populated Lower Super Output Area (LSOA)
RAG Pre Metro





South East Wales
Densely Populated Lower Super Output Area (LSOA)
RAG Post Metro

Figure 45: Pre/post Metro impact on accessibility: most densely populated LSOAs

Given the current patronage of the Valley Line network is about 14M journeys per annum, an increase of 400,000 in catchment for Metro could add a further 9M to this figure. That would be over 6000 peak hour journeys Vs 4000 today. This will be in addition to the predicted trend growth (Section 3.4) within current industry plans. Given this, it does not seem unreasonable to plan for a Metro network that could be carrying double the amount of passengers in 2030 than Valley Line Services do today.

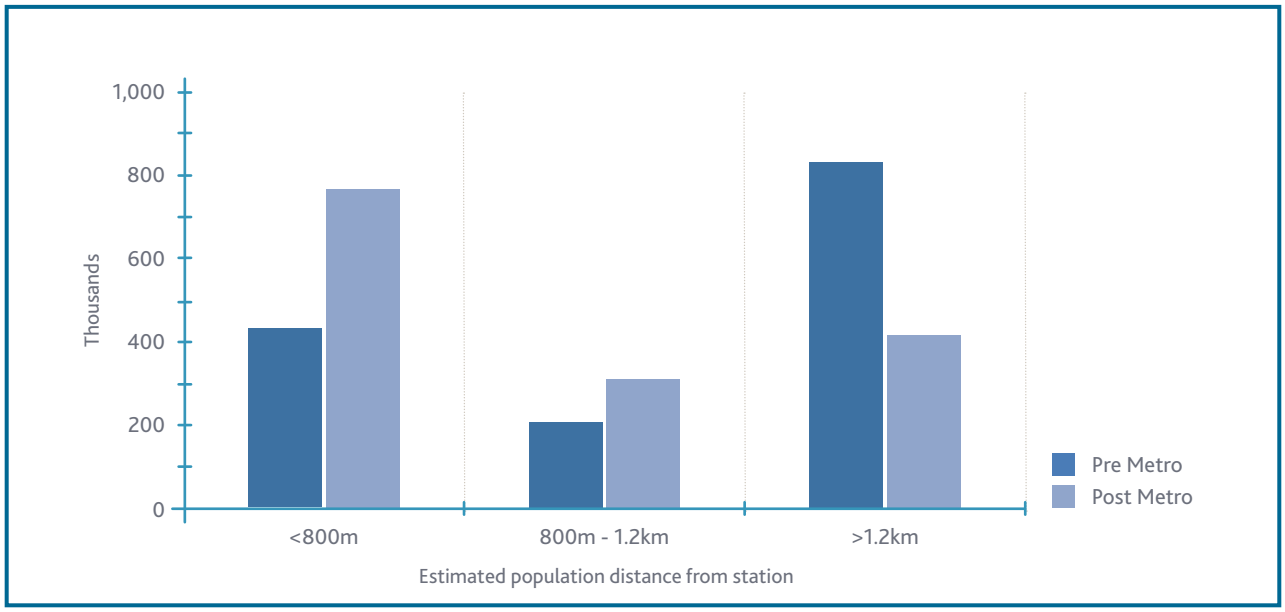


Figure 46: Population distance from station pre/post Metro

Table 8: Summary of Metro Accessibility Impact

	Population Pre Metro				Percentage V's Total		
PRE METRO	**GREEN**	**AMBER**	**RED**	**TOTAL**	**GREEN**	**AMBER**	**RED**
Cardiff	121,506	61,542	154,644	337,962	28%	30%	18%
Rhondda Cynon Taff	58,212	33,138	124,662	243,012	20%	16%	15%
Caerphilly	61,542	26,826	85,212	173,580	14%	13%	10%
Newport	18,936	12,624	118,350	149,910	4%	6%	14%
Bridgend	41,028	28,404	69,432	138,864	9%	14%	8%
The Vale of Glamorgan	56,808	22,092	45,762	124,662	13%	11%	5%
Torfaen	9,468	9,468	75,744	94,680	2%	5%	9%
Monmouthshire	9,468	7,890	71,010	88,368	2%	4%	8%
Blaenau Gwent	11,046	1,578	61,542	74,166	3%	1%	7%
Merthyr Tydfil	18,936	4,734	33,138	56,808	4%	2%	4%
	433950	**208296**	**839496**	**1,481,742**	**100%**	**100%**	**100%**

	Densley Populated Pre Metro				Percentage V's Total		
DENSELY POPULATED PRE METRO	**GREEN**	**AMBER**	**RED**	**TOTAL**	**GREEN**	**AMBER**	**RED**
Cardiff	104,148	53,652	130,974	288,774	40%	38%	32%
Newport	9,468	12,624	86,790	108,882	4%	9%	21%
Rhondda Cynon Taff	34,716	17,358	41,028	93,102	13%	12%	10%
Caerphilly	23,670	14,202	31,560	69,432	9%	10%	8%
Bridgend	25,248	12,624	31,560	69,432	10%	9%	8%
Torfaen	6,312	4,734	36,294	47,340	2%	3%	9%
The Vale of Glamorgan	41,028	15,780	12,624	69,432	16%	11%	3%
Blaenau Gwent	3,156	1,578	15,780	20,514	1%	1%	4%
Monmouthshire	4,734	7,890	9,468	22,092	2%	6%	2%
Merthyr Tydfil	6,312	1,578	14,202	22,092	2%	1%	3%
	258,792	**142,020**	**410,280**	**811,092**	**100%**	**100%**	**100%**

RAG based on number of LSOA centroids falling within 800m (green), 1.2km (amber) or 2km (red) of railway station

		PRE METRO			
ALL LSOA's	**TOTAL**	<800m	800m - 1.2km	>1.2km	>800m
LSOA Centroid Distance from Station	939	275	132	532	664
Percentage of Population		29%	14%	57%	71%
Estimated number of people	1,481,742	433,930	208,296	839,496	1,047,792
DENSELY POPULATED LSOA's	**TOTAL**	<800m	800m - 1.2km	>1.2km	>800m
LSOA Centroid Distance from Station	514	164	90	260	350
Percentage of Population		32%	18%	51%	68%
Estimated number of people	811,092	258,792	142,020	410,280	552,300

Note: Analysis used LSOAs as population proxies with estimated 1578 people per LSOA; will not match official population figures exactly.

	Population Post Metro				Percentage V's Total		
POST METRO	**GREEN**	**AMBER**	**RED**	**TOTAL**	**GREEN**	**AMBER**	**RED**
Cardiff	236,700	74,166	26,826	337,692	31%	25%	6%
Rhondda Cynon Taff	126,240	44,184	72,588	243,012	17%	15%	17%
Caerphilly	83634	33,138	56,808	173,580	11%	11%	14%
Newport	52,074	34,716	63,120	149,910	7%	12%	15%
Bridgend	80,478	34,716	23,670	138,864	11%	12%	6%
The Vale of Glamorgan	58,386	26,826	39,450	124,662	8%	9%	9%
Torfaen	636,294	20,514	37,872	94,680	5%	7%	9%
Monmouthshire	17,358	9,468	61,542	88,368	2%	3%	15%
Blaenau Gwent	37,872	11,046	25,248	74,166	5%	4%	6%
Merthyr Tydfil	34,716	11,046	11,046	56,808	5v	4%	3%
	763,752	**299,820**	**418,170**	**1,481,742**	**100%**	**100%**	**100%**

	Densley Populated Post Metro				Percentage V's Total		
DENSELY POPULATED POST METRO	**GREEN**	**AMBER**	**RED**	**TOTAL**	**GREEN**	**AMBER**	**RED**
Cardiff	205,140	61,542	22,092	288,774	44%	34%	14%
Newport	636,294	25,248	47,340	108,882	8%	14%	29%
Rhondda Cynon Taff	53,652	18,936	20,514	93,102	11%	11%	13%
Caerphilly	36,294	17,358	15,780	69,432	8%	10%	10%
Bridgend	45,762	18,936	4,734	69,432	10%	11%	3%
Torfaen	18,936	7,890	20,514	47,340	4%	4%	13%
The Vale of Glamorgan	41,028	15,780	12,624	69,432	9%	9%	8%
Blaenau Gwent	12,624	1,578	6,312	20,514	3%	1%	4%
Monmouthshire	6,312	7,890	7,890	22,092	1%	4%	5%
Merthyr Tydfil	14,202	4,734	3,156	22,092	3%	3%	2%
	470244	**179892**	**160956**	**811092**	**100%**	**100%**	**100%**

RAG based on number of LSOA centroids falling within 800m (green), 1.2km (amber) or 2km (red) of railway station

	POST METRO			
ALL LSOA's	<800m	800m - 1.2km	>1.2km	>800m
LSOA Centroid Distance from Station	484	190	265	455
Percentage of Population	52%	20%	28%	48%
Estimated number of people	763,752	299,820	418,170	717,990
DENSELY POPULATED LSOA's	<800m	800m - 1.2km	>1.2km	>800m
LSOA Centroid Distance from Station	298	114	102	216
Percentage of Population	58%	22%	20%	42%
Estimated number of people	470,244	179,892	160,956	340,848

Table 8: Summary of Metro Accessibility Impact (continued)

7 Metro Interventions

Full details can be found in the sub reports: Capita 'Metro Interventions Appraisal Report' and Powell Dobson Urbanists: 'Regeneration and The Metro'.

The Priority Metro Interventions presented in the Executive Summary are expanded here alongside all the Metro interventions identified. This includes an illustration of routes and a summary of the development and regeneration opportunities that exists for each of them.

The technical details of the methodology, appraisal and intervention proposals are presented in the Technical Appendix: Metro Intervention Appraisal prepared by Capita Symonds. That analysis, because of the strategic nature of this study, drew some of its detail from other earlier investigations and studies so covers some schemes in more detail than others. Similarly the estimates for capital costs are derived, in the main, from others sources and vary in accuracy and coverage. As set out at the outset of this study, these estimates will need to be subject to more detailed work and analysis. However, the figures presented do represent a fair reflection of the order of magnitude. The detailed breakdown of the Metro Interventions in the sub report may not match exactly this overview; this does not detract from the strategic nature of this overall report.

NO.	PTY?	NAME	DESCRIPTION
1	y	Enhancement to core VLE Network	New stations, higher frequency services, P&R and station/interchange enhancements. Prioritise schemes with best business case. Those schemes identified within the "quick wins" are the priorities; remainder to be phased to 2030
2	Y	Ebbw Vale Town to Newport	Enhancements to deliver >2tph and a service to Newport.
3	Y	Cardiff NW Corridor to RCT	New routes and stations to facilitate the medium term expansion of Cardiff, from Cardiff Bay to RCT via Creigiau. Also a link to Taffs Well to support redevelopment and help alleviate congestion on the A470. Early conversion of City & Coryton lines to tram train
4	Y	M4 Corridor	New routes & stations to provide a commuter network for East Cardiff and Newport by introducing rail/tram-train services on the electrified relief lines between Cardiff and Severn Tunnel Junction (STJ) and the use of complementary Bus Rapid Transit (BRT).
5		Other Rapid Transit in Cardiff	Medium/long term measures to extend RT to Ely, NE Cardiff, etc
6		Rapid Transit to/in Newport	Medium/long term measures to extend BRT to east of Newport, Llanwern, etc
7		Newport Abergavenny Corridor	Long term measure based on electrification and new stations
8	y	BRT across the region including	Priority for BRT between Pontypridd and Pontypool/Cwmbran.
9	Y	Cardiff Airport	A new station able to support both local and interregional services.
10		Nelson-Machen-Newport	Longer term option tied to land use changes on corridor

7.1 Enhancements to Core VLE Network (1)
Make better use of existing core Network post CASR/VLE

Strategic Sites Impacted: Bridgend Industrial Estate, Caerphilly Town Centre, Ystrad Mynach/ Nelson, Cardiff EZ, Pentrebach, Chepstow - Fairfield Mabey, Newport City Centre, Llanwern, Treforest ind Estate/Taffs Well, Barry Town Centre, Pontypridd.

Scheme Description

To be delivered incrementally in the period to 2030, an on-going programme will prioritise those schemes with the best business case, the most economic impact and the least engineering challenges earliest. The total package is estimated at £470M to be delivered to 2030, the priority items are circa £270M to 2025.

This programme aims to:

- Deliver >4tph on the majority of the network. Priority for services to Merthyr, Ebbw Valley.
- Deliver new stations across the network and prioritise those that add significant passenger numbers with limited capex and minimal opex impact.
- Enable small network extensions where increased connectivity merits; whereas the conversion of the freight line from Ystrad Mynach to Bedlinog has been ruled out at this stage (in favour of Cross Valley BRT), an extension from Aberdare to Hirwaun does merit further exploration as this scheme, whilst only connecting a relatively small population, could provide a P&R directly on the A465 and an 'entry point' to the Brecon Beacons to help the Tourism agenda; it will also connect the Aberdare campus of Coleg Morganwg to the Metro network.
- New stations and frequency enhancements may/will require further investment at the core of the network (to address constraints anticipated post CASR - especially junctions at Cardiff West and north of Queen St)) and/ or use of rolling stock post VLE that provides more timetable flexibility through shorter station stop times. Change in service patterns to serve the network periphery should also be considered with the use of network sub regional hubs/interchanges and shuttles for some services.
- A rolling programme of interchange and station enhancements across the network to improve permeability at stations for easier and more secure pedestrian and cycle access to deliver Active travel obligations. This will require some design enhancements to improve the 'placemaking' of key stations. This should also include a programme of Metro branding "station updates". An example of station design principles for Ebbw Vale Town station is included in a Sub report.
- Strategic P&R sites will also be included to help attract more road users onto public transport.
- Depending on timing and strategy for VLE rolling stock procurement and reflecting the output of the Mode review (See Section 11), could consider LRT or tram train for core valley line routes (Merthyr, Aberdare, Treherbert) and EMUs for the SWML, VoG and Ebbw Valley services; early consideration for tram-train operation on Bay, Coryton, City and Penarth lines (See Cardiff NW Corridor).
- A subset of this 'list' will also be part of the quick wins as illustrated in Figure 7.

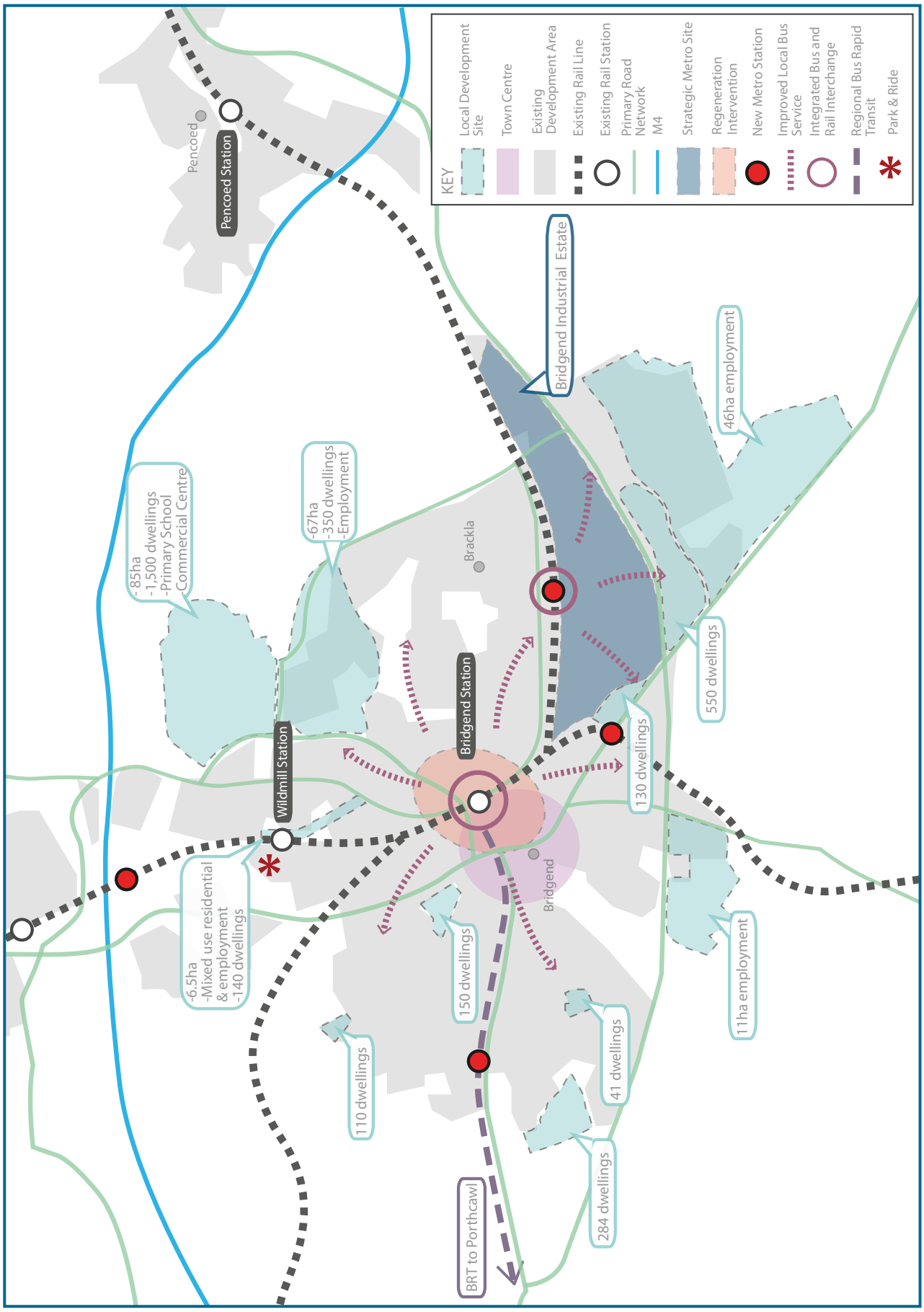


Figure 47: Regeneration Opportunities at Bridgend

Examples of Development and Regeneration Impacts

- A key intervention will be a major upgrade of Cardiff Central. At the core of the network a multi modal hub will be needed able to cope with double its current patronage by 2030, implemented in a way the fully integrates with the developing masterplan for the Central Cardiff Enterprise Zone.
- Other parts of the network will require comprehensive transport land use studies and masterplans to fully appraise the Metro opportunities to inform the best locations for new stations and associated developments. Such locations include Taffs Well/Treforest (also aligned with the NW Corridor) and Bridgend Industrial Estate.
- In Bridgend (Figure 47) improvements to journey times and service frequency, combined with the provision of a new station at Brackla will increase the connectivity of Bridgend Industrial Estate, identified as a strategic site within the context of a future Metro. Improved connectivity of the estate would increase the likelihood of future investment which will have a positive impact on the local economy; creating new employment and helping sustain existing businesses.
- The provision of a new railway station for Bridgend College will increase the ease with which students throughout the wider region can access further education and vocational training programmes. This will enhance the quality of the local labour market, which will encourage investment into Bridgend and help to strengthen the local economy.
- The improvements to connectivity will help address Merthyr's perceived geographic remoteness and increase the likelihood of private sector investment. The commercial analysis identifies Pentrebach (Figure 48) as a strategic Metro development site, and proposes that the Metro will provide the connectivity necessary to facilitate the delivery of a residential led mixed-use scheme. Such a scheme will create an exemplar sustainable mixed-use scheme in the Heads of the Valleys to will help to contribute to the Local Development Plan's aspiration to deliver 3,000 dwellings, and provide a fresh opportunity to revitalise a traditional employment area where occupancy levels are poor[67]. Better links to Cardiff will ensure that Pentrebach can support a range of employment sectors. It is recommended that a development brief should be prepared to set out a vision for the site.

67 Merthyr Tydfil Local Development Plan 2006-2021, 2011, p.50

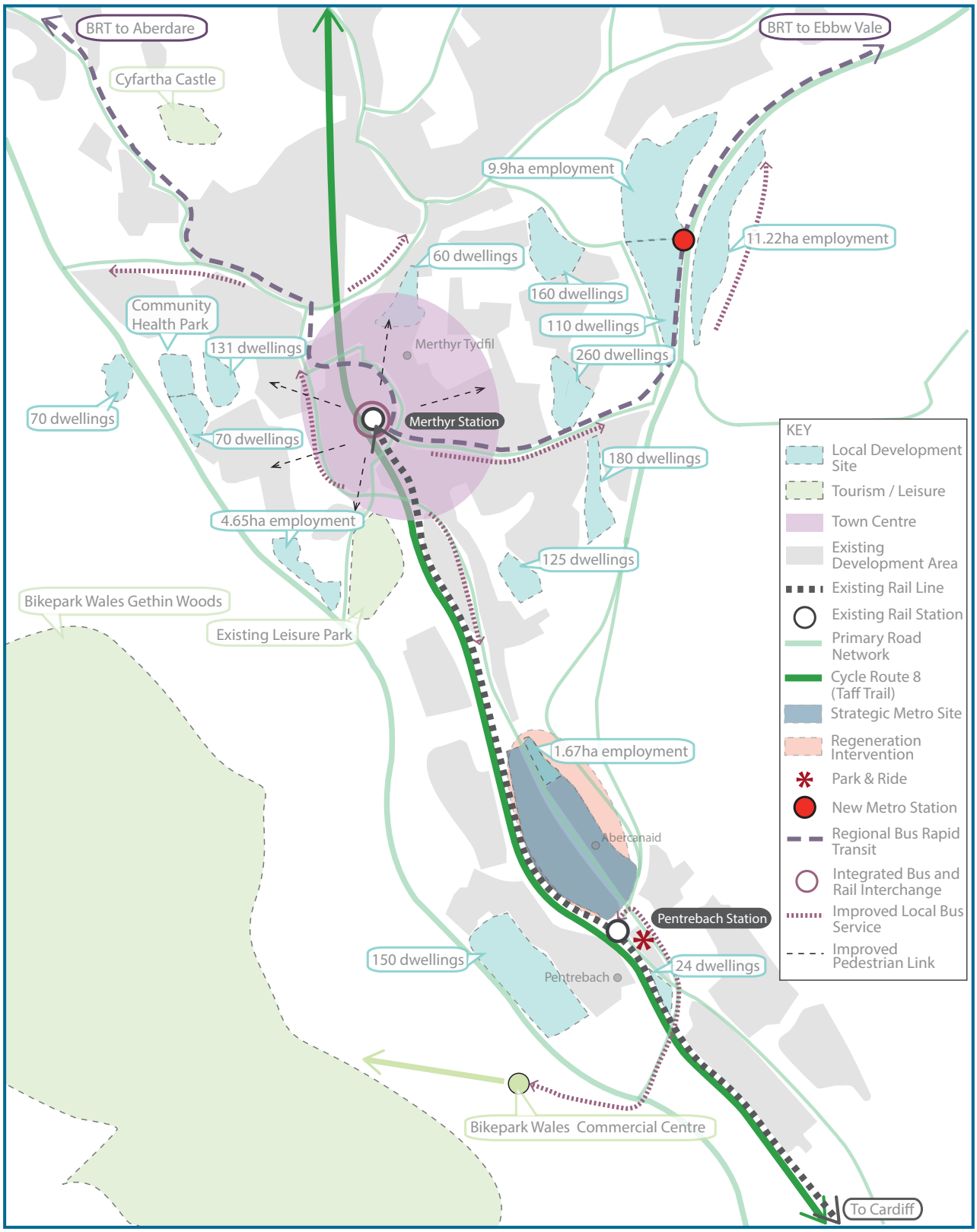


Figure 48: Regeneration Opportunities at Merthyr/Pentrebach

7.2 Ebbw Vale - Newport Enhancements (2)

See Figure 49
Strategic Sites Impacted: The Works, Northern Gateway, Newport City Centre, Duffryn/Celtic Lakes

Scheme Description

- Extend line to new station at Ebbw Vale Town, new station at Pye corner.
- Enhance infrastructure to enable 2 tph (one to Cardiff and another to Newport).
- Best suited to EMU (not tram-train, LRT).
- Longer term aspiration to deliver 4tph to Ebbw Vale – but considerable engineering challenges to address (with significant cost) to double track north of Aberbeeg; the option of extending to Abertillery to provide 4tph on the lower section of the route may be a more practical early intervention.
- Options of further station in Newport between Pye Corner and Gaer Curve (eg at Tredegar Park) to serve some of the Duffryn Business Park, potential for interchange with Newport BRT and/or Cardiff/Newport Tram-train.

Examples of Development and Regeneration Impacts

- The Works will be directly accessible by two and in the longer term three or four times per hour, by rail services from Cardiff and Newport railway stations. Although the Northern Corridor sites are not connected to the railway line, their accessibility will be improved through the Bus Rapid Transit and local bus services operating from the town centre.
- Improved access to both of these sites will complement the Enterprise Zone designations and help to deliver 'specialist' employment opportunities in advanced manufacturing, which will diversify the local economy. It will also increase the viability of delivering the 1,300 dwellings that have been allocated across the sites, which will address local housing need and broaden the choice of housing available.
- There is an opportunity to integrate the Works sites & new rail station into Ebbw Vale Town with use of an imaginative master plan - proposal for cable car link to town is important to deliver permeability between the station and the town centre.
- The Metro will also help to deliver development opportunities outside of the immediate vicinity of the strategic sites and the rail corridor. The Circuit of Wales, for example, is a prominent proposed development that has the capacity to transform the local economy through delivering 6,000 jobs in motorsport and automotive industries. Its inclusion within the South East Wales public transport network could be a key marketing tool for the development and help fulfil its economic potential.

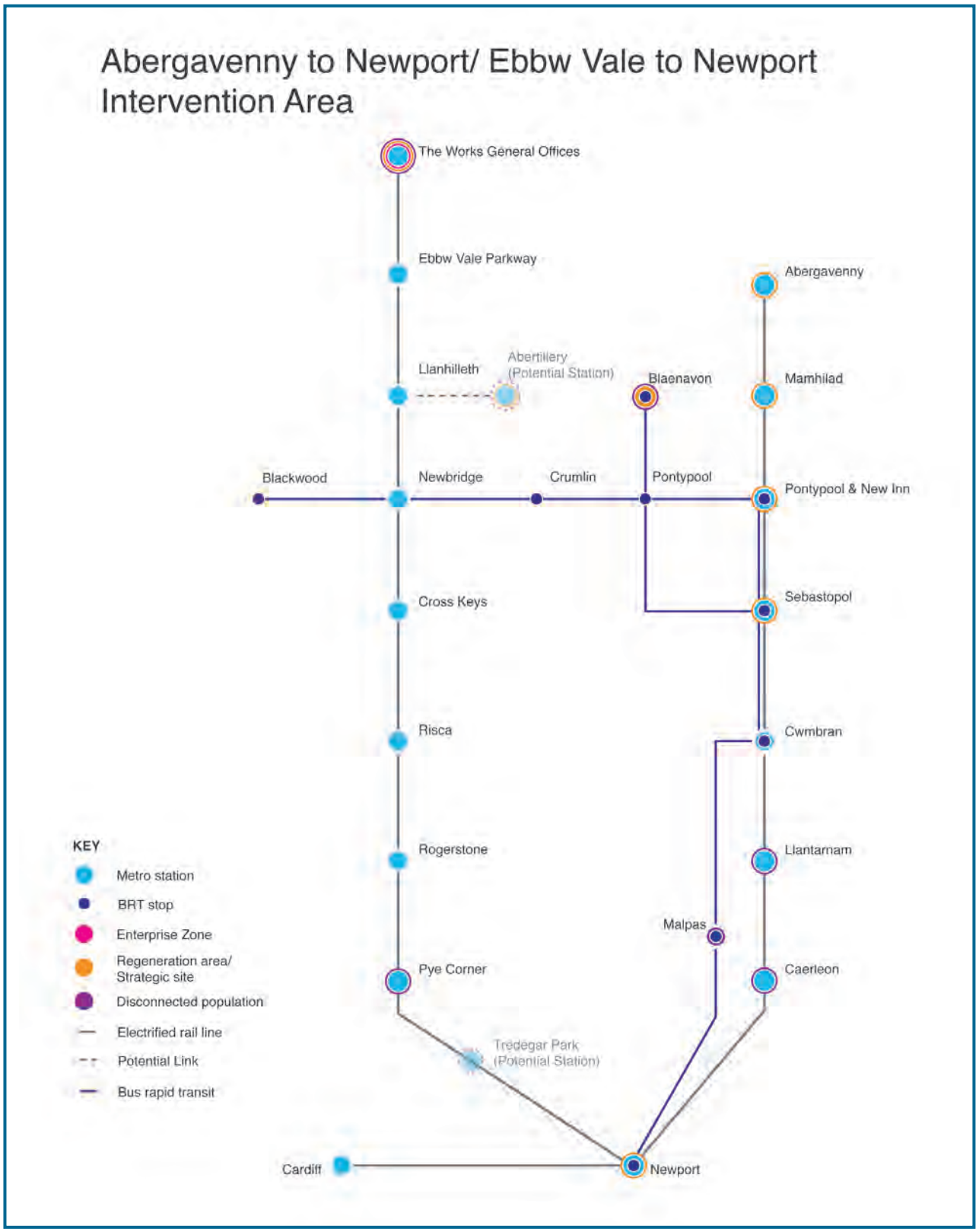


Figure 49: Newport Ebbw Vale

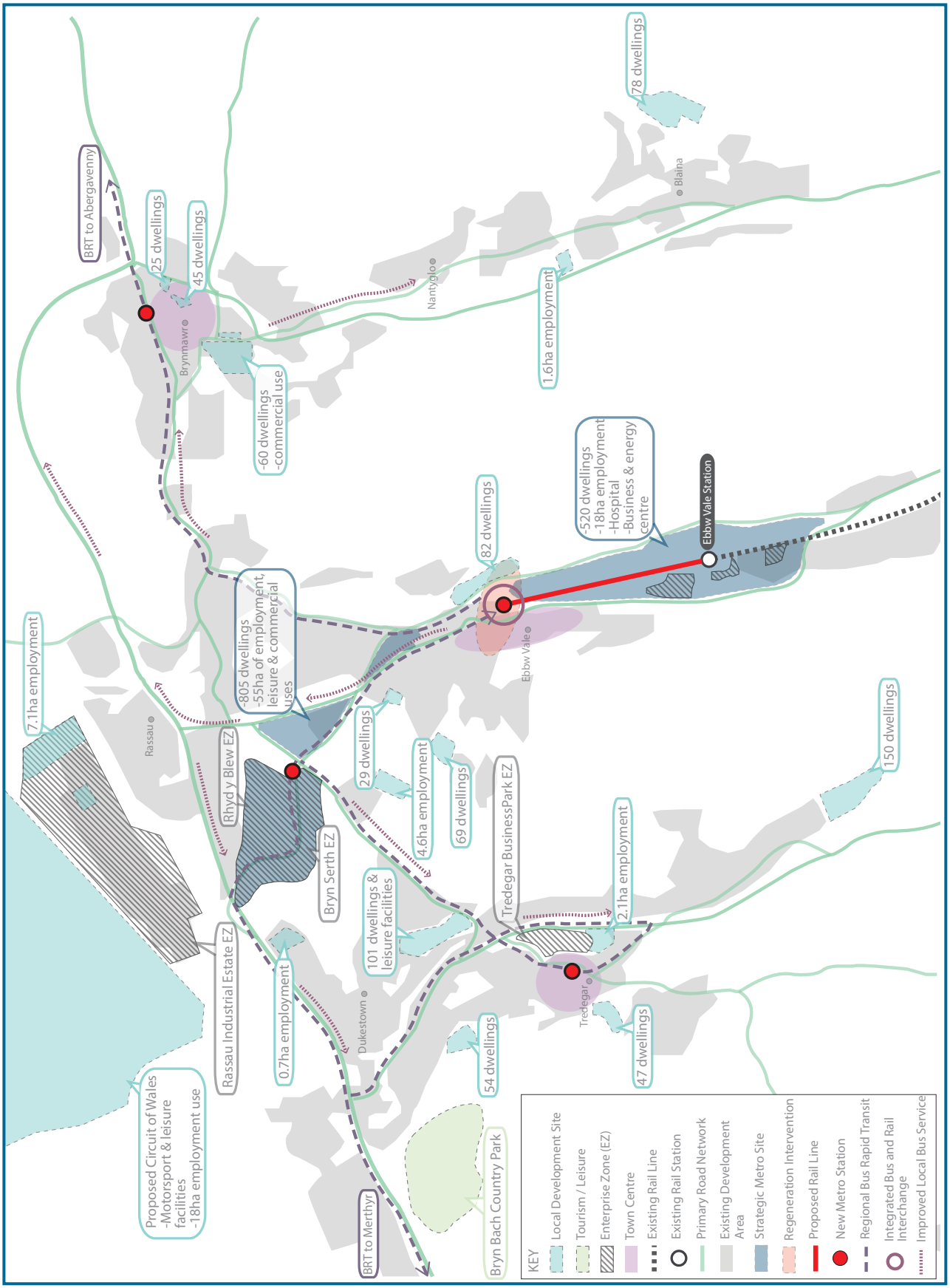


Figure 50: Regeneration Opportunities at Ebbw Vale

7.3 Cardiff NW Corridor: From Cardiff Bay to RCT via Creigiau (3)

See Figure 51

Cardiff Central to Pontyclun.

First phase, Cardiff Bay – City Centre (and include early conversion of City and Coryton lines).
Fairwater – Radyr/Taffs Well.

Strategic Sites Impacted: Cardiff EZ, Cardiff Bay, NW Expansion, Llantrisant/Talbot green, Taffs Well/Treforest.

This is the regions priority new transport corridor and to be subject to early development.

This is the most important and strategic regional project identified in this study. At an estimated cost of £400M this could, by 2030, deliver £100M annual benefit to regional economy and support the creation of 3,000 jobs. This is based on apportioning some of the Metro impact on the relevant strategic sites (Table 11 in Section 9) to this project. The wider construction impact from this project (£700M) and the contingent housing development in North West Cardiff (£900M) could add a further £1.6Bn 'one off' impact. This project could also be eligible for European funding if delivered by 2022.

Scheme Description

- A new rapid transit route from Cardiff Bay to Pontyclun/Beddau via City Centre, Fairwater, Waterhall, J33 and Creigiau.
- This is a 20Km route that, subject to further investigation, could utilise tram-train technology; the City Line would be converted with new sections to extend to NW Cardiff and into RCT and also to Cardiff Bay using the current Bute Heavy Rail.
- Key new stations will include Wales Millennium Centre (WMC), Butetown Estate in Cardiff Bay, Herbert St, Waterhall, M4 J33, Creigiau, Talbot Green and an interchange with the SW mainline at Pontylcun.
- Several route options exist for the spur to Beddau and Llantwit Fardre, a spur from the city line via Radyr would extend to the service to Taffs Well/Nantgarw by 4-tracking that section of line, it will also include conversion of the Coryton line to tram-train linked directly to Cardiff Bay.
- First phase to convert and extend the current heavy rail between Queen St and Butetown. New stations and a link to Cardiff Central & city centre could be delivered ahead of the main scheme to the NW (Figure 53) to support development in Cardiff Bay.
- Opportunity to link the Coryton & City lines to the Bay/Centre pilot and to get this 'rail' traffic of the core of the heavy rail network at Central (could require new routes and/or new Newport Rd. span - to be subject to further work); several options in previous Cardiff RT studies.
- The new stations on the City and Coryton lines will increase the overall catchment of the Metro network as well as making the Heath Hospital/Roath Park more accessible to the wider region by public transport.
- Extend Coryton Line to J32/Forest Farm new station and pedestrian link over river to new station on tram-train line at Morganstown.
- Linking City line to Bay section and negotiation of Cardiff West junction at Canton (signalling/junction resolution, flyover, or route RT through Canton or Grangetown to avoid junction constraints) to be subject to further investigation.
- Could the route be converted entirely from heavy rail and segregated (physically and/or by using signalling) to lower the specification of the entire city line route?

- Later phases can penetrate into Cardiff Bay/Porth Teigr and can link with relief line section via Tidal Sidings to Rover Way.
- Tram train infrastructure costs for new sections likely to be lower than traditional heavy rail.
- Other proposals on this corridor have been ruled out. This includes a station and P&R on the main line at Miskin/J34. There is no immediate residential catchment population, the south wales main line is already congested and the presence of a P&R here would abstract demand and revenue away from the more strategic NW corridor scheme, undermining its business case. Similarly, a station at St Fagans has been ruled out due to its low immediate residential catchment population.

Examples of Development and Regeneration Impacts

- This scheme will enable the 8000 new homes planned in NW Cardiff and allow RCT to locate further housing near Talbot Green (perhaps a further 3000~5000) along the route.
- The route will also connect major mixed use development at J33 & Talbot Green; provide a major P&R at J33 to help relieve congestion on the M4 and enable a main line interchange at Pontyclun.
- It will also make it easier to access the Central Cardiff EZ and increase its TTWA and therefore its ability to secure high quality tenants looking to attract well qualified employees from access the region. The link to Cardiff Bay addresses the issue of connectivity between the city centre and the Bay and can form an early phase of the project.
- The route to Taffs Well will be explored as part of a comprehensive Masterplan from Coryton J32 to Treforest that should explore land use (and potential for more and higher density mixed use development), major P&R and new/relocated stations.
- There is an opportunity to develop a tourism hub at Taffs Well to access the Taff Trail and explore the southern Taff Valley that includes the regional tourism attraction of Castell Coch. Cycle rental facilities could be provided in the railway station and the pedestrian and cycle links to the surrounding environment, in particular to the Taff Trail, should be improved. The latter could be further explored in the development brief recommended for the area.
- The improved economic activity levels delivered throughout the North West Corridor by the Metro will increase the expenditure that individuals are able to invest into the local economy. This will have a positive impact on the vitality of all established retail centres adjacent to railway lines (Fairwater, Radyr, Taffs Well, Llantrisant and Talbot Green) but most importantly, Pontypridd Town Centre, which will benefit from the combination of improved rail connectivity and the Bus Rapid Transit to Pontypool. This will establish Pontypridd as a key hub within the South East Wales Metro network and will increase visits to the town centre. This will help to diversify and improve the retail economy, enhance the town centre's sense of place and improve its potential to act as sub-regional employment centre.

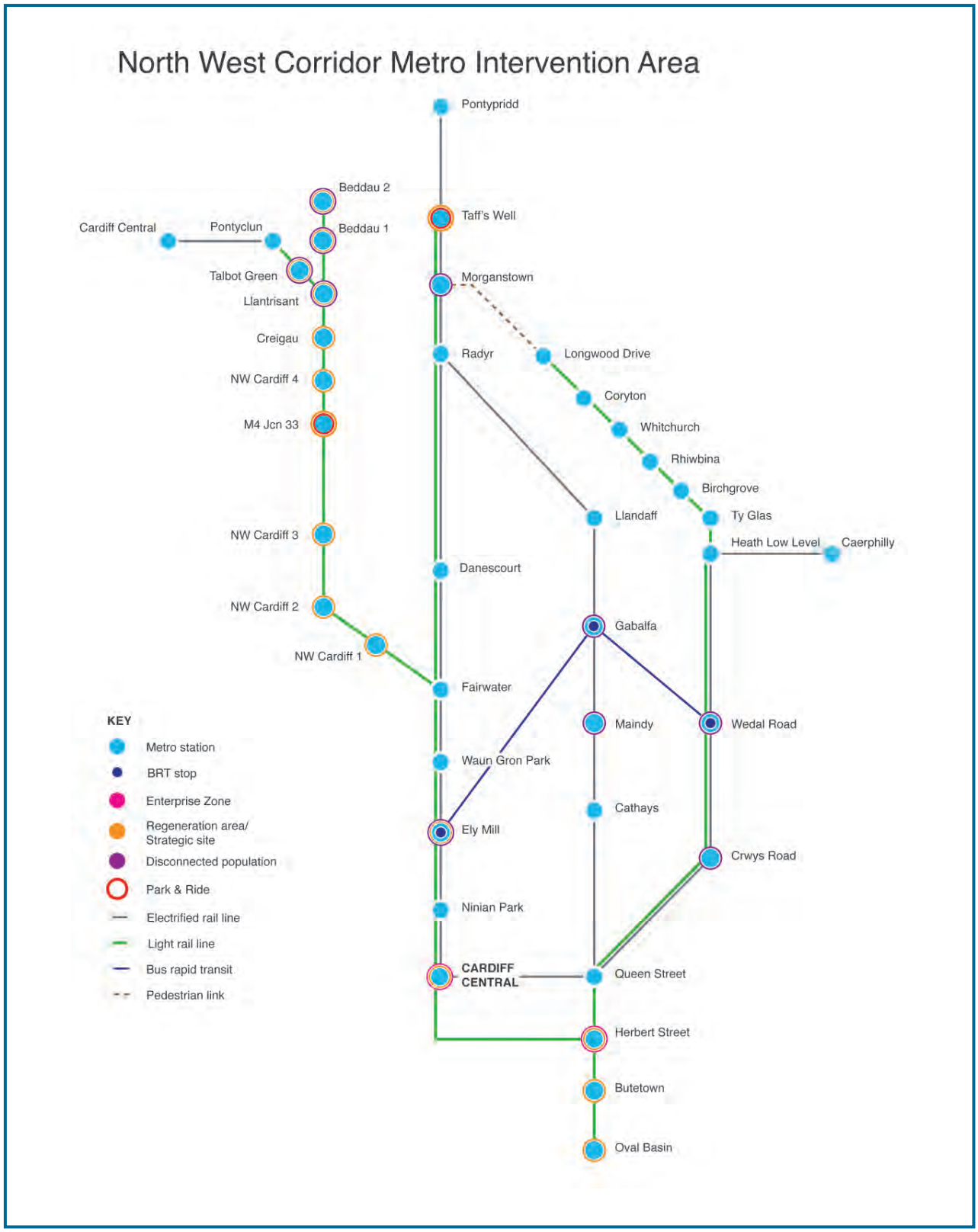


Figure 51: North West Corridor Metro Intervention

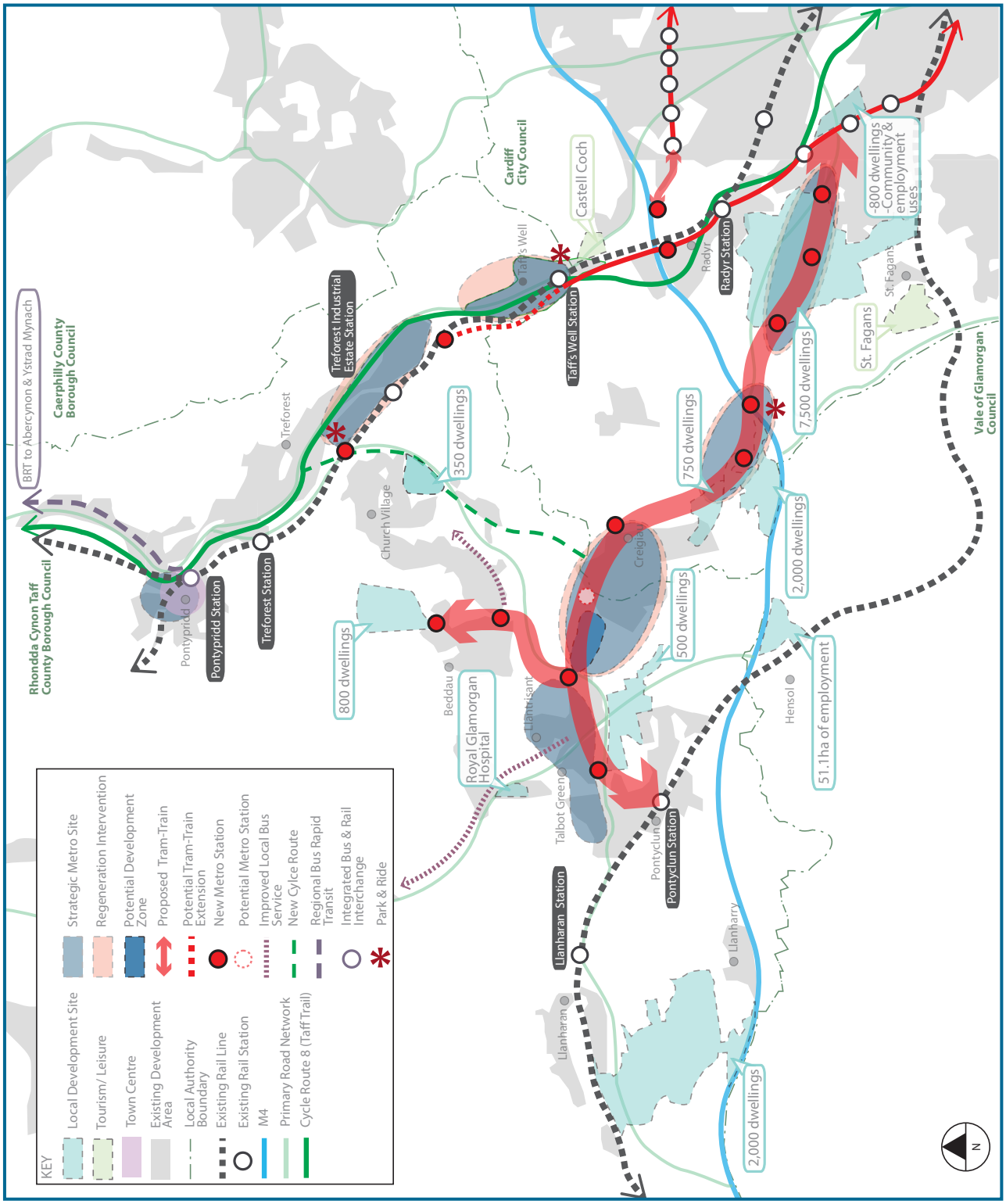


Figure 52: Spatial Map of NW Cardiff/RCT section of NW Corridor Intervention

- The Cardiff Central/Bay section of the route can be integrated within and help the implementation of, a comprehensive mixed use redevelopment of the area between the city centre and bay.
- This route, can also provide a new station to serve the middle of Butetown to aid accessibility and regeneration; stations on route can be designed to help E-W permeability (Figure 54) and support regeneration initiatives in Butetown.
- Alternate and/or additional route options along Dumballs Rd and/or Canal Park - these may require more time, capital and likely TTWA to proceed (whereas a route using current heavy rail corridor may be less costly and quicker to implement) We recommend a more detailed study.

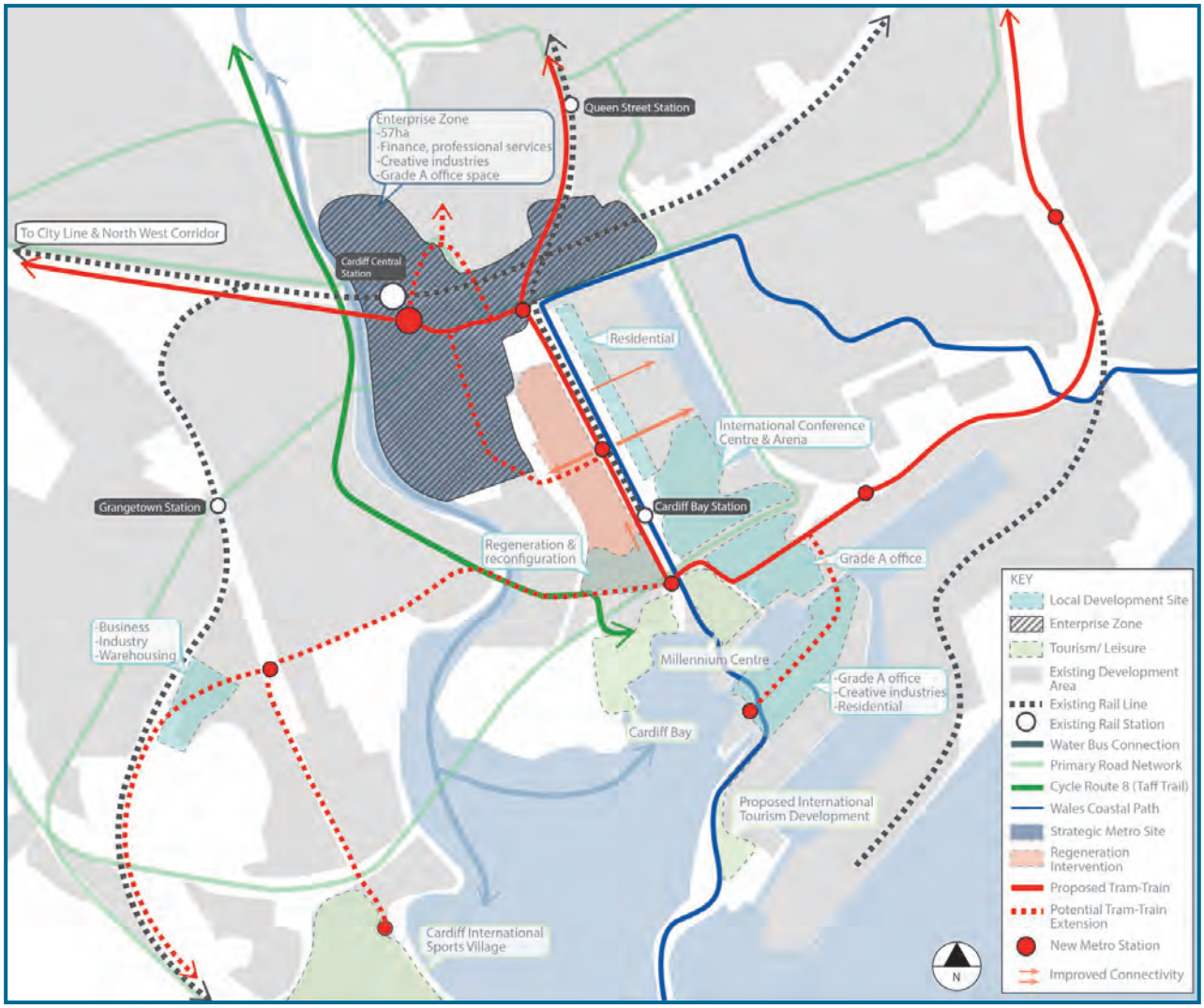


Figure 53: Spatial Map of Cardiff Bay/Central section of NW Corridor Intervention

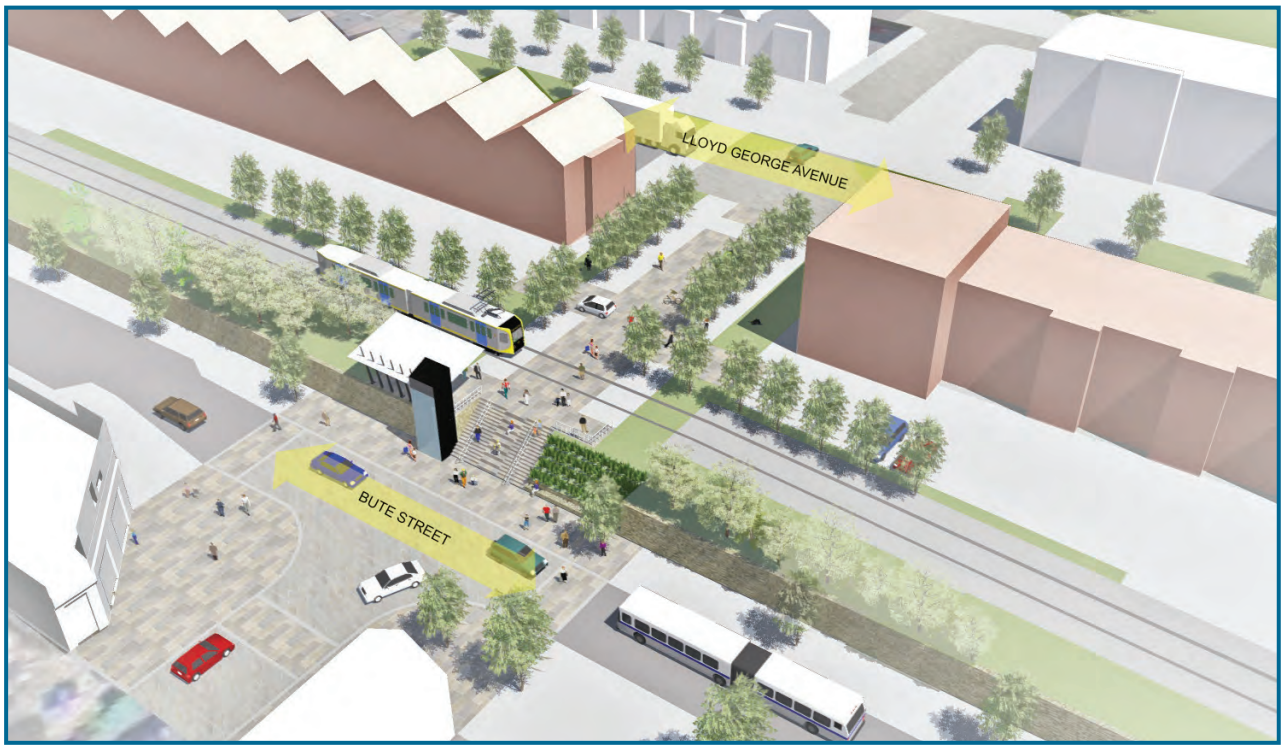


Figure 54: Illustration of tram-train stop at South Loudon Square on Bute Street

7.4 M4 Corridor: Cardiff Central via Newport to Severn Tunnel Junction (4)

See Figure 55

Strategic Sites Impacted: Cardiff Central EZ, Glan Lyn/Llanwern, Celtic Lakes/Duffryn, Cardiff Bay, Newport Pil/ Mon Bank, Newport City Centre.

This could cost a total of £250M and be delivered in full by 2025.

Scheme Description

- As identified in the M4 Capacity Enhancements Measures (M4CEM) appraisal, public transport measures are needed to reduce pressure on the main transport artery in south Wales by introducing new stations and services on the electrified relief lines between Cardiff and Severn Tunnel Junction.
- New Cardiff stations could include: Splott, Rover Way, Rumney, St Mellons, Coedkernew, Newport West, Newport East, Llanwern, Magor and Severn Tunnel Junction (STJ)
- New services along this corridor can serve significant population centres in Newport, Cardiff and Monmouthshire.
- It may be possible to utilise tram train technology and enable new routes in Newport City Centre via Pill and Mon Bank and a route to Cardiff Bay via Tidal Sidings (Splott/Tremorfa).
- In advance and to supplement the rail interventions, a BRT link that interchanges at key points on this rail corridor can provide access from low density sites on the corridor and those further from the rail stations (St Mellons, Celtic Springs, Langstone, parts of Rumney/Llanrumney) as well as a link to Newport City Centre via Pill/Mon Bank.
- Opportunities exist for new and/or expanded P&R sites.
- At the eastern end, if/when electrification is extended to Chepstow then this location and perhaps Caldicot can form part of the network.
- Rover Way could provide interchange with tram-train line (if the relief line is EMU only) and/or form a key bus interchange.
- A tram-train implementation will enable more stops than EMU.

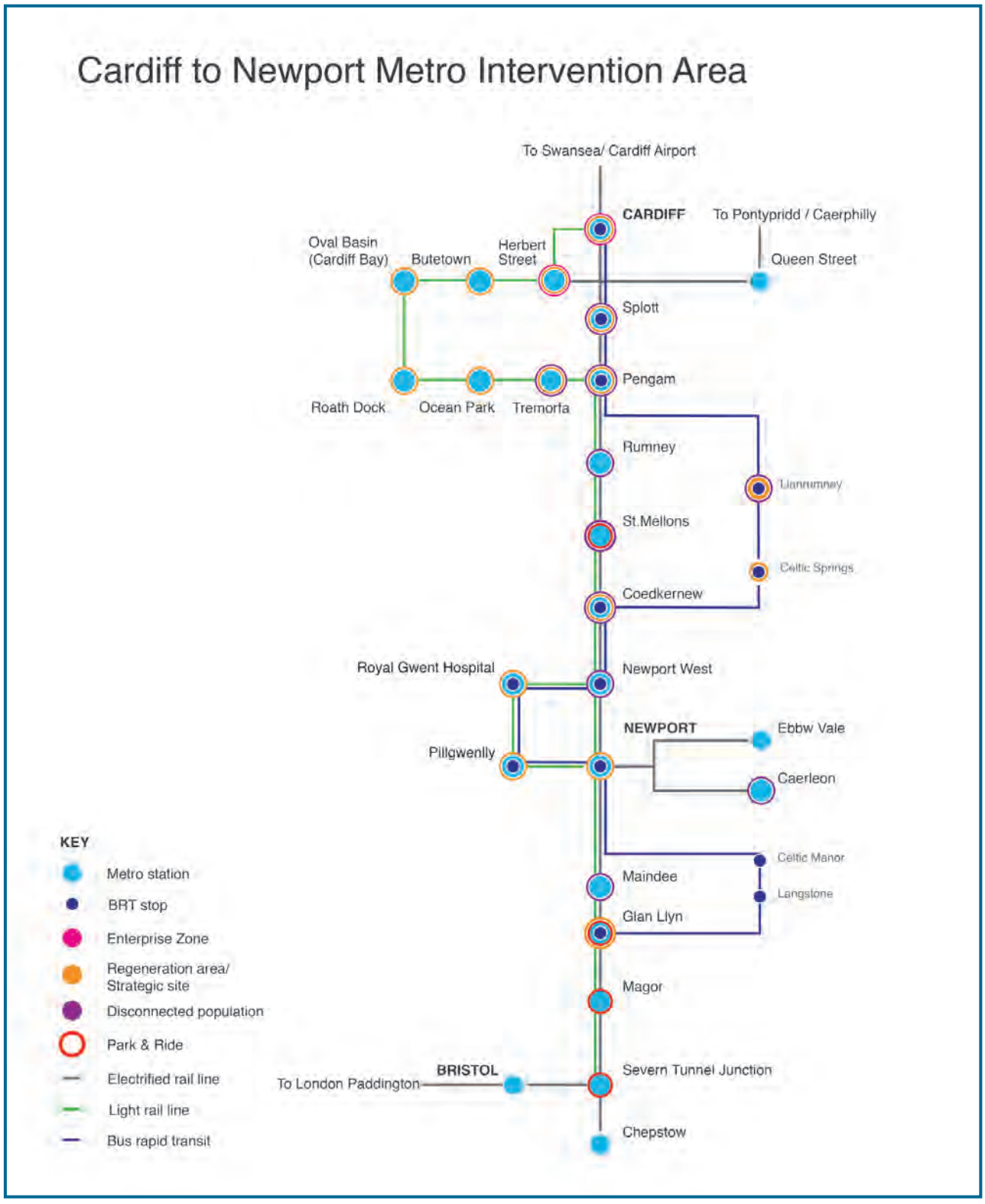


Figure 55: M4 Corridor/ Relief Line Metro Intervention

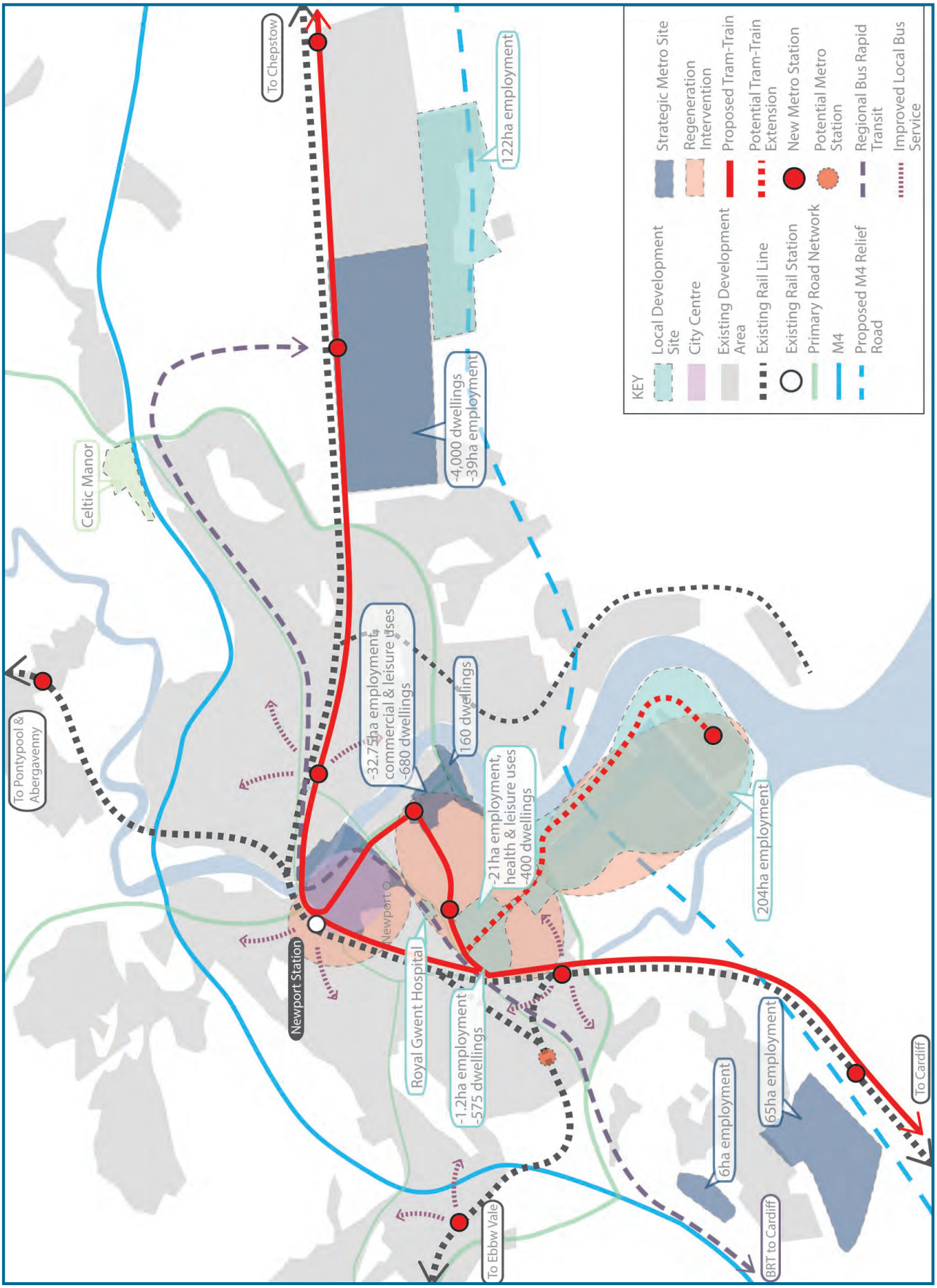


Figure 56: Spatial Map of NW Cardiff/RCT section of NW Corridor Intervention

Development and Regeneration Opportunities

- The route links several strategic sites: Cardiff Central EZ, Duffryn, Newport City Centre and Llanwern as well as locations such as St Mellons.
- Tram-train application, with link to Pill and Cardiff Bay, would connect two further strategic sites - Pill/Mon bank and Cardiff Bay.
- Provide major accessibility benefits to communities along the route via stations at Rover Way/Pengam, Rumney, St Mellons, Llanwern, Coedkernew and potentially Magor, Newport East and Newport West.
- Stations at Rover Way & Newport West could provide easier access to existing retail parks.
- The route via Mon Bank & Pill in Newport could have a significant positive impact on development potential south of Newport City centre and to the north of the docks.
- The Royal Gwent Hospital site could be far easier to reach from across the region.
- M4 Relief Road, junctions design/route could enable major P&R expansion (eg STJ)
- Further extensions (beyond those described for the relief line tram train) open up longer term development opportunities along the river bank south from the centre.
- The local and regional Metro interventions will increase the connectivity of the University of South Wales, Newport's city centre campus to the wider Capital City region. This will encourage more young people to study in Newport, enabling the University to further invest in the city centre, increase the number of skilled and educated young people entering the local labour market and attract investment that delivers higher value industries to the centre.

7.5 Other Rapid Transit in Cardiff (5)

See Figure 57

Strategic Sites Impacted: North West Expansion, Cardiff Bay, Cardiff EZ, NE Expansion. Could be mix of Tram-train and BRT; Multiple interchange opportunities with heavy rail & bus. Likely to be longer term measures as Tram-train, some routes could be BRT in shorter timescale.

Scheme Description

- Route to Rumney:
  - Could extend tram-train from Rover Way over heavy rail to NE Cardiff via Rumney Hill, St Mellons and on to Cardiff Gate or St Mellons, multiple route options.
- Spur to Pontprennau from Rhymney Line:
  - could spur off the Rhymney line east into Pontprennau and Cardiff Gate.
  - relationship with route to Rumney needs to be explored & clarified.
- Spur to Ely/Culverhouse:
  - Could spur off the city line to provide a direct route to Ely and Culverhouse Cross.
- Convert /Extend Penarth Branch to Tram-train:
  - Take Penarth branch off VoG Heavy rail (free up capacity on that route) and divert via Avondale Rd/Clarence Bridge to link with Bay/Central Phase 1.
  - Links into Sports Village (divert Penarth service nr Gas works site (Cardiff LDP strategic development) and into Sports Village?
  - Extend as tram-train further south in Penarth.
- City Centre Tram-train on street to by pass of core of network between Central & Queen St:
  - Investment in some on street running for tram train to avoid Central/Queen St rail corridor could free up more capacity for longer distance VLE services.
  - Solution to Cardiff West junction constraints for NW Corridor Interventions may require on street solution.
  - Needs to be subject of further study; likely to be a longer term measure.

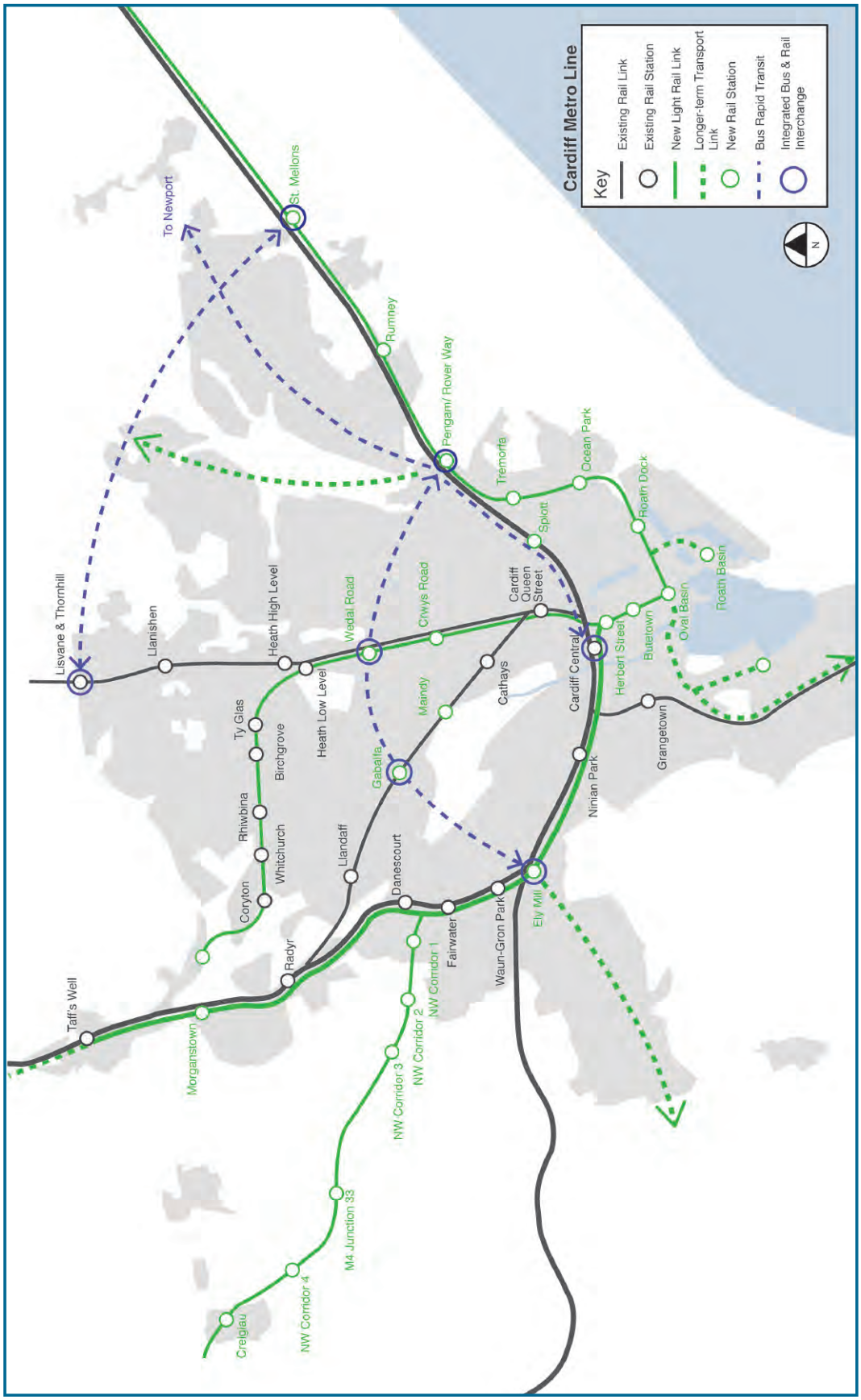


Figure 57: Cardiff Metro Rapid Transit Options

7.6 Rapid Transit in Newport (6)

See Figure 58

Strategic Sites Impacted: Newport City Centre, Pill/South Newport, Glan Llyn, Duffryn.
BRT and/or Tram-train and interrelated with M4 Corridor/Relief Line Intervention (Section 7.4).

Scheme Description

- New stations on the existing lines and improved/ integrated local bus services will enhance connectivity in Newport as the vast majority of Newport's urban area are within 5km of Newport Station; (Cf Cardiff where peripheral urban areas are 5~8km from the city centre).
- BRT option could link to existing/new rail stations to business parks at Celtic Springs/Imperial Park in the west and Llanwern, Langstone/Celtic Manor/Spytty in the east.
- Use of old alignment from Mon bank via Pill to the city centre could be considered for BRT and/or Tram-train.
- This could potentially connect to the re-opened line to Machen and Caerphilly - most likely in Tram-train mode (and a longer term aspiration).
- Rapid Transit development in Newport to be integrated with developments on the relief lines/M4 Corridor (Section 7.4).

Development and Regeneration Opportunities

- One of the key inhibitors to the city's growth is its limited connectivity to the rail network - despite its vast rail network the city is only served by Newport station.
- The Metro aligned with a local integrated bus network, will provide the city with the connectivity required to attract investment, which will facilitate regeneration and economic growth, and integrate the city centre into the Capital City Region as a central economic centre.

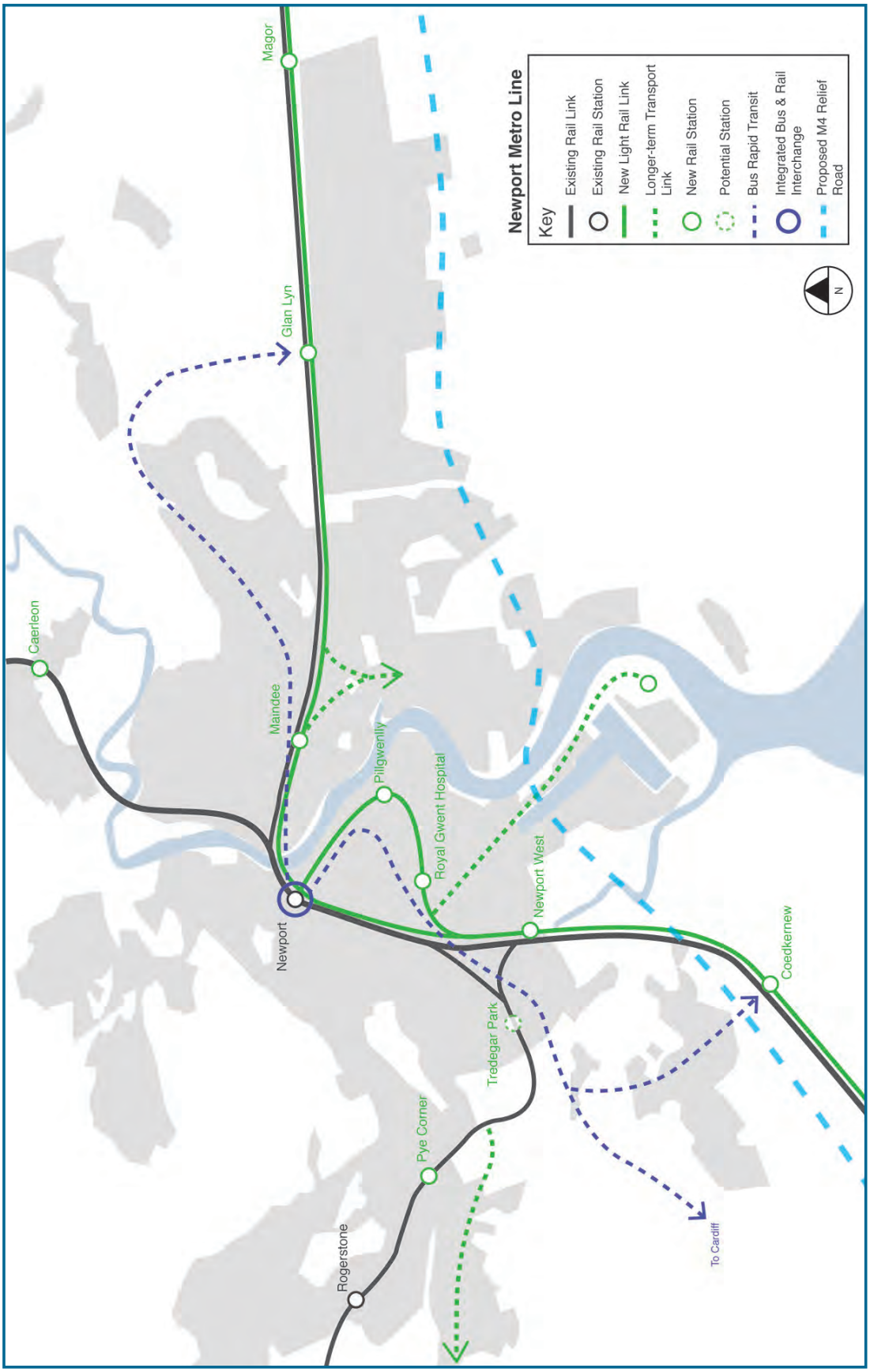


Figure 58: Newport Metro Rapid Transit Options

7.7 Newport-Pontypool-Abergavenny Corridor (7)

See Figure 59

Strategic Sites Impacted: Newport City Centre, Sebastopol, Mamhilad.

Scheme Description

- Longer Term electrification.
- Possible earlier frequency enhancement.
- Caerleon - early win station.
- New stations aligned to development (e.g. Sebastopol, Mamhilad, Llantarnam).
- The park and ride at Pontypool and New Inn station will provide rural communities in Monmouthshire with a hub from which they can access the regional rail network.
- Interchange with Cross Valley BRT at Pontypool/New Inn and/or Cwmbran.

Development and Regeneration Opportunities

- The improved connectivity delivered through electrification and enhancements to capacity will have a positive impact on the on-going development of the strategic sites identified in the commercial analysis. Both the Sebastopol and Mamhilad development sites are located adjacent to the Abergavenny railway line and the provision of new stops adjacent to both sites will connect them directly to both Newport and Cardiff[68]. This will further increase the viability of delivering the sites and help to provide 2,900 dwellings and community and education facilities.
- The Metro (via the Pontypool to Pontypridd and Blaenavon to Newport BRT routes) will have a particularly significant impact on the vitality of Pontypool town centre. The BRT will increase visitor numbers to the town centre and increase the likelihood of investment, which will help to prevent further decline and begin to improve the centre's sense of place.
- Both the rail and BRT interventions will help deliver Torfaen's tourism strategy which is based on its connectivity to natural tourism opportunities in Monmouthshire, the Brecon Beacons National Park and the Blaenavon World Heritage Site.
- National cycle routes 49 and 492 provide accessibility to adjacent natural and heritage attractions. This is a distinctive element of the local tourism offer and is one that the Metro can complement through improving the interface between the rail network and the cycle routes. The provision of bike rental facilities at Cwmbran and Pontypool and New Inn Stations, for example, could establish the stations as hubs within a cycle network from which visitors can cycle or walk south to Newport or north to Blaenavon, the Brecon Beacons and Abergavenny. This will help to increase the strength of the local tourism offer and diversify the local economy.

68 The provision of new stations will need to be considered following the development of both sites. Alternative access to both sites could be delivered through the improved local bus services operating from Cwmbran and Pontypool.

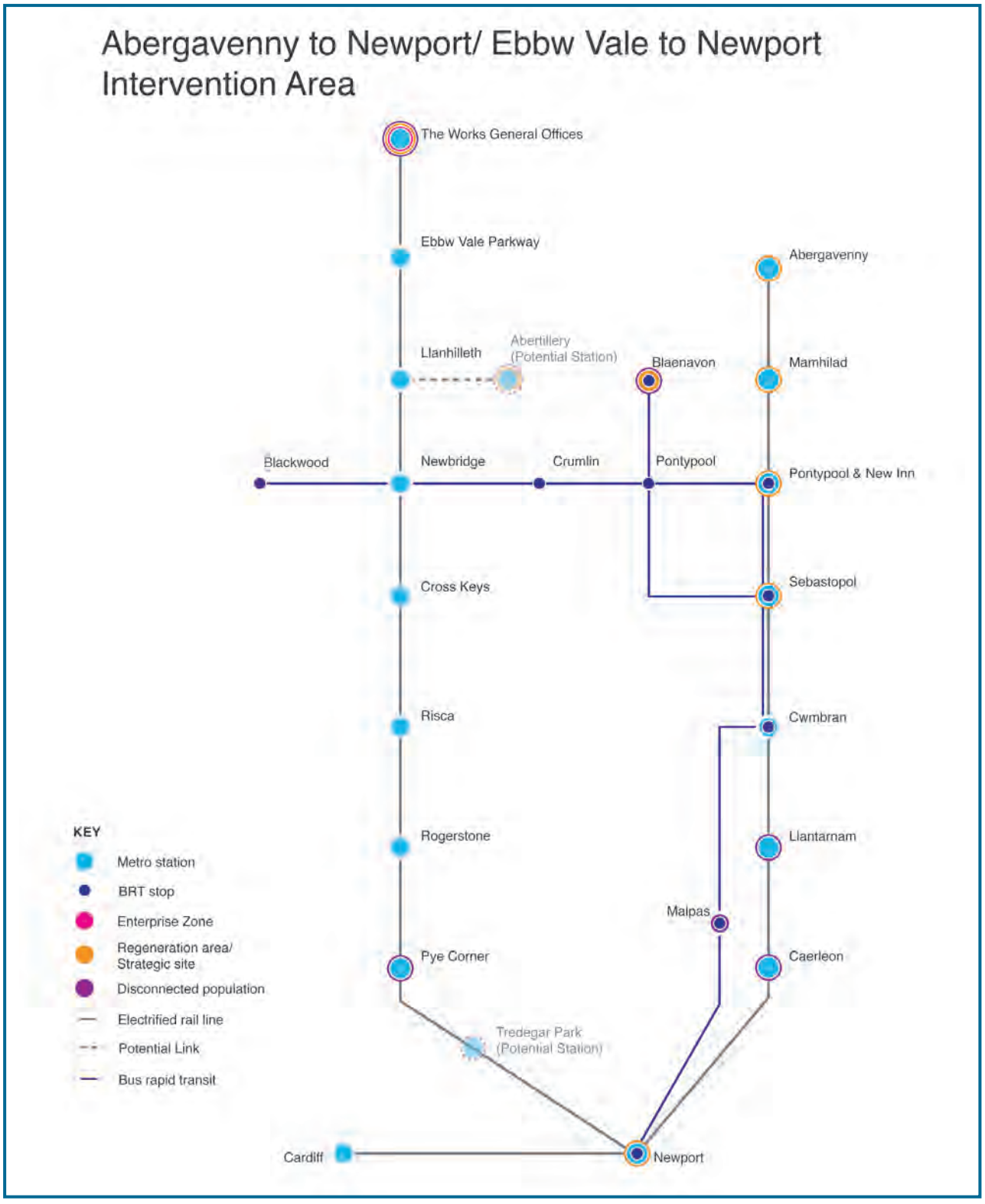


Figure 59: Newport Ebbw Vale Abergavenny

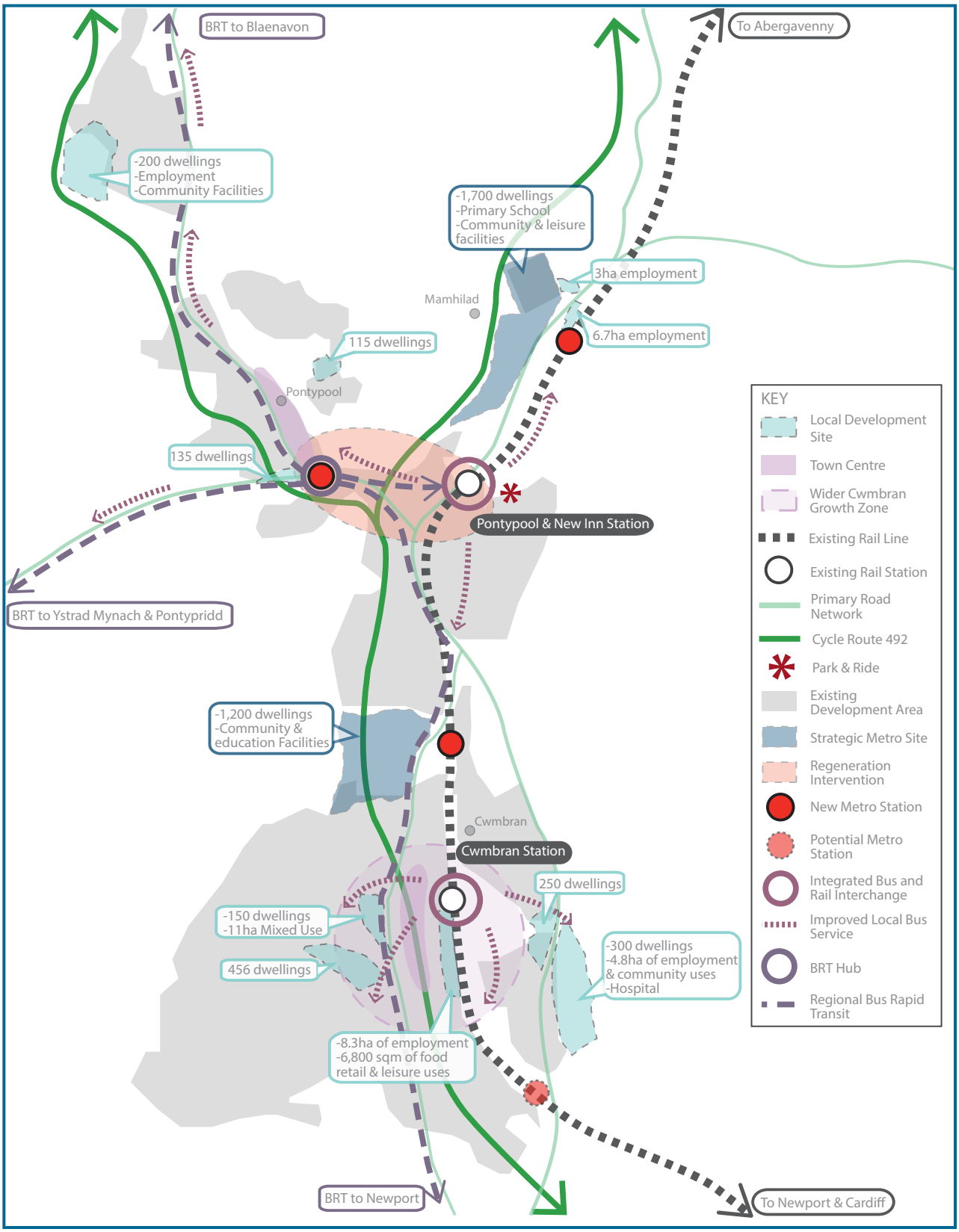


Figure 60: Regeneration Opportunities - Newport to Pontypool

7.8 Regional BRT (8)

See Figure 61

Strategic Sites Impacts: Pontypridd Town Centre, Ystrad Mynach/Nelson, The Works (Ebbw Vale).

Priority BRT Scheme: Cross Valley BRT from Pontypridd to Pontypool.

Scheme Description

- High quality partially segregated bus corridor –with key stops/interchanges to include: Pontypridd, Abercynon, Nelson, Ystrad Mynach, Blackwood/Pontllanfraith, Newbridge/Crumlin, Pontypool, (Cwmbran).
- Negates the early need for 'valleys circle' concept which has engineering/cost implications.
- Interchange with existing north-south rail services at Abercynon, Pontypridd, Ystrad Mynach, Newbridge.
- Development and enhancement at key rail/BRT interchanges.
- Consider inclusion of this corridor in next "rail" franchise as integrated BRT route.

Development and Regeneration Opportunities

- The BRT across the mid valleys will complement Pontypridd's location on the periphery of the North West Corridor and establish the town as a key hub within the regional network. This will help the town to become a significant employment, leisure and retail centre.
- BRT will establish the mid Caerphillys Valleys (Nelson, Ystrad Mynach and Newbridge) as a key transport corridor. This will encourage continued investment, which will help the corridor to become a strong sub-regional hub.
- The improved connectivity delivered through electrification and enhancements to capacity will have a positive impact on the on-going development of Ystrad Mynach. Although the town is a key health, education and administrative hub, commercial analysis suggests that the town and wider corridor is located on the periphery of the South East Wales private sector investment zone. The improved rail connectivity and the Pontypridd-Pontypool BRT, will help to secure the position of Ystrad Mynach and the wider corridor within the primary investment zone, and ensure that sites such as Dyffryn Business Park (where 10.3ha of employment space is allocated) or Penallta Colliery (where 690 dwellings are allocated) receive the investment necessary to create local employment opportunities and improve the provision and quality of local housing.

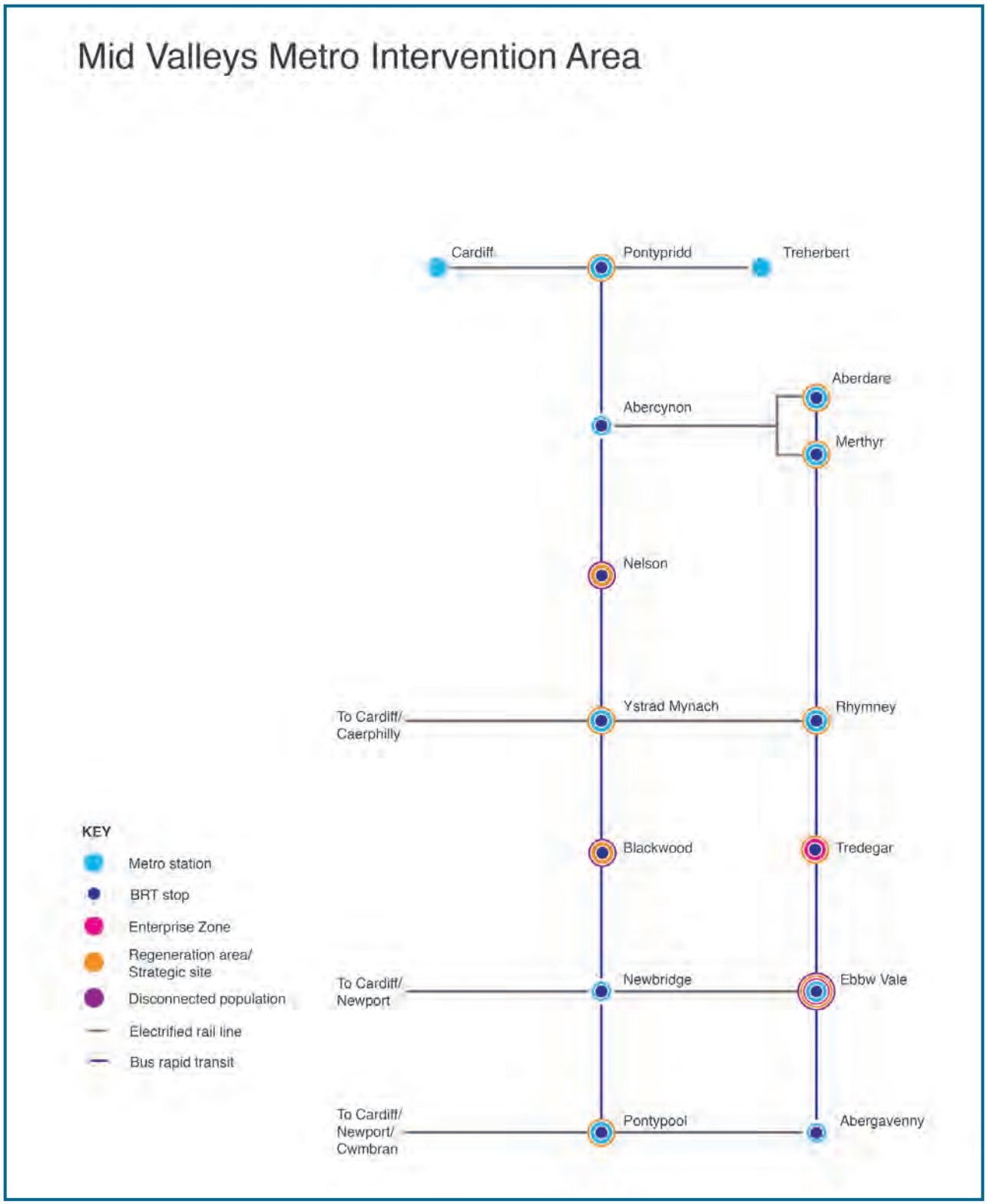


Figure 61: Cross Valley BRT

Development and Regeneration Opportunities

- The BRT across the mid valleys will complement Pontypridd's location on the periphery of the North West Corridor and establish the town as a key hub within the regional network. This will help the town to become a significant employment, leisure and retail centre.
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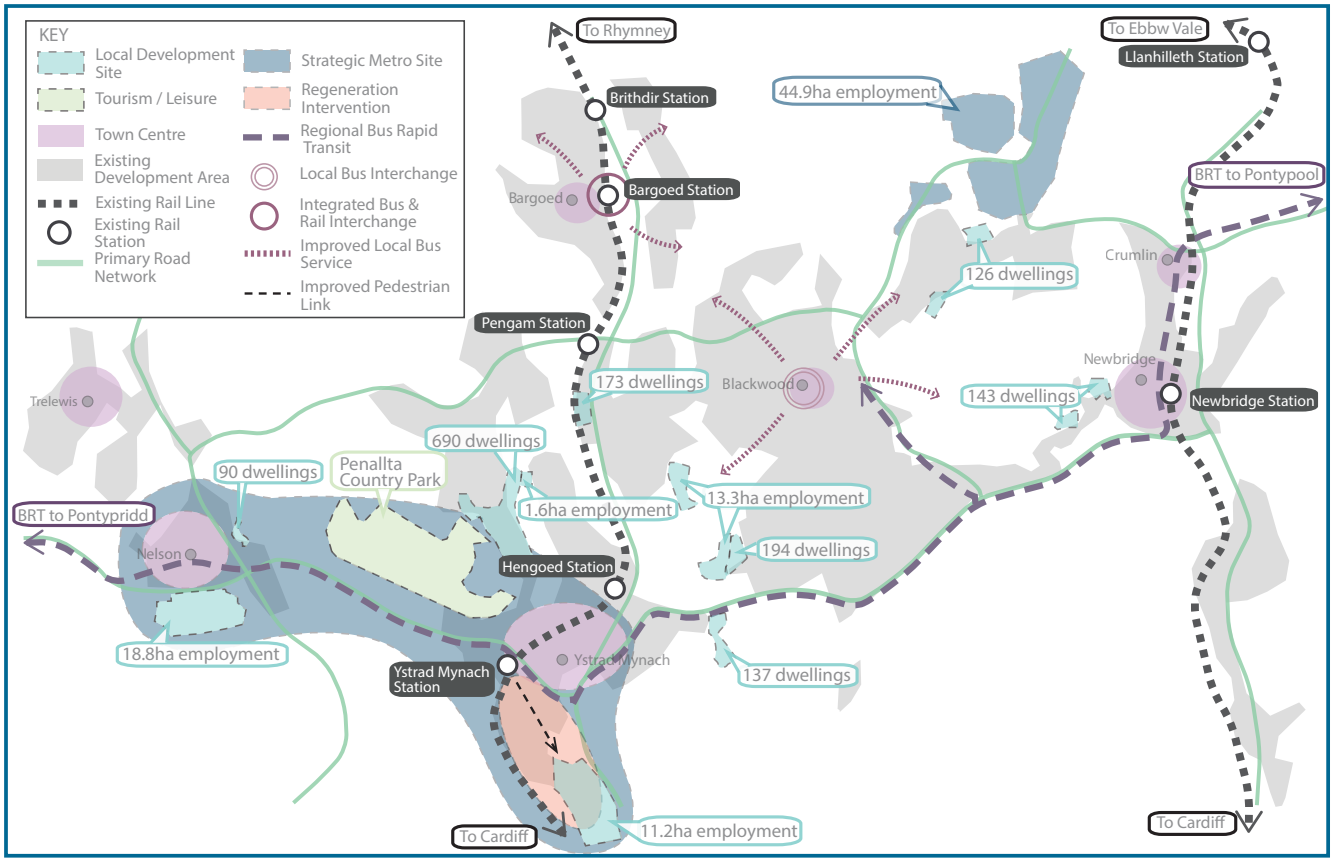


Figure 62: Regeneration Opportunities at Ystrad Mynach

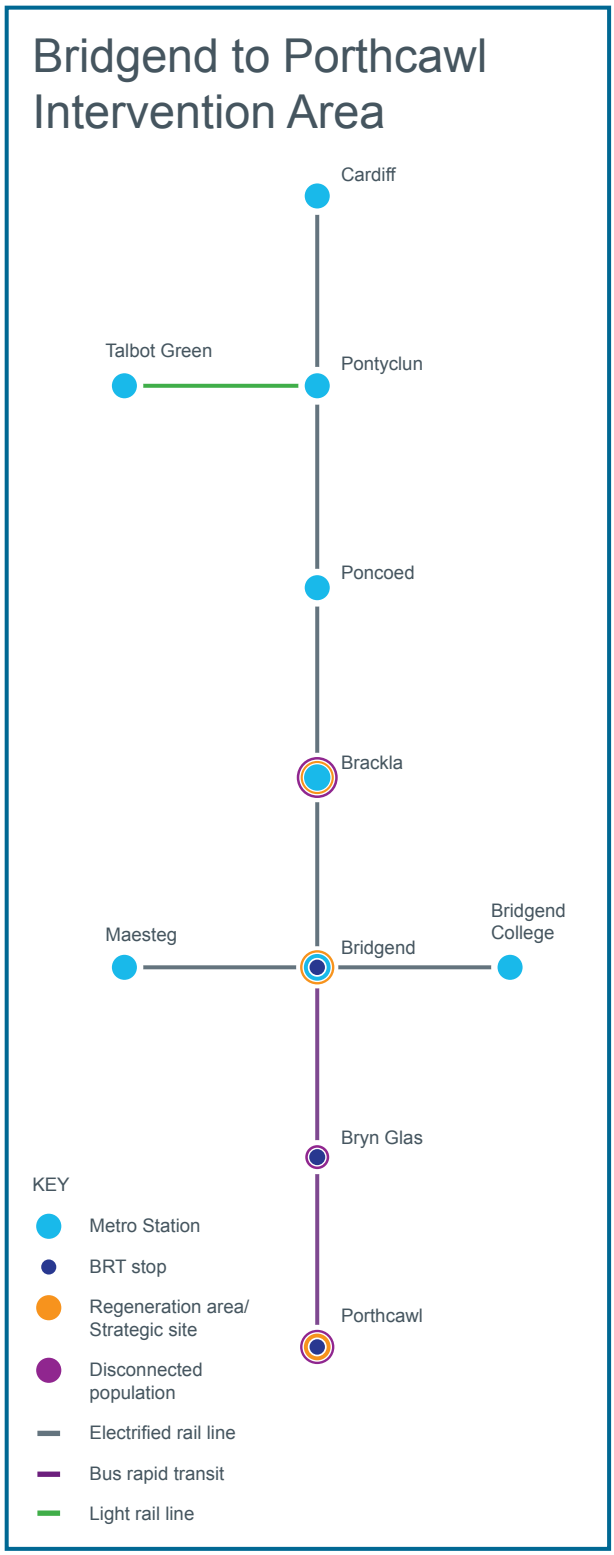


Figure 63: Bridgend - Porthcawl BRT

Other BRT Options across the region include:

- Across the Heads to the Valleys from Aberdare to Ebbw Vale.
- Blaenavon – Pontypool –Cwmbran – Newport.
- Porthcawl – Bridgend (Figure 63).

7.9 Cardiff Airport (9)

Strategic Sites Impacts: St Athan/Airport EZ/Cardiff EZ.

Priority BRT Scheme: Cross Valley BRT from Pontypridd to Pontypool.

- Cardiff airport is a pivotal regional asset whose performance can be enhanced by increasing its catchment area by public transport.
- From a Metro perspective this will require a new or upgraded airport station - either on the current VoG line or at the current airport site via a new spur.
- New services from across the region and from out of the region will be able to access the airport either directly or via a change at Cardiff central.
- A major P&R can be located at a new airport station.

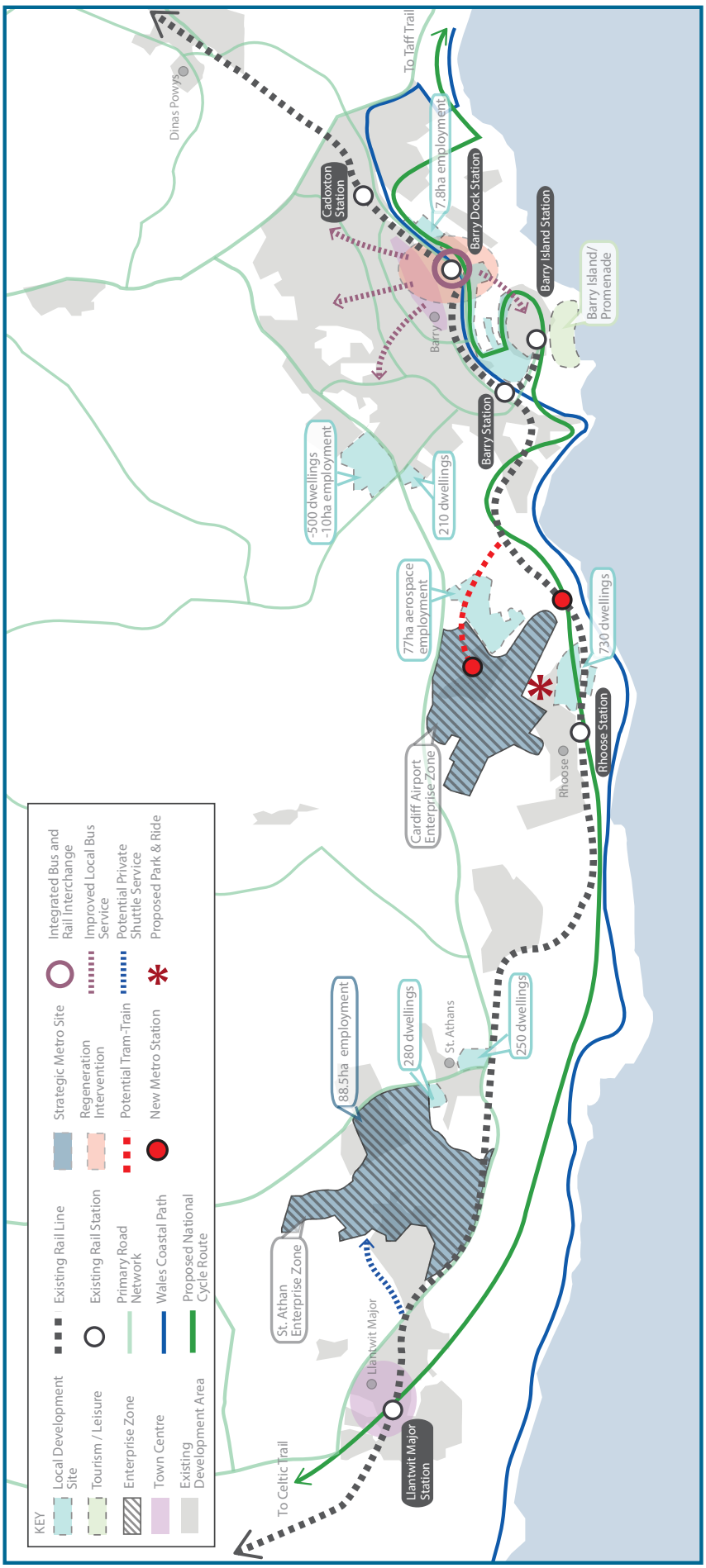


Figure 64: Cardiff Airport and the Vale of Glamorgan

7.10 Nelson – Newport (10)

- Likely to be a long term project, but could provide alternate route to Newport for large section of mid valleys.
- Makes the conversion of the freight line to Nelson easier to deliver from a network capacity perspective.
- Major land use change required – greater housing density on corridor, especially between Newport and Caerphilly, can help make the case.
- Could be delivered more cost effectively as tram-train
- Could link to Mon bank/Pill route (subject to feasibility) into Newport via Cardiff Rd.

7.11 Metro: Network Wide Measures

Whilst not within the scope of this study there are other issues that will need to be addressed as the Metro is developed and implemented:

- Multi modal integration
- Single Ticketing across modes
- Customer information
- Branding and Marketing
- Bus operations & regulatory environment

7.12 Metro: Early/Quick Wins

To make rapid progress, a number of early Metro projects have been identified that can be delivered at the same as, or before, the completion of VLE in 2020. These are:

- Within the scope of the current proposed programme to 2015:
  - Enhancements under the National Stations Improvement Programme (NSIP) - at Bargoed, Merthyr Tydfil, Porth, Rhymney, Treherbert, Treforest Industrial Estate and Ystrad Mynach.
  - Enhancements - to the Ebbw Vale line to enable new stations at Ebbw Vale Town & Pye Corner and an additional hourly service from Ebbw Vale Town to Newport and a passing loop on the Maesteg line to allow 2tph.
- From Metro Intervention(1), Enhance Core VLE Network:
  - New stations on the existing network at Roath Park/Wedal Rd, Crwys Rd, Gabalfa, Maindy, Ely Mill/Victoria Park, St Mellons, Llanwern and Cardiff Airport (May require infrastructure enhancements to deliver some of these – capacity/signalling).
  - Park and Ride (P&R) at Bargoed, Treforest, Pontypool & New Inn, Pencoed, Chepstow, Taffs Well, Porth, Pyle, Llanbradach, Severn Tunnel Junction, Pontyclun, Pentrebach and Abergavenny.
  - Bus/rail integration improvements at Barry Docks, Cardiff Central, Merthyr, Porth, Pontypridd, Newport, Bridgend, Pontyclun, Abercynon, Pengam, Pontypool, Taffs Well, Chepstow and Abergavenny.
- Tram-train pilot (as first phase of NW Corridor) between Cardiff Bay & City Centre with the conversion and extension of the current Queen St - Bay rail link. A new spur to Central station and penetration further into Cardiff bay are recommended; this pilot should include consideration of the early conversion of City and/or Coryton lines to 'tram-train' operation.
- Cross Valley BRT from Pontypridd to Pontypool. The potential to include this service within the scope of the next 'rail/Metro' franchise from 2018 should be explored.

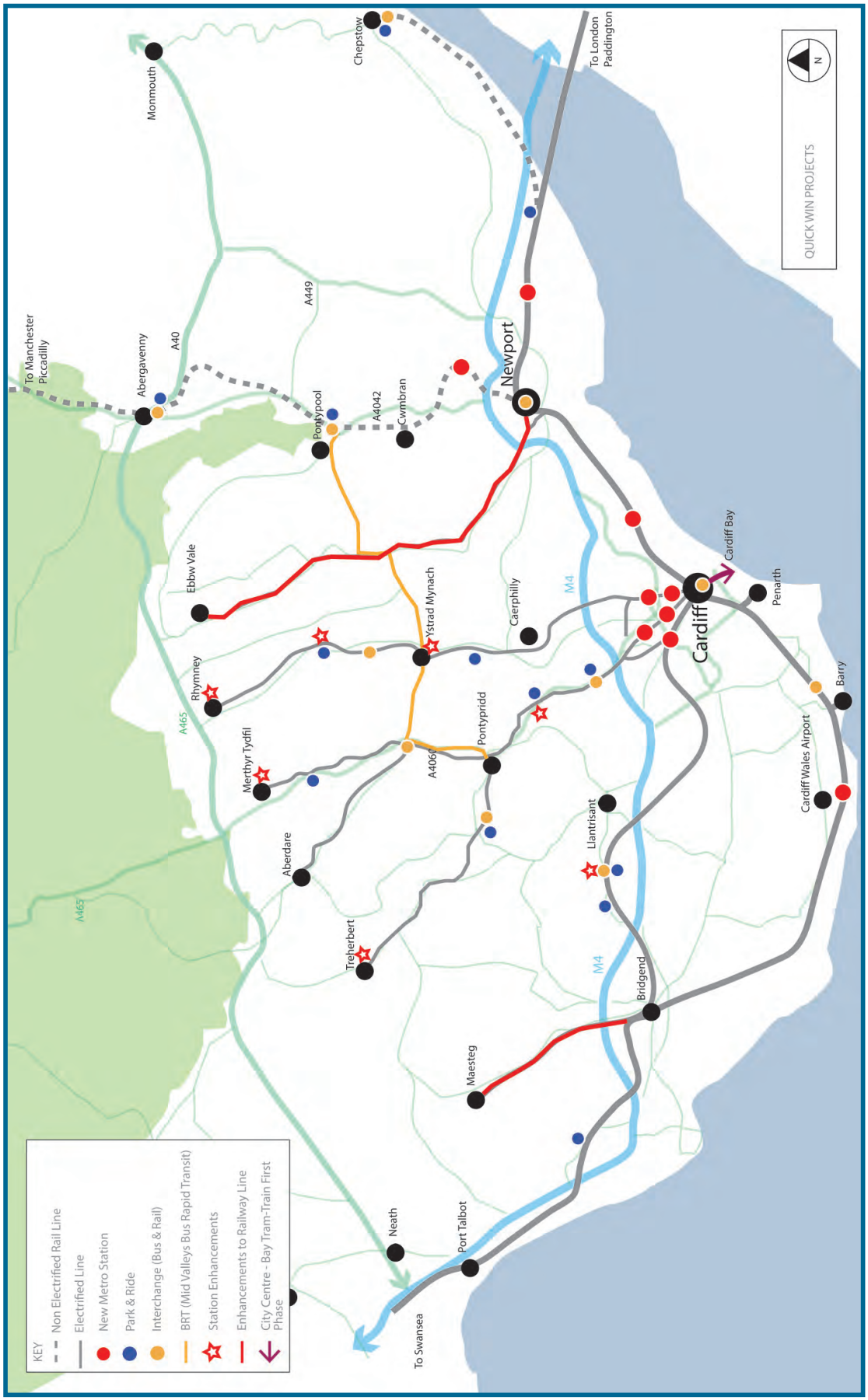


Figure 65: Metro Quick Wins

8 Metro Regeneration And Development Opportunities

This section prepared in part by Powell Dobson Urbanists

In sections 7 and 9 the full scope of Metro interventions and the overall potential economic impact are presented. In this section some of the wider regeneration benefits are explored (Full details can be found in sub report, Metro Regeneration).

8.1 Regeneration: Making Places More Resilient to Change

Regeneration activity in South East Wales has focused on addressing problems caused by structural economic change and the societal and environmental consequences of this shift.

In the most successful projects, regeneration has addressed these legacy issues, whilst simultaneously equipping a place to operate effectively in a new context. The regeneration of Cardiff Bay is a prime example of this kind of transformation.

The proposed Metro system is a strategic opportunity to address weaknesses in the Capital City Region whilst equipping it with the infrastructure that it needs to become a successful twenty-first century city-region. The regeneration objective of the Metro is to make the Capital City Region a more successful and liveable city.

The Metro is a unique project because it has the potential to enable the region to become:

- More economically prosperous.
- Less reliant on fossil fuels.
- More socially equitable.
- Better connected and convenient.
- A high profile tourism destination.
- A recognisable place to invest.
- Synonymous as a place with a high standard of living.

Metro can make a substantial contribution to the future wellbeing of the Capital City Region so that the most populated part of Wales is recognised as one of the most liveable and varied conurbations in the world.

The following sections describe the impact of the Metro on regeneration and liveability by explaining the potential of the Metro via the following key themes:

- Contributing to existing regeneration priorities.
- Supporting 21st century business practices.
- Impact of increased mobility on young people.
- Redistribution of regional population patterns.
- Placemaking and town centre vitality.
- Housing supply and design.
- Tourism and image.
- Welsh Government vision for a sustainable Wales.
- Connectivity to employment (and consequent links to public health).

8.2 Welsh Government Regeneration Policy

Vibrant and Viable Places (2013) sets out a new national regeneration framework that seeks to establish a more integrated way of reversing economic, social and physical decline throughout Wales. An improved transport network is identified as *"…a key building block"* of the new approach, since its *"availability and accessibility influence where people live & work, their leisure options, and their opportunities to interact with friends family and the wider community"*[69].

The Metro will increase connectivity throughout South East Wales and provide the infrastructure that is required to facilitate the investment necessary to enable the Capital City Region and its communities to develop, transform and regenerate. It therefore has an integral role to perform in delivering wider national regeneration aspirations.

8.3 Connectivity to Employment

The Metro will improve the frequency, image and geographic reach of the public transport network and increase the ease with which people from throughout the region can access employment opportunities.

Removing Barriers to Employment

Improving public transport will remove one of the key barriers to employment: poor accessibility. By improving connectivity to places that currently receive limited rail services, the Metro will broaden the range of jobs that people can access and have a positive impact on economic activity levels in those settlements currently disconnected from the region's public transport network[70].

For example, Merthyr Tydfil and Ebbw Vale currently receive half-hourly and hourly train services. However, following the implementation of the proposed Metro interventions both settlements could benefit from three and perhaps in the longer term, four train services per hour. Metro will significantly improve the ease with which the average person living in each settlement can access economic opportunities further afield.

The Metro will meet the demand for improved access to economic opportunities by public transport, which the reopening of the Ebbw Vale line in 2008 clearly demonstrates exists throughout the Capital City Region[71].

The Metro will also help to create a network of sustainable and prosperous communities throughout the Capital City Region through unlocking local development opportunities that enable key settlements to become vibrant sub-regional employment hubs. For instance, the Metro will increase the viability of redeveloping development sites like Pentrebach and The Works, and help to provide local employment opportunities that are immediately accessible to local people.

69 Vibrant and Viable Places, 2013, p. 27

70 Research undertaken by Welsh Government into the potential impact of electrifying the Valleys Line Network suggests that subject to affordability electrification could allow residents to access more employment opportunities in the wider network. Will the VLE Strategy Reduce the Barriers to Employment for the Economically Inactive Living in the Poorest Parts of the Valleys? Welsh Government Social Research, 2013, pp.51-52

71 In 2011 676,000 passengers used the Ebbw Vale line service. This exceeded estimated passenger usage by 69%. ATW SETA Update (March 2012)

In this respect the Metro will build upon the work of the region's Communities First Clusters which collaborate with the most disadvantaged and deprived communities, and help to deliver the *Tackling Poverty Action Plan* (2012), which states that, the *"best route out of poverty is through employment"*[72].

To ensure the local labour market is equipped to take advantage of the opportunities that the Metro will help to deliver it will be necessary to engage with all regeneration bodies to identify how the Metro can respond to bespoke regeneration opportunities. Further work around skills and education is necessary to ensure that the pathways to employment exist as well as the transport connections to economic activity.

8.4 Twenty First Century Business Practice

Just as the Metro will increase the ease with which people can access employment opportunities it will help emerging entrepreneurs and small and medium sized businesses by providing the connectivity that will facilitate agglomerative economic activity and make it easier to develop and nurture business relationships across the region.

Connectivity and Innovation

The latter will be particularly helpful to 'start up' businesses and will respond directly to the increasingly flexible way that entrepreneurs are undertaking business. Business in the twenty-first century is likely to become more mobile and disaggregated and the speed of transport and fast Internet connections will become critical preconditions for a vibrant economy. In an economy defined by technological innovation, and where knowledge and creative thinking are increasingly important, many entrepreneurs require the flexibility that allows them to seek out and access business opportunities. In this sense, the rolling stock of the Metro has the potential to become a place where people can work whilst they are travelling to the office or meetings.

Flexible Working Patterns

In Wales companies such as Indycube represent the changing nature of entrepreneurial practice. Indycube is a Community Interest Company that rents out flexible office space to entrepreneurs and home workers who want adaptable access to high quality office facilities, but also the peer advice, support and networking and business opportunities that result from working in a shared environment. To date the company has a network of offices in Cardiff, Newport and Swansea, but is in the process of implementing an ambitious growth strategy that will result in the opening of a further 25 offices over the next 18 months throughout South Wales.

While the Metro has little opportunity to help the realisation of this ambitious short-term target, the lasting connectivity that it will deliver will help to secure the long-term future of companies such as Indycube, as entrepreneurs seek to grow and expand.

Increased connectivity and flexibility will also complement public sector led initiatives like the Welsh Centre for Innovation Excellence. This is based in Caerphilly Business Park and was set up in 2012 to provide a flexible and inventive facility for emerging entrepreneurs from throughout South East Wales to explore, test and develop their business ideas through collaboration with other entrepreneurs. The Metro will increase the accessibility of the centre to emerging entrepreneurs and help the centre to fulfill its ambition to create a growing community of entrepreneurs.

72 Tackling Poverty Action Plan, 2012 – 2016, 2012, p.3

8.5 Education, Skills and Young People

The improved connectivity delivered by the Metro will make it easier for prospective students to access further education and vocational training centres throughout South East Wales by public transport.

For example, a new station at Gabalfa will increase the accessibility of the Cardiff Metropolitan Llandaf campus to students throughout the region, while the extension of the Aberdare railway line to Hirwaun will increase the connectivity of local students to post-16 education opportunities in Coleg Morgannwg's Aberdare campus. This improved connectivity throughout the region will encourage more individuals to enter into further education and vocational training, which will have a positive impact on the skill and knowledge levels of the regional labour market.

Although increased access to education and training opportunities will have a positive impact on people of all ages, it will have a particularly significant impact on young people, and will help to achieve Welsh Government's aspiration for all young people to have access to a *"comprehensive range of education and learning opportunities"*[73].

Furthermore, the Metro will complement a number of public sector led initiatives such as Jobs Growth Wales, which is seeking to equip young people with the skills and experience to develop successful careers. Jobs Growth Wales was launched in 2012 to provide unemployed young people aged 16-24, who are job ready but who have struggled to secure employment, with a job opportunity for six months. As a result of the Metro the region will be better connected by public transport, and participants of the programme will have access to increased job opportunities across a wider geographical area.

The Metro will also improve general quality of life enjoyed by young people, through improving connectivity to cultural, sporting and leisure attractions throughout the Capital City Region. Together with improved education and training opportunities, the latter are key components of Welsh Government's seven core aims for young people[74].

8.6 Placemaking and Town Centre Vitality

Vibrant and Viable Places promotes a *"place-based approach"* to regeneration, and advocates that through targeted investment and improvements to town centres it will be possible to create a *"developmental hub"* that will have a *"wider economic impact as a place of employment, leisure activity and public services"*[75]. Town centres are therefore identified in the framework as key priorities for regeneration investment.

The Metro will help to facilitate this approach throughout South East Wales by establishing numerous town centres as the gateways to the regional transport network. This focus will stimulate footfall in each centre and potentially re-establish the regions town centres as highly connected places of employment. In many ways, this upgrade in connectivity could mean that town centres, instead of locations without good accessibility, become the preferred locations for investment in new jobs. The Metro will establish places like Pontypridd, Merthyr Tydfil and Ebbw Vale town centres as key hubs, and encourage higher footfall within these kind of settlements (as people from surrounding areas commute through the centre to access the wider network), which can stimulate private sector investment.

73 http://wales.gov.uk/topics/childrenyoungpeople/rights/sevencoreaims/?lang=en
74 http://wales.gov.uk/topics/childrenyoungpeople/rights/sevencoreaims/?lang=en
75 Vibrant and Viable Places, p.20

Impact on Sense of Place

The implementation of Metro interventions provides the opportunity to enhance the sense of place of many of the regions town centres. For instance, an improved or new Metro station will create an opportunity to improve the sense of arrival and may even stimulate sufficient footfall to catalyse demand for new high density mixed use development. By designing these places to reflect local, character and heritage the Metro can be knitted into the town centre and promote the regions distinctive identity. This process will substantially support the need to broaden the range of uses in town centres beyond retail by incorporating new places to work, opportunities for tourism as well as new homes.

In this respect the Metro will complement ongoing town centre regeneration initiatives such as the recommendations of the *Business Rates Wales Review: Incentivising Growth (2012)* and Business Improvement Districts[76].

In order to ensure that the Metro has a transformational impact on town centres, its implementation needs to be aligned as closely as possible to current town centre regeneration initiatives and the work of organisations like the Centre for Regeneration Excellence Wales (CREW). It is recommended that CREW should be a key consultee during future Metro works to ensure that all opportunities for collaboration with ongoing town centre regeneration initiatives are explored. Interaction with other Welsh Government departments and Local Authorities will also be important.

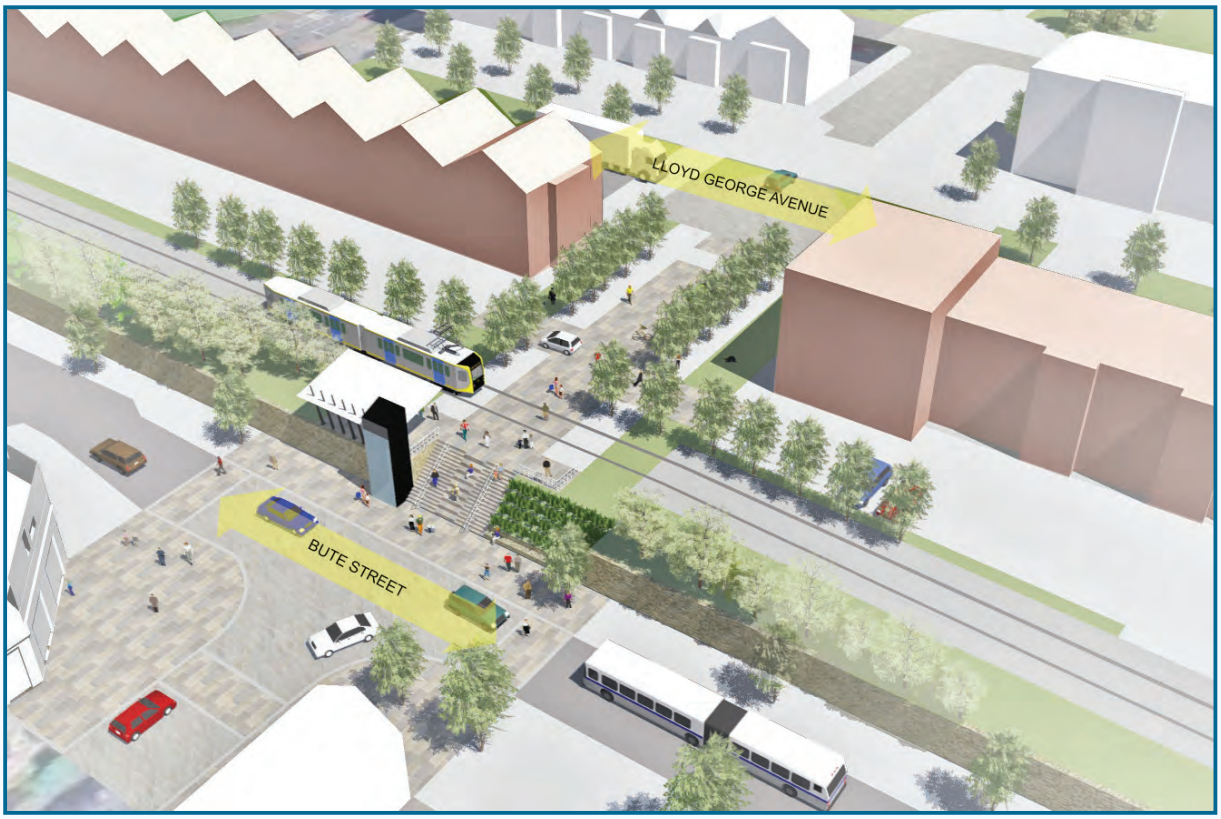
Maximising the regeneration potential of the Metro regarding town centre vitality will require any station improvements to be very carefully designed. It is essential that the brief for the development or improvement of stations incorporates some important principles and that these are considered at the inception of the project. These are:

1. The spaces around the station are as important as the station itself.
2. The needs of different transport modes need to be carefully managed.
3. Creating a strong sense of arrival is important.
4. Station security needs to be integrated in to the overall design, rather than be considered as an 'add on'.
5. Stations can be anchors of mixed use developments and the potential for interventions that could become more than just a station should be considered at the outset.
6. Stations need to address changes in level carefully to ensure that they are effectively integrated into their surrounding townscape.
7. Stations create opportunities to connect places either side of a railway track and cross line connectivity should be as important as controlling fare evasion.
8. Station design needs to convey character of the region in a way which is integrated and meaningful, rather than superficial and tokenistic.
9. Stations should be considered as the hub of other activities and therefore more than just a piece of functional transport infrastructure.
10. Multi-disciplinary collaboration is essential. Experience from other major infrastructure projects suggests that mono-disciplinary interpretation of the above principles will not result in successful schemes.
11. Station design needs to convey the Metro identity through consistent and widespread application of design and branding

76 http://wales.gov.uk/topics/businessandeconomy/regeneration/business-improvement-districts/?lang=en

The entrance to Clapham Junction station which combines an effective space in front of the main entrance that creates a meeting space as well as functional requirements for different modes of transport.

The new Reitlandpark railway station in a new district of Amsterdam demonstrates how a station separated by a change of level can be integrated into its surrounding urban context.



Initial design concept to demonstrate how a tram / train connection to Cardiff Bay can also overcome barriers between Butetown and its surroundings. This example demonstrates how Louden Square can be integrated into both the Metro, and the wider area.

Illustration which highlights how Ebbw Vale The Works Station might look and how this appearance has been informed by the palette of materials that are already adopted on other public buildings on The Works site. This image sets a strong precedent for how new stations throughout the network should deploy regional vernacular to emphasise sense of place and regional identity.

8.7 Housing Supply and Design

The improved regional connectivity delivered by the Metro will unlock opportunities for new housing development. Increased connectivity will reduce some of the barriers to viability on a range of sites throughout the region. This will help to meet local housing need and improve the quality of accommodation available throughout the region. The latter is particularly important within the context of the City Region approach to economic development, since it will ensure that the Capital region's housing stock is of sufficient size and quality to support a labour market with the critical mass required to attract investment and deliver economic growth.

Affordable Housing

The Metro will also help to facilitate the delivery of more affordable homes throughout South East Wales through helping to create an environment that makes it easier for Housing Associations to build new homes. Currently a number of affordable development programmes such as the RCT Homes led Pothcwlis initiative and the Welsh Housing Club Bond demonstrate that Registered Social Landlords (RSLs) are beginning to adopt a more innovative approach to delivering development[77].

Improved connectivity will increase the range of sites that can be viably developed, and make it easier for RSLs to find suitable development partners. This will help to assist the gradual change in approach of RSLs to enabling development, which both the Pothcwlis and Welsh Housing Club Bond programmes demonstrate is starting to take place, and contribute to the creation of thousands of new affordable homes that will address housing need throughout the South East Wales region.

RSLs will be a key development partner in realising this aim, since as a result of the Under Occupancy (Bedroom Tax) RSLs are increasingly seeking to build smaller units on sites that are connected by public transport to employment opportunities. Aside from this current Government policy and demographic changes suggest that there is a long-term trend for the creation of a greater number of smaller households. Neither the current housing supply nor the approach of mainstream residential developers will meet this demand.

In order to develop a co-ordinated approach to improving the interface between land uses and transport, increasing densities, facilitating Placemaking and encouraging more SMEs to enter the market further consultation will be required with, Local Authorities, CREW and Community Housing Cymru. The latter in particular will be a key implementation partner, since the group represents over 70 not-for profit housing associations and is at the forefront of improving innovative social housing practice, as their role as co-ordinations of the Welsh Housing Club Bond programme demonstrates.

Metro Compliant Housing Density

Where Metro infrastructure and new development opportunities are aligned there will be an opportunity to develop higher density residential development. This approach is in line with Planning Policy Wales (2012), which advises, "…higher density development, including residential development, should be encouraged near public transport nodes or near corridors well served by public transport"[78]. Planning for Sustainable Travel advocates that depending on local context up to 50-100 dwellings per hectare can be achieved in many areas, and even "…100-200 dwellings per hectare around important public transport interchanges"[79].

77 www.rcthomes.co.uk/main.cfm?type=PORTHCWLIS&object_id=2745 and www.insidehousing.co.uk/finance/first-welsh-'club'-bond-to-go-ahead/6527222.article

78 & 79 www.plan4sustainabletravel.org/key_themes/density

While the latter will not be appropriate throughout the entire Cardiff City Region it is recommended that densities adjacent to key transport interchanges in the more urbanised areas of the region should be maximised. Further work is required to test the impact upon site viability of promoting such high densities, given that the housebuilding industry is geared towards developing sites at around 35-40 dwellings per hectare.

The promotion of housetypes that are suited to car based, suburban developments should not dictate the layout of new places that are developed adjacent to the Metro network. In areas where new places are being created alongside Metro initiatives, places need to be developed using a mixture of housetypes and arranged in layouts that promote access by walking, cycling, the Metro and bus. Whilst car access will remain important (this paper is not advocating car free developments) the key selling point of new housing development located close to Metro stations will be Metro enabled connectivity. This connectivity can be undermined by poor quality urban design. Where neccessary/applicable Local Planning Authorities should issue Supplementary Planning Guidance to establish a benchmark for the kind of development that will be supported adjacent to the Metro, and consequently the kind that will not.

Where the Metro does facilitate residential development (specifically higher density) it will be important that clear design principles are put in place to integrate new development into the transport network and crucially create a sense of place that reflects local distinctiveness and offers residents a place to live that is humane, vibrant and stimulating.

The proposed North West Corridor Metro intervention provides the ideal opportunity to test the recommended principles and approach, since the surrounding area (Waterhall to Talbot Green) has been identified as the preferred location for in excess of 10,000 new homes.

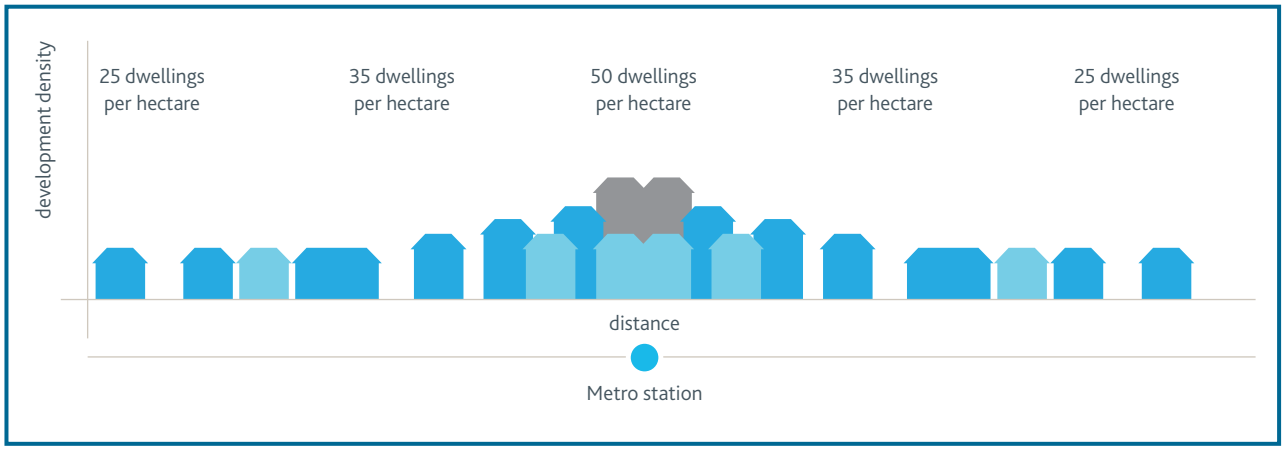
Staithes Southbank, Gateshead

Staithes, South Dunston was a collaboration between Hemmingway Design and George Wimpey Plc. This suburban development consists of 697 houses and apartments and 158 have been completed as part of phase one. The density of development is 43 dwellings per hectare.

The scheme boasts a very clear logical street layout which is very much geared to the pedestrian. Homes are arranged based on a grid which makes it easy to navigate and move around.

Car parking is arranged in a mixture of on street and parking courts and the public realm has been designed based upon homezone principles to promote active travel and humane environments.

Price levels at Staiths Southbank are, in a national and regional context, affordable, prices started at below £70,000 and rising to £225,000. The whole development is aimed at private buyers as Gateshead Borough Council has no social housing requirement due to their considerable existing stock.



8.8 Sustaining and Promoting Regional Tourism

Tourism 2020 (2013) identifies that tourism makes a major contribution to the Welsh economy. However, it also states that competition is increasing, and destinations will be required to stand out through providing a bespoke tourism offer that is founded on world-class service. The strategy acknowledges that the current national tourism strategy has made "…good progress in taking forward the priorities and actions identified", but states that many of the "…strategic challenges identified in (the current strategy) are still current"[80].

To respond to the strategic challenges and ensure that Wales's tourism offer stands out on the international stage, the strategy proposes to set a new direction for tourism that will "grow tourism earning in Wales by at least 20% by 2020"[81]. To achieve this the strategy advocates a policy of selective growth, which proposes to increase Wales's share in the international and domestic market. Improving market share in the selected markets of Germany, US and Ireland is identified as essential to delivering the target.

To grow the share of the domestic and international tourism markets, the strategy identifies that focused investment will be required to improve the quality and range of the Welsh tourism offer. Improved accessibility is identified in the strategy as a focus for investment in its own right. The strategy states "*…it is important that we make it easier for visitors to get to and to move around Wales by car or public transport*[82]".

Within this context the Metro is essential to the success of tourism within South East Wales and is integral to the ambition to grow national tourism earnings by 20%. Specifically the Metro will 'open up' the South East Wales region so that all of its features can be enjoyed in a concentrated period - the coast, a city and a national park all in 48 hours; improve the experience of visitors travelling to attractions throughout South East Wales; and transform the first impression that all visitors (business and leisure) form when they arrive at key transport gateways such as Cardiff International Airport or Cardiff Central railway station.

To ensure the Metro helps to improve the regional tourism offer it may be beneficial to integrate Capital Region Tourism and Visit Wales into future planning stages. This will ensure that the Metro is equipped to respond to the needs of the regional tourism offer and help to facilitate the *Tourism 2020* Framework Actions Plans.

80 Tourism 2020, 2013, p.2
81 Tourism 2020, p.5
82 Tourism 2020, p.17

8.9 Health

Our Healthy Future (2011) and *Together for Health* (2012) are based on the premise that most policy has some impact on health. Establishing healthier communities is therefore an integral component of the holistic approach to regeneration advocated in *Vibrant and Viable Places*[83]. The Metro will contribute to improving health levels through addressing deprivation by increasing connectivity to economic opportunities and education and training opportunities, and improving the quality of housing and the urban environment.

The Metro will support the active travel agenda represented in the Active Travel Bill, which was laid in the National Assembly for Wales in February 2013. One of the key requirements of the Bill is for local authorities to "…*continuously improve facilities and routes for pedestrians and cyclists*"[84]. The Metro will support this action through encouraging sustainable travel to the network by providing appropriate cycle rental and storage facilities throughout the network. It will also act as the focal point for improving local pedestrian and cycle infrastructure. The provision of a new railway station or bus interchange will increase footfall through the areas leading to each transport hub and therefore frame an area where pedestrian and cycle infrastructure should be upgraded or provided.

8.10 Environment and Sustainability

Sustainable Development is a key component of Welsh Government's approach to governance, and the White Paper A Sustainable Wales Better Choices for a Better Future (2012) marks the next step in setting out a framework to enable the integration of sustainable development practice into all aspect of governance. Currently One Wales: One Planet (2009) sets out Welsh Government's vision for a sustainable Wales. In the vision the public transport network has a key role to perform, providing "…fast, reliable (and) affordable" connectivity between "…major settlements", and "frequent, reliable mass transit services within cities and more heavily urbanised regions"[85].

Within this context the Metro will perform an essential role through providing a level of connectivity between key settlements and the expanding urban hubs of Cardiff and Newport that discourages use of the private car. Improved local bus services to key Metro interchanges will further reduce car dependency, as will improvements to pedestrian and cycle infrastructure supporting key stations, which the implementation of Metro stations for example, will provide an opportunity to address.

This will contribute significantly to national carbon reduction targets, to reduce greenhouse gas emissions by 3% per annum and to achieve at least a 40% reduction by 2020 compared to emission levels in 1990[86]. However, it is recommended that an independent Strategic Environmental Assessment should be undertaken to ensure that the Metro complies with Welsh Government's commitment to embedding sustainable development into all aspects of governance.

83 Vibrant and Viable Places, p.29
84 http://wales.gov.uk/about/cabinet/cabinetstatements/2013/Acttravbillintro/?lang=en
85 One Wales One Planet, 2009, p.21
86 http://wales.gov.uk/topics/environmentcountryside/climatechange/emissions/targets/?lang=en

9 Metro Economic Impact

This majority of this section taken from sub-report prepared by Steer Davies Gleave

The concept for Metro is that it is very much a regeneration and economic development programme, albeit with transport as a fundamental component. Whilst the Metro transport interventions are set out in Section 7, in this section we present in more detail the potential economic benefits and conceptual framework that can be developed to estimate potential benefits to the Welsh economy from the Metro. As the scheme is developed further and additional details are determined, the economic impacts from the scheme can be estimated in a more accurate way and with greater granularity.

Summary of Potential Metro Impacts

- Agglomeration Impacts approx. 20% of traditional transport benefits.
- Commuting benefits from generalised journey time savings of approx. £30M/yr.
- Economic impact of enabled or enhanced activity at strategic sites could, by 2030, conservatively generate £270M/yr and support up to 7,000 jobs.
- Construction multiplier of £1.76 for every £1spent; a £2Bn Metro Project delivered over 15 years could produce £3.5Bn.
- Enable 5000 houses in NW Cardiff with multiplier effect from construction of £900M.
- Uplift in residential values of 1% for homes within 800M of Metro circa £380M.

9.1 Improving Business Efficiency

The implementation of the Metro would have a direct economic benefit to businesses through a reduction in the generalised cost of travelling, through more frequent and reliable services and shorter journey times. Such a benefit to business travel results in a direct productivity (GVA) benefit to the economy.

Take the case of a professional working for Admiral in Newport, who needs to travel between different offices across the region. Improved frequency and reliability of the transport system helps to reduce the amount of time spent travelling, resulting in a direct productivity benefit to the employee and firm. As a result the insurance company would be able to increase wages, reduce prices, increase output and/or increase its profits. These types of business benefits arising from journey time savings would be enjoyed by a variety of firms across the region.

There are two drivers of the efficiency benefit from the Metro. First, improved public transport services will lower business travel costs for business trips made by public transport. Second, the modal shift that could occur as former car users are encouraged to use public transport means that the road network becomes less congested, and these reduce the cost of road-based business trips.

9.2 Wider Economic Benefits – Encouraging Urban Agglomeration

Following the guidance issued by the UK Department for Transport (DfT) in 2005, the assessment of economic benefits from transport has begun to include a wider set of benefits, including those triggered by agglomeration economies, imperfect competition and labour market dynamics.

Agglomeration benefits are, for urban areas, the largest of these benefits and have been found to typically add between 5% and 40% to the conventionally measured transport appraisal benefits. Agglomeration benefits effectively relate to the benefits of business clustering, in particular to the concentration of financial and business services in city centre locations. The evidence suggests that encouraging clustering, measured by 'effective density', can increase the overall productivity of all firms, and increase overall GVA. Cardiff has a number of key characteristics that provide significant potential for productivity benefits from agglomeration; it is the capital city and the centre of government, has the highest employment levels and existing productivity in Wales, has a high proportion of business and financial services (nearly 40% of the sector in South East Wales) and has good strategic connections to important UK and international markets, and is expected to grow significantly in the next decades. Metro has the potential to increase the 'effective density' of firms by reducing travel costs and effectively bringing them closer together.

A higher concentration of firms in a given location leads to a series of agglomeration benefits, including the following opportunities for businesses:

- Sharing intermediate inputs in the production process, increasing the potential market for firms along different stages of the supply chain;
- Drawing upon a wider pool of labour, ensuring better matching between supply and demand; and
- Sharing knowledge thanks to greater proximity and the ability to pick up new ideas.

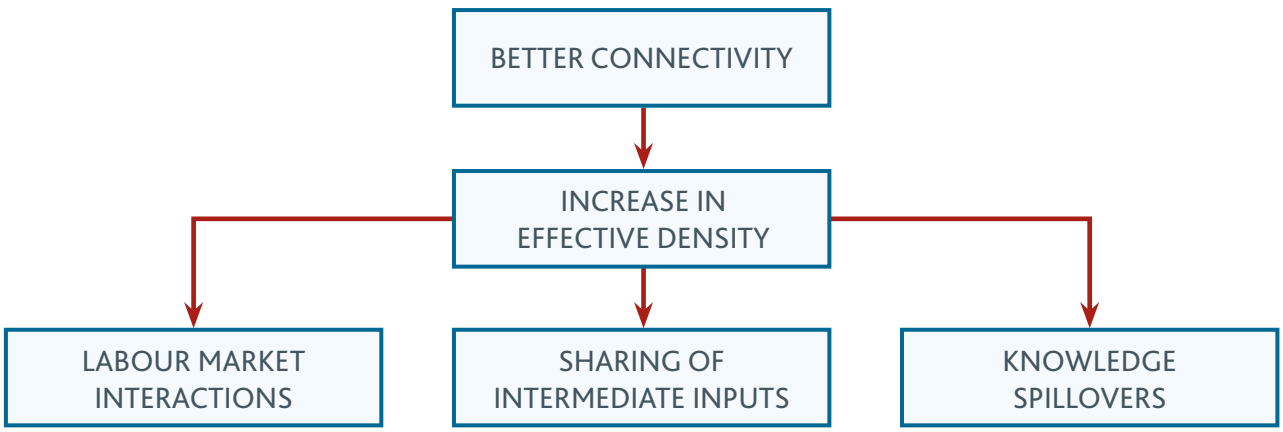


Figure 66: Potential agglomeration impacts of the Metro

Density is best achieved at the urban level and thus cities have become the engines of national economic development. Cardiff's population has grown by 11% between 2001 and 2011 and the number of jobs has grown by 17%. The city's population is expected to grow to 430,000 by 2030.

Companies have set up their headquarters in the city with a view to benefit from proximity to other businesses. For instance, a specialist team set up within the Deloitte practice in Cardiff to combat threats facing the accountancy profession, has grown to become a multi-functional research and compliance unit against international fraud and terrorism related to money-laundering. The ability to recruit skilled consultants from other firms to set up this unit was crucial for its success, showing the importance of knowledge sharing triggered by density, as well as the ability to recruit the right employee profile.

Likewise, 'effective density' can be expressed as geographical proximity in terms of journey times between different locations. Reducing travel times leads to higher effective densities and accelerates agglomeration without the need for permanent relocation of businesses and residents. This is why transport investment is instrumental to promote local economic development, especially in the context of the polycentric and fragmented South East Wales Region.

The introduction of high quality rapid transit has the potential to generate higher effective densities both around key terminal destinations and along the new transport corridors. As outlined in our analysis above, the Metro could substantially increase the employment capacity of the region. This will trigger an increase in effective density. As a result, the benefits of increased agglomeration could be calculated by multiplying the change in effective density by the agglomeration coefficients suggested by the DfT[87]. The resulting change in the agglomeration index would need to be multiplied by the economic output attributable to the sectors reputed to be affected by these benefits.

Assessments of the wider economic benefits resulting from transport investment have been undertaken for several other schemes across the UK. These indicate that a variable range of positive outcomes can be expected from improved accessibility. The following table summarises the main findings for a series of projects, expressed in terms of their proportion of (conventional) direct benefits.

LOCATION	TRANSPORT SCHEME	WIDER IMPACTS AS A PROPORTION OF CONVENTIONAL BENEFITS
London	Crossrail investment	56%
Tees Valley	Metro system with tram-train links	26%
Leeds	Urban area public transport investment	18%
Plymouth	Rail service frequency improvements	11%

Table 9: Wider economic benefits of transport - UK Review[88]

87 Graham, D et al (2010), The spatial decay of agglomeration economies: estimates for use in transport appraisal, LSE and Imperial College, London

88 Source: Rognlien (2010)

9.3 Commuting and Labour Market Benefits

Access to labour markets is vital to existing businesses, and can be a key factor in determining where firms choose to locate. Enhanced accessibility provided by Cardiff Metro would increase the effective labour market of firms in the City Region. For residents, transport accessibility can provide then with access to employment opportunities and increase their job search horizons. The city region of Cardiff encompasses both the lowest (Blaenau Gwent/ Merthyr), and the highest (Cardiff / Vale) GVA per capita in Wales, and the Metro has the potential to both support the overall growth of the economy and to reduce inequalities within the City Region by providing better connecting areas of deprivation with those where growth is likely to occur.

Labour supply impacts

When individuals make decisions about whether to work, how much to work and where to work, they take many factors into account. Importantly they balance the financial gains (i.e. 'take-home wage') against what we may call personal costs (e.g. giving up spare time). If the financial returns to work increase or the personal costs decrease, more individuals are likely to choose to work, whilst some of those who already do will decide to work more or in more productive (and more demanding) jobs.

Since the monetary costs of travelling to work reduce the financial gains from working, and commuting time costs increase the personal costs, the time and cost of commuting are therefore a deterrence to productivity. Investment in the Metro would reduce both types of commuting costs and therefore lead to an increase in productivity and a resulting change in employment, in the form of:

- An increase in the number of people working; and
- A change towards more productive jobs.

Labour market impacts will be beneficial in the context of South East Wales, given that barriers to efficient recruitment by key employers currently exist. A number of businesses, including Centrica in Cardiff and Admiral in Newport, have publicly stated that the commuting experience of their staff has a direct impact on retention rates, as well as on recruitment processes. The Metro would help overcome these barriers by providing smoother and more direct access to key employment areas from the wider region, including the Ebbw Valley and Blaenau Gwent. Better public transport links are not only needed to make commuting easier at peak times, but also to support business shift patterns and weekend operations. The younger section of the workforce (and those experiencing youth unemployment), who tend to rely more heavily on public transport given lower car ownership levels, will particularly benefit from improved access to jobs.

Sustainable Commuting

The Metro has a role in encouraging future economic growth to take place in a more sustainable manner. Currently most travel-to-work trips into Cardiff are made by car (58%), while the proportion of sustainable travel-to-work trips diminishes with the distance of commuting[89]. In the short-term Metro could encourage modal shift and increase the effective capacity of both the public transport and highway networks, while in the longer-term improved levels of public transport accessibility will increase the relative attractiveness of locations and sites that are accessible by public transport, encouraging more sustainable patterns of land use.

89 Cardiff Local Development Plan Background Technical Paper No.12, October 2012

Valuing Potential Commuting Benefits

The valuation of commuting benefits within economic appraisal is based upon the overall time savings that accrue to commuters. This time saving represents the 'first order' effect of the transport intervention which can lead, in turn, to responses such as those outlined above such as change in job location or more people entering the labour market.

We have undertaken an illustrative assessment of the potential benefit of the Metro given an assumed time saving per trip[90]. On the basis of 100,000 commuters gaining an average 5 minutes reduction of journey and/or waiting times (resulting from improved frequency and/ or reliability) across the entire commuter network for Cardiff and Newport (both for public transport, rail and road users), the potential benefits could be nearly £30 million per year, in current prices[91]. Should the average time savings rise to 10 minutes per journey, benefits could total over £55 million a year.

9.4 Supporting Employment Growth

The Metro has the potential to provide direct economic benefits by unlocking employment opportunities, and thus has the potential to reduce unemployment in the region. There are a number of ways in which this could occur:

- Providing the transport links that are necessary to provide the access and capacity to enable employment sites to develop. In this case jobs are effectively dependent on the provision of transport.
- Increasing the accessibility, attractiveness and viability of employment sites and locations. Making locations and sites more attractive can increase the scale and/or density of development, and help bring forward development sooner that it would otherwise occur.

Included in Table 5 in Section 4.5 is an assessment by Jones Lang LaSalle (JLL) of the potential for the strategic sites identified as part of the study. For each site the development potential, or ambition, for commercial and/ or residential use is set out. Clearly, until detail plans are submitted this assessment is only an informed estimate based on the experience of the team. Nonetheless it does present the appropriate order of magnitude of what is possible.

In order to understand the potential scale of the value of delivering increased employment capacity, the strategic sites identified as having potential for employment developments have been assessed. On the basis of assumed employment densities[92] the potential number of employees accommodated by the developments can be estimated. It can then be assumed that the economic impact of each additional job is equivalent to the average GVA per job for Cardiff[93].

On the basis of this approach Table 10 presents the potential economic impact resulting from the provision of employment accommodation for each strategic site.

90 Note that this refers to 'generalised travel time', which is a composite measure capturing benefits from increased frequencies, journey time reductions and quality improvements.

91 Assuming return trips 232 days of year and DfT value of time for commuting

92 Indicative employment density for B1 type (office space) and B8 type (storage and distribution) - Employment Densities Guide, 2nd edition (2010) by OffPAT and the Homes & Communities Agency

93 ONS, Nominal (unsmoothed) GVA per filled job; by NUTS 2 and NUTS 3 subregions, GVA for Cardiff and the Vale of Glamorgan is £39,313 (2010)

It is anticipated that investment in Metro will increase the likelihood that the development ambitions for the strategic sites are met. It may also accelerate the development window for each site and encourage greater density where areas are well served by Metro, e.g. around a station. Metro can therefore support the delivery of a proportion of the estimated economic impact.

STRATEGIC SITE	CAT	EMPLOYMENT SPACE POTENTIAL (M^2)	TYPICAL EMPLOYMENT DENSITY (M^2/FTE)	EMPLOYMENT CAPACITY	POTENTIAL ECONOMIC IMPACT (£M 2010)
Central Cardiff Enterprise Zone	A	93,000	12	7,750	304.7
Cardiff Bay	A	46,000	12	3,833	150.7
North West Cardiff	A	23,000	12	1,917	75.3
Newport City Centre	A	46,000	12	38,333	150.7
Llantrisant / Talbot Green	A	46,000	46	1,000	39.3
Treforest Ind Estate / Taffs Well	A	46,000	66	697	27.4
The Works, Ebbw Vale	B	19,000	66	288	11.3
Pill/South Newport	B	46,000	60	767	30.3
Glan Llyn/Celtic Business Park	B	139,000	60	2,317	91.0
Duffryn / Celtic Lakes	B	209,000	63	3,317	130.4
Pontypridd Town Centre	B	4,600	12	383	15.1
St Athan /Airport Ent. Zone	B	46,000	73	630	24.8
Total		**763,000**		**26,732**	**£1,051**

Table 10 - Potential employment capacity of strategic site

Source: JLL analysis of Strategic Sites

It is clear that Metro will have a different impact on different sites and locations. For example, even without the Metro, development at the Central Cardiff Enterprise Zone will proceed, whereas it could be argued that sites such as North West Cardiff are dependent on a public transport corridor being delivered. The team assessed each site and considered the impact Metro could have as a percentage of the overall potential development. This ranges from a 10% impact at the Central Cardiff Enterprise Zone to 75% for the wider masterplan including housing and mixed use developments in North West Cardiff, see Table 11. This suggests Metro could support the creation of perhaps 7,000 additional jobs and contribute £270 million per annum to the regional economy based upon a Metro related take up of an additional 200,000 m^2 of employment space by 2030. The greatest potential impact comes from a potential additional 50,000 m^2 of office accommodation with an employment density of 12m^2 per FTE, which contributes £180 million to the overall impact. As a comparison the annual office take up in Cardiff alone is circa 40,000 m^2. per annum, so in relation to the Grade A office market the potential impact of Metro over 15 years could be viewed as being conservative.

A £270M pa benefit over the last 15 years of a standard 30 year assessment period (on the conservative assumption that no economic benefit would accrue during the 15 years to construct the entire Metro) would equate to £4Bn. Clearly further and more detailed analysis will be required to present a more definitive assessment.

	POTENTIAL OF STRATEGIC SITES				POTENTIAL METRO IMPACT		
STRATEGIC SITE	CAT	EMPLOYMENT CAPACITY	POTENTIAL ECONOMIC IMPACT (£M 2010)	METRO IMPACT IN ENHANCING /ENABLING AS %AGE	SPACE POTENTIAL	METRO EMPLOYMENT CAPACITY	METRO ECONOMIC IMPACT (£M pa)
Central Cardiff Enterprise Zone	A	7,750	£305	10%	9,300	775	£30
Cardiff Bay	A	3,833	£151	30%	13,800	1,150	£45
North West Cardiff	A	1,917	£75	75%	17,250	1,438	£57
Newport City Centre	A	3,833	£151	30%	13,800	1,150	£45
Llantrisant/Talbot Green	A	1,000	£39	40%	18,400	400	£16
Treforest Ind Estate/Taffs Well	A	697	£27	30%	13,800	209	£8
The Works, Ebbw Vale	B	288	£11	30%	5,700	86	£3
Pill/South Newport	B	767	£30	30%	13,800	230	£9
Glan Llyn/Celtic Business Park	B	2,317	£91	30%	41,700	695	£27
Duffryn/Celtic Lakes	B	3,317	£130	20%	41,800	663	£26
Pontypridd Town Centre	B	383	£15	30%	1,380	115	£5
St Athan /Airport Ent. Zone	B	630	£25	20%	9,200	126	£5
Total		**26,732**	**£1,051**		**199,930**	**7,037**	**£277**
					26.18%		**26.33%**

Table 11: Illustration of potential impact of Metro on strategic sites

To provide a comparison, assessments of direct economic benefits resulting from transport investment have been undertaken for other schemes across the UK. These indicate that a variable range of positive outcomes can be expected from improved accessibility. The following table summarises the main findings for a number of projects.

LOCATION	TRANSPORT SCHEME	ECONOMIC BENEFITS	SOURCE
Nottingham	Express transit – Light rail	10,000 additional jobs in Greater Nottingham by 2021	Full business case 2010
Wolverhampton	Multi-modal station interchange	22,300 m2 of office space, capacity for 1,500 jobs	City Centre Prospectus 2012
Manchester	Rail hub and service improvements	£1.5 billion rail user benefits NPV (60 years, 2002 prices)	Network Rail Study 2009
Tees Valley	Metro system with tram-train links	>1,700 additional jobs by 2016 across the sub-region	CEBR Economic Assessment 2008
Plymouth	Rail service timetable changes	City Region GVA higher by £9 million in 2026	Steer Davies Gleave 2012

Table 12: Direct Economic Benefits of Transport in the UK

In addition to the long-term employment potential generated by the Metro, a further one-off boost in local employment will be added during the construction phase. A typical multiplier effect for construction investment in Wales is around £1.76 generated for every £1 spent[94]. The proportion of activities along the construction supply chain that take place in Wales will also determine the specific multiplier of the Metro investment. On the basis of the high-level estimate of the investment cost for Metro the generated multiplier impact would be around £3.5bn (excluding any displacement effects). A recent CBI analysis suggested an even larger benefit of £2.84 for every £1 invested in infrastructure[95] suggesting Metro could have an even bigger impact.

Overall, better connectivity resulting from the Metro therefore has the potential to stimulate the provision of greater capacity to accommodate potential new jobs in the area. The key relationships between improvements in connectivity, job opportunities and their related benefits are summarised in Figure 67 below.

This diagram recognises the knock-on effects that better job opportunities could have on the economy, including the following:

- Greater viability of transport schemes given the increase in commuting flows.
- Additional induced consumption at the local level as more people take up jobs.
- Enhanced attractiveness for new businesses given the wider accessibility of labour.

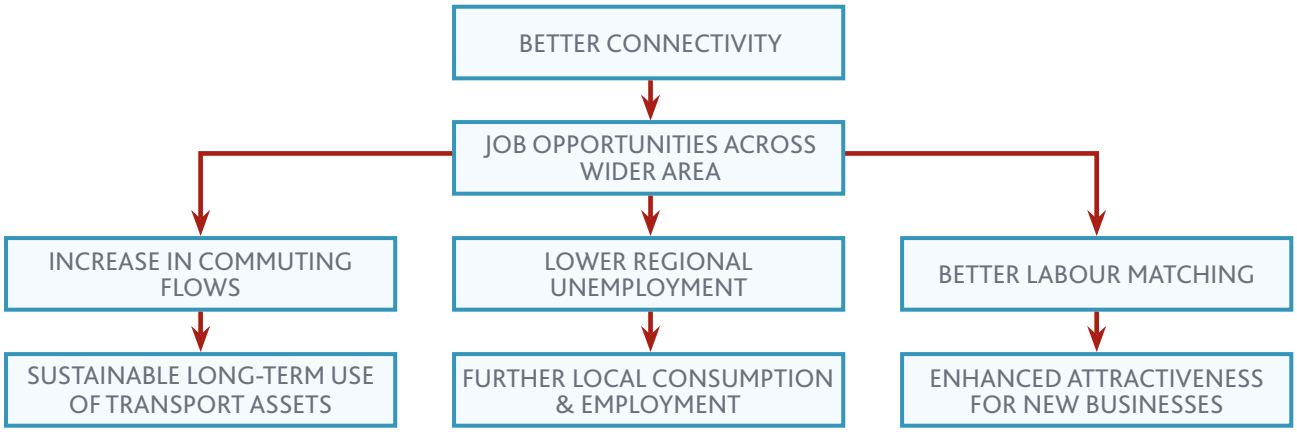


Figure 67: Potential employment impacts of the Metro

94 Chandler KBS (2013), Tracking the benefits of construction investment, Welsh Assembly Government
95 CBI, 2012, Bridging The Gap

9.5 Supporting Housing Delivery

The population of Cardiff is forecast to increase by a quarter over the next twenty years. Improved public transport can potentially help in the delivery of housing through similar mechanisms as for employment: it can directly enable housing to take place on otherwise poorly accessible locations and it can increase viability, scale and density of housing.

The Metro proposals could enable urban regeneration and unlock the construction of new residential and commercial spaces around key transport hubs and stations.

Of the sites identified in the appendices by JLL, the Cardiff North-West Corridor provides the greatest proposals for housing. In the Local Development Plan 2006-2026, the indicative master plan included in the candidate site submission proposes a segregated public transport corridor running centrally through the site and providing a rapid and direct public transport connection to the city centre and Cardiff Bay areas. It is therefore recognised that good quality public transport, such as the Metro proposals, has the potential to unlock a major urban expansion of more than 7,000 houses. As with investment in transport infrastructure, the generated multiplier impact of housing construction can be estimated. For the North-West Corridor this would amount to around £1.2bn[96]. Whilst some of this value would come to market in any case perhaps 75% or £900M is contingent on Metro and the NW Corridor project.

Improving transport accessibility and helping increase housing supply are factors in making Cardiff as a whole a more attractive place to live through better connecting housing and jobs and maintaining the affordability of housing as additional housing supply would, other things being equal, moderate increases in house prices. The combination of the transport accessibility delivered by Metro, and potential impacts in helping increase housing supply, therefore have a role in accommodating and supporting the forecast growth of Cardiff.

9.6 Property Market Impacts

An additional set of impacts likely to be generated by Metro investment is related to the property market. These will include both a positive impact on land values around key transport nodes, and an enabling impact on development being brought forward.

Land values often increase as a result of public investment in infrastructure, for example a new transport scheme. Any uplift in land values is likely to translate into higher rental values for residential as well as commercial property.

Evidence from a range of studies supports the view that transport schemes have a positive impact on land values. For instance, rail stations have the potential to raise land values in the surrounding area. Evidence[97] suggests that moving 250 metres closer to a station has the potential to increase residential property values by around 2.4% and commercial property values by 0.1%.

96 Based on average cost of construction as advised by JLL
97 Steer Davies Gleave (2011), "The value of station investment", Research for Network Rail
98 Steer Davies Gleave (2008), "VIVA Benefits Case", Research for Metrolinx

Further evidence[98] on rapid transit is available from North America. Based on average values for the US and benchmarks from the Government of Canada, a bus rapid transit scheme would have a modest positive impact, creating a 2-4% premium on residential and office space and 1-2% premium on retail property values within a 400-metre radius of stations.

Light rail schemes have the potential to lead to higher premiums, partly because of lower negative externalities such as pollution and of lower susceptibility to local traffic conditions. Prices for residential property have increased by around 20% in Newcastle[99] along the new metro (as opposed to comparable properties elsewhere in the city), while uplifts of around 10% have been witnessed along the Altrincham metro line in Manchester. Similarly, evidence from Freiburg indicates a rent premium of 15-20% for offices in the city centre with direct access to the tram, as opposed to offices without.

The Nottingham Tram represents another example of transport-led property impacts. With the opening of the Nottingham Tram Line One linking Hucknall to the main railway station, journey times have been reduced by around one-third and public transport use has increased by 25% along the corridor. Residential development in Ashfield, where the Hucknall terminus is located, has seen a faster increase in the housing stock than in Nottingham and the national average[100].

It is forecast that the Metro would deliver significant improvements in transport accessibility to more than 300,000 dwellings within an 800m catchment[101]. Given the average property price for residential dwellings in Wales was around £115,000 in July 2013[102], if Metro was to result in a 1% uplift in residential values this would equate to an overall land value uplift of around £380 million.

9.7 Environmental and Social Benefits

The improvement in rail and rapid transit connectivity provided by the Metro has the potential to deliver environmental benefits to the region by incentivising modal shift from road to more sustainable transport modes. Currently transport accounts for over 12% of CO_2 emissions in Wales[103] and the road-based commuting patterns in South East Wales contribute to this figure, with 24% of CO_2 emissions in Cardiff coming from road-based transport. A direct environmental benefit of modal shift would be a reduction in CO_2 emissions from road transport.

The impact of this can be estimated with reference to a recent report[104], which modelled the potential impact of rolling out a Smarter Choices programme across Wales, leading to a reduction in car vehicle kilometres of 11% and a consequent modal shift to rail and bus. The report argues that such a modal shift would result in a reduction of around 200,000 tonnes of CO_2. In perspective, we estimate this to be the equivalent of a reduction of 0.5% in CO_2 emissions across Wales, all other things being equal. In addition, the report also suggests that increasing rail and bus patronage would have an economic impact for Wales, mainly because public transport is a service that cannot be imported (as fuel can). An 11% reduction in car trips is expected to stimulate the creation of around 300 new jobs.

99 Hass-Klau, C et al (2004), Economic Impact of Light Rail: The Results of 15 Urban Areas in France, Germany, UK and North America
100 CBI (2012), Locally grown - Unlocking business potential through regeneration
101 Based on catchment analysis undertaken by Capita
102 Land Registry - House Price Index July 2013, published 29 August 2013
103 National Assembly for Wales – Greenhouse Gas Emissions in Wales, February 2013
104 Stop Climate Chaos Cymru (March 2011), Cutting Carbon: Creating Jobs

Following further development of the Metro proposals a similar estimation could be carried out to assess its environmental benefits, in relation to its expected modal shift impact.

At the same time, modal shift could reduce overall road traffic levels which would result in fewer traffic collisions and associated injuries and fatalities. The reduction in accidents has economic benefits through avoiding lost productivity of casualties and reducing direct costs from police response, hospital care etc, as well as a broader societal benefit from reduced loss and suffering.

Figure 68 illustrates the potential sources of socio-environmental benefits which arise from improved public transport connectivity.

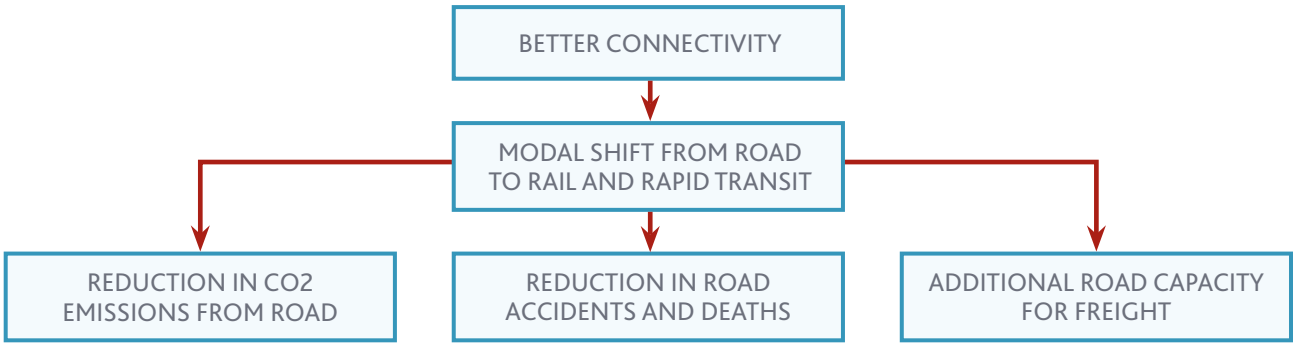


Figure 68: Potential socio-environmental impacts of Metro

Other Societal Benefits

Other direct economic impacts would materialise. These include the personal time/cost savings for people due to the enhanced accessibility for residents of the region to local services such as public offices, hospitals and schools. Leisure travel will also be facilitated with a potential increase in tourist trips across the region. While these impacts will not directly increase business productivity, they highlight the potential for an increase in economic benefits to society and tourism as a result of enhanced connectivity.

A less congested road network is also likely to require relatively lower investment over the coming decades in terms of new construction as well as maintenance. These savings to public budgets could accrue as an additional long-term benefit of the Metro investment, and could be estimated as a fraction of the public construction procurement budget for Wales[105].

105 This is in the order of £850 million annually, based on Welsh Government Assembly figures

10 Impact of Metro on other Regional Policy Interventions

This section prepared by Jones Lang LaSalle

The proposed Metro Network for South East Wales, will impact upon a number of existing and proposed Government interventions and policies. These include planning reform, enterprise zones, the City Region concept, together with regeneration and transport policies, including the Welsh Investment Infrastructure Plan.

The Metro Project will need to form part of an overall strategic regional economic plan that presents a clear vision integrating economic development, regeneration and transport. This brief report sets out other key policies, consideration of which may assist in the delivery of the Metro network.

10.1 General Matters of Consideration

European Funding

Wales is likely to retain a significant exposure to the EU Structural and Cohesion Funds programmes as we enter into the next period of funding 2014-2020.

The Wales European Funding Office (WEFO) state that; "Future Structural Funds programmes for Wales will continue to seek to reduce regional disparities and help to deliver the strategies and priorities of the EU and Welsh Government for growth and jobs".

The consultation process is on-going, however, the following extracts from the 'West Wales and the Valleys' consultation document are of interest:

> *"The focus of EU transport policy is both on promoting green transport and on promoting the functioning of the EU wide TEN-T network. However, OECD15 research quoted in Economic Renewal: a new direction confirms that while transport infrastructure can play an important role in promoting economic development, it is far from being a panacea. In particular, schemes need to be designed to address effectively real constraints, and if the other elements necessary for growth are not present, transport infrastructure improvements will not be successful. It is therefore essential that any investments in infrastructure are considered in there wider strategic context and are accompanied by complementary interventions, to provide a holistic, sustainable change.*
>
> *Investment in rail should seek to capitalise and maximise the impact of the planned investment in the Welsh rail network, complementing already committed work to ensure greatest added value. Improvements to integrated transport will need to demonstrate their impact in enabling access to employment and education.*
>
> *Enterprise Zones may identify some of these specific opportunities and transport connectivity has been identified as crucial to developing City Region approaches in Wales. Investments utilising funding from the West Wales and the Valleys programmes will have to identify the economic benefit to the programme area."*

In March 2013, Dr Grahame Guilford presented his report to Welsh Government: 'Investing in Growth and Jobs: An Independent Review of Arrangements for Implementation of European Structural Funds Programmes 2014-2020'.

This report set out a series of recommendations on how to adjust the structural funds programme to help support economic growth in Wales beyond 2014. A key recommendation was *"…the development of an Economic Prioritisation Framework (EPF) that would allow the identification of those areas in which Structural Funds can contribute to the most effective and synergistic way to overall Welsh Government economic policy. The EPF should be constructed at a level of detail sufficient to provide guidance to potential project sponsors, to inform decision making at the time of project selection and to support the management of implementation. WEFO should be responsible for the production of the EPF drawing on relevant input from Welsh Government Economic Strategy Development and, bearing in mind any specific obligations in relation to EU policy and structural funds regulation".*

Dr Guilford also explored the concept of demand drivers, defined as strategic growth opportunities, and suggested the identification of such drivers would form part of any EPF. Dr Guilford suggested four potential demand drivers including *"…rail electrification and associated infrastructure development in South East and South West Wales".*

Devolution of Minor Taxes

The Commission on devolution in Wales, also known as The Silk Commission, has reviewed the case for devolution of fiscal powers to the National Assembly for Wales and has focussed upon five minor taxes – business rates, stamp duty, landfill tax, aggregates levy and air passenger duty. To date, there has been consultation of the issues arising from the devolution of business rates and stamp duty land tax. Both of these can, potentially, be incentivised to encourage investment in line with policy ambitions.

A Task and Finish Group was established in Autumn 2011 to review business rates policy, under Chair Professor Brian Morgan. The Group's report (Business Rates Wales Review: Incentivising Growth, May 2012) recommended the devolution of business rates to Wales and a series of other measures including enabling Local Authorities to retain a proportion of the income they generate from business rates and other measures to support new development of speculative floorspace and regeneration of town centres. Business rates can be an effective tool in encouraging investment and regeneration in the Metro area.

City Regions

A Task and Finish Group, Chaired by Dr Elizabeth Heywood, reported in July of 2012 with recommendations on the potential for using City Regions as economic drivers and to identify potential City Regions in Wales.

This report recommended a *"… City Region be recognised in South East Wales on the basis of existing patterns of movement and the potential for increased inter-connectivity".* This report also recommended that the Valleys Metro be adopted as a key theme for a South East Wales City Region.

Key operational matters arising from this report included the need to:

- Cede power, funding and decision making to a more regional level.
- A Passenger Transport Executive/Authority to be established in South East Wales with similar powers, funding and responsibilities to those in English City regions.
- Recognition of the importance of spatial planning and a recommendation that Welsh Government should adapt or replace the Wales Spatial Plan, to ensure the Economic Development Framework is fit for purpose.
- A recommendation of an over-arching City Region Strategic Planning Tier to ensure City Region hinterlands benefit from the growth of their cities and have a voice in cross boundary development.
- The City Region to take advantage of the next round of EU funding as well as greater flexibility in the use of EU funds, in particular with regard to connectivity.
- Welsh Government to explore the full range of funding tools to support the City Region approach, including borrowing powers.
- Recognition that different levels of governance are required for different policies and the City Region should be free to explore best fit governance arrangements.

The report suggests that there should be a long term approach and commitment and *"…if City Regions are to be the engine of growth they must be the principal beneficiary of transport, housing, inward investment and funding"*.

Commission on Public Service Governance and Delivery

Established in April 2013, under Chairman Sir Paul Williams, this Commission has been tasked with providing a review of public services in Wales and the way they are governed and held accountable.

10.2 Economic Development Initiatives

Overview

There are a number of existing and emerging economic development projects that will overlap with the Metro concept. The three Enterprise Zones of South East Wales are currently topics of discussion; however, new policy is emerging in the form of The City Regions Report. Additionally, there are legacy projects such as the urban regeneration company, Newport Unlimited.

In September of 2011, the Welsh Government announced plans for Enterprise Zones in Wales with an initial tranche of five zones including Central Cardiff, Ebbw Vale and St Athan – Cardiff Airport. A further two zones were announced in Spring 2012 but these have not impacted on South East Wales.

The Welsh Government has aligned each zone with a target sector in the economy and the three zones in South East Wales are as follows:

- Central Cardiff - Financial & Professional Services.
- Ebbw Vale - Advanced Materials & Manufacturing (Automotive).
- St Athan - Cardiff Airport - Advanced Materials & Manufacturing (Aviation).

Central Cardiff Enterprise Zone (CCEZ)

CCEZ comprises 56.6 hectares (140 acres) located broadly to the south of the city centre but including Cardiff Central train station, the Millennium Stadium, Motorpoint Arena, Callaghan Square and mainly derelict land running southward between Dumballs Road and the River Taff.

CCEZ is focussed upon the growth of the office market and with a particular focus on Financial and Professional Services (F&PS) Sector. The F&PS Sector Panel has established a marketing strategy to target London based financial institutions and professional services firms with a view to offering cost effective relocation opportunities to base mainly back office operations in Cardiff. For target companies, the Metro offers the opportunity of creating a widened labour pool by creating a larger catchment area and adding more capacity on existing commuter routes.

Ebbw Vale Enterprise Zone (EVEZ)

EVEZ comprises six distinct sites totalling 40 hectares (100 acres) including the whole of Rassau Industrial Estate, the proposed Circuit of Wales north of Rassau, The Works regeneration project (former Ebbw Vale Steelworks) together with infill sites at Rhyd y Blew, Brynserth and Tredegar Business Park.

EVEZ is aligned to the 'Advanced Materials and Manufacturing' Sector Panel, with a particular focus upon the automotive industry. The Works site is in close proximity to the existing railway line (soon to be extended northwards to Ebbw Vale town centre). However, the remainder of the sites are somewhat remote from the railway network. The manufacturing sector is also generally less reliant upon the rail network with little or no freight traffic generated in this sub-region from manufacturing business. The Metro may, however, have limited benefit in creating greater accessibility for workers travelling to their place of employment.

St Athan – Cardiff Airport Enterprise Zone

This Enterprise Zone is based across dual sites being the RAF St Athan airbase and Cardiff International Airport, the latter recently acquired by Welsh Government.

St Athan Aerospace Business Park retains a significant Ministry of Defence (MOD) presence and offers a secure environment for aerospace companies requiring airside access.

Cardiff Airport includes the operational airport together with the adjacent British Airways Maintenance Facility and gateway land on the approach to the airport.

This Enterprise Zone is served by two stations on the Vale of Glamorgan line at Rhoose and Llantwit Major. Neither is well located for the airport or St Athan respectively. There is reasonable access to rail services for this area however; an increase in the number of trains per hour is identified as the primary issue rather than precise location of stations.

The Enterprise Zone is aligned to the Advanced Materials and Manufacturing Sector Panel with a particular focus upon the aerospace industry.

Newport

Created in 2003 following the "Five Counties Study & Programme for Newport & Blaenau Gwent", the so called 'Corus Study' recommended the creation of an Urban Regeneration Company for Newport. The resulting organisation, Newport Unlimited, is a private company sponsored by Welsh Government and Newport City Council.

Newport Unlimited is mandated to promote the development of Newport as a premier business location and stimulate investment in the City Centre. In addition the company seeks to promote greater accessibility around the City Centre including more use of sustainable forms of transport.

In Spring 2013, a Newport City Centre Regeneration Taskforce was appointed with Mr Simon Gibson, Chief Executive of Newport based venture capitalists, Wesley Clover, appointed as Chairman. The Taskforce will run for 12 months.

The terms of reference for the Task Force is to identify the barriers to business growth, examine ways to bring business life back into the city centre and make appropriate recommendations.

10.3 Planning Policy

Planning Policy Wales

Planning Policy Wales (PPW) Edition 5, November 2012, seeks to provide a wider perspective in terms of the regional and sub-regional economies of Wales:

> *Effective planning for the economy requires local planning authorities to work strategically and co-operatively steering development and investment to the most efficient and most sustainable locations, regardless of which local authority area they are in. In addition, travel-to-work patterns do not necessarily respect local authority boundaries and it is essential that local planning authorities identify and make adequate provision for their role in the regional and sub-regional economies of Wales.*

PPW also highlights the opportunity for collaborative working between Local Authorities and the importance of rail transport in terms of existing and future provision of public transport:

> *Local authorities should promote public transport as a means to achieve environmental objectives, to assist in relieving congestion and to encourage social inclusion. Collaborative working by regional groups of local authorities and the establishment of cross-boundary transport consortia are assisting this process. Appropriate public transport measures include improved facilities for railway and bus passengers, park and ride schemes, and measures to encourage better services. Local authorities may wish to explore the potential for new rail lines (including light rail), the re-opening of rail lines, the provision of new stations and enhanced passenger services on existing lines. Rail services, with their fixed infrastructure, can provide a focus for regeneration and new development, as can bus services, especially in urban areas where supporting facilities and priority schemes, such as bus lanes, are provided.*

> *Local authorities should consider the potential for promoting the use of railways for additional passenger and freight traffic. They should identify new infrastructure (including park and ride sites), multi-modal transfer facilities and, where appropriate, major employment sites with access to railways. Disused railways and disused or unused rail sidings should be safeguarded from development where there is a realistic prospect for their use for transport purposes in the future.*

"People, Places, Futures", The Wales Spatial Plan

The Wales Spatial Plan (2008 update) seeks to provide a canvas against which Welsh Government investment can be considered and agreed. It seeks to promote better decision making on a regional basis and to continue the process of restructuring the economy, with particular reference to South East Wales. The Plan also sets out some principles such as guiding employment related property development towards public transport and close to housing and infrastructure developments.

The Plan has the following vision:

> *We will sustain our communities by tackling the challenges presented by population and economic change. We will grow in ways which will increase Wales' competitiveness while assisting less well-off areas to catch up on general prosperity levels and reducing negative environmental impacts.*

- The Spatial Plan specifically addresses South East Wales and acknowledges the inter-dependent relationship between Cardiff, one of Europe's fastest growing capital cities, and the wider capital or city region. Cardiff's role is to be the key economic driver for the region, at the centre of a strong regional economy which is internationally competitive. The Plan sets out the following three priorities for the city region:
- The area will function as a networked city region, on a scale to realise its international potential, its national role and to reduce inequalities
- A fully integrated high quality transport system is necessary for this to happen. Over the 20 year horizon of the Wales Spatial Plan, all the Area's key settlements should be linked to Cardiff or Newport by suitable high capacity public transport
- The success of the Area relies on Cardiff developing its capital functions, together with strong and distinctive roles of other towns and cities.

The Plan takes account of the inter-dependence of Cardiff, Newport and the Valleys and suggests there are three sub areas of the capital region, each of which requires an alternative approach:

- City Coastal Zone: An area including the two main cities of Cardiff and Newport as well as smaller distinct communities offering a high quality of life located in rural, coastal locations
- Heads of the Valleys Plus: An area set in superb natural surroundings, comprising the upper valleys of the Capital Region facing very considerable social challenges created by economic restructuring of the late 20th century
- Connections Corridor: The mid valleys and rural areas increasingly under pressure for economic and housing development spilling out of the cities and city fringes. While some areas of deprivation remain in this sub-region, this connecting strip between coastal city growth and the restructuring area in the Heads of the Valleys Plus zone is generally increasing in prosperity.

The Spatial Plan suggests that South East Wales must work as a networked City region of 1.4 million people in order to provide the quality of life appropriate for the twenty-first century and in order to compete with comparable areas for investment in growth.

The Plan suggests a network of strong, sustainable communities spreading prosperity from the major centres of the coastal belt to Valleys across the region. Key settlements will provide the central framework around which high capacity transport links will be developed.

The Plan also suggests a wider range of facilities and services, which add to employment opportunities, should be delivered to the key settlements to reduce the need to travel.

- Fourteen key settlements have been agreed, and independently validated, as having a critical role to play in the success of the Capital Region. These are: Aberdare, Abergavenny, Barry, Blackwood, Bridgend, Caerphilly, Cardiff, Chepstow, Cwmbran/Pontypool, Ebbw Vale, Llantrisant, Merthyr Tydfil, Newport and Pontypridd.
- Cardiff will play a pivotal role as a key provider of higher level services, focusing on innovation and higher value-added knowledge sectors.
- Newport's regeneration will strengthen its strategic role as the economic gateway to Wales, and maximise the benefits of its strong connections with the Eastern Valleys.
- Bridgend has a particular role to play in linking with the Swansea Bay city region.

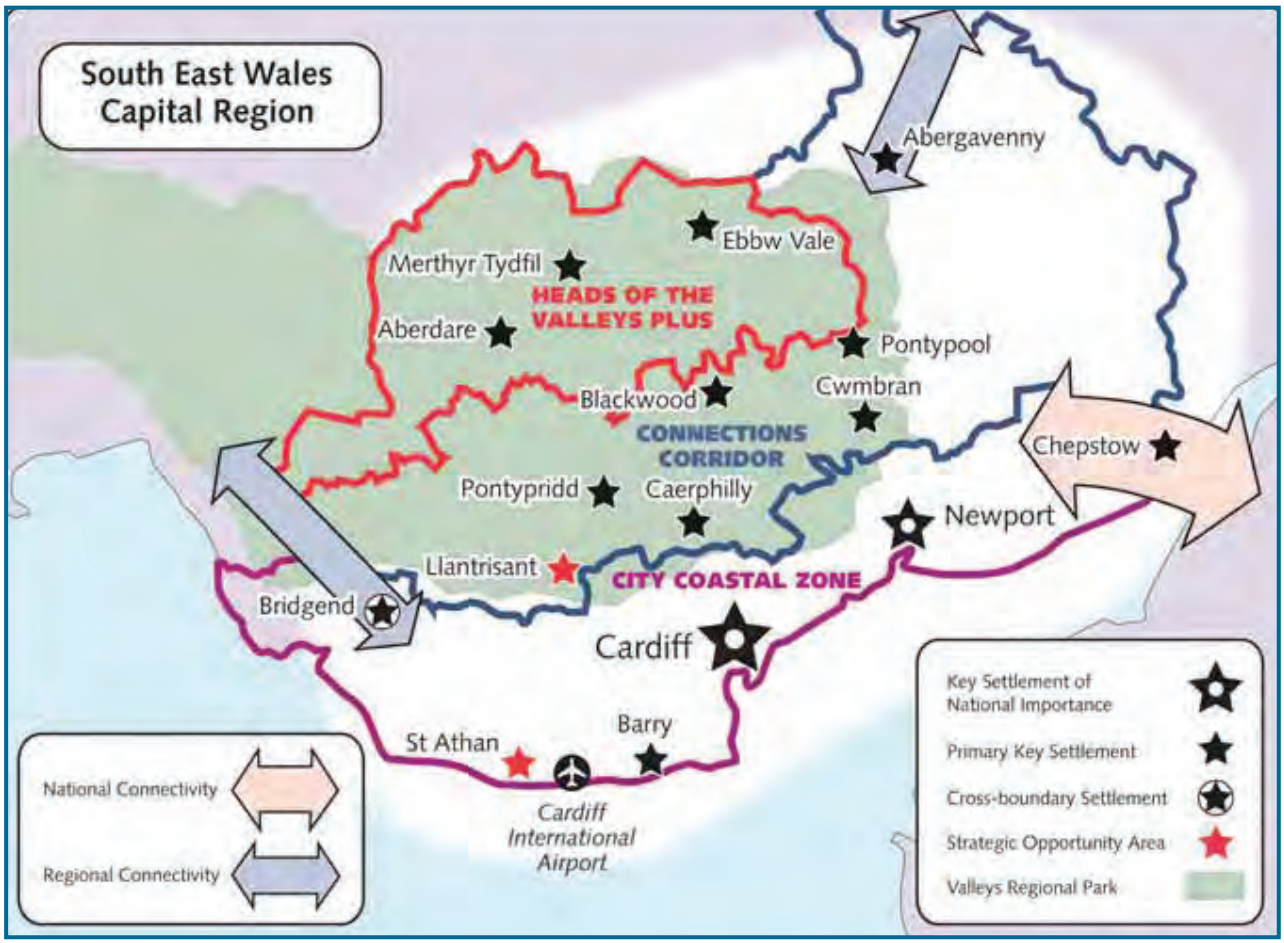


Table 13: Wales Spatial Plan for SE Wales

Improved transport is identified as being central to making the City Region work. Measures to alleviate congestion and investment to tackle transport bottlenecks are identified as important elements in measuring the areas competitiveness. The Plan refers to the regional transport plan being developed by the South East Wales Transport Alliance (SEWTA). Investment in infrastructure is seen as allowing major private sector employment growth in the South of the City Region whilst allowing strategic interventions, focussed on regeneration and investment in the more deprived areas through the creation of sustainable transport corridors.

Finally, the Spatial Plan highlights the contribution made by Cardiff International Airport in providing economic and tourism links to the City Region and suggests there needs to be "…good road and public transport access" to the airport.

Planning Reform

The Welsh Government has embarked upon a programme of planning reform leading toward a proposed new Planning Bill for Wales in 2015/16.

The latest edition of Planning Policy Wales (Edition 5, November 2012) included a revised chapter 7 on economic development which sets out how the planning system should aim to support and promote economic and employment growth alongside social and environmental considerations. Section 7.1.3 suggested that the planning system should aim to *"…co-ordinate development with infrastructure provision"* and *"… align jobs and services with housing so as to reduce the need for travel, especially by car"*.

Chapter 7 of PPW seeks to implement the findings of the Independent Advisory Group (IAG) on planning reform (Towards a Welsh Planning Act: Ensuring the Planning System Delivers, June 2012). The IAG final recommendations included a requirement for a statutory framework to enable the introduction of strategic planning and a national support structure to ensure delivery of the proposed regional strategic planning arrangements.

As an interim measure, the Welsh Government is recommended to identify the status of national documents such as the Wales Infrastructure Investment Plan with respect to the land use planning system, setting out those national priorities that have a spatial dimension so as to clarify their place in the formation of informal regional land use strategies and LDPs.

Delivery of Local Development Plans

Under the Planning and Compulsory Purchase Act 2004, each unitary authority in Wales was placed under a statutory duty to provide a Local Development Plan (LDP).

These plans will be vital in pursuing an economic development strategy for the wider City region.

As at 1 June 2013 four out of ten Local Authorities in South East Wales had adopted their LDP. Bridgend, Cardiff, Monmouthshire, Newport, Torfaen and the Vale of Glamorgan remain outstanding.

LDPs are the business plans of our towns and cities and the slow progress in preparing these plans illustrate the practical difficulties in aggressively promoting change in the planning system.

The Independent Advisory Group (IAG) recommended a 'larger than local' approach to LDP formation and the introduction of a statutory framework to enable strategic regional planning. The IAG also recommended the granting of incentives to Local Authorities for prompt completion of LDPs and the provision of penalties for the poorest performers.

Strategic Environmental Assessment (SEA) Requirements

There are requirements for a strategic environmental assessment of Government plans for transport, planning or land use which will set the framework for future development. It would be a key recommendation that an SEA is undertaken to comply with these requirements.

10.4 Regeneration Policy

Vibrant and Viable Places

The Vibrant and Viable Places Report was the result of a policy review into regeneration and was launched at The Senedd in March 2013.

The vision is that everyone in Wales; *"…should live in well-connected, vibrant, viable and sustainable communities with a strong local economy and good quality of life"*.

At the heart of this vision is a joined up delivery across the whole of Government with full Cabinet support of regeneration as a cross cutting agenda. The framework is also to integrate, wherever possible, EU funding to maximise investment opportunities.

The report sets out the following commentary on transport and the rail network:

> *Transport plays a central role in our daily lives. Its availability and accessibility influence where people live and work, their leisure options, and their opportunities to interact with friends, family and the wider community.*
>
> *An effective, accessible and affordable transport system will be a key building block of our regeneration framework.*
>
> *Ensuring sustainable access – especially by public transport and active travel modes – should be an integral element of planning new services and facilities and the regeneration of communities.*
>
> *Welsh Government and other partners continue to make substantial investment in transport infrastructure in Wales. We will ensure that our investment secures the maximum benefit for communities and helps drive regeneration through targeted recruitment and training and local supply chain development. We will also work with partners, such as Network Rail, to ensure that their major investments, for example, the substantial investment in Valley Lines electrification and their plans for network renewal throughout Wales, secure significant economic and regeneration benefits for Wales.*

The report also seeks to review the future of rail in Wales and to better understand the role we will require of rail in future. In this way, the report seeks to provide more accountability to the Welsh Ministers of rail investment. In doing so, we will be better placed to match railway investment to our regeneration framework.

Vibrant and Viable Places, New Regeneration Framework

On 10 September 2013, the Minister for Housing and Regeneration provided an update on the allocation of up to £90 million capital of targeted regeneration investment for 2014/15 to 2016/17 inclusive. This funding was made available under the 'Vibrant and Viable Places' regeneration framework. Eleven Local Authorities have been invited to proceed to Stage 2 of this competitive application process, including five of the ten Local Authorities in South East Wales as follows:

LOCAL AUTHORITY	SETTLEMENT AREA
Bridgend	Bridgend
Merthyr Tydfil	Merthyr Tydfil
Newport	Newport Central
Rhondda Cynon Taff	Pontypridd
Torfaen	Pontypool

Schedule of Settlement Areas in South East Wales Invited to Submit Strategic Outline Programmes for Regeneration Funding

In addition, the Minister for Housing and Regeneration ring-fenced £5 million over the next three years to invest in key projects aimed at tackling poverty in those Local Authorities not included in the table above but which contain wards within the top 10% of deprived areas (2011 Welsh Index of Multiply Deprivation). These include the following Settlement Areas:

LOCAL AUTHORITY	SETTLEMENT AREA
Blaenau Gwent	Tredegar
Caerphilly	Rhymney
Cardiff	Grangetown
Vale of Glamorgan	Barry

Schedule of Settlement Areas in South East Wales Invited to Submit Applications for Funding Aimed at Tackling Poverty

Centre for Regeneration Excellence Wales (CREW)

CREW was established in early 2010, following the recommendations of a Task and Finish Group which reported in 2009.

We are not aware of any specific work undertaken by CREW on transport related regeneration or economic development. We note however their general involvement in projects relating to disadvantaged communities.

There is, however, potential for an interface between CREW and Welsh Government Regeneration Specialists to support the improved integration of land use and transport in and around railway stations, to increase densities, manage place making, demonstrate benefits for the market and encourage local developers into this market.

10.5 Transport and Infrastructure Policy

Wales Transport Strategy 2008

'One Wales: Connecting the Nation' is the Wales Transport Strategy which seeks to ensure that transport will feature strongly in the Welsh Government policy spectrum. In this way, it is anticipated that we can get the most out of our existing transport system, make greater use of more sustainable modes of travel and reduce the demand on our current transport system.

The report states that an efficient and effective transport system helps increase the number of people wanting to live, work and spend leisure time in Wales, which in turn builds strong and vibrant economies. The report also notes that improved access to education and employment contributes to the long term prosperity of Wales with poor access in the Valleys being one issue highlighted. The strategy refers to the Wales Spatial Plan in terms of its ambition to building and promoting sustainable communities.

National Transport Plan 2010

In March 2010 Welsh Government published its first five year transport plan. This announced improved rail services and included updated rolling stock and the direct Ebbw Vale to Newport rail link.

The National Transport Plan set out solutions to transport issues along the main movement corridors and recognised the strategic corridors as east-west. The plan also sought to strengthen the role of transport planning during policy development and planning, to improve the provision of, and access to, rail services as well as improving access to key sites and services.

In terms of South Wales, the Plan identified both the 'east-west' links to England as well as the city region traffic generated around our main cities. Specific recommendations for South East Wales were:

- Increase the capacity, quality and performance of the Valleys Lines rail network by:
  - Create additional platforms at Pontypridd, Caerphilly and Barry with work starting by 2014.
  - Introduce additional carriages to peak time services and add a new station at Energlyn, by 2014.
  - Develop plans to introduce additional services on the lines from Pontypridd and Caerphilly to Cardiff.
- Introduce additional half-hourly services on the Vale of Glamorgan Line, to facilitate access to Cardiff Airport.
- Complete the redevelopment of Newport rail station to increase capacity and improve the quality and reliability of services.
- Complete the improvement to Gaer Junction to enable direct rail services between Ebbw Vale and Newport, by 2011.
- In line with the regeneration of Ebbw Vale, appraise the feasibility of a new rail station in the town centre (now confirmed).

The National Transport Plan committed to increase the capacity of the Valleys lines with additional platforms, carriages and services together with the construction of additional park and ride facilities. In addition, The Plan suggested that old railway lines could be re-opened with the potential for light rail and guided buses.

South East and Wales Transport Alliance, Regional Transport Plan

The Regional Transport Plan (RTP) was written in March 2010 and was developed, in collaboration, by the ten constituent Councils of SEWTA.

The RTP set out a 15 year vision up to 2025 with a programme of projects for the first five years included.

The vision of the RTP is *"…a modern, accessible, integrated and sustainable transport system for south east Wales which increases opportunity, promotes prosperity for all and protects the environment; where walking, cycling, public transport and sustainable freight provide real travel alternatives"*.

The Plan sets out the wider goals of supporting economic development, social inclusion and equality and the environment.

In terms of planning, the RTP states that it is not a land use plan but that Welsh Government guidance on RTPs should emphasise that the interaction between transport planning and land use planning will be critical and a process of information sharing and joined up thinking is required.

Local Planning Authorities are encouraged to influence transportation matters by guiding development to appropriate locations that can be accessed by sustainable transport provision, whilst appropriate planning obligation policies can help fund such infrastructure improvements.

Wales Infrastructure Investment Plan

In May 2012, Welsh Government published the Welsh Infrastructure Investment Plan (WIIP) which sought to set out the Government's strategic investment priorities across seven core priorities:

- Improving transport networks, particularly east-west links.
- Improving telecommunications networks.
- Supporting the development of the energy industry in Wales.
- Investing in housing.
- Delivering more efficient and economical public services.
- Improving the quality of the educational estate.
- Developing our Enterprise Zones.

The first edition of this plan set out a clear pipeline for public funded projects and a route to unlock private sector investment. The plan sets out a long list of all schemes from various sections of Government but these are not necessarily prioritised. The first annual update of the plan was produced in June 2013 and there is reference to the electrification of the Valley Lines and the Great Western mainline from Cardiff to Bridgend together with the Cardiff Area Signalling Renewal (CASR).

The WIIP provides an opportunity for the Metro in promoting a centralised Welsh Government approach to the prioritisation and assessment of investment proposals. Goal 1 seeks to *"…create a system that identifies and prioritises nationally significant infrastructure schemes across departmental responsibilities, focussing resources on the highest priority investments which will deliver the most benefit in line with sustainable development"*.

In addition, WIIP seeks to establish engagement across all levels of Government, including regional partnership boards, to ensure there is an understanding of local level need together with a wider strategic picture. The South East Wales Integrated Transport Scheme is specifically referred to in the context of collaboration across the public and private sectors at a regional level.

The WIIP also sets out a case to supplement traditional capital funding with innovative approaches to lever in significant additional investment where it offers value for money. Goal 2 states that Welsh Government will seek to "… *increase the resources invested in prioritised strategic infrastructure over the next ten years beyond expected budgeted levels"*. This might include an extension of Local Government borrowing or borrowing powers for Welsh Government.

Alignment with Other Infrastructure Projects

WIIP should provide a framework for separate projects to be aligned and, for example, there are on-going proposals for an M4 Relief Road South of Newport together with an Eastern Bay link in Cardiff. Such projects should be aligned, as far as possible, to the developing Metro project through the protection of rail corridors, establishment of park and ride facilities and high density development along corridors with strong communication links.

11 Modal Study

Full details of the mode study are provided in a sub report by Capita Symonds

11.1 Modes and Routes Considered

The study explored the potential application of Heavy Rail, Light Rail, Metro, Tram, Tram-train and Bus Rapid Transit (BRT), Personal Rapid Transit (PRT) and Ultra-Light Rail on the corridors illustrated in Figure 69.

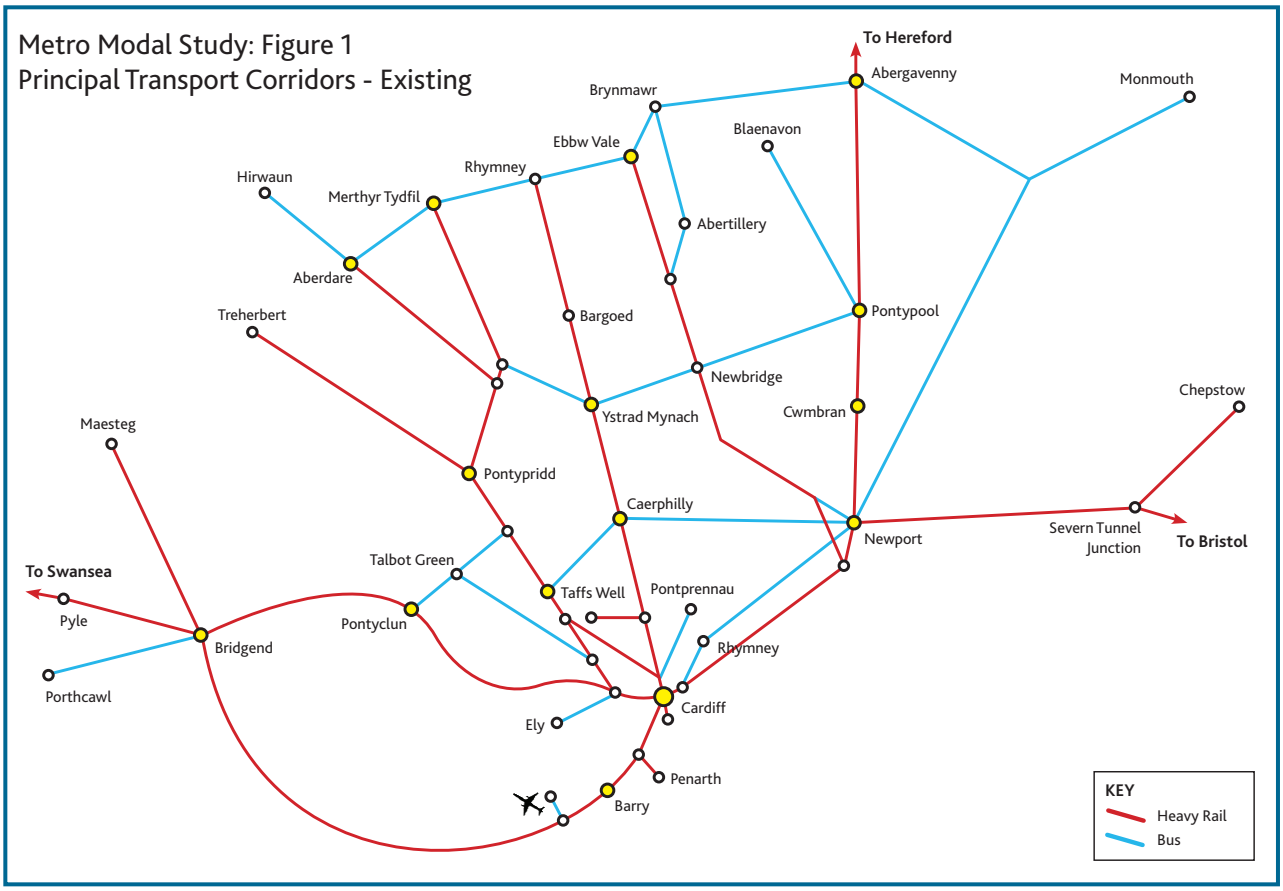


Figure 69: Principal corridors for Mode Study

11.2 Analysis & Key Findings

The majority of the existing Valley Lines network was originally designed primarily for moving heavy freight. Current passenger operations, which have gradually been extended over the years, have remained 'heavy rail' in due to a combination of legacy arrangements, availability of rolling stock and network interfaces and other constraints including on-going freight flows.

Wales Infrastructure Investment Plan

The use of 'light rail' technology for the Valley lines network has been considered in the past however constraints to this have been:

- Lack of electrification.
- Signalling immunisation costs for electrification.
- Existing freight flows include Coal on the Cwmbargoed Branch/Rhymney Line, Stone Traffic on the Machen Branch/Ebbw Valley Railway, Coal Traffic from Hirwaun on Aberdare/Taff Vale Branch and Freight on Maesteg line south of Tondu.
- Existing mainline heavy rail passenger operations including interfaces at Cardiff Central and Cardiff West Junction.
- Line capacity for higher frequency operations.

The completion of Cardiff Area Signalling and Newport Area Signalling Renewal schemes together with an associated package of other improvements, including increased separation of Valley lines and other rail traffic though Cardiff Central station together with the Valley lines electrification project will remove a large number of these constraints. Consequently the use of light rail modes can be considered on the existing heavy rail network.

Based on demand information available the majority of public transport corridors in the study area have current peak hour capacities of between 150 - 1200 ppdph (passenger per day, peak hour). Given average growth rates of 4- 6% per annum mean any new proposals need to consider capacities of at least 2- 2.5x this to cater for the next 20 years demand (i.e. 400-3000 ppdph).

Metro intervention proposals to extend of the population catchment within 1.2km of a strategic services by 60% through provision of new stations to improve local accessibility and provision of new routes would increase demand on core corridors further. This places the majority of the principal corridors forming the strategic network in the capacity range for BRT, Light Rail, Tram Train and Light Rail transit (on the main corridors). They would also be better suited to the stop spacings on the network allowing for metro interventions compared to heavy rail. Full Metro is not applicable as system capacities are oversized.

BRT is well suited to existing highway based corridors with lower flows where measures can be progressively developed to support key corridors include Cardiff – Newport northern corridor, the mid Cross Valleys corridor, Heads of Valley corridor and Blaenavon to Cwmbran (and possibly Newport). BRT is also an alternative mode to tram or tram train for new rapid transit routes in Cardiff. The rural routes to Monmouth have very low passenger flows and limited congestion are best served by existing bus and coach operations.

On the existing heavy rail network there are constraints on the choice of modes for passenger operation due to need to accommodate continuing freight services such as Cwmbargoed to Aberthaw Coal Trains. Whilst tram would provide the appropriate capacity its use is still constrained by difficulties of achieving full segregation from freight operations in the short to medium term.

In addition, the existing stations at Central and Queen Street are well situated to the centre of Cardiff so there is less immediate need for new on street routes except where to bypass existing heavy rail lines for capacity reasons. Whilst tram would be ideal for new rapid transit in Cardiff it is also less suited to longer journeys over 15 miles.

Tram Train addresses the main restrictions on Tram use with similar benefits although this mode would also benefit in terms of greater operational separation from the heavy rail system. Its ability to operate on street and use tight radii as with trams in particular, makes it appropriate for new alignments such as the North West corridor from Cardiff where this would help reduce construction costs and enable potential on street operation to by-pass congested areas such as Cardiff west junction. The main technical issue to be addressed is whether to use high or low floor vehicles.

Light Rail Transit would also be appropriate to the main corridors in capacity terms particularly if configured internally in terms of seating provision for longer distance journeys in the range of 10 – 30 miles from the north mid valleys catchment area which are less suited to tram and tram train, although the latter is not ruled out. Light Rail Transit (LRT) would be particularly appropriate as a replacement to existing heavy rail operations in the core Valley lines network using high platform stations where operations on are fully segregated alignments and can be largely physically separated from heavy rail operation except for limited freight traffic where signalling separation could be used.

Heavy rail will have a continuing role on a number of parts of the network which cannot easily be separated from existing heavy rail operations or where heavy rail has specific advantage, such as improved comfort for longer distance journeys and higher speeds. Whilst heavy rail operations also falls into the identified capacity range this would be with longer trains at lower frequencies (typically 2tph) which would not address the objectives of a turn up and go service at an affordable cost. Similarly it is less well suited to the stop spacings on many parts of the core Valley lines network compared to light rail modes.

PRT has not been identified as suitable for any of the principal transport corridors largely due to difficulties of integrating it into the existing urban fabric, capacity capability and concerns over its use in an uncontrolled environment. However it would be well suited to provide a link between Cardiff airport and new Station on the Vale of Glamorgan line in particular given its flexibility allow for future changes to the airport terminal arrangements. An alternative would be a ground based cableway system.

EMU – Electric Multiple Unit. Standard 'heavy rail' Electric Commuter Trains in widespread use across the UK and likely to be rolled out on some/all of the valley lines network following electrification by 2020.

Tram-train : A hybrid train used in parts of Europe, able to run on normal electrified rail lines and also in 'tram' mode on street enabling lower cost extension of rail services. Could work well in Cardiff to link City and Coryton lines to Cardiff Bay and beyond, as well as potential extension to the North West of Cardiff and RCT. The best known example is Karlsruhe in Germany. Currently being trialled in Sheffield.

LRT – Light Rail Transit. Lighter Electric Trains better suited to operating high frequency services with close stop spacings than EMUs. The best example in the UK is perhaps the Newcastle Metro. Could be considered on the core Valley lines network instead of EMUs.

BRT – Bus Rapid Transit. Range of technologies involving full or partial segregation of high quality bus network away from other road users. Operation and performance more akin to light rail/tram rather local bus service with fewer stops/shorter journey times. In the UK The Cambridge guided bus way is perhaps the best example.

11.3 Future Network Proposals

In developing future Network proposals two future scenarios have been considered.

Scenario 1 - Limited Separation

This scenario is largely based on the 'status quo' with majority of services remaining integrated with the heavy rail network with the development of a number of 'tram-train' services and limited separation on routes into Cardiff and along the South Wales main line relief lines to Newport. A potential network is illustrated in Figure 70 based on this scenario.

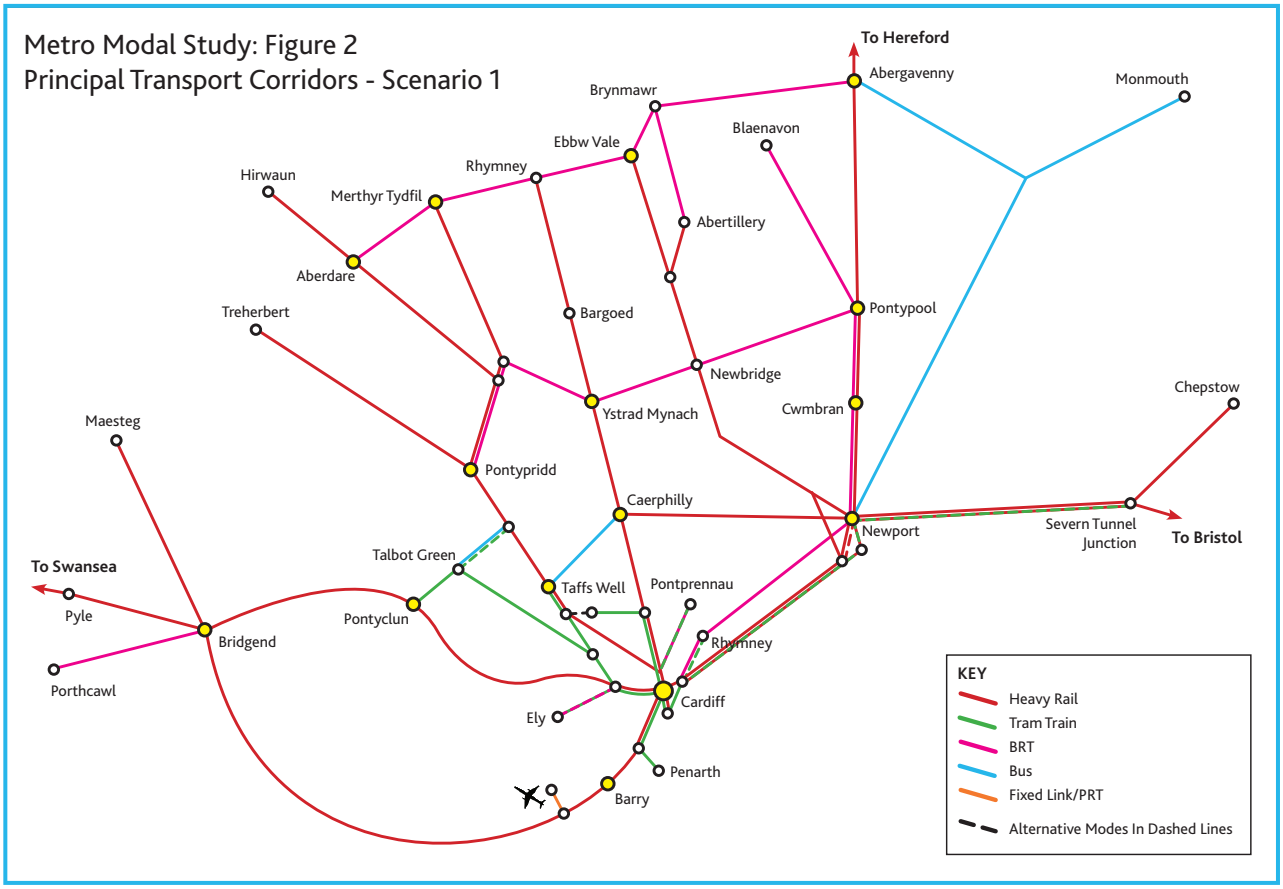


Figure 70: Mode study potential network Scenario 1

This scenario, whilst representing an improvement on the existing situation particularly for routes around Cardiff, it is unlikely to fully satisfy the Metro project aims of provide the region with a high quality, high capacity 'turn up and go' network as Heavy rail frequencies would be lower for the same capacity as Tram Train or LRT.

Scenario 2 - Maximum Separation

Maximum physical and signalling separation of the Valley line network from the Heavy Rail network will be used to enable the replacement of Heavy Rail with a combination of tram train and LRT rolling stock on the core Valley lines network together with tram train on other routes. The remainder of the Network which interfaces with main line operations would remain as heavy rail. There would be a total of 3 rail modes, Heavy Rail, Tram - Train and LRT. BRT provide the main mode on the majority of the remaining Network. A potential network is illustrated in Figure 71 based on this scenario.

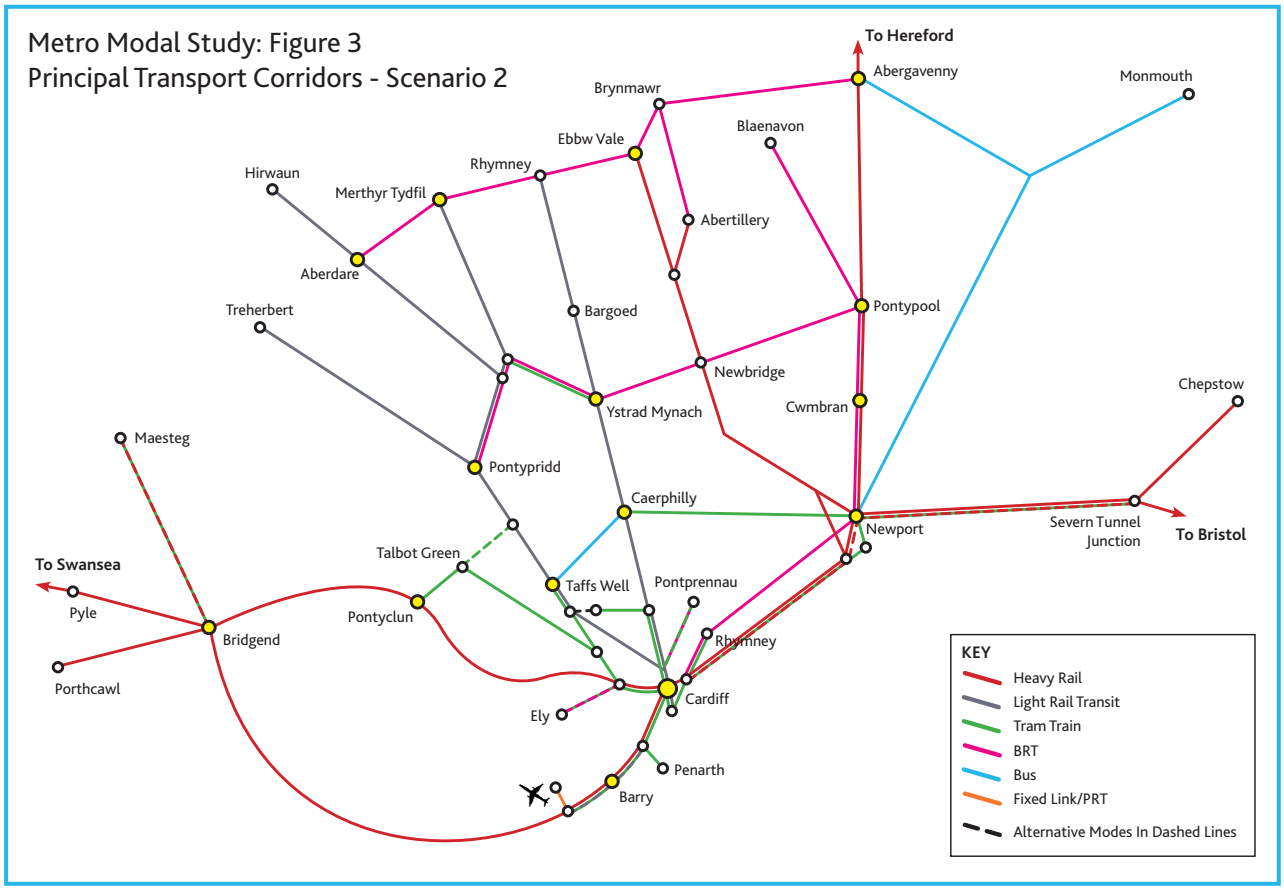


Figure 71: Mode study potential network scenario 2

There are a number of intermediate scenarios between these two options, with scenario 2 potentially a longer term development of scenario 1 subject to other factors and change in potential constraints.

The following network is likely to remain heavy rail only operation in all scenarios:

- South Wales Mainline West of Cardiff (and main lines East of Cardiff).
- Marches Line.
- Gloucester Line.
- Ebbw Valley Line.
- Vale of Glamorgan Line (used as a diversionary route for the Main Line).

The Maesteg line could remain as heavy rail or be operated as a shuttle to Bridgend using Tram train operation which would also support possible extension of the line to Caerau.

11.4 Rolling Stock Requirements and Fit with VLE

Table 14 summarises the rolling stock implications for each scenario.

Current rolling stock consideration for the Valley Lines Electrification is based on cascaded 3 car Electric Multiple Units (EMUs) although new build EMUs may also be considered. In view of the electrification timescales with completion by 2019 and ongoing trial of Tram Train operation it may be difficult to progress more than small scale tram train application on the network in that timescale.

However, cascaded stock would have a lifespan of no more than 15-20 years during which time it could be steadily replaced by Tram Train or LRT stock as lines are converted and displaced stock used for improving services on remaining routes e.g. Ebbw Valley, Maesteg or Marches line if electrified. If new rolling stock is ordered for VLE it may be more difficult to make a business case for subsequent light rail conversion of the core Valley lines network therefore scenario 1 is a more likely outcome. However given a likely on-going UK national program of electrification there should be a ready market for surplus stock.

A further issue in respect of Valley lines Electrification is the choice of electrification system where provision of 750 DC rather than 25kv AC on low speed routes such as the Cardiff Bay branch or Coryton branch may be more economic than 25kv system if tram train operation could be introduced in time.

The introduction of a new modes will bring with it a number of high fixed costs including the provision of appropriate maintenance facilities. It is also more economic to operate larger common fleets. This means that there needs to be a 'critical mass' of new routes. For these reasons tram – train proposals to Cardiff bay need to be linked with either Coryton line, City Line/Radyr, North West corridor or relief line proposals to derive a core network of sufficient size. Likewise implementation of light rail transit on the core Valley line network.

Table 14: Mode study potential service and rolling stock requirements

ROUTE	SERVICES REQUIREMENT		ROLLING STOCK REQUIREMENTS			COMMENTS
	EXISTING FREQUENCY	POTENTIAL FREQUENCY	DO MIN	SCENARIO 1 - MIN SEPERATION	SCENARIO 2 - MAX SEPERATION	
Cardiff Bay Branch	5 tph	>6 tph	EMU	Tram-Train	Tram-Train	
Coryton Branch	2 tph	>4 tph	EMU	Tram-Train	Tram-Train	
City Line	2 tph	>4 tph	EMU	Tram-Train	Tram-Train	
Merthyr, Treherbert & Aberdare Lines	2 tph per line, 6 tph total	4 tph (>6 tph total)	EMU	EMU	Light Rail Transit	Proposed segregation of City Line with NW corridor
Rhymney Line	1 - 3 tph	>4 tph	EMU	Light Rail Transit	Light Rail Transit	Potential Network extension Aberdare to Hirwaun
Penarth Line	4 tph	>4 tph	EMU	EMU	Light Rail Transit	
VoG, Barry and Airport	1 tph VoG (3 tph Barry)	>4 tph to Airport	EMU	EMU	EMU/ Light Rail Transit	
Ebbw Valley Line	1 tph	>4 tph	EMU	EMU	EMU	Newport Service and Potential Network extension to Abertillery
Maesteg Line	1 tph	2 - 4 tph	EMU	EMU	EMU/Tram-Train	Potentially operated as shuttle to Bridgend
Cardiff - Abergavenny	1 - 1.5 tph	2 - 4 tph	DMU	EMU	EMU	Potential route electrification
Cardiff - Chepstow	1 tph	2 - 4 tph	DMU	EMU	EMU	See below
Cardiff - Newport - STJ/ Chepstow (Relief Lines) #1	New Service	>4 tph	NONE	EMU	EMU	Includes potential electrification to Chepstow
Cardiff - Newport - STJ Relief Lines) #2	New Service	>4 tph	NONE	Tram-Train	Tram-Train	Includes extension via Cardiff Bay/ Newport Centre. Development of 1.
Cardiff - Pontyclun/Beddau	New Service/Line	>4 tph	NONE	Tram-Train	Tram-Train	New route from City Line
Further Cardiff RT. Pontprennau, St Mellons, Culverhouse Cross	New Service/Lines	>4 tph	NONE	Tram-Train or BRT	Tram-Train or BRT	Longer Term proposal
Newport - Caerphilly & Ystrad Mynach to	New Service/Line	2 - 4 tph	NONE	Tram-Train	Tram-Train	Longer Term proposal
Cardiff - Newport	New Service	>4 tph	BUS	BRT	BRT	

11.5 Low or High Floor

A key decision in whether to implement proposed new lines such as the north west corridor as high floor (915mm high platforms as per existing rail network) or low floor (350mm platform use on modern tram systems). Low floor systems would be the first choice, legacy issues aside due to lower construction cost, vehicle availability and improved aesthetics. However interfacing with the existing rail network would require either dual height platforms or reconstruction existing stations to lower platform heights.

A high floor system avoids interface issues with the existing network but incurs increased costs for new routes. Existing tram train products are low floor. Unless high floor tram train stock can be economically procured one option is to split the system between high and low floor operations with limited number of interface stations with dual height platforms. Under scenario 2 high floor light rail transit would be used on the core valley lines network.

12 Costs, Implementation Plan and Next Steps

12.1 Overall Programme

The Metro identified in this paper can be delivered incrementally in the period to 2030 at an estimated total cost of £2Bn. There will be opportunities to review components in detail and revise this programme subject to the more detailed work required in the next couple of years (see below). However, at this stage an illustrative programme is set out in Figure 72 below.

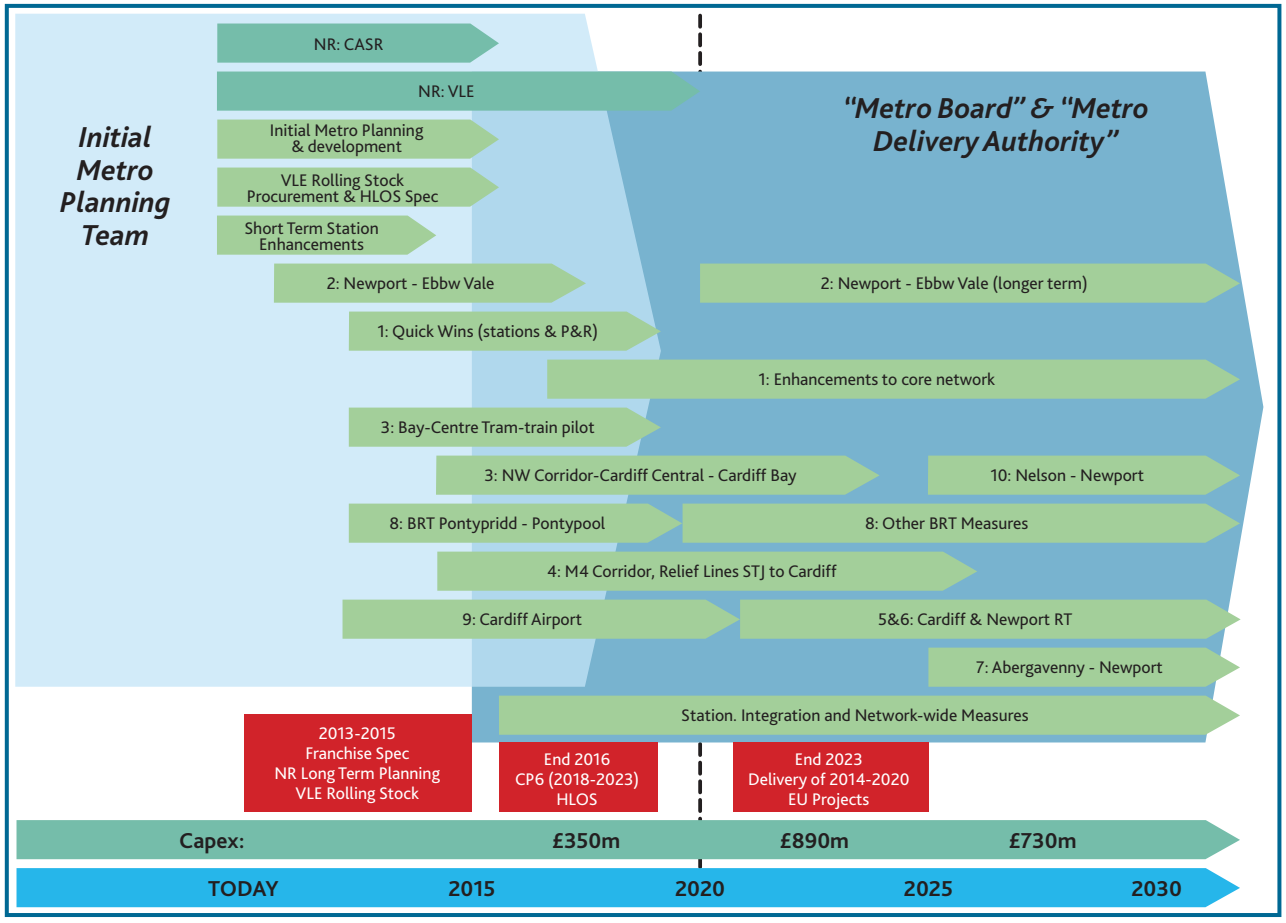


Figure 72: Illustrative Metro Implementation Plan to 2030

METRO COMPONENT	TO 2015	2015 - 2020	2020 - 2025	2025 - 2030	TOTAL	NOTE
Current programme proposals						*Includes NSIP/DDA station enhancements and extemsion to Ebbw Vale Town with 2tph; allocation for further Metro development*
M1 Enhancements to core network		£100m	£170m	£200m	£470m	Priority for early development
M2 Ebbw Vale Newport			£20m	£10m	£30m	Priority items in current programme above
M3 North West Corridor		£150m	£240m	£0m	£390m	Priority for early development and implementation by 2002
M4 Relief Lines / M4 Corridor			£250m	£0m	£250m	Priority for early development
M5 Other RT in Cardiff			£150m	£300m	£450m	Likely to be later in the programme
M6 Rapid Transit to /in Newport		£10m	£20m	£40m	£70m	Medium Term
M7 Newport - Abergavenny				£70m	£70m	Likely to be later in the programme
M8 Regional BRT		£30m	£40m		£70m	Prioritise Pontypool - Pontypridd
M9 Cardiff Airport		£60m			£60m	Priority for early development
M10 Nelson Newport				£110m	£110m	Long Term
Total for new Metro schemes		**£350m**	**£890m**	**£730m**	**£1,970m**	

Other Measures to be considered include: Station branding, wider placemaking, ticketing and customer information, local bus services and integration admin/ops

Table 15: Illustrative Capex Profile to 2030

Note:
These costs have not been based on a detailed engineering assessment but on desk research and use of previous studies and reports. The margin of error in some cases is likely to be significant. Further and more detailed analysis and assessment will be required as the schemes are developed further. VLE and CASR costs, as committed schemes have been excluded.

Within the above programme are a number of 'quick wins' that can be developed and delivered by 2020. Subject to the results of more detailed engineering assessment, these will cost of the order of £350M. Similarly estimates for the priority projects (which include the quick wins) to 2025 suggest a total cost £1.3Bn.

In addition to the capital costs estimated above, further work will be required to explore costs for:

- Additional rolling stock.
- Station Design & Placemaking.
- Operating costs and potential subsidies.
- Systems and wider integration measures (ticketing, services and customer information).
- Longer term operating and administration costs to support potential dedicated Metro development/delivery team/function.

An illustrative programme for delivery has been set out which will enable the benefits to be delivered incrementally from 2015 to 2030 as illustrated in Figure 72.

In the medium term, the responsibility for the project, its detailed development and implementation should be the responsibility of a separate and dedicated body as set out in the Executive Summary. In advance of any major organisational and governance changes, immediate progress can be made on further development of the concept by establishing a dedicated team under the auspices of the Welsh Government.

12.2 Immediate Actions

It is the view of the project team that the most important consideration is to maintain momentum and begin more detailed work (engineering, options appraisal, business cases, etc) for the key Metro interventions identified in this report. Issues of Governance, longer term funding, organisation, PTA/PTE, devolution of rail powers re franchises and/or infrastructure etc and the impact of the developing city region debate will clearly influence how the metro is developed and delivered. However, this should not prevent the Welsh Government from making immediate progress in exploring the priority schemes in more detail. It is anticipated that 18~24 months will be required to develop these schemes to more accurately present the costs, business cases and relative priorities.

In progressing with this development work, a programme should be established that also incorporates other near term work planned on the rail network. This includes some station enhancement and planned infrastructure improvements on the Ebbw Vale line.

This team will also lead on establishing the longer term governance and financing arrangements for consideration by the Minister as well as defining the Metro network.

12.3 Key Sills Required

In progressing with more detailed work on the Metro a core team will need to possess a range of skills, experience and expertise. This should ideally include:

- Strategic regional planning, development and regeneration.
- Transport economics, appraisal and business case development.
- Rail, Light Rail and Rapid Transit engineering assessments and modelling.
- Rail/bus finance and operations.
- Customer information and ticketing systems.
- Franchise and HLOS specification.
- Land and property acquisition; planning/regulatory/CPO.
- Masterplanning, urban design, station design and placemaking.
- Organisation and Governance.
- Corporate finance/investment, public sector finance and European Funding.
- Procurement and contract management.
- Marketing, branding and communications.
- Stakeholder engagement.
- Leadership and programme management/support.

It is recommended that a core dedicated Metro planning team is established to drive the further development of the concept on behalf of WG and the local authorities.

13 Notes and Context

13.1 Context and Approach

In March 2103, The Metro Consortium published its report "A Cardiff City Region Metro: transform | regenerate | connect". Following discussions in April 2013, the Minister for Economy, Science and Transport, Edwina Hart, asked Mark Barry to undertake a Metro study and report back in the autumn. The study team, led by Mark Barry, also included Capita Symonds, Jones Lang LaSalle, Powell Dobson Urbanists and Steer Davies Gleave.

13.2 This Report

An executive summary is included at the beginning of the report which sets out the primary conclusions and recommendations which are supported and explored in more detail in the remaining sections. Further supporting details are provided in separate sub reports and appendices.

13.3 Project Scope, Objectives and Approach

Geographical Project Scope

This project will explore connectivity and economic development/regeneration for the ten local authorities in South East Wales: Blaenau Gwent, Bridgend, Caerphilly, Cardiff, Rhonda Cynon Taf, Merthyr Tydfil, Torfaen, Newport, Monmouthshire and The Vale of Glamorgan.

Objectives

This Metro Study started in May 2013; its overall objectives, as set out in the Project Specification (V1.1 dated 16th May 2013) agreed during May, were to:

- provide a more comprehensive spatial & regional economic context for Metro development.
- inform a strategic region wide economic plan.
- provide guidelines/context for the regions local authorities as regards Metro development.
- provide input to the Wales & Borders franchise specification & Network Rail route planning.
- assess a range of transit modes for Metro interventions (EMUs, tram-train, light rail & BRT).
- provide details and data for further and more detailed Metro planning.
- present a number of strategic Metro interventions and their potential impact.
- identify a number quick wins for implementation at the same time as or before, VLE.

Approach

The project approach embodied:

- A mix of desk and primary research
- Mix of qualitative and quantitative analysis
- 80/20 rule applied, aimed for rapid progress even if some data/analysis was n/a or outstanding.
- Leverage and apply the expertise and experience of team.

Primary Deliverable

- Mapped economic and demographic profile of the region and relative connectivity Vs VLE
- Strategic development and regeneration locations and opportunities
- Metro interventions and Quick Wins.

What was ***not*** included

- Metro marketing, branding, etc
- Assessment of customer information, ticketing, etc
- Bus operations & regulatory environment
- Detailed site constraints or engineering feasibility
- Detailed operational and/or delivery plans
- Cost benefit analysis, environmental impact assessment, etc
- A formal business case

Assumptions

- Will need to leverage related work by WG, SEWTA, NR, Local Authorities, etc
- Will be mode agnostic - although will make recommendations where appropriate
- Will focus on strategic regional opportunities and interventions and not "smaller local" schemes
- Will not explore local bus services (except where interchange and service changes may be required at new/existing Metro stations)
- The baseline is CASR/VLE (Metro Phase 1)

13.4 Project Team

The team involved in preparing and delivering the report and its sub reports/appendices included:

ROLE	ORGANISATION	NAME
Study Lead	M&G Barry Consulting	Mark Barry
Regeneration & Design	Powell Dobson Urbanists	James Brown
		Liam Hopkins
Property	Jones Lang LaSalle	Chris Sutton
Transport Analysis/Appraisal	Capita Symonds	Alan Davies
Spatial Model		David McCallum
Mode Study		Alison Walker
		Michelle North-Jones
		Steph Malson
Economic Impact	Steer Davies Gleave	Chris Whitehouse
Funding Overview	Steer Davies Gleave	Chris Busch
		Simon Ellis
Governance Principles	Capita Symonds	Richard McCarthy
		Colin Wood
Project Board	Network Rail	Jeff Collins
		Tim James
	Arriva Train Wales	Claire Falkiner
		Mike Bagshaw
	Welsh Government	Bayo Dosunmu
		James Ardern
		Gareth Morgan
Challenge Review Group	Cardiff Metropolitan University	Prof Brian Morgan
	University of South Wales	Prof Stuart Cole
	Bartlett School of Planning	Janice Morphet
	Steer Davies Gleave	Jim Steer
	Welsh Government	Henry Small
	Wardell Armstrong	Jon Fox
Ad-hoc Input	Cardiff University	Prof Francesca Sartorio
		Prof Kevin Morgan
		Prof Calvin Jones
Project Support	Welsh Government	Laura Kennedy
	Capita Symonds	Carolyn Dyer
		Antony Hyde
	Jones Lang LaSalle	Patricia Freeth

Note: All potential routes and stations represented in this report are for illustration only and do not represent a commitment for any specific development and/or project.

14 Bibliography

A wide range of other reports, studies, publications were used or referenced in preparing this main report, sub report and appendices. Most of these are listed below and may provide further relevant sources of information as the Metro concept is progressed.

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15 Glossary

ACRONYM	DESCRIPTION
ATW	Arriva Trains Wales
BRT	Bus Rapid Transit
CASR	Cardiff Area Signalling and Renewals
CCEZ	Cardiff Central Enterprise Zone
CP	Control Period
DDA	Disability Discrimination Act
DfT	Department for Transport
EMU	Electric Multiple Unit
FE	Further Education
GDHI	Gross Domestic Household Income
GVA	Gross Value Added
GWML	Great Western Mainline
HE	Higher Education
HLOS	High Level Output Specification
IWA	Institute of Welsh Affairs
JLL	Jones Lang LaSalle
LDP	Local Development Plan
LGA	Lloyd George Avenue
LRT	Light Rail Transit
LSOA	Lower Super Output Area
M4CEM	M4 Capacity Enhancement Measures

ACRONYM	DESCRIPTION
NR	Network Rail
NSIP	National Stations Improvement Programme
ORR	Office of the Rail Regulator
P&R	Park and Ride
PDU	Powell Dobson Urbanists
ppdph	Passengers per day, peak hour
PRT	Personal Rapid Transit
PRT	Personal Rapid Transit
PTA	Passenger Transport Authority
PTE	Passenger Transport Executive
RAG	Red, Amber, Green Connectivity Analysis
RSL	Registered Social Landlord
RUS	Route Utilisation Strategy
SEWTA	South East Wales Transport Alliance
STJ	Severn Tunnel Junction
SWML	South Wales Main Line
tph	Trains per hour
VLE	Valley Line Electrification
VoG	Vale of Glamorgan
WG	Welsh Government

Study led by Mark Barry of M&G Barry Consulting and included Capita, Powell Dobson Urbanists, Jones Lang LaSalle and Steer Davies Gleave

Jones Lang LaSalle

the urbanists a powelldobson company

M&G Barry Consulting

CAPITA

steer davies gleave

www.metroconsortium.co.uk