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Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

# City Regions Geoscience in Wales: Scoping Study

Geology and Regional Geophysics - Geology and Landscapes  
Wales

Internal Report IR/15/003



BRITISH GEOLOGICAL SURVEY

GEOLOGY and Regional Geophysics

INTERNAL REPORT IR/15/003

# City Regions Geoscience in Wales: Scoping Study

A M Patton, D P Boon

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# Foreword

This report is the published product of a study by the British Geological Survey (BGS) in Wales. The report documents the findings of a scoping study to identify how stakeholders use and value subsurface knowledge in Wales. The findings of this study will help inform the BGS City Region research strategy for Wales, and to make recommendations on how BGS can improve delivery of geoscience data and research Wales.

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# **Summary**

This report describes the results of a scoping study to identify key geoscientific knowledge gaps in City Regions in South Wales. The study involved consultation meetings with key stakeholders and reviewed planning policy documents and development plans to establish the demand for subsurface knowledge in City Regions to reduce risk, support urban redevelopment and underpin growth.

The first part of the report provides a background to the study placing it in context. The report then goes on to review national and regional policy documents followed by detailed summaries of the Local Development Plans for all councils in South and Mid Wales. A review of these documents has established sustainable development as a priority for the Welsh Government. Councils have been required to produce Local Development Plans which address a number of key issues related to the sustainable development of each area. These include climate change, flooding, sustainable housing, resource efficient construction, employment, brownfield redevelopment, sustainable drainage, waste management, energy and minerals. Several of these key topics require geoscience knowledge and data to underpin planning decisions. The extent to which this is understood by local authorities varies between counties.

The second part of this report provides a discussion of information gathered through stakeholder engagement and includes a number of case studies which outline how subsurface data has been shared and reused for the greater benefit to society. Talks with local councils, ground engineering consultancies and water companies have identified the types of data in demand from BGS; these include: existing ground investigation data, information on contaminated land and groundwater, the nature of artificial ground, Infiltration SuDS suitability information and land stability data.

# 1 Introduction

The British Geological Survey provides geoscientific data and research that may underpin management of the environment, and development and regeneration in Wales. The quality and spatial availability of data and associated information is largely reliant on donations from external partners. The City Region programme was initiated in 2013 to improve the impact of geological research on the public and private sector in Wales, and to provide planners and developers with factual evidence upon which to inform decisions. Experience from the UK and overseas suggests provision of easily accessible subsurface information will assist environmental and resource management, including environmental issues such as land and groundwater contamination, water resources, sustainable urban drainage systems (SuDS), land instability and geohazards, coastal management, energy from coal bed methane extraction and ground sourced heat, flooding and mineral resources, as well as the effects of climate change on Wales.

At the time of writing there are no proposed City Regions in North Wales and so this study has focused on those in South Wales.

The project promotes the benefits of shared information for urban planning and regeneration in order to produce a more reliable ground model and to conserve time and financial resources. It is important that data is presented and shared in a mutually favoured way. The project aims to include an element of 3D visualisation.

This report outlines the results of the scoping study which aims to determine, through stakeholder involvement, what geoscience data would be useful to urban planning, and in what format this information should be presented. A detailed literature review has been carried out to evaluate current planning policy documents for South Wales in order to highlight key policy drivers and environmental issues. Discussions with stakeholders have identified a number of subsurface data sets that could be provided and managed by the BGS in order to support local to national scale planning decisions. Existing information, such as ground investigation records and borehole logs, could potentially be served via a link to a central geospatial data portal, such as Welsh Government's Online Geospatial Information System. IT security can be an obstacle to data sharing, but this is not insurmountable.

## 1.1 PROJECT SCOPE

The aims of the scoping study were:

- To ascertain the need for geological information and data to underpin sustainable urban development in City Regions in Wales.
- To establish the level and consistency of geoscience awareness of local and national planning authorities.
- To identify key areas of planned development and regeneration in South Wales and where there are knowledge gaps in geoscience understanding to support growth and regeneration strategies.

## 1.2 REGIONAL SETTING

The population of Wales is projected to increase by 4 per cent to 3.19 million by 2022 and 8 percent to 3.32 million by 2037 (StatsWales, 2012) and development of new housing and transport infrastructure is a priority for Wales. The main urban areas are Cardiff (pop. 346,100), Swansea (239,000) and Newport (145,700) (Welsh Government Statistics 2014). South Wales has a long history of industrial land use and much of the region is still in a stage of post-industrial regeneration. Several areas of major and minor redevelopment have been identified within the region. In recognition of the increasing impact of environmental issues, brought about by climate

change, depletion of natural resources and increased waste materials, the Welsh Government has produced a series of planning policy documents and Technical Advice Notes to guide local councils and planning authorities on sustainable development issues and to assist them in creating their Local Development Plans (LDPs). These documents form the basis of this report which aims to inform the shape the BGS's strategy for applied geology research in Wales to the end of this decade.

### 1.3 SOURCES OF INFORMATION

Correspondence has taken place between the BGS and a number of stakeholders, most of which have been followed up by visits to discuss the project and receive feedback on the types of information they would like to have made available to them.

The following organisations were contacted:

- Cardiff Council
- City and County of Swansea Council
- Neath Port Talbot County Borough Council
- Rhondda Cynon Taf Council
- Newport City Council
- Torfaen County Borough Council
- Caerphilly County Borough Council
- Welsh Government
- Atkins Global
- Parsons Brinkerhoff
- Celtic
- Welsh Water
- Natural Resources Wales
- South Wales SuDS group

A review of planning policies and Local Developments Plans involved the following documents and websites:

- Planning Policy Wales. 5<sup>th</sup> Edition
- Technical Advice Notes
- Minerals Planning Policy Wales
- Local Development Plans and Deposit Local Development Plans
- One Wales: One Planet The Sustainable Development Scheme of the Welsh Government
- Wales Infrastructure Investment Plan for Growth and Jobs
- People, Places, Future, The Wales Spatial Plan 2008 Update
- Strategic Planning Guidance For South East Wales Volume 1
- Strategic Planning Guidance For South East Wales Volume 2
- SuDS Wales website
- Lle website
- Joint Resilience Unit website

In addition, consultation of relevant BGS projects, including 'A Background to Urban Geoscience Studies in the Swansea-Neath-Port Talbot Area' and 'Maximising Past Investment in Subsurface Data in Urban Areas for Sustainable Resource Management: a Pilot in Glasgow, UK'.

## 2 Recent urban studies in Wales and Scotland

### 2.1 A BACKGROUND TO URBAN GEOSCIENCE STUDIES IN THE SWANSEA-NEATH-PORT TALBOT

In 2000-2005 a study to investigate contaminated land and contaminant migration issues in part of the Swansea-Neath-Port Talbot area was undertaken by the BGS and was partly funded under the URGENT programme.

The project aimed to improve the understanding of the 3D geometry of the area's geology, assess the types of data necessary to understand contaminant pathways, and understand the influence of geology and hydrogeology on contaminant pathways. The aim was to present the data in a GIS format for use by planners and specialists, and to assess techniques to provide a cost-effective approach to providing an initial assessment of the nature of artificial deposits. Together with the report (Waters, *et al*, 2006), the project produced a GIS database containing the following information:

- DiGMap 50k maps of solid, drift, artificial and landslides
- 50k OS topographical maps, 10k OS topographical maps and contour information
- Orthorectified historical maps and BGS fieldslips
- G-Base geochemical and chemical data
- Petrol stations, nature reserves, SSSIs, ancient monuments
- Water levels from Wellmaster and from SI records, water abstraction sites, groundwater vulnerability maps
- Waste disposal sites from the 1972 database
- Aerial photography registered to the topographical base
- Digital Terrain Model to allow 3D visualisation of data
- Geological model showing superficial and bedrock distribution and location of geological faults
- The extent and characterisation of artificial deposits
- Former and current land use relevant to potential contamination
- Landfill database
- Database of boreholes and site investigation reports with index information
- Geological interpretation of boreholes useful in modelling the 3D geometry of sand bodies, areas of peat
- Rockhead contour and drift thickness isopachyte maps
- Depth to water table map
- Distribution of washland areas, useful in identifying areas of potential contamination occur on floodplains
- Licensed water abstractions
- Water courses
- Aquifer vulnerability/protection zones
- Hazard assessment ranking for particular contaminants.

The extent and nature of Artificial Deposits was not previously mapped in this area, and so had to be determined from archive data such as aerial photographs, Ordnance Survey maps and boreholes leading to limited and imprecise information. The artificial ground was separated into three classifications; made ground – deposited upon natural rock or superficial deposits, worked ground – areas of excavation, and infilled ground – excavation areas which have been subsequently filled. These categories are then further subdivided as follows: Made ground:

- Embankments
- Waste tips
- Raised fill

- Artificial lagoons
- Archaeological raised ground

Worked ground:

- Mineral excavations
- Engineering excavations
- Archaeological excavations

Infilled ground:

- There are few examples of this within the study areas

This work paved the way for an enhanced classification for Artificial Ground (Ford, *et al*, 2010) and the data formed part of the Artificial Ground layer in the subsequent revision of the 1:50 000 Swansea Sheet 247 (2011).

A 3D model of the Quaternary age deposits, Artificial Deposits, and of rockhead was derived from contoured borehole data. The rockhead model was based on hand-drawn contours. The main Superficial deposits were modelled using GSI3D software (v1) using borehole information, to produce a 2D framework of digitally hand-drawn geological cross-sections, that was interpolated to generate 2.5D surfaces. The early version of GSI3D software (v1) was useful for modelling superficial deposits but was less suited to more structurally complex bedrock geology.

The distribution of potentially contaminated land was derived from current and former land use. The forms of land use that may have resulted in contamination have been categorised as follows:

- Agricultural land
- Extraction industries and mineral processing
- Gas works, coke works and coal carbonisation works
- Power stations
- Electricity sub-stations
- Metal works/foundries
- Asbestos manufacture
- Glass manufacture
- Oil refineries
- Chemical industry
- Engineering works
- MoD land
- Food industry
- Animal and animal products processing works
- Pulp and paper works
- Timber works
- Textiles industry
- Docks, docklands and council depots and warehouses
- Petrol filling stations and bulk storage of oil/petrol products
- Airports and airfields
- Railway land
- Sewage works
- Waste management sites
- Works (unspecified)
- Laundries
- Hospitals
- Cemeteries

The categories related to potential receptors are

- Residential areas
- Recreation/parks
- Playing/sports fields
- Schools and playgrounds
- Stadiums
- Allotments

### **Urban G-BASE survey**

Swansea was surveyed for near surface and deep profile soil contamination as part of the G-BASE programme to ascertain the level of contamination. This data was loaded into ArcGIS and proportional symbol geochemical maps were generated.

### **Hydrogeology and contaminated land screening**

Hydrological data was largely obtained from former mine working and borehole data but it was decided that there was insufficient data to develop a full hydrogeological model for the area. A semi-quantitative pathway characterisation for a GIS-based hazard ranking system for evaluating contaminated sites was attempted based on pathway permeability/porosity; depth to water table; head gradient estimate. A water table elevation model was also created and groundwater zonation could be derived from the model.

The Portable Infrared Mineral Analyser was used to identify an approach to characterising surface deposits within potentially contaminated sites. However this did not prove to be a very useful technique due to the dark material on the sampled sites.

The BGS ConSEPT approach was adapted to score the whole of the Swansea study area to produce a risk map. The main difference between ConSEPT and this modified version was that the scores were derived from industrial sites at or with close proximity to an area and weighted proportionally, based on their distance.

## **2.2 3D GEOLOGICAL MODELS AND THEIR HYDROGEOLOGICAL APPLICATIONS: SUPPORTING URBAN DEVELOPMENT – A CASE STUDY IN GLASGOW-CLYDE UK**

A number of projects were undertaken in Glasgow and the Clyde catchment which have subsequently been drawn together under the ASK Network (see Section 2.3.1). These projects include the Clyde Basin Project and the Clyde-Urban Super-Project. The aims of these projects included providing a range of geoscientific products and datasets to aid a geoenvironmental study of Glasgow and the Clyde catchment, incorporating updated baseline data and geological mapping, the creation of thematic environmental geology maps and the production of 3D models. These models would be continuously updated as new data became available and provide geochemical, physical property and hydrogeological data.

The projects combine urban, rural and marine geology, engineering geology, geotechnics, groundwater and geochemistry for the development of 3D subsurface and process models to be used by policy makers, local and regulatory authorities, consultants, contractors, developers and researchers. 3D models give planners a preview of subsurface properties using virtual cross-sections and boreholes. Two models were created for this study area. The Clyde Gateway Pilot Model was designed to assist regeneration and major redevelopment. Nearly 8,000 boreholes were used to create this model. 40,000 boreholes were used to generate the Glasgow Conurbation Model. The models comprise rockhead, superficial and bedrock, geotechnical properties, geochemical baseline data, groundwater, SuDS susceptibility and resource potential data. They

have been generated from a combination of existing BGS data, collaboration with third parties and new research specifically carried out for this work.

The key research priorities for these projects were increasing the datasets of BGS and third party data. Conducting baseline geochemical surveys, understanding groundwater systems, determining SuDS suitability, understanding the anthropogenic effects on the area, assessing the potential for Ground Source Heating and understanding the Quaternary geology of the region. The geoenvironmental applications of these works are not limited to understanding migration pathways and contaminant sinks, identifying mining hazards and highlighting groundwater resources. Environmental drivers for the projects include flooding, industrial legacy, rising sea levels, changing land use, brownfield development, SuDS, sustainable use of resources and indentifying contaminate pathways. These have been addressed by baseline surveys and predictive 4D models, geological and engineering geological research, groundwater and geochemical studies, knowledge exchange and partnership with the user community. A key theme for this work has been collaboration and this has progressed to form the basis of the ASK Network. The advantages of this include improved decision making, cost benefits, better risk management and sustainable development. These benefits have been deliveries to key stakeholders including Glasgow City Council, South Lanarkshire Council, Clyde Gateway Development Ltd, Scottish Enterprise, SEPA and the NHS through the medium of the ASK Network, peer-reviewed publications, good practice guidance, iPublications, conferences and 3D models.

### **2.3 MAXIMISING PAST INVESTMENT IN SUBSURFACE DATA IN URBAN AREAS FOR SUSTAINABLE RESOURCE MANAGEMENT: A PILOT IN GLASGOW, UK**

The EU INSPIRE Directive sets out to achieve the sharing and re-use of data to attain widespread benefits. In the Glasgow pilot study, BGS, Glasgow City Council and Grontmij from the private sector, collaborated showing a potential for creating the circumstances needed for an overhaul of the way subsurface data in urban areas can be reported and exchanged between the public and private sectors. A lack of understanding of subsurface conditions is key to overspend and delays in construction projects, which has an effect on sustainable development. By sharing and re-using data there can be greater efficiency and effectiveness in identifying ground conditions and planning accordingly. Previous ground investigation data can make a big contribution to desk studies, with significant cost savings possible in the long term, but this is limited by the lack of existing ground investigation data available and difficulties in the sourcing the information. If data were more accessible its use in desk studies would increase. The Association of Geotechnical and Geoenvironmental Specialists (AGS) have developed a digital format for transferring ground investigation data which reduces the time and costs associated with data re-use and removes the danger of transcription errors. However due to the fact that companies are not required to submit data to a central repository, it is often only used by the client for the job the ground investigation was intended. The National Geological Records Centre, operated by the BGS, collects data submitted on a voluntary basis and from those boreholes required to be deposited under the Mining Act of 1926 and the Water Resources Act 1991. The BGS also manages the National Geotechnical Properties Database for the UK which stores spatial data on geotechnical properties taken from ground investigations. The submission of data is not mandatory in mainland UK.

3D models have improved the use of ground investigation data from urban areas and developed a better understanding of the subsurface. In Europe, geological surveys have led the development of 3D models on city-wide scales to underpin urban planning and sustainable development, engineering hazard assessment and groundwater management. The 3D models for Glasgow have helped refine the geometry, and characterise the properties, of the superficial deposits beneath the city. Therefore there is now an improved understanding of groundwater flow and flood risk zones. Much of the data required to produce models is in a format which is difficult to use and it is time consuming to extract the salient information contained within. AGS format would reduce these time constraints. Data reporting is usually carried out by the supply of paper or pdf formats which are not easy to capture. Combined with the lack of a centralised database, this makes data sharing

less likely. In Glasgow the Accessing Subsurface Knowledge (ASK) Network has been formulated as an exchange network between public and private bodies, developed by the collaboration of the BGS and Glasgow City Council. The ASK Network encompasses a range of organisations from consultancies to environmental regulators and transport agencies. The main aim is to enable two-way exchange of new subsurface data. Members of the ASK Network partnership can access free 3D subsurface models for the central Glasgow area.

### **2.3.1 ASK Newtork Partnership - Glasgow**

The ASK Network in Glasgow is a vehicle for knowledge exchange of subsurface information. The initiative promotes sharing of geological and geotechnical data on ground conditions, contaminated land, flooding, sustainable drainage and geothermal resources, as well as geology, set against a digital terrain model. The 3D model is periodically updated as additional data is passed on to BGS and a new version of the model reissued to industry partners. The model is made up of a series of layers showing superficial and bedrock geology and engineering properties including strength, permeability, texture, grain size and SPTs.

The potential benefits of establishing ASK-type networks in City Regions in Wales would include cost savings for funding agencies, a geological framework to assess subsurface ecosystems services, and improved sustainability through reuse of subsurface information and more intelligent and holistic planning decisions and design solutions (Bonsor, *et al*, 2013).

## **3 Planning Policy Documents and Resources**

A number of planning policy documents have been reviewed during this scoping study, the key findings from these documents are presented below. The following sections are offered as summaries of these documents and are not representative of BGS opinion.

### **3.1 ONE WALES: ONE PLANET THE SUSTAINABLE DEVELOPMENT SCHEME OF THE WELSH GOVERNMENT**

The vision of a sustainable Wales illustrated in One Wales: One Planet the Sustainable Development Scheme of the Welsh Government is one where Wales lives within its environmental limits, using a reasonable share of resources and becoming resilient to climate change. The Welsh Government believes Wales should have healthy, biologically diverse ecosystems that are sustainably managed and a resilient and sustainable economy. The scheme states that Wales requires safe, attractive communities that are fair, non-discriminatory and bilingual. In order to achieve these goals the Welsh Government is committed to sustainable development.

To achieve sustainable development over the lifetime of a generation, it is considered that Wales needs to reduce its resource consumption by at least two thirds. To do this it is necessary to reduce carbon-based energy by 80-90%, develop a different approach to waste management aiming to reduce waste and recycle, reduce travel needs, have a stable economy that can adapt to changes in resource production and consumption, and source food locally and in season. Training in skills that will lead to low carbon and low waste services has been, and continues to be taking place. There is an emphasis on durable, recycled and re-usable goods which are locally produced and transported by rail.

Several gains in the pursuit of a low carbon, low waste Wales have already been made, including a reduction in traffic and traffic pollution. Homes and businesses are more energy efficient and sustainable. The land in Wales is being managed better for ecosystems services including carbon storage, water quality, flood management, landscape quality and the connectivity for wildlife to adapt to climate change.

The key principles supporting sustainability are involvement, integration, reducing Wales' ecological footprint, costs and benefits, the precautionary principle, a polluter pays principle, a proximity principle to waste management, and distinctiveness. Decisions will be made based on supporting sustainable development including aiming to achieve 'excellent' standard under BREEAM for new buildings. At least 10% of new build materials will be from recycled sources.

The Welsh Government aims to reduce greenhouse gas emissions by 3% a year and achieve a waste recycling rate of 70%. The initial plan will be to stabilise Wales' ecological footprint, then to start reducing it after 2020. Wales aims to be a zero waste nation by 2050. By 2025 a minimum of 1% of municipal waste will be recycled. It is considered that energy recovery should be an option for a maximum of 30% of municipal waste by 2025, and there should be a maximum level of residual household waste per inhabitant of 150kg/year. The landfill waste target is less than 5%. Promoting a behaviour change amongst individuals is key. Welsh Government believes these measures are best achieved through inter-organisation collaboration.

In terms of sustainable environment, the key issues are trends in biodiversity, the ecological impacts of air pollution, air quality, river quality, soil quality and sustainable water resource management. Appropriate land and resource management will sustain biodiversity, safeguard the environment and mitigate climate change. Soils, water, the coast and woodlands are to be protected by government policies. The economy will be boosted through the development of sustainable technologies, for example, those associated with renewable energy. The aim is to produce 30TWh of electricity by renewable energy sources by 2025 and 3TWh of heat from biomass. 40,000 microgeneration stations will be established in the Heads of the Valleys area.

### **3.2 PEOPLE, PLACES, FUTURE, THE WALES SPATIAL PLAN 2008 UPDATE**

The purpose of the Wales Spatial Plan is to make sure decisions are taken based on their impact beyond administrative boundaries, ensure sustainable development governs everything, set the context for local and community planning, influence where money is spent, and provide clear evidence for public and private sectors on which to base their policies. The plan's evidence base is made up from statistical information from Welsh Government, commissioned research and independent research. The challenges of the plan are to improve the website and provide better access to available data, develop a GIS tool to improve the presentation and analysis of information relevant to Spatial Plan Areas and to improve spatial intelligence. Collaboration is central to the Wales Spatial Plan which holds the firm belief that by bringing organisations together decisions can be better informed and solutions more sustainable. Welsh Government states that the plan should be consulted before authorities produce their LDPs and that their aim should be to focus regeneration in a way that enhances natural and built environments and delivers sustainable communities including with regards to climate change.

Climate change is a major issue with fundamental impacts on our whole lives. Most of the Welsh population lies close to the coast or rivers where climate change may cause an increased flood risk. There will also be consequences for land use, water resources, biodiversity and wildlife, and communities need to adapt to these new issues. It is important to reduce anthropogenic contributions to climate change by changing attitudes towards energy and travel, and change how we live and work. This may be achieved by encouraging walking and cycling, providing open spaces, traffic management, waste management, sustainable use of water and soils and increased recycling, but local authorities are urged to identify other methods specific to each area. The environmental policies set out in the Wales Spatial Plan are:

- Adapting and responding to climate change and its effects, including flooding and coastal erosion
- Using resources sustainably including waste, water, soils, minerals, aggregate and land
- Conserving and enhancing ecosystems
- Improving the local environment, including the development of brownfield sites

- Promoting environmental education
- Reducing traffic

The Wales Spatial Plan states priorities for the Cardiff/South East Wales City Region as working together, transport and developing Cardiff's capital role. Key settlements in this area are Barry, Aberdare, Cwmbran/Pontypool, Abergavenny, Blackwood, Bridgend, Caerphilly, Cardiff, Chepstow, Ebbw Vale, Llantrisant, Merthyr Tydfil, Newport and Pontypridd. The Wales Spatial Plan identifies priorities for the Swansea Bay City Region as improving accessibility, developing a knowledge economy, reducing economic inactivity, maximising the coastline, developing tourism, ensuring environmental protection and managing geological features sensitively. The key settlements are Ammanford/Cross Hands, Bridgend, Carmarthen, Gorseinon/Penllergaer, Llanelli, Maesteg, Neath, Pontardawe/Clydach, Porthcawl/Pyle, Port Talbot and Swansea.

### **3.3 WALES INFRASTRUCTURE INVESTMENT PLAN FOR GROWTH AND JOBS**

The investment priorities set out in the Wales Infrastructure Investment Plan relate to the improvement of transport links and telecommunications networks, supporting the development of the energy industry, investing in housing, delivering efficient and economical public services, improving education quality and developing Enterprise Zones (Cardiff, Anglesey, Deeside, St. Athan and Ebbw Vale). The approach to the plan seeks to take is to invest in schemes of national significance, integrate socioeconomic and environmental issues, improve infrastructure procurement, improve asset management and to co-operate more closely with key stakeholders. This co-operation aims to exploit opportunities to optimise value for money through shared solutions, and to engage with private sector investors, UK Government and EU funding sources.

The Welsh Government will seek to ensure infrastructure serving ports and airports support their role as key economic drivers. A task group was established to identify the role that City Regions would have on the economy. Updating the electricity transmission network in Wales is of high importance. The construction industry in Wales accounts for 10% of GDP. The challenge of climate change requires a more sustainable approach to development. Welsh Government will work with construction companies to provide solutions to the impacts of climate change.

The National Transport Plan has provided investment into transport which will help tackle poverty and assist economic growth. The aims and objectives of transport investment are:

- Prioritising investment which contributes to economic growth
- Being more proactive in the approach to developing solutions
- Making railways more accessible
- Electrifying key railway lines
- Improving disabled access to stations

There are a number of funds available to local authorities from the Welsh Government to improve road infrastructure. There are to be major improvements to the M4 corridor. The aim of the Waste Infrastructure Investment Programme is to support local authorities in securing sufficient treatment capacity to enable the diversion of waste from landfill.

The number of people and properties at risk of river and tidal flooding may increase between 10% and 100% by the 2020s. It is estimated that 22km of motorway, 2,300km of other roads and 4,000km of railway lines are significantly at risk from flooding. 20% of power generation capacity and 11% of hospitals are also at risk. The Welsh Government is investing in flood and coastal erosion risk management policies for flooding and coastal erosion. These are Catchment Flood Management Plans, Shoreline Management Plans and Local Strategies. There are 31 Risk Management Authorities including the Environment Agency, 22 local flood authorities, 3 Internal Drainage Boards and five companies supplying water and sewage services.

The aim of investment in the energy sector is to exploit commercially proven low-carbon energy sources. The Welsh Government supports the Energy Island and new nuclear build at Wylfa, the

Severn Tidal Power Scheme, the development of a 1.2MW full-scale tidal energy demonstrator in Ramsey Sound, a 10MW pre-commercial tidal array off the Skerries, a community renewable programme and the investigation of opportunities to secure long-term economic benefits of energy efficient living. The Government is keen to improve the energy performance of buildings and plan to invest in maximising the impact of energy efficiency programmes tackling fuel poverty through programmes such as Nest, arbed and Energy Company Obligation.

Investment aims are to increase the supply of affordable housing in Wales and to refurbish and improve existing housing stock. The Regeneration Areas approach seeks to deliver outcomes relating to local challenges in line with national priorities, investing in areas to improve prosperity and well being and reversing declining communities.

The National Assets Working Group aims to ensure that public estate is used to its maximum efficiency by encouraging collaborative working and data sharing, promoting the potential opportunities for the public sector in sharing asset information, and securing public sector engagement for a programme to develop a comprehensive land and property information resource for Wales with easily assessable data.

### **3.4 STRATEGIC PLANNING GUIDANCE FOR SOUTH EAST WALES VOLUME 1**

The Strategic Planning Policy Guidance for South Wales Volume 1 sets out its key priorities as increased use of brownfield sites (especially for housing, retail and employment), reducing the need to travel, enhancing the vitality of towns, protecting strategic employment sites, controlling growth, environmental protection and ensuring plan appraisals consider environmental effects.

There is a need to address the attitude towards brownfield sites, which are usually more costly to develop. There are large housing requirements much of which could be built on brownfield sites. Transportation is another big issue. By working together it should be possible to provide better transport links across the region. Transport corridors are the starting point for achieving this. The four main types are those dominated by road with little public transport, those dominated by road with buses, those predominately dominated by road with greater potential for public transport, and those with greatest potential for public transport. Significant land use should be located within transport corridors. Transport by rail will be promoted and land for Park and Ride schemes will be identified. Retail proposals will be based on statistics on consumer trends. Development plans should define the regional retail hierarchy and identify sites for new development. The amount of land available for employment is compatible with requirements. Preference will be given to existing sites, encouraging development away from the M4 Corridor. Derelict land is prioritised according to the 1988 Derelict Land Survey and submissions by local authorities. These documents support categorising land based on schemes dealing with identified health and safety threats and that prevent further degradation of adjacent land, schemes which bring contaminated land back to use and schemes which alleviate pressure on greenfield sites.

Greenbelts depend on regional co-operation to ensure they are maintained for at least 30 years. The coalescence of settlements in the region is to be prevented. It is undesirable to undermine the attractiveness of the landscapes of Cardiff. To protect Cardiff, Special Landscape Areas will be designated. Statutory designations for landscape or nature conservation are to be treated differently from non-statutory ones. Authorities are advised to work together to recognise the importance of statutory sites. Neighbouring countries are asked to collaborate over sites that cross authority boundaries. Development plans will be required to include provision for nature conservation and protection of wildlife and habitats, and direct new development away from important landscapes and conservation areas.

### **3.5 STRATEGIC PLANNING GUIDANCE FOR SOUTH EAST WALES VOLUME 2**

The Strategic Planning Policy Guidance for South Wales Volume 2 aims for planning which maximises brownfield site use, makes development land allocations which reduce the need to

travel and maximise public transport use, conserves mineral resources, minimises waste, protects open spaces, promotes sustainable tourism, protects coastlines, pioneers environmental protection measures and ensures development plan policies consider all environmental impacts.

This document recommends that planning policies identify and conserve mineral resources by preventing sterilisation and establishing buffer zones. Plans are to ensure an adequate supply of minerals for local and regional needs. Planning proposals related to the extraction of minerals are required to demonstrate the efficient use of minerals and outline the proposed restoration and after use of the site. The Strategic Planning Guidance states that plan policies regarding open cast coal extraction and oil and gas exploration need to ensure that development can be carried out in an environmentally acceptable way, and that planners should collectively ensure a continuous aggregate supply and the use of secondary and recycled resources should be encouraged. Mineral development is not to take place in national parks and Areas of Outstanding Natural Beauty unless it can be demonstrated that it is in the national interest.

Local authorities have been urged to work together with other relevant bodies to monitor the production and management of waste. Waste management proposals may not be sited where they would have unacceptable effects on the best agricultural land, conservation areas, open spaces, floodplains, controlled waters, historical or archaeological sites or in areas close to sensitive land uses. It is required that facilities comply with waste hierarchy and proximity principles, and be regionally self-sufficient. Planning authorities will favour energy-related development which encourages the self sufficiency of Wales where such development does not result in unacceptable environmental impacts. This shall include the exploitation of renewable energy resources.

The Strategic Planning Guidance states that development plans should identify areas within coastal zones, indicating where development will only be permitted if a coastal location is necessary. In identified coastal zones, authorities will favour schemes to regenerate existing port facilities and urban areas. Authorities are asked to give preference to integrated coastal management schemes to enhance the environment and maximise biodiversity.

### **3.6 SUDS WALES**

Sustainable Drainage Systems (SuDS) are a design measure aimed at reducing the impact of development with respect to surface water. SuDS are designed to replicate natural drainage and remove surface water run-off through collection, storage, and cleaning, before releasing it back to the environment. SuDS may be used instead of conventional drainage systems to reduce the risks of flooding, pollution and groundwater contamination. SuDS technologies to be considered at a development include green roofs, infiltration basins, infiltration trenches, permeable pavements, rainwater harvesting, soakaways, filter drains, swales, filter strips, detention basins, retention ponds and wetlands. The SuDS approach requires careful consideration of site conditions and how these may be altered by climate change. Factors to be considered when planning for SuDS include topography, the relationship to watercourses and floodplains, flow regime, water quality, ecology, groundwater levels, the environment, abstraction, soil classification and soil porosity. There are a number of issues associated with the design, implementation and adoption of SuDS and little is known about their performance over long periods of time. A map showing the locations of SuDS implemented in or planned for Wales can be found in Figure 1. Of these schemes, the majority of the SuDS employed are infiltration basins, detention basins and permeable pavements.



#### SuDS Type

- Not specified
- Detention basin
- Detention basin, Filter/French drain
- Detention basin, Infiltration basin
- Detention basin, Retention pond
- Detention basin, Retention pond, Soakaway, Swale
- Detention basin, Soakaway
- Green roof
- Green roof, Permeable pavement
- Infiltration basin
- Infiltration trench
- Permeable pavement
- Permeable pavement, Rainwater harvesting
- Permeable pavement, Rainwater harvesting, Retention pond, Swale
- Permeable pavement, Rainwater harvesting, Retention pond, Swale, Wetland
- Permeable pavement, Rainwater harvesting, Soakaway
- Rainwater harvesting
- Retention pond
- Retention pond, Swale
- Retention pond, Wetland
- Soakaway

**Figure 1 - Map Showing the Locations of SuDS Schemes in Wales**

Data source: <http://www.sudswales.com/> (Accessed: 13 Dec 2013). British Geological Survey © NERC Contains Ordnance Survey data © Crown Copyright and database rights 2014.

### **3.7 JOINT RESILIENCE UNIT**

The Joint Resilience Unit is a collaborative team which plans for and responds to emergencies in Swansea and Neath Port Talbot. These emergencies include flooding, weather hazards, industrial accidents and pandemics. The partnership is made up of representatives from Neath Port Talbot and Swansea local authorities, South Wales Police, Mid and West Wales Fire and Rescue Service, the Welsh Ambulance Service, the Environment Agency, the Health Board, the Port Health Authority, British Transport Police, the Maritime and Coastguard Agency. Risks are assessed based on the likelihood of occurrence and the potential impacts of the hazard. The Joint Resilience Unit works with the Environment Agency which offers flood warnings for Wales. The Environment Agency is now signing up over 500,000 households and businesses that are in at risk areas to flood warnings. The area is subject to coastal, fluvial and surface water flooding.

### **3.8 LLE**

The Lle website was under development at the time of writing but when completed will be an European INSPIRE Directive based set of spatial data and services developed by Geography and Technology department of Welsh Government, which supports Welsh Government and Natural Resources Wales. It contains a series of GIS databases including the locations of SSSIs, woodlands, marine nature reserves, Ramsar sites, Development Advice Maps for flooding and other geospatial information in bilingual format. The site is linked to data.gov.uk which contains a number of datasets or links to data sources which have been supplied by numerous organisations, including the BGS. BGS metadata include the coal resource map of Britain, the Borehole Geology Database, the Geotechnical Database and an Aquifer Properties Database. There are also a number of open licence datasets including data supplied by the Environment Agency, Welsh Government and the Department for Environment, Food and Rural Affairs.

### **3.9 PLANNING POLICY WALES**

The Planning Policy Wales sets out the land use planning policies of the Welsh Government and is supplemented by Technical Advice Notes. Every Local Planning Authority is required to produce an LDP. The policy sets out that planning systems must provide an adequate and continuous supply of land to meet society's needs, paying regard to sustainability (especially concerning climate change), the Wales Spatial Plan and the detailed policies on the different topic areas set out in this document. The documents states each local authority may determine the content of their LDP in accordance with legislation and national policy but planning authorities must ensure they have sufficient information on which to base strategies. The LDPs are to provide a level of certainty about the types of development that will be permitted in a given location. Deposit Plans will be reviewed to ensure compliance before they can be adopted. Collaborative work will be encouraged in the production of LDPs and authorities are advised to consider the relationship of the plan to other local adopted strategies, including Local Biodiversity Action Plans, Local Housing Strategies and Regional Transport Plans. LDPs are to be subject to sustainability appraisals after their completion for the purpose of assessing the economic, environmental and social effects of the policies contained within. The Strategic Environmental Assessment Directive requires that formal environmental assessment be carried out during the production of plans where they are likely to have significant affects on the environment. It is stipulated that a Habitats Regulation Appraisal must be undertaken when preparing LDPs to ensure compliance with the Conservation of Habitats and Species Regulations 2010. Where a development would negatively impact upon a designated site the planning authority will need to demonstrate that there is a significant overriding public need. Where a planning application is unacceptable, the developer may be able to offset the negative consequences of their work by providing community facilities or funding. Where planning permission is considered reasonable for development within Flood Risk Area Zone C, significant residential development, minerals

development, waste development or aggregate development in National Parks or Areas of Outstanding Natural Beauty, applications should be referred to Welsh Ministers.

Under the Government of Wales Act 2006 (Section 79) Welsh Ministers are required to develop a scheme setting out how they propose to promote sustainable development. They are achieving this by putting sustainable development at the centre of the decision making process, collaborating with other organisations, encouraging others to embrace sustainable development, monitoring, developing specific policy actions and through their strategic policies. Sustainable development in Wales means promoting social justice and equality of opportunity and enhancing the natural and cultural environment, respecting its limits, and using only a fair share of the earth's resources. The main outcomes that the Welsh Government wishes to deliver are sustainable resource use, sustaining the environment, sustainable economy, sustainable society, and the well-being of Wales. This is compliant with UK principles of living within environmental limits, ensuring a strong healthy and just society, achieving a sustainable economy, promoting good governance and using sound science responsibly. The planning system aims to ensure that social, economic and environmental issues are balanced and integrated. All departments involved in planning are required by the Welsh Government to aim to place people and their quality of life at the centre of decision making, ensure everyone can obtain information and see how decisions are made, safeguard the interests of future generations, respect environmental limits, tackle climate change, apply a precautionary principle to preventing environmental damage, and use scientific knowledge to aid decision making. It is also important to apply a proximity principle to waste management, consider the full costs and benefits of a development and to work in collaboration with other bodies. Planning policies and proposals required to promote resource efficient and climate change resilient settlement patterns, encourage the redevelopment of brownfield sites, reduce the demand for travel, move towards a zero carbon economy, minimise the risks associated with unstable or contaminated land and flooding, facilitate sustainable building standards, secure the provision of infrastructure, protect the environment, conserve heritage, maximise the use of renewable resources, reduce waste, provide housing and employment, and improve transport facilities.

Climate change is a major driver in Wales and key areas that underpin actions to reduce climate impact are the support of behaviour change, research and good practice, innovation and skills, buildings, energy generation and food. Failure to address climate change will make planning for sustainability impossible. As a result of climate change Wales expects an increase in winter rainfall and the frequency of intense rainfall, an increased length to the growing season, a rise in sea levels, more extreme weather, hotter average temperatures, an increase the number of hot and dry summers, milder winters and a reduction snowfall. This will impact on Wales by increasing flash flooding, pressure on sewers and winter storm damage, as well as changing landscapes and habitats, causing water shortages, increasing subsidence risks, increasing thermal discomfort in buildings, and causing health problems in summer. A 'twin-track' approach to climate change is required, tackling the cause and managing the consequences of climate change. In addition to the negative consequences of climate change, there will be some new opportunities presented.

The priority for sustainable development in urban areas are to secure environmentally sound and socially inclusive regeneration to ensure places become desirable, and to foster sustainable change. Priorities for rural areas are to secure sustainable rural communities with access to affordable housing and public services, a thriving economy and conservation and enhancement of the environment. In the countryside it is important to conserve and enhance ecological, geological, physiographic, historical, archaeological and agricultural value. Conserving the countryside also protects carbon sinks. The relationship between urban and rural areas, both now and in the future, needs to be considered. Development plans are asked to establish sustainable settlement patterns which are suitable to meet the needs of the economy, the environment and health. In their land allocations policies, planning authorities are asked to promote sustainable patterns of development including co-locating new development with older sites and transport hubs, improving the vitality of towns, locating development where it can be serviced by existing infrastructure, locating development in areas resilient to climate change and ensuring that tackling climate change is

incorporated into plans. Planning Policy Wales stipulates that strategies for development should also reflect the need to reduce travel requirements in developed areas. Housing and employment needs be matched to avoid lengthy commutes and development which may generate a large amount of traffic should be located in existing urban areas or in areas well served by public transport. It is preferred that development plans encourage mixed use development in urban areas, and development in the countryside should be located close to existing settlements. Infilling or minor extensions to existing settlements may be permitted but development in the countryside will be strictly controlled. New development is required to respect the character of the surrounding area. Local authorities are to consider establishing greenbelts and making local designations. These are to be based on formal assessment. These areas can provide accessible countryside to the public, give opportunities for sport and leisure, conserve the landscape and wildlife and provide carbon sinks. Greenbelt prevents the coalescence of large towns and cities and assists urban regeneration by encouraging brownfield development. The boundaries of greenbelts are to remain unaltered except under extreme circumstances. Due to the long lifespan of greenbelt classification, authorities are asked to ensure sufficient land allocations for development. The construction of new buildings in greenbelt will be considered inappropriate unless it is for justified rural enterprise needs, essential outdoor sport and recreation facilities, cemeteries, limited alteration of an existing building or small scale diversification within farms. Reuse of buildings is acceptable as long as the alterations to the original building will not cause major disruption and building is in keeping with the surrounding area. Preference is to be given to brownfield sites over greenfield sites. Many of these sites will require remediating before they can be developed.

In planning for sustainable design and buildings, it is considered good practise for planners to engage with stakeholders and commission audits and appraisals from expert consultation in order to assist decision making. Mitigating the cause of climate change by minimising carbon and greenhouse gas emissions associated with their design, construction, use and demolition is considered to be of great importance to proposals. Planning Policy Wales requires buildings to be resilient to the effects of climate change, for example by incorporating SuDS.

Wales has vast natural heritage including its geology, landforms and biodiversity. The objectives for the conservation of the natural heritage are to promote conservation of landscapes and biodiversity, ensuring Wales meets international responsibilities, ensuring designated sites are well managed, safeguarding protected species and promoting the function of soil. Natural heritage sites do not follow county boundaries, thus authorities need to work together. The UK Biodiversity Action Plan includes the following conservation objective:

- Conserve and enhance the quality and range and wildlife habitats and ecosystems
- Conserve and enhance the overall populations and natural range of native species
- Conserve and enhance internationally important and threatened species, habitats and ecosystems
- Conserve and enhance species, habitats and natural and managed ecosystems characteristic of local areas
- Conserve and enhance biodiversity of natural and semi-natural habitats where this has been diminished over recent decades.

The Welsh Government supports the development of Local Biodiversity Action Plan as a tool to encourage organisations to conserve and enhance biodiversity. Local planning authorities are required to protect trees, woodlands and hedgerows owing to their role in wildlife habitat. Designated landscapes are of extra significance in terms of conservation. Statutory landscape designations in Wales are National Parks and Areas of Outstanding Natural Beauty. These are designed to be protected to the highest degree. Statutory nature conservation designations include SSSIs, Ramsar sites, Special Protection Areas and Special Areas of Conservation. For the purposes of LDPs potential designated sites will be treated as though they have already been designated. Non-statutory designations such as Special Landscape Areas or Sites of Interest for Nature Conservation are to be based on a formal scientific assessment of the nature conservation,

landscape or geological value of the site, however these are not to unduly restrict acceptable development. The LANDMAP information system methodology describes and evaluates aspects of the landscape and provides a foundation for a consistent Wales-wide approach to landscape assessment. Planning Policy Wales states that the development plan should:

- Identify international, national and locally designated sites
- Establish criteria against which development at designated sites will be judged
- Include local policies on conservation
- Conserve and enhance those areas not covered by designations
- Provide Local Nature Reserves
- Protect trees
- Protect and enhance open spaces
- Secure carbon sinks

Under exceptional circumstances development may be permitted in National Parks or Areas of Outstanding Natural Beauty. Where this is planned an assessment will be made of the need for the development and its impact on the local economy, the possibilities of locating the development elsewhere and the effects of the development of the environment, and the methods by which these can be limited.

The EU is baking coordinated policy for coastal regions and is calling on member states to legislate for Integrated Coastal Zone Management recognising the importance of the coast for the conservation of the natural and historic environment, urban and rural development, and tourism and recreation. Local authorities are required to understand the dynamic relationships at work in coastal environments, including the role of climate change. There are a number of potential constraints to coastal development, including erosion, flooding and instability. Development plans will normally only propose coastal locations for development which requires a coastal setting. New development will not usually be approved where expensive engineering works will be required to defend the site. The historic environment also requires conservation. The Welsh Government's objectives with regard to this are to preserve the historic environment, protect archaeological remains, guard against alterations to buildings and ensure conservation without placing unnecessary controls on the building's occupants. Archaeological sites and listed buildings will be safeguarded with designations set up to regulate conservation.

It is vital that planning systems consider and provide for the economy. The aim is to coordinate development with infrastructure provision, support economic policies, align jobs and services with housing, promote brownfield development and regenerate disadvantaged communities. Transport is another key issue for Wales and the Planning Policy aims to integrate different types of transportation, align transport with land use planning, and encourage transport measures which compliment environmental and socioeconomic policies. This will be achieved by reducing the need to travel, locating development near other related services to encourage multi-purpose trips, improving accessibility, promoting walking and cycling, supporting infrastructure improvements and increasing sustainable travel options. The Welsh Government is also aiming to provide more housing and offer a choice of housing. Houses are required to be more energy efficient and housing services are to be improved. Previously developed land will be used in preference to greenfield sites for new houses and new homes will contribute to community regeneration. Local authorities are asked to encourage mixed tenure communities, easily accessible development, efficient land use and construction of new housing with low environmental impacts. In deciding land allocations for housing planners are required by Planning Policy Wales to consider the availability and suitability of brownfield sites, the location and proximity to jobs and amenities, the capacity of existing infrastructure, environmental constraints, carbon footprints the compatibility with the surrounds.

The Welsh Government's objectives for retail and town centres are to secure retail provision, promote and establish towns or centres as the most appropriate locations for facilities, enhance the

vitality of towns and promote non-private car access to these centres. The Welsh Government's tourism objectives are to encourage sustainable tourism and manage the tourist industry without causing harm to the environment. Recreation and sports facilities are to be made accessible to all, with playing fields protected, and social inclusion is to be of high importance.

Infrastructure, including that related to education, health, water supply, sewers, waste management, utilities and communications is critical. The Welsh Government aims to protect and improve water resources through increased efficiency, ensure sewage facilities are provided, deliver suitable waste management, promote renewable energy, facilitate development of advanced broadband and to minimise the vulnerability of infrastructure to severe weather. The Welsh Government wants development plans to consider all aspects of water management including water resources, surface water, rivers and groundwater. A catchment-wide perspective will be adopted including the use of SuDS where appropriate. The policy states that waste management should not cause harm to water, air, soil, plants or animals and that waste should be disposed of close to the point of generation by applying a proximity principle. Local planning authorities are to demonstrate how the objectives of the national waste strategy have been taken into account and allocate sites for waste facilities. The delivery mechanism for most types of renewable energy are outside of the control of the planning system, however Wales is dedicated to reducing carbon emissions and the promotion of alternative energy resources. The Welsh Government is committed to using the planning system to optimise renewable energy generation, optimise low carbon energy generation and facilitate combined heat and power systems. Local planning authorities are required to consider what contribution their areas can make to facilitate renewable energy whilst ensuring the environmental impacts of such development are minimised, and should outline the potential sources of renewable energy that they may accommodate. The environmental impacts of renewable energy are to be fully considered.

The Welsh Government aims to maximise environmental protection and minimise pollution. The Environment Agency and other relevant organisations will advise on environmental management. Flood risk is a major concern in planning. The consequence of flooding and the likelihood of the hazard are critical. The approach adopted by the Welsh Government is a move away from flood defence towards a system of avoidance. In preparing the development plan, authorities are urged to consult with neighbouring counties to ensure that developments are not at risk from flooding, nor do they increase the flood risk elsewhere. Sensitive buildings are not to be constructed in high risk areas. Development in areas of high risk will only take place if the development can be justified in that area despite the flood risk and the development would not result in the intensification of the risk or increase the risk elsewhere. Increased surface water runoff problems as a result of new development will also be considered in plans.

The Welsh Government believes development in instability prone areas or contaminated land are not to be prevented but require careful consideration and mitigation. Contaminated land issues include land which may become contaminated through the planned development. This policy stipulates that new development should not be planned without understanding and considering environmental risks. Planning decisions are to be based on specialist assessment and an understanding of the risk. New development should not be planned in areas of instability without understanding the risks and proper precautions should be applied. Expensive engineering works will not be permitted if it impacts on public funding. Decisions related to unstable land must consider the hazards to the development, its occupants and the environment, and take regard of specialist investigations at the site in order to meet the requirements set out in this document.

### **3.10 MINERALS PLANNING POLICY WALES**

The Minerals Planning Policy Wales separates mineral extraction from other types of development in that this type of work can only take place where minerals are found to occur, workings are non-permanent due to the finite nature of the resource, the development must be consistent with

environmental protection and where this fails the effects of the operations must be mitigated, and the site must be restored after works cease.

According to the Minerals Planning Policy Wales authorities should use their development plans to account for the costs and benefits of mineral workings. The main aims relate to minerals planning as follows:

- Adequate supply of minerals to meet present and future needs
- Effective protection of the environment
- Sustainable use of natural resources
- Ensuring reasonable prices for resources and safeguarding resources for future use

The policy requires that planning documents outline a broad strategy towards mineral working and identify areas of land where the policies will be related. Policies should be extended to resources areas that are already in use. There is also a requirement that policies should give clear guidance on what areas are likely to be sustainable for extraction, and on legislation of the environmental protection requirements.

A balance must be struck between the need for a resource, sustainable use of finite resources and environmental protection. The five key principles of mineral extraction are to provide mineral resources to meet society's needs and to safeguard resources from sterilisation, to protect areas of importance to natural or built heritage, to limit the environmental impact of mineral extraction, to achieve a high standard of restoration and after use, and to encourage efficient use of minerals including reusing and recycling minerals.

Each authority is asked to ensure that the region it covers makes its contribution to meeting local, regional and national mineral requirements in a way that reflects the nature of mineral resources in the area. Since minerals can only be worked where they occur, it is considered that groups of authorities will need to work together to determine the contributions to be made by each county. Secondary, recycled and marine resources may be considered but will not be a substitute for investigating local resources. Safeguarding does not imply planning permission will be granted but it will protect resources from sterilisation. There is also guidance relating to the potential for extraction prior to construction.

The Minerals Planning Policy Wales stipulates that policies should state the likelihood of a development taking place for non-energy minerals. The demand for energy minerals is dependent on power generation and is therefore difficult to predict long term, making planning difficult. It is requested that policies indicate, on the basis of environmental impacts, how likely a site is to be developed. Local authorities are to consult with the Coal Authority and other local communities and organisations regarding sites that have existing extraction licenses in order to ascertain the likelihood of planning permission being granted.

A land bank is a stockpile of planning permissions providing a constant supply of non-energy minerals. There is a requirement that these be maintained in the policies. Borrow pits are temporary workings for specific projects and should be in close proximity to the scheme. The Minerals Planning Policy Wales states that authorities must indicate the environmental benefits of using borrow pits in preference to established workings and sites must be restored after use.

The Minerals Planning Policy Wales stipulates that inactive sites which are unlikely to be used in the future should be identified and policies outlined regarding the future use of the land. These could include prohibition orders, restoration or proposed after use. Minerals workings are not permitted in National Parks and Areas of Outstanding Natural Beauty. In order to be granted permission for workings in these areas, consideration will need to be taken regarding the need for the development, the impact on the local economy, alternative supplies, the detrimental effects on the environment, and the extent to which development would constitute an enhancement to local landscapes. Development will not be permitted in designated conservation sites unless there are no alternative solutions and there are imperative reasons overriding public interest.

According to the Minerals Planning Policy Wales changes in the water table as a result of mineral extraction or disposal must not cause unacceptable impact to water resources. Dewatering that would lead to an offense against protected species would require a license. Changes to the water table may also induce geohazards such as shrinkage of clay, subsidence or karstic collapse.

The policy requires that authorities consider the preservation of historic buildings, landscapes, parks, gardens, conservation areas and ancient monuments. Agricultural land is only to be used in exceptional circumstances, or where full restoration is possible. Environmental issues that must be considered include access and traffic, noise, dust and fume control, disposal of mineral waste, blasting controls, drainage and water, visual impacts, conservation impacts, instability, contaminated land and restoration. Where significant environmental impact is likely an Environmental Impact Assessment will be required.

Buffer zones will provide areas of protection around mineral workings where new sensitive development should be restricted. The extent of the zone will depend on the size, type and location of the workings, the surrounding topography, noise and dust levels, vibration expectations and the availability of mitigation.

Minerals should, where possible, be transported by rail or water in preference to road to meet the requirements of the Minerals Planning Policy Wales. These infrastructures should be established or improved leading to multiple benefits both in and out of the minerals industry.

10% of the total aggregate supply for the country is sourced from secondary or recycled minerals. This could be increased which would assist in preserving primary resources. This is to be encouraged in development plans. Proposals for coal extraction will be expected to be environmentally acceptable or to be made so with mitigation. Where this is not established proposals must demonstrate why the benefits of the project outweigh the negative impacts in order to satisfy policy requirements.

Another condition of the policy is that development plans should indicate where oil and gas operations may be acceptable. For coal bed methane permission will be required from the owner of the coal. There are additional environmental considerations related to coal bed methane extraction including the environmental impact of exploration, development, operation and restoration of the wells. Other concerns are the high number of wells required in this type of operation, the disposal of contaminated water produced in the process and the adverse effects on subsurface resources such as groundwater.

The main materials found in Wales which are considered to be of high value to the construction industry include dimension stone, slate, brick clay/fireclay, limestone, silica sand, tufa and metalliferous minerals.

### **3.11 TECHNICAL ADVICE NOTES**

A number of Technical Advice Notes (TANs) have been produced to help planning authorities prepare documents and legislation on planning in their areas. Technical Advice Notes relevant to this study are summarised below

#### **3.11.1 Technical Advice Note 5: Nature Conservation and Planning**

The Technical Advice Note on Nature Conservation and Planning guides local authorities in planning matters related to geoconservation, biodiversity, natural habitats, landscapes and environmental planning. This document encourages all those involved in planning to work to achieve conservation through partnership between local planning authorities, the Environment Agency Wales (now Natural Resources Wales), developers and other organisations, and to ensure development does not damage access to geological sites or interfere with natural processes. Consultation with other local planning authorities is particularly relevant where development may affect adjacent conservation areas. Local planning authorities are asked to consult with expert bodies prior to planning application submission to ensure that all aspects of a site's design have

been fully considered from the onset of the project. Where necessary geological, geomorphological, hydrological, hydrogeological and soils reports are to be carried out when an Environmental Impact Assessment is not needed. Further testing is also required to ensure the plans are sustainable and will have no ongoing damaging effects. LDPs are required to indicate how they will carry out monitoring and what indicators will be used to demonstrate the effectiveness of targets.

Under the advice set out in TAN 15, development plans should seek to avoid irreversible harm to the environment and only under exceptional circumstances would a plan be allowed if it affected a European Site. All planning proposals should show how the affects of climate change will be reduced and accommodated in the design, as well as addressing the local implications of climate change including, but not limited to, coastal erosion and flooding.

Where plans present a risk of damage to the environment or could be seen as detrimental to nature conservation, planners will be required to demonstrate that there are imperative reasons for overriding public interest. It is also recommended in TAN 15 that planners consider offering compensation measures to justify planning permission being granted.

### **3.11.2 Technical Advice Note 8: Planning for Renewable Energy**

The Technical Advice Note on Planning for Renewable Energy sets out a series of issues related to the practical implementation of renewable energy sources. The majority of these considerations are socioeconomic, relating to such issues as the siting of unsightly installations such as wind turbines, sharing resources by housing processing plants inside buildings already in use by the energy sector and the cost implications of utilising renewable energy as offset by its potential productivity. TAN 8 details recommended output values for sites to be viable.

This document makes recommendations on the locations of offshore wind farms and highlights a number of factors relating to the position of onshore installations. These considerations include the visual impact of the turbines themselves as well as the potential to block out the landscape behind them; the physical design of turbines which should consider colour, reflectance and impacts on birds and electromagnetic signals; and the geotechnical implications on a given site.

TAN 8 makes recommendations on the use of a large number of renewable energy sources, including various new technologies and research areas. Local authorities are urged to consider solar power and photo-voltaics, hydropower, landfill and mine methane, biofuels, heat pumps and anaerobic digestion of waste. Local authorities are also urged to look for potential geothermal power sources, although it is acknowledged that as yet, the required temperatures have only been found at great depth in Wales and may therefore not be a viable option.

### **3.11.3 Technical Advice Note 12: Design**

The Technical Advice Note on Design defines design as the ‘relationship between all elements of the natural and built environment’ (Welsh Assembly Government, 2009). This document encourages planners to actively engage with other organisations to design in consultation with experts. In order to design sustainably and environmentally, site surveys should be carried out prior to planning and all natural resources need to be evaluated. It is important for planners to recognise a site’s constraints and assets, for example, flooding, soils, geology, slopes, topography, drainage and landscape characteristic and to plan in such a way so as to not detrimentally alter the natural land. The relationship between these elements and other physical processes should be understood and incorporated into the design. These plans are required to take into consideration the longevity of the structures being designed to ensure that the development is sustainable throughout its lifetime. This is of particular importance with regards to the evolving constraints imposed by climate change.

In addition to the sustainability of the development itself, TAN 12 advises that good design should incorporate secondary factors such as the burden on water and infrastructure resources, waste

management and the potential for contamination and other harmful effects on neighbouring areas. TAN 12 recommends that the transportation of building equipment be considered at the planning stage in order to minimise the inconvenience and harm caused to the surrounding areas. Building materials should, where possible, be sourced locally and be in keeping with other buildings in the area, and with the surrounding landscape.

#### **3.11.4 Technical Advice Note 14: Coastal Planning**

The Technical Advice Note on Coastal Planning states that planning authorities need to be aware of coastal issues both at the direct local scale and in the wider context. TAN 14 requires planners to consider the nature of ground conditions and physical processes, and the potential for remediation; the likely effects of physical and biological processes; the potential effects on mineral, water and land resources; visual impacts; the role of physical processes in creating landscapes; and the effects on geomorphology and stability.

The key issues identified in TAN 14 associated with earth science are as follows:

Estuarine – flooding, sedimentation, channel erosion, foundations

Coastal cliffs – landsliding and cliff recession

Coastal lowlands – flooding

Sand dunes – wind-blown sand and flooding.

Planners are referred to BGS maps when making decisions requiring a knowledge of ground conditions and instability, and are reminded that coastal defences and mitigation measures reduce risk but do not eliminate it. The emphasis is placed on avoiding development in coastal areas that require hard engineering.

#### **3.11.5 Technical Advice Note 15: Development and Flood Risk**

The Technical Advice Note on Development and Flood Risk cites climate change as a major factor in increased precipitation and rising sea levels resulting in a greater frequency of flooding events. A flood risk map showing areas of Wales split into three categories has been compiled using the Environment Agency extreme flood outlines and the BGS drift maps. These areas are defined as having little or no risk, evidence of previous flooding and known flood-prone areas. TAN 15 guides planners and developers towards those areas identified as having little or no risk, and reminds them that current government defences are directed only at existing developments and cannot be relied upon to protect new structures. However, where a low residual risk can be established after designed mitigation, plans involving non-sensitive structures will not be ruled out in areas in potentially at-risk zones.

Increased urban development can lead to a rise in surface water flooding due to the use of impermeable hard surfaces. Planners are required to include in their designs provisions for how they will manage the consequences of their developments and how their plans will adapt in response to climate change. TAN 15 states that planners should consider the effects that their developments will have on the surrounding terrain, bearing in mind the repercussions that their works may have elsewhere, for example downstream. It is also noted that in addition to increased strain on sewage systems caused by a greater number of buildings, disturbances to drainage channels, groundwater profiles and surface runoff may lead to the mixing of water with sewage causing contamination during flooding events.

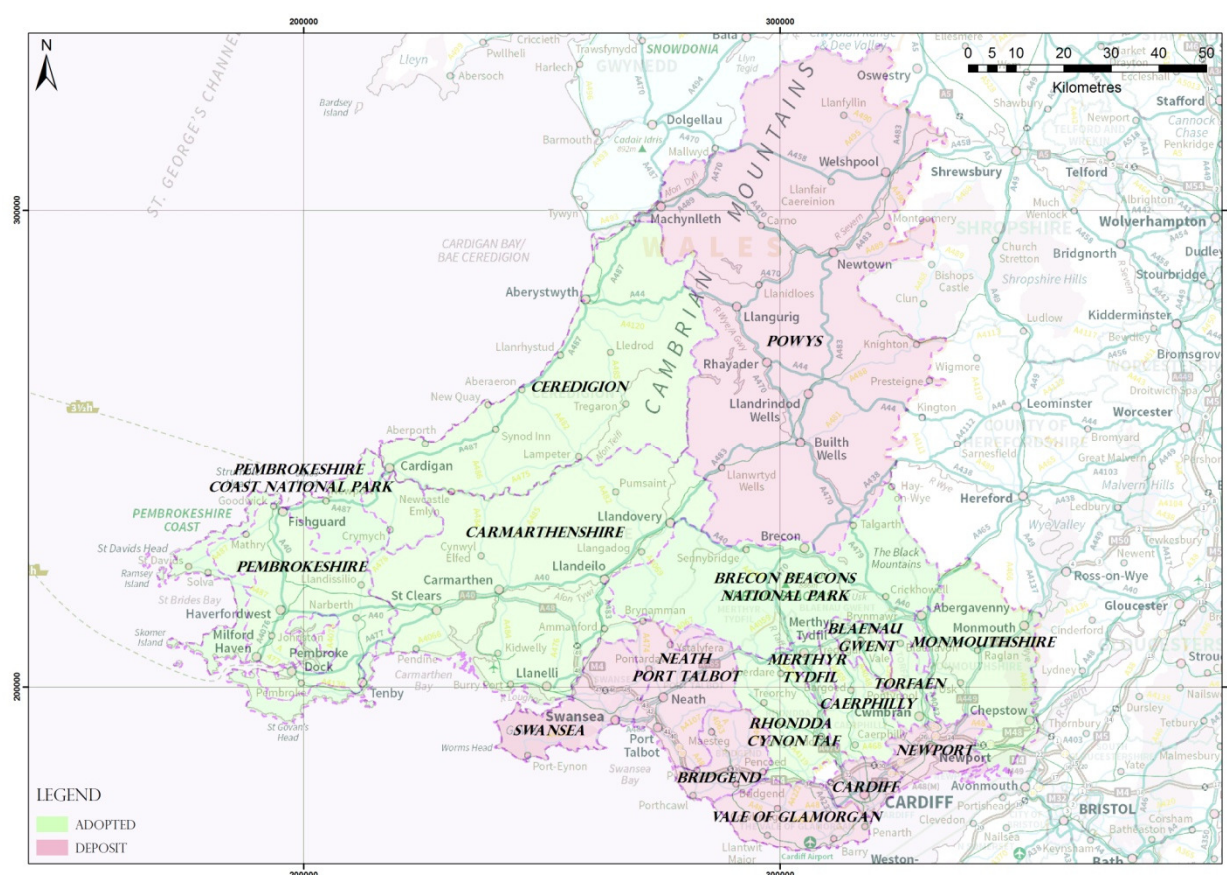
#### **3.11.6 Technical Advice Note 21: Waste**

The Technical Advice Note on Waste recognises the need for waste disposal sites but encourages local authorities to adopt a hierarchy approach to waste management. The first aim of the waste hierarchy is to reduce the amount of waste produced and then to re-use. If these methods are not possible, waste should be recycled or composted, or recovered for energy. Disposal should be the

last resort and this should not take place in the national parks. Although, following the 'Proximity Principle', local authorities should aim to dispose of waste as close to the source as possible, joint local authority arrangements are encouraged by TAN 21 in order to meet the waste management requirements in the most suitable and sustainable way possible. Where landfill is the only option, and it is accepted in TAN 21 that this will be the case with some waste types, the location of sites should be carefully considered so as to have minimal adverse effect on the environment. According to TAN 21, in order to do this the existence of groundwater and coastal water needs to be researched and their regimes understood, surface and subsurface geology and hydrogeology should be established and geohazards such as flooding and landslides need to be identified.

### 3.12 LOCAL DEVELOPMENT PLANS

Under the guidance of the Planning Policy Wales, Minerals Planning Policy Wales and the Technical Advice Notes, councils and local authorities have compiled their Local Development Plans, covering a period up to 2021 (or 2026 in some cases). These documents are drafted as Deposit Plans which then undergo a consultation period before they can be adopted.



**Figure 2 - Areas covered by the adopted and deposit Local Development Plans**

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#### 3.12.1 Cardiff, Newport and Swansea

The following LDPs appertain to the three main cities of South Wales and therefore been summarised here in detail for their relevance to the City Region-approach to planning and development. These LDPs are at the draft stage and are under review at the time of writing. These documents are summarised below while an outline of the LDPs for all other counties in south and mid Wales can be found in Appendix 2.

### 3.12.1.1 CARDIFF LOCAL DEVELOPMENT PLAN 2006-2026 DEPOSIT PLAN

The Cardiff LDP aims to create more housing and jobs, respect the environmental qualities of the county, develop brownfield sites in preference to greenfield with a split of housing on each type of 65% to 35%, develop the retail sector, reduce travel needs, improve the transport hubs, and to provide new sites for gypsies and travellers. The plan also considers the introduction of light rail and trams. The main elements of the regeneration in Cardiff will be jobs, managing growth and encouraging sustainable design, bringing forward new infrastructure, delivering sustainable transport solutions, responding to evidenced economic needs, responding to evidenced social needs, respecting Cardiff's environment and climate change. 41,100 new homes and 40,000 new jobs will be created over the plan period, with over half of all new houses built on brownfield sites. Brownfield sites are associated with high costs due to the required remediation involved with their development thus they are unsuitable for providing affordable housing solutions. New housing is to follow strict settlement boundaries. The principle areas of development will be Cardiff Central Enterprise Zone, the former gas works at Ferry Road, north West Cardiff, north of Junction 33 of the M4, south of Craigau, north east Cardiff (west of Pontprennau), east of Pontprennau Link Road and south of St. Mellons Business Park. Developments in Cardiff must be designed to protect the greenbelt and avoid coalescence with Newport. The LDP sets out that mixed use developments should follow existing transport corridors and new buildings should be compatible with their surrounds. Waste management will depend heavily on the waste hierarchy and place great emphasis on recycling.

Cardiff believes natural resources within the county need protecting and planners will be required to demonstrate that designs are favourable to geodiversity, soils, water and vegetation which acts as a carbon sink. Rivers, landscapes, the coast, parks and open spaces also need safeguarding. It is important that all new developments protect agricultural land and are not detrimental to water quality or water resources. This includes underground, surface and coastal waters. The onus will be on developers to ensure that development does not result in the contamination of land and that all previously contaminated sites are suitably restored. Development within the countryside is to be harmonious and have no harmful effects on the surrounding environment. There is a requirement that for such development planners need to demonstrate that alternative sites were considered prior to choosing the countryside setting, and the need for a countryside location must be proven. The LDP states that development within geologically important areas should maintain or enhance the nature of the conservation and/or the geological importance of the designation. A number of designations exist within the county including SSSIs, European Sites and Historic Landscape and Archaeologically Sensitive Areas. Special Landscape Areas have been designated at St. Fagans Lowlands and the Ely Valley, Garth Hill and Pentyrch Ridges, Fforest Fawr and Caerphilly Ridge, Wentloog Levels and Flat Holm.

Climate change is a major issue faced by Cardiff which the LDP seeks to address by reducing carbon dioxide emissions and increasing carbon sinks. Careful design of new developments and recycling are just two of the ways to achieve this. New buildings are to be climate resilient to cope with the effects of climate change but it will also be mitigated by reducing the demand for energy and increasing the use of renewable energy sources. Developers are expected to submit an independent energy assessment investigating the financial viability and technical feasibility of incorporating renewable energy schemes. With climate change comes increased flooding. The LDP is concerned with fluvial, tidal and surface water flooding in Cardiff. The Strategic Flood Consequence Assessment has analysed risks over the lifetime of coastal developments and has shown that sites can be protected by raising the sea wall and increasing the ground level at the development site. A phase 3 Flood Consequence Assessment is needed to assess the precise nature of flood risk and mitigation in relation to a building's lifetime. In areas that are prone to unacceptable risks of flooding, or where developing the site may lead to an increased risk of flooding, proposals will be rejected. Development will not be permitted within tidal or fluvial floodplains unless the existing mitigation measures will be sufficient to protect the new facilities. Planning permission will not be granted where a development would increase flood risk, burden

existing flood defences or where the maintenance of existing defences would be hindered. Proposals including ground floor bedrooms will not be accepted in high risk areas. It will be unacceptable for development to pose a risk to underground, surface or coastal water, including pollution, depletion and obstruction. Developments are to be designed in a way that considers water demand and supply, waste water and pollution, rainfall and runoff, watercourses, water resources, flooding and water pathways. SuDS are to be implemented where possible which would profit the site in a number of ways. The benefits of water sensitive urban design are reduced flooding, the security of water supplies, improved water courses, more affordable water bills, improved health and well being, a celebration of the environment, improved local character, green infrastructure, attractive places and improved ecosystems health.

A key aim of the LDP is to protect existing mineral resources and ensure adequate supplies of limestone aggregate and to promote the use of recycled materials. Limestone is the primary mineral resource in the area. Cardiff has a 69 year mineral supply which it will safeguard to avoid sterilising the resources, and buffers will be applied to prevent extraction effecting sensitive structures. Mineral resources with planning permission will be safeguarded from development that would prevent their extraction at Craigiau Quarry, Taff's Well Quarry, Ton Mawr Quarry, and Blaengwynlais Quarry. Resource areas will be safeguarded from development that would prevent extraction at Craigiau Quarry and Ton Mawr Quarry. Measures will be put in place to prevent further workings at Cefn Garw Quarry in Tongwynlais, Highland Park Brickworks in Ely, West End Brickworks in Ely, southern and western parts of Craigiau Quarry and Blaengwynlais Quarry at Rhiwbina Hill. These sites will be progressively restored. Sand and gravel and coal will also be safeguarded, although there is currently no demand for coal in the area.

### 3.12.1.2 NEWPORT LOCAL DEVELOPMENT PLAN 2011-26 DEPOSIT PLAN

Newport is aiming to create 9,600 new homes during the lifespan of the LDP, including a proportion of affordable housing. All of these houses are to be built on brownfield sites with no greenfield sites allocated for development. Transport networks are to be improved with two new highways and new railway stations at Llanwern, Caerleon, Coedkernew and Pye Corner. There is also a proposal for M4 motorway diversion and an airport in the Severn Estuary but these matters are not within the scope of the LDP.

The key issues affecting Newport are flooding (particularly with reference to mitigation), climate change (from a cause and consequence perspective), energy consumption, biodiversity, gypsy and traveller sites and waste management. The objectives of the LDP are sustainable land use, climate change, economic growth, housing, conservation and the environment, community facilities and infrastructure, culture and accessibility, health and well-being and waste. The strategy aims to maximise the use of brownfield sites, develop the former Llanwern steelworks into housing, regenerate the retail core, protect the landscape and conserve protected sites.

Newport City Council is a member of the South East Wales Strategic Planning Group. This cross-boundary initiative aims to forge collaboration between local authorities. The other member authorities of the group are Blaenau Gwent, Bridgend, Caerphilly, Cardiff, Merthyr Tydfil, Monmouthshire, Rhondda Cynon Taf, Torfaen and the Vale of Glamorgan. One of the focuses of the group is to achieve sustainable development that is suitable for the area being developed and the greater surrounds so that works in one region do not negatively impact upon another. A similar group has been set up as the South West Wales Regional Planning Group but the LDP for Pembrokeshire Coast National Park says there is no formal agreement in place and there is little appetite for local authorities in the area to work together.

One of the major themes of the Newport LDP is the reuse and recycling of land, materials and waste. Climate change is of great concern to Newport with all designs required to show how they will withstand predicted changes in rainfall, temperature and erosion caused by the forecasted climate. The LDP also requires plans to show how they intend to mitigate their impact on climate and the environment, with such methods as permeable surfacing, as well as proving that

development will have no significant adverse effects on geology. Where plans fail to demonstrate this, they will need to justify why there is a need to override public interest. Special Landscape Areas north of Bettws, west of Rhiwderin, at Wentlooge Levels, at the River Usk, at Caldicot Levels, at Wentwood and Tredegar Park will be protected. Coastal development will not be permitted unless there is an exceptional need. If such a need can be established, planners will need to demonstrate that the site is not at risk and development will not cause erosion, flooding or instability.

The risk of flooding in Newport is directly linked with climate change. The LDP stipulates that all new developments should aim to be as energy efficient as possible and an overall reduction in energy consumption is desired. Development is to be directed away from areas prone to flooding, however where this is not achievable, planners must show that they have suitably mitigated against flood hazards. The use of SuDS is to be considered at suitable sites and surface water should be reduced or recycled to prevent flooding and conserve water.

The document states that mineral safeguarding should be carried out in accordance with the Minerals Planning Policy Wales. Sand and gravel resources are of particular importance to Newport but the use of recycled aggregates in development is also to be considered under the LDP. When planning extraction, developers are reminded of the potential effects of these actions on the surrounding landscape, including, but not limited to, their effects on biodiversity, flooding, pollution, health and restoration. There are no identified mineral energy resources in Newport but exploration for oil and gas resources is taking place. The LDP notes that these investigations are invasive and limits operations to one year to explore and investigate a potential source, so as to reduce the detrimental effects of this type of work.

### 3.12.1.3 SWANSEA LOCAL DEVELOPMENT PLAN PREFERRED STRATEGY

The LDP for Swansea aims to make provision for 16,700 new dwellings and 14,700 jobs during the course of the plan's validity. Swansea aims to achieve this by providing mixed use developments and sustainable urban extensions in areas with existing good public transport routes. These areas have been identified as Felindre, Penllegaer and Gowerton/Waunarlwydd. Strategic development areas have been identified in the city centre, SA1 Swansea Waterfront, Tawe Riverside Corridor, Swansea Vale, Cefn Coed Hospital, Hendrefoilan Student Village, Garden Village, the land north of Pontarddulais, the land west of Penyrheol and the land west of Morriston. Key employment land sites are situated at Felindre, Waunarlwydd, Swansea Vale, Fabian Way and City Centre.

The key drivers of the regeneration in Swansea are the economy - with the aim to create more jobs, workspaces, retail units and tourism; social – aiming to increase housing, access to further education, improved health, developing gypsy and traveller sites, creating social hubs, promoting Welsh language and improving transport networks; and the environment – increasing brownfield development, defining Special Landscape Areas, improving water quality, decreasing flood risk, remediating and preventing land contamination, protecting mineral resources and using renewable energy.

Two thirds of new housing developments will be on land classified as brownfield. However, due to the contamination issues present on many brownfield sites, high costs are often associated with this type of development. Therefore, in order to make provision for affordable housing, some greenfield will be utilised. Green spaces will, however, be protected and development that would cause unacceptable adverse effects to any site or its surrounding areas will not be permitted. This is of particular significance where those effects are related to flood risk, water quality, land contamination or instability and subsidence. The LDP sets out to conserve and enhance natural heritage including landscapes, green infrastructure and sites of geological importance. 17% of the region is protected by national or international designation with 40% of that land falling within the Gower Area of Outstanding Natural Beauty.

In addition to protecting natural environments and habitat through design, the sustainable redevelopment of Swansea is dependent upon good waste management, including waste produced by energy consumption. The plan aims to reduce carbon emission and follow the waste hierarchy, as well as reusing existing materials in the construction and mineral industries. The plan states that Swansea has no operational mineral workings or reserves and is therefore unable to meet the requirements set out in the Minerals Planning Policy Wales for mineral land banks. The majority of viable mineral resources that are known in the areas are found in Areas of Outstanding Natural Beauty and are therefore not suitable for extraction. The search for useable mineral reserves in the county is ongoing but mineral resource requirements will continue to be met from outside the county. Swansea has made provisions to safeguard natural resources, including that of coal, however at this time no interest in the working of coal has been established. The LDP, however, states that coal will be protected in case interest should arise in the future and no developments that may lead to sterilisation of the resource areas will be permitted. The LDP raises concerns about the potential impact of quarrying and mineral extraction on land stability. There are also questions about how much these activities contribute towards flooding in the area.

Land allocations for development will continue to be informed by the Strategic Flood Consequence Assessment throughout the plan period. No development will take place in areas highlighted as at risk from flooding unless plans can show that the hazard can be successfully mitigated and that no adverse effect will be caused to surrounding areas. Drainage is a key importance to the LDP and planners are advised to consider the use of SuDS to manage surface water and prevent it mixing with sewage, potentially resulting in an environmental health hazard.

### **3.12.2 Adopted Local Development Plans**

The following LDPs have been adopted by their local authorities following the consultation period and are summarised in Section 3.12.4. A more detailed synopsis of these documents is found in Appendix 2.

- Blaenau Gwent
- Brecon Beacons National Park
- Caerphilly
- Carmarthenshire
- Ceredigion
- Merthyr Tydfil
- Monmouthshire
- Pembrokeshire
- Pembrokeshire Coast National Park
- Rhondda Cynon Taf
- Torfaen

### **3.12.3 Deposit Local Development Plans and Preferred Strategies**

The following LDPs have been drafted and are under review at the time of writing. They are summarised in Section 3.12.4. A more detailed synopsis of these documents is found in Appendix 2.

- Bridgend
- Cardiff
- Neath Port Talbot
- Newport
- Powys
- Swansea
- Vale of Glamorgan

### 3.12.4 Summary of LDPs outside of Cardiff, Newport and Swansea

The LDPs for south and mid Wales cover those locations identified as City Regions and their surrounding areas. This area has a wide range of geological features and varying ground conditions. A number of these could have implications for planning and developments. The LDPs make reference to many issues which may require geoscience data to facilitate planning and often specifically guide planners and developers to key data sets that will be of use. A number of the LDPs mention of the BGS as a source of some of this data (see Figure 3). Some of these topics have specific policy requirements and planners and developers must adhere to these instructions, while other aspects of the plan contains advisory recommendations that do not need to be fulfilled in order to obtain planning permission.

There is a variable appreciation of the issues that affect each local authority planning area and the geoscience data that is needed to facilitate a better understanding of their potential effects on development. Many issues known to BGS that may potentially affect a particular area have not been identified as a major problem with the corresponding LDP. For example Caerphilly does not appear to have recognised the severity of land instability and subsidence in the area. The failure to identify key issues within LDPs may be the result of a lack of expertise within the local authority regarding particular subject areas rendering these problems as ‘unknown unknowns’. Political interest, resource management and overriding need may also account for a reluctance to engage with certain issues.

There were a number of geoscience topics discussed by all or most of the local authorities in their LDPs. These issues tended to be those topics that LDPs are required to include. It was generally found that the issues which are enshrined in law were the ones raised in most detail in the LDPs. Subject areas that were not prescribed by government legislation were far less frequently identified in the LDPs and were not covered in such depth. The issues that are likely to require geoscience data that were mentioned in the LDPs are summarised in Table 1. These subjects were discussed in varying depth and levels of understanding amongst the different LDPs. Not all local authorities portrayed the same recognition of geoscience issues or data requirements.

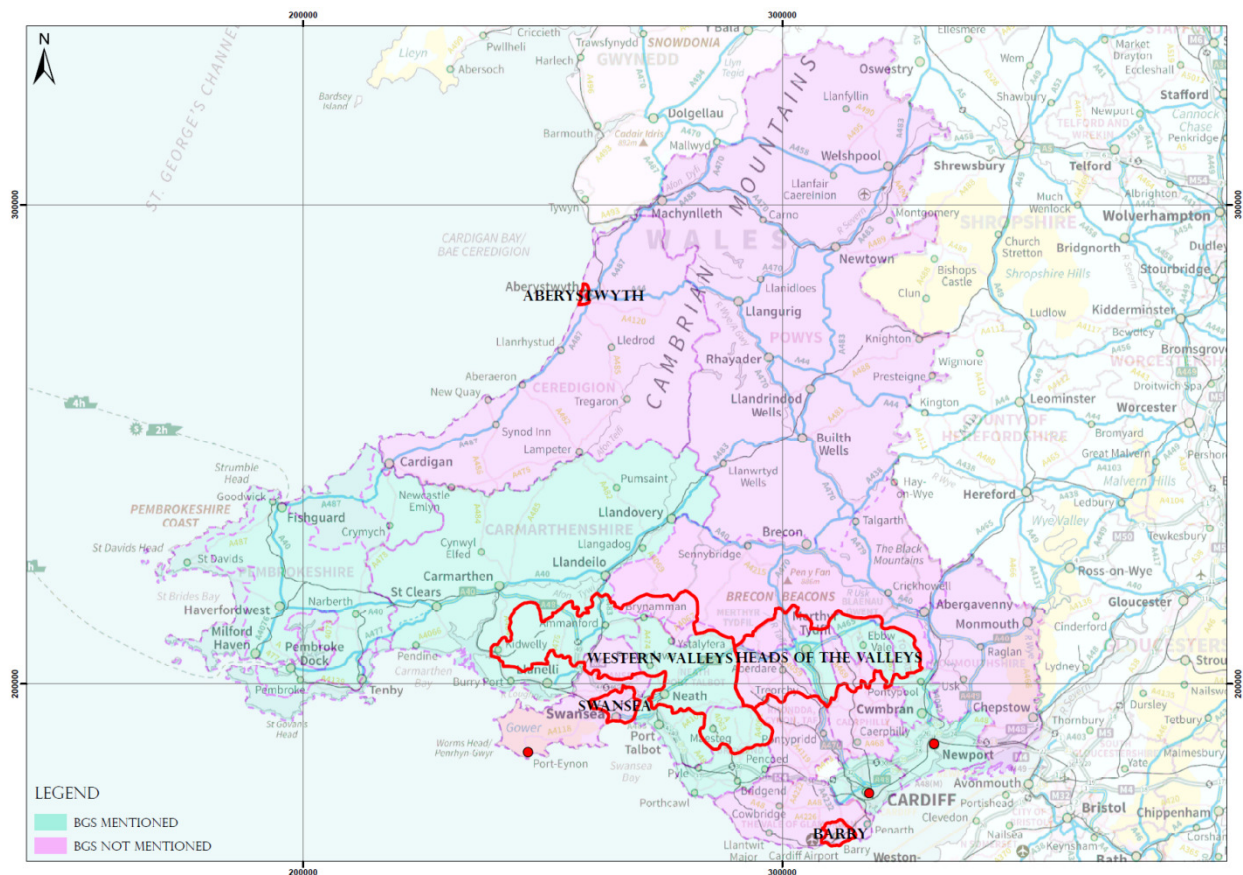
<b>Issue Requiring Geoscience Data</b>	<b>Councils/Local Authorities Identifying the Issue</b>	<b>Number of Councils/Local Authorities Identifying the Issue</b>
Mineral Resources	Blaenau Gwent, Beacon Beacons National Park, Bridgend, Caerphilly, Cardiff, Carmarthenshire, Ceredigion, Merthyr Tydfil, Monmouthshire, Neath Port Talbot, Newport, Pembrokeshire, Pembrokeshire Coast National Park, Powys, Rhondda Cynon Taf, Swansea, Torfaen, Vale of Glamorgan	18
Waste Management	Blaenau Gwent, Beacon Beacons National Park, Bridgend, Caerphilly, Cardiff, Carmarthenshire, Ceredigion, Merthyr Tydfil, Monmouthshire, Neath Port Talbot, Newport, Pembrokeshire, Pembrokeshire Coast National Park, Powys, Rhondda Cynon Taf, Swansea, Torfaen, Vale of Glamorgan	18
Water Resources	Blaenau Gwent, Beacon Beacons National Park, Bridgend, Caerphilly, Cardiff, Carmarthenshire, Ceredigion, Merthyr	17

	Tydfil, Monmouthshire, Neath Port Talbot, Newport, Pembrokeshire, Pembrokeshire Coast National Park, Rhondda Cynon Taf, Swansea, Torfaen, Vale of Glamorgan	
Contaminated Land and Groundwater	Blaenau Gwent, Beacon Beacons National Park, Bridgend, Caerphilly, Cardiff, Carmarthenshire, Ceredigion, Merthyr Tydfil, Neath Port Talbot, Newport, Pembrokeshire, Pembrokeshire Coast National Park, Powys, Rhondda Cynon Taf, Swansea, Torfaen, Vale of Glamorgan	17
Flooding	Blaenau Gwent, Beacon Beacons National Park, Bridgend, Caerphilly, Cardiff, Carmarthenshire, Ceredigion, Merthyr Tydfil, Monmouthshire, Neath Port Talbot, Newport, Pembrokeshire, Pembrokeshire Coast National Park, Powys, Rhondda Cynon Taf, Swansea, Torfaen	17
Climate Change	Blaenau Gwent, Beacon Beacons National Park, Caerphilly, Cardiff, Carmarthenshire, Ceredigion, Merthyr Tydfil, Monmouthshire, Neath Port Talbot, Newport, Pembrokeshire, Pembrokeshire Coast National Park, Powys, Rhondda Cynon Taf, Torfaen, Vale of Glamorgan	16
Geoconservation	Beacon Beacons National Park, Bridgend, Caerphilly, Cardiff, Ceredigion, Monmouthshire, Neath Port Talbot, Newport, Pembrokeshire, Pembrokeshire Coast National Park, Powys, Rhondda Cynon Taf, Swansea, Torfaen, Vale of Glamorgan	15
Renewable Energy	Blaenau Gwent, Beacon Beacons National Park, Bridgend, Cardiff, Carmarthenshire, Ceredigion, Merthyr Tydfil, Neath Port Talbot, Newport, Pembrokeshire, Pembrokeshire Coast National Park, Rhondda Cynon Taf, Swansea, Torfaen	14
Instability and Subsidence	Blaenau Gwent, Brecon Beacons National Park, Bridgend, Carmarthenshire, Ceredigion, Merthyr Tydfil, Monmouthshire, Port Talbot, Newport, Pembrokeshire Coast National Park, Rhondda Cynon Taf, Swansea, Torfaen	13
Brownfield Development	Caerphilly, Cardiff, Merthyr Tydfil, Monmouthshire, Neath Port Talbot, Newport, Pembrokeshire, Powys, Swansea, Torfaen	10

SuDS	Brecon Beacons National Park, Cardiff, Carmarthenshire, Ceredigion, Merthyr Tydfil, Monmouthshire, Newport, Torfaen	8
Coastal Erosion	Carmarthenshire, Ceredigion, Neath Port Talbot, Newport, Pembrokeshire Coast National Park, Vale of Glamorgan	6
Coal	Carmarthenshire, Merthyr Tydfil, Neath Port Talbot, Powys, Torfaen	5
Ground and Surface Water	Cardiff, Merthyr Tydfil, Neath Port Talbot, Powys, Torfaen	5
Soil Quality	Ceredigion, Pembrokeshire Coast National Park, Torfaen, Vale of Glamorgan	4
Recycled Minerals and Aggregate	Brecon Beacons National Park, Cardiff, Carmarthenshire, Torfaen	4
Wetlands	Brecon Beacons National Park, Bridgend, Torfaen	3
Ground Conditions	Merthyr Tydfil, Torfaen	2
Sewage	Swansea, Torfaen	2
Oil and Gas Exploration	Carmarthenshire, Newport	2
Peat	Ceredigion	1
Ground Investigation	Caerphilly	1
Reclamation	Rhondda Cynon Taf	1
Coal Bed Methane Extraction	Bridgend	1

**Table 1- Summary of Local Development Plans showing which geoscience issues were identified in each LDP**

The following map (Figure 3) shows the counties and local authorities that have referred to the BGS as a source of information relevant to planning within their LDPs. The red outlines define the key regeneration areas referred to in Section 4.



**Figure 3 – Map showing LDPs that mention BGS as a source of subsurface information. Red indicates key regeneration areas**

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## 4 Areas of Regeneration

A number of areas have been selected by the Welsh Government for major regeneration in South and Mid Wales within the last decade. These include The Western Valleys, The Heads of the Valleys, Swansea, Barry and Aberystwyth. The Regeneration Areas in South and Mid Wales are shown in Figure 3 and Key Diagrams of the proposal plans for redevelopment can be found in Appendix 1. The aims of the Regeneration Areas were creating attractive town centres, environmental improvement, housing, transport, tourism, education and skills, employment, economic growth and social legacy. In 2014 the Welsh Government began winding down the Regeneration Areas project, replacing it with the new Vibrant and Viable Places Framework. Like the Regeneration Areas project, the concept is to provide money for the development of areas with high deprivation. All local authorities in Wales were able to bid for a share of a fund. Within South Wales Bridgend, Merthyr Tydfil, Port Talbot, Newport, Pontypridd, Swansea and Pontypool have been successful in gaining funding.

In Bridgend this money will be used to transform the old Rhiw car park site into an area for affordable housing with increased access to jobs. There will be better parking facilities and a new community/arts space. The money will also go towards supporting local jobs and small businesses. Merthyr Tydfil will utilise the funding to develop the sites of several derelict buildings including the General Hospital, St. Tydfil's Hospital and the Labour Exchange/promenade so that they may be used for housing development more readily. Funding has also been granted to assist with site investigations and surveys to address planning constraints for nine housing sites in the north of Merthyr Tydfil. The Miners Arms, the Miners Hall and Kingdom Hall buildings which are

currently derelict will be transformed into social housing and the historic YMCA listed building will become home to the Universities Heads of the Valleys Institute and small to medium sized businesses. Grants may also be used to restore long-term empty properties to use, including transforming Trevithick House into a home again. St. David's Hall has been allocated funding for restoration and future maintenance for use as a venue for creative arts and Merthyr Tydfil Football Club wants to redevelop Penydarren Park to into a community leisure complex with conference facilities. Funding for the Gellideg Foundation Group (GFG) to build a new training centre will enable the block of flats currently occupied by GFG to be renovated as part of the Gellideg Flats Cooperative. Other areas to receive funding in Merthyr Tydfil include a feasibility study to assess whether Nant-Morlais weir could be used for electricity generation, large-scale home energy projects, increasing new businesses in the town, cleaning the Nant Morlais Brook and linking up the Taff Trail and Trevithick Trails.

Port Talbot has secured funding for a number of projects including a housing regeneration area aimed at making a difference to living standards through refurbishing existing homes, developing the Glanafan School site for a mixed housing and shopping area, the creation of flats and shops at the former police station and a new employment advice centre at the former fire station, transforming the former cinema into a hub for cultural industries, creating a new transport centre in the heart of the town, building affordable homes on brownfield sites and improving accessibility and links for pedestrians and cyclists between employment, housing and leisure areas. In Newport help will be available to landlords to cover the costs of improvements to properties and for the enhancement of building exteriors. A number of derelict buildings are to be brought back into use for housing and commercial development and there will be improvements to homes on the first floor of the Grade II listed Newport Market. A new learning and employment centre will be created in an existing empty property and development will take place at the Citizens Advice Bureau. An energy improvement programme will run until March 2015 to support people living in fuel poverty and reduce Newport's energy consumption.

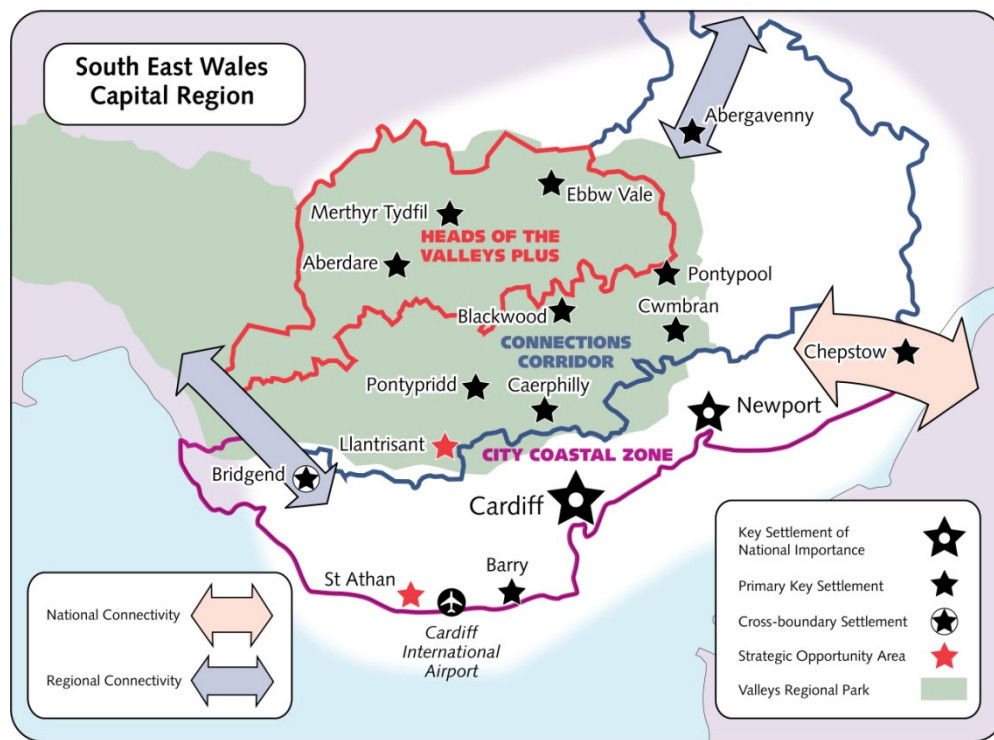
New homes will be created above shops in Pontypridd town centre and a mixture of social and affordable housing will be funded. New homes will also be built on the former Lady Windsor Colliery site and the former YMCA building will be renovated to a multi-purpose facility. Free energy efficiency measures will be offered to existing homes. In Swansea Homes Above Retail Premises (HARP) grants will support the conversion of vacant floor space above shops into new affordable homes. Development is planned for the High Street with the aim of bringing in private investment and improvements will take place within the city centre and its gateways. Swansea Market, Glynn Vivian Gallery, the former Central Library building, the Dylan Thomas Centre, Morgan's Hotel and Dragon Hotel will all profit from a property enhancement grant, and the five-year Sandfields Housing Renewal Area programme will improve housing quality and energy efficiency. Additionally there are plans to relocate the over 50s residential scheme from St. David's to Sandfields and the Kingsway area will be rejuvenated to form housing for young professionals through a Gwalia Housing Association led development. Finally, in Pontypool the funding will be used to deliver mixed housing schemes at key development locations and to help property owners raise the standards of their rented accommodation. The Pontypool Development Trust will restore run-down properties at the town centre's edge to homes and renovate empty shops so that they may be used once again. There is also funding for the renovation of buildings within the town centre that may be used to economically, educationally and socially improve the environment in Pontypool. There will also be a sustainability impact assessment funded by this scheme to evaluate plans to reinstate the Monmouthshire and Brecon Canal. (<http://wales.gov.uk/topics/housing-and-regeneration/regeneration/vibrant-and-viable-places/regeneration-areas/?lang=en>)

## 5 City Regions

City Regions is an initiative in England and Wales initially endorsed by HM Treasury to establish metropolitan areas of divided administration but with shared resources. City Regions are used by planners, economists and government to shape legislation for a region on a multi-area agreement basis under a long-term approach. The concept of a City Region is one of a large urban area with multiple administrative regions but working together to share common resources such as businesses, a workforce and transport links. After a scoping review undertaken by a task and finish group in 2012 looking at the appropriateness of City Regions in Wales, the Welsh Government proposed two City Regions; Cardiff/South East Wales City Region and Swansea Bay City Region. (Welsh Government, 2012.)

### 5.1 CARDIFF/SOUTH EAST WALES CITY REGION

The Cardiff/South East Wales City Region covers the area of the south east of Wales and includes the Cardiff-Newport Metropolitan Area. This region includes 11 county or administrative areas, 10 of which are part of the cross-boundary collaborative organisation, the South East Wales Strategic Planning Group (Section 3.12.2.7). The areas included in the Cardiff/South East Wales City Region are Cardiff, Newport, Caerphilly, Rhondda Cynon Taf, Bridgend, Blaenau Gwent, Merthyr Tydfil, Monmouthshire, Torfaen and the Vale of Glamorgan. As the majority of this region falls within the South East Wales Strategic Planning Group, it is subject to the recommendations of the Strategic Planning Guidance for South East Wales which focuses on brownfield development, environmental protection, mineral resources, waste management, open spaces and the coast. This City Region contains two of the main Regeneration Areas; Heads of the Valleys and Barry, as well as the large scale developments planned in the Cardiff and Newport areas. The LDPs for this region make reference to the following with implications for the ways in which redevelopment should be managed within each county; topography, railways, wetlands, climate change, renewable energy, water resources, sewage, minerals, aggregate, waste management, contaminated land, brownfield development, recycled minerals, oil and gas exploration, coal bed methane, soils, flooding, geoconservation, ground investigation, ground conditions, instability, reclamation, coastal erosion and SuDS. SuDS are of particular significance for the area with the largest number of existing SuDS schemes in Wales falling within the Cardiff/South East Wales City Region. The LDPs for Cardiff, Newport, Bridgend, Torfaen, Blaenau Gwent and Merthyr Tydfil all cited the BGS as a source of data.

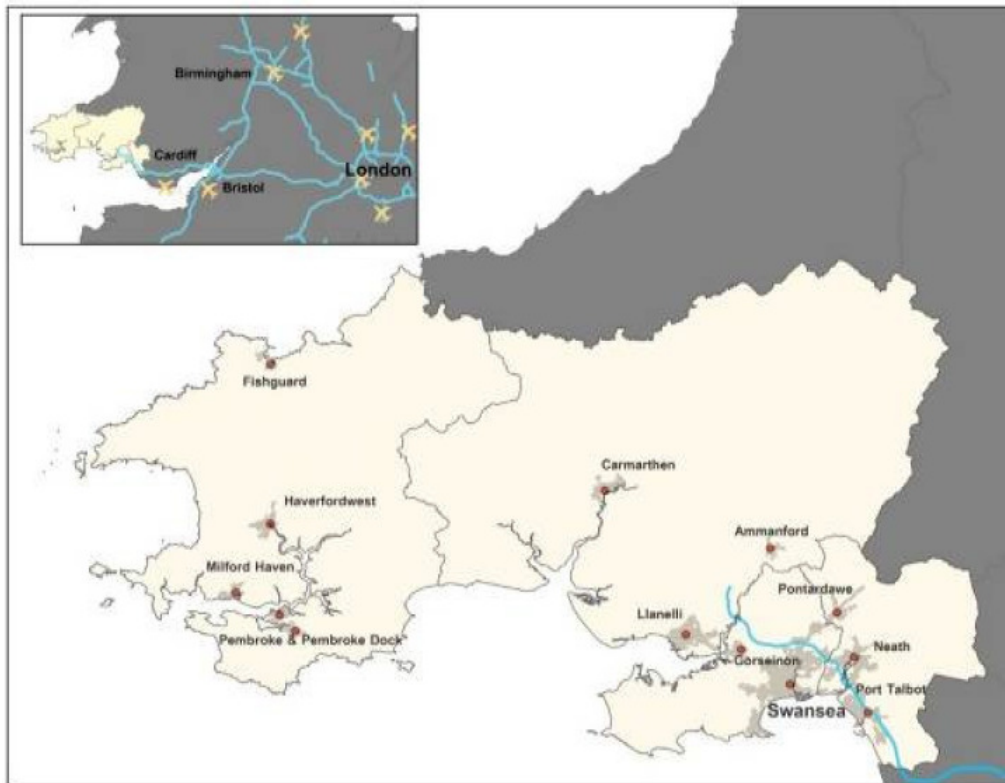


**Figure 4 - Outline of the extent of the Cardiff/South East Wales City Region**

Source: People, Places, Future, The Wales Spatial Plan 2008 Update. Welsh Assembly Government.

## 5.2 SWANSEA BAY CITY REGION

The Swansea Bay City Region covers the area of the south west of Wales. This region includes five county or administrative areas. The areas included in the Swansea Bay City Region are Swansea, Neath Port Talbot, Carmarthenshire, Pembrokeshire and Pembrokeshire Coast National Park. This City Region contains two of the main Regeneration Areas; Swansea and Western Valleys. The LDPs for this region make reference to the following; climate change, renewable energy, geoconservation, flooding, soils, water resources, minerals, aggregate, coal, recycled minerals, waste management, instability and subsidence, contaminated land, brownfield development, ground and surface water, coastal erosion, SuDS, sewage and oil and gas exploration. The LDPs for Neath Port Talbot, Carmarthenshire, Pembrokeshire and the Pembrokeshire Coast National Park all cited the BGS as a source of data.



**Figure 5 - Outline the extent of the Swansea Bay City Region**

Source: Swansea Local Development Plan Preferred Strategy

## 6 Stakeholder Engagement

Discussions with a number of key stakeholders have taken place in order to get feedback from those actively engaged in planning and redevelopment. Participants included:

- Cardiff Council & Harbour Authority
- Rhondda Cynon Taf Council
- Newport City Council
- Neath Port Talbot Council
- Swansea Council
- Torfaen County Borough Council
- Caerphilly County Borough Council
- Welsh Water
- Atkins Global
- Parsons Brinkerhoff
- Celtic
- Welsh Government
- South Wales SuDS group
- Natural Resources Wales

The discussions were approached by first researching who the likely stakeholders would be and then contacting them to arrange meetings. At these meetings we asked what each of those we approached knew about BGS and what BGS data sets they were already accessing. We also asked what they would like to be available if we could provide it for them. We then presented the stakeholders with the work done on the ASK Network and outlined our vision for a similar project in South Wales. This concept was well received. After the presentation we asked for feedback and offered stakeholders the opportunity to say what they would like to see in the South Wales model

and how they could see the end product being utilised. The meetings were used as a way of promoting BGS services, raising awareness of a potential new product and gauging the interest in this type of work and the types of data and presentation format that would be preferred by the end-users.

After initial consultations we met for a second time with a number of these stakeholders to discuss more specific agendas and to update them of our progress so far. From these secondary meetings a number of key outcomes have been achieved. These include setting up an in-principle agreement with Newport City Council that should Newport be selected for inclusion in our project the council is keen to sign up, acquiring archive site investigation reports containing borehole logs from Newport, Cardiff and Torfaen councils and gaining interest for an ASK Network style project from Cardiff Council. The stakeholder engagement has also resulted in developing case studies together with Atkins which explore how data sharing can save time and money, as well as assist in the understanding of subsurface conditions, and a partnership with Cardiff Harbour Authority has led to the development of a thermal resource map for Cardiff's groundwater. Potential work in partnership with several organisations is likely to come about as a result of the stakeholder engagement and a number of possible projects concerning landslides, ground source heating and SuDS monitoring are at the discussion stage with Cardiff Council, Caerphilly County Borough Council, Parsons Brinkerhoff and more.

After contacting local councils, planning authorities and consultancies, several issues regarding geoscience data were identified, including a number of data sets that would assist in urban development, questions regarding discrepancies between data formats, data archiving and sharing information between organisations in a bid to increase cooperation and decrease the time and financial expenses of projects.

Datasets which have been identified as useful to consultants include existing ground investigation data, information on contaminated land and groundwater, the nature of artificial ground and land stability data. Discussions with consultants revealed that GeoSure data is utilised in the commercial sector but there is divided opinion on the way in which geological data is delivered, with some showing a preference for paper maps over GIS layers for geology maps, due to the additional attribution provided by paper map series.

Discussions with local authorities revealed a tangible interest in data sharing initiatives and a genuine vision for how this could save time and money, and better assist planning and development. Cardiff and Newport councils in particular showed an enthusiasm for such practises and appeared keen to discuss further the potential for such partnerships.

After initial suspicion regarding future hidden cost implications of a partnership and some concern of data confidentiality, there was generally support from the majority of parties contacted for a regional data portal and subsurface models. The one area that proved most controversial however was whether contaminated land data in the public domain may cause blight to land, especially as this data may be quickly outdated.

## 7 Data Sharing: Case Studies

The concept of data sharing to support development and manage construction risk is well established in the ground engineering industry worldwide through initiatives such as Association of Geotechnical and Geo-environmental Specialists (AGS), who developed a common data format for geotechnical and geo-environmental data (.ags), and through knowledge exchange networks such as the ASK Network in Glasgow.

A number of examples of how the re-use of subsurface information has resulted in benefits were identified during the study. These form an important evidence base in support of a subsurface

knowledge exchange partnership in Wales. A selection of industry sourced case examples are described in the remainder of this section.

The content of these case studies is not intended to reflect BGS's opinion on best practice for construction management, nor does it have any connection with the companies mentioned. Furthermore, although the use of existing GI data can inform GI design and preliminary design, re-use of data is not a substitute for site-specific ground investigation.

### **7.1 WILLOWS HIGH SCHOOL LIFT SHAFT - ATKINS**

Consultancy Atkins Global was employed by Cardiff Council to carry out works, including a ground investigation, for the installation of a new lift shaft at Willows High School, in Cardiff. The lift shaft was located inside a courtyard within the school grounds and thus access, whilst possible, was limited. Cardiff Council was able to supply Atkins with the interpretive report carried out for the site during the initial construction of the school from the 1960s. This report contained boreholes and test data, not limited to standard penetration and triaxial tests. The data was sufficient for the Atkins team to establish a ground model to assist in the preliminary foundation design without carrying out a ground investigation of their own, and thus overcoming the difficulties of locating a drilling rig in the enclosed courtyard. This resulted in a saving to the project of approximately £3,000 and three weeks in time that would have otherwise been required for the procurement and undertaking of ground investigation works.

### **7.2 MOUNT STUART PRIMARY SCHOOL EXTENTION - ATKINS**

On behalf of Cardiff Council Atkins Global were responsible for carrying out a ground investigation for the extension of the existing Mount Stuart Primary School in Cardiff Bay. Cardiff Council was in possession of several ground investigation reports for a number of projects close to the site, and the majority of these were made available to the Atkins team during the desk study stage of the project. Some reports were missing from the Council's archive. The reports were conducted during the initial construction of the school and for a number of ground contamination studies that had been commissioned in the area. The reports were in .pdf format, but Atkins were able to input the information into their own systems. Additionally, Cardiff Council was able to supply the Atkins engineers with as-built records for the piles at the school site, although whilst these did show the diameter of the piles, they did not show depth. As a result of the information supplied by Cardiff Council to Atkins, no new boreholes were required to establish the ground model. No test data was available for the site so Atkins carried out one day of trial pitting to establish the level of contamination on the site. Hand dug pits were carried out over two days to confirm the locations of the piles. This simplified ground investigation resulted in a saving of 2-3 days on site for the ground investigation works and £4,000, and the amount of disruption to the public caused by invasive investigations was greatly reduced.

### **7.3 GEOTECHNICAL INFORMATION INFRASTRUCTURE – GEOTECHNICAL ENGINEERING OFFICE, HONG KONG**

The Geotechnical Engineering Office (GEO) is a branch of the Civil Engineering and Development Department of the Hong Kong SAR Government. GEO acts as a regulatory body for geotechnical engineers and as custodian for geoscience data. These data sets include ground investigation reports, borehole logs, laboratory test data, Landslide Incident reports, Historical Landslide Catchments, the Enhanced Natural Terrain Landslide Inventory, registered man-made features, areas identified for slope upgrading works and Dangerous Hillside Orders, Stage Study Reports, areas included in the Landslide Prevention and Mitigation Programme, as-built records, geological maps, aerial photographs (territory-wide each year since 1972), land status and lot ownership plans, and engineers' inspection reports and recommendations.

Much of this information is included in regularly updated GIS layers which GEO distributes to consultants for use in desk studies. All records can be checked by visiting the GEO. Since 2012, the majority of records can be accessed online, free of charge via the Geotechnical Information Infrastructure website which is powered by ArcGIS. This site allows consultants to identify what data is available at their sites and open the associated reports that go with each point/polygon, for example, a borehole log. Archive logs are available as scanned pdfs or electronic reports, while new data may be available in AGS format if desired. LiDAR data for Hong Kong is also available through the system which allows the user to draw slope profiles anywhere on the map, and the programme automatically generates an Excel file with the x and y coordinates which may be used to produce cross sections and geological models in CAD.

Sharing data is standard practise in Hong Kong and the majority of reports are handed over to GEO upon their completion and added to the system. When a consultant begins a project, the usual procedure is to start with the available information from GEO and to create a preliminary ground model based on pre-existing data. It is then possible to determine where there are any gaps in the available data or areas where clarification is needed, and to plan the site specific ground investigation with this in mind. In Hong Kong this results in large cost savings, time reductions and makes it easier to form an understanding of the ground conditions in an area of steep, densely vegetated topography, where it is often difficult to gain easy access to the site with drilling equipment. The concept of sharing data in Hong Kong is firmly in place and it is the normal practice of any consultancy in the territory to utilise existing data and to add to the archive themselves.

## 8 Discussion

After reviewing government legislation and planning documents, engaging with key stakeholders from the public and private sectors, and learning from practices elsewhere, such as Glasgow and Hong Kong, it appears there is a need for ready exchange of subsurface knowledge and data which can be made available to planners to underpin sustainable development. Initial stakeholder engagement suggests some differences in the types of data required by various users, the format in which this data is desired and the likelihood of uptake amongst various organisations.

Discussions with some local authorities have revealed that whilst the initial realisation of the need for geoscience data may be lacking, the enthusiasm for a centralised database, data portal, or model is strong, and co-operation is forthcoming.

Within the private sector, consultants understand the need for subsurface data and know which data sets they require (geotechnical) but appear less excited by a collaborative approach to data; a mindset perhaps shaped by current practice whereby consultants carry out their own site investigation to obtain the data they need. They considered baseline geological mapping data and borehole scans critical to the construction process, and although there were issues regarding confidentiality, members of the private sector did agree that sharing data would result in time and cost reductions for clients and allow for a more detailed ground model.

After presenting the concept of a wider subsurface knowledge exchange network in Wales, consultants did become more open to the benefits of such an approach, however accepted that it is often easier to receive data than to provide it within the resource constraints of a project.

It was also apparent that whilst BGS data is used in the private sector, more work needs to be done to raise awareness of the full range of BGS data and services available. A change in mindset to match the style of public-private interaction seen in Hong Kong may be required.

Whilst many of the local authorities were aware of the BGS as a source of data, for example for mining resource maps, other organisations such as NRW (formally Environment Agency Wales) were referenced more frequently in LDPs because they are statutory bodies. LDPs also make

reference to certain environmental issues but appear not to fully understand what geoscience data is needed to support planning and decision making around these issues. In other cases, local authorities simply did not mention issues that may affect their counties and this may be because they are unaware of the potential constraints posed by the subsurface, or other priorities on their resources.

Newport, Caerphilly, Cardiff, Bridgend and the Pembrokeshire Coast National Park were among the authorities that were most responsive to thinking as a City Region in their LDPs. There are several references within these LDPs to neighbouring counties and the need to consult with these when making decisions for the LDP that may have cross-boundary implications. Bridgend and Pembrokeshire Coast National Park in particular stress the need for a collaborative approach to planning and Caerphilly wishes to establish itself as an alternative business centre to Cardiff and Newport, spreading the distribution of wealth and employment and being a cheaper option for smaller businesses. Cardiff is recognised by Newport and Caerphilly as a major employment centre and as such aim to deliver better transport links between the capital and the wider area. It is noted by Newport and Cardiff that the City Region has a population of 1.4 million and many of these have to travel from less affluent areas in the Valleys to Cardiff for employment, therefore transport infrastructure will need to be able to meet these demands and be offered at a cost suitable to low-income families. Newport recognises the interdependence between itself, Cardiff and the Valleys and states that only by working together as a City Region can it have the critical mass required to provide a quality of life suitable for the 21<sup>st</sup> century and be in a position to compete with the rest of the UK and Europe for economic investment and growth. The Newport LDP also make reference to a number of south east Wales groups that have been set up to manage key cross-boundary issues such as transport, aggregate and waste.

Of all the councils engaged with, those in the South East Wales City Region seem most aware of what subsurface information may be needed to underpin planning and sustainable development. The South East Wales Strategic Planning Group provides an existing hub through which to promote subsurface knowledge exchange in the region.

The Regeneration Areas are not restricted to single local authorities and require co-operation between organisations when planning for sustainable development. The key issues facing planners when considering proposals were identified as climate change, flooding, coastal erosion, instability and subsidence, mineral resources, renewable energy, unconventional oil and gas exploration, waste management, brownfield development, contaminated land, groundwater, SuDS and geoconservation. In the private sector, the data that consultants showed most interest in related to ground conditions (previous ground investigation data), contaminated land, radon, geology, hydrogeology and the nature of artificial ground.

The special area between Swansea Bay and Cardiff/South East Wales City Regions lies within the Neath Port Talbot and eastern Swansea Bay and is set to become a key location to exploit subsurface natural capital for the remainder of the century, including plans for a new Swansea Bay Lagoon. Part of this area already benefits from previous subsurface research (e.g. Waters, *et al*, 2005), however extension of the 3D model to incorporate new data would be desirable in the future.

## 9 Summary

- Representatives from key stakeholders have been interviewed; Swansea Council, Neath Port Talbot Council, Cardiff Council, Newport City Council, Rhondda Cynon Taf Council, Caerphilly County Borough Council, Merthyr Tydfil County Borough Council, Natural Resources Wales, Welsh Water, Celtic and Atkins Global.
- There is a clear ‘public good’ and private stakeholder interest in a centralised system which allows access to shared subsurface knowledge and data in Wales.

- There is a risk that growth and sustainable development in City Regions in Wales will be hampered by a lack of subsurface knowledge exchange.
- Geological data sets most relevant to underpinning sustainable development in Wales are those related to climate change, flooding, coastal erosion, instability and subsidence, mineral resources, renewable energy, unconventional oil and gas exploration, waste management, brownfield development, contaminated land, groundwater, sustainable drainage systems and geo-conservation.
- Civil engineering and environmental consultants currently largely rely on their own site specific data and online borehole records, but would be interested in accessing further information on ground conditions, contaminated land, radon, geology, hydrogeology and the nature of artificial ground.
- The industry case study (Cardiff Council-Atkins) indicates that the public sector could make considerable cost and time savings on construction projects, simply by exchanging subsurface knowledge at an early stage of the project. Additional benefits to the public would include reduction in disruption.
- There is a significant volume of subsurface information already held in the public domain, much of it kept by councils and other authorities, some of which is donated to BGS. The format of this data is variable, and includes paper records, digital scans, and only rarely AGS. One example is site investigation reports contained in some planning applications. However, if this data is not actively captured for re-use, it is at risk of being lost when Councils undergo planned restructuring.
- This is unfortunate as re-use of subsurface knowledge could offer time savings and reduced ground risk for construction projects, making Wales a more attractive prospect to investors. Conversely, there is a risk that information used out of context could lead to blight at some sites, particularly those with potential for land contamination.
- Cardiff, Newport, Bridgend, Torfaen, Blaenau Gwent, Merthyr Tydfil, Neath Port Talbot, Carmarthenshire, Pembrokeshire and Pembrokeshire Coast National Park councils and authorities already refer to BGS as a source of information in their LDPs.
- The LDPs of Swansea, Caerphilly, Ceredigion, Rhondda Cynon Taf, Brecon Beacons National Park, Monmouthshire, Powys and the Vale of Glamorgan do not reference the BGS.
- Stakeholders have fed back that the knowledge, data and information held within BGS is not always put to best use simply due to many organisations in Wales not being aware of its existence.
- Local authorities fed back that our data licensing fees are prohibitively high, and this experience appears to result in some organisations not engaging with BGS in other ways, such as collaborative research.
- From their LDPs Newport, Caerphilly, Cardiff, Bridgend and the Pembrokeshire Coast National Park appeared most alert to the key environmental and geographical issues in their areas, and cognisant to how subsurface information can be used to better manage the risks these pose.
- The key social and physical Regeneration Areas in South and Mid-Wales are The Western Valleys, The Heads of the Valleys, Swansea, Barry and Aberystwyth. Bridgend, Merthyr Tydfil, Port Talbot, Newport, Pontypridd, Swansea and Pontypool will be developed under the Vibrant and Viable Places Framework. The largest areas of planned housing development and infrastructure, however, are Cardiff, Swansea, and Newport, with around 41,000, 17,000 and 10,000 new homes planned respectively.

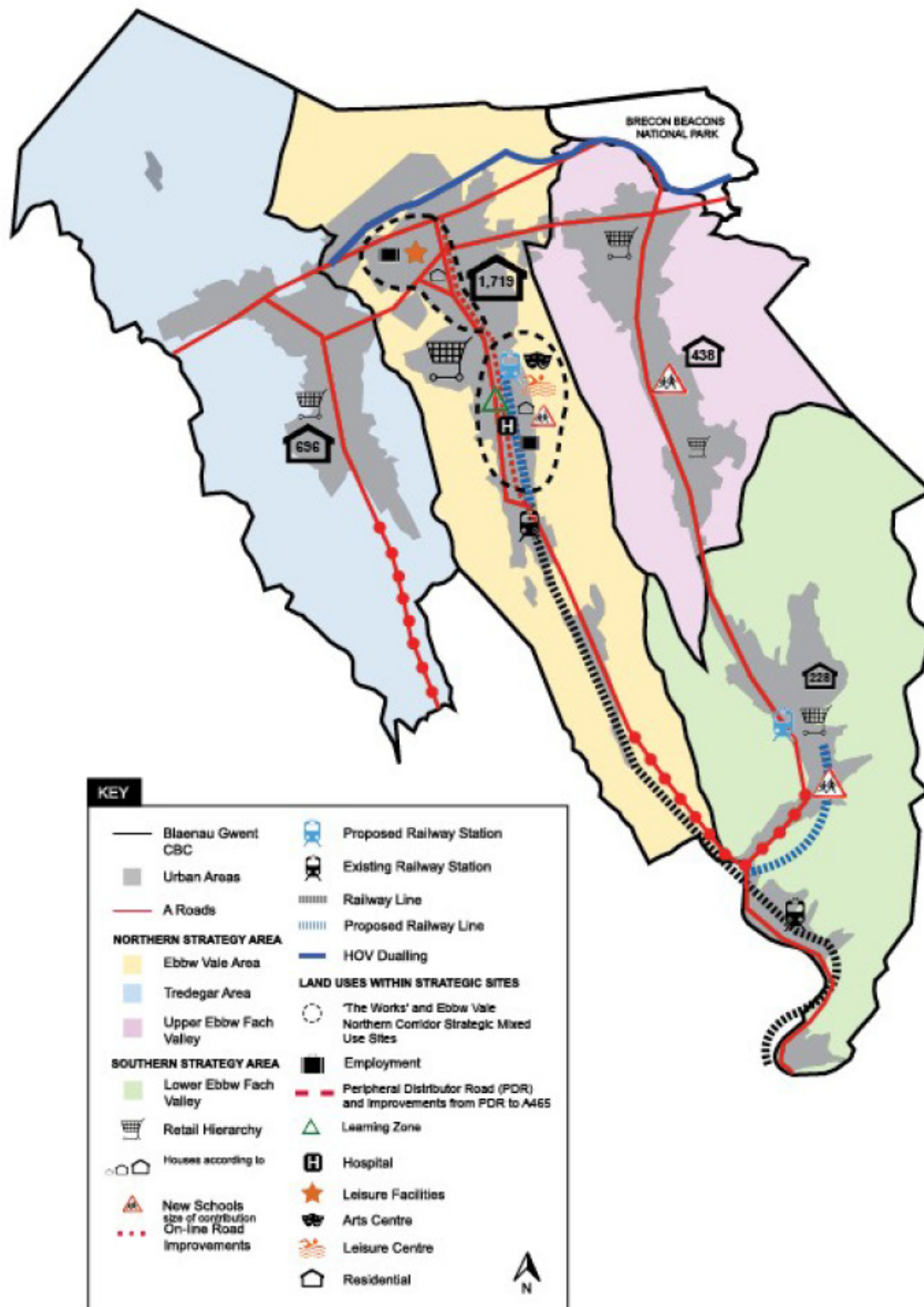
## 10 Recommendations

- The first step towards increasing the benefit of subsurface information is to develop a knowledge exchange network in Wales. This should be on a trial basis initially, in one or two council areas where there is a strong desire for partnership working, and where there is potential for future expansion to a regional level. Suggested trial areas are Cardiff and Newport.
- Further discussions with other stakeholders are required, particularly in North Wales.
- Linked research opportunities, with partner organisations such as Councils, NRW, Welsh Water, and universities (e.g. Cardiff University Sustainable Places Research Institute) should be developed. Key knowledge gaps include public perception of value and risk of subsurface Natural Capital, the role of the subsurface in provision and sustainability of ecosystems services, and how increased subsurface information could be perceived and interpreted with regards to blight versus the reduced risk associated with prior knowledge of adverse ground conditions, potentially providing greater certainty in time and cost estimates.
- A targeted data mining exercise should be undertaken, focused on, but not restricted to, Newport and Cardiff, to mitigate the risk of subsurface environmental data losses during planned public sector restructuring, and to provide data for planning and research purposes.
- A 3D geological model of Cardiff should be developed to provide a framework for physical property attribution studies (e.g. thermal, hydrogeological, geotechnical properties). The Artificial Ground layer should be updated, using borehole data, to attribute the model using the enhanced classification for Artificial Ground, described by Ford, *et al*, 2010.
- The BGS borehole and geotechnical database should be populated in the Newport area, in partnership with the council, to support future 3D ground characterisation studies and to develop new planning tools and methods.
- Re-establishment and quality assurance of the Swansea-Neath Port Talbot 3D LithoFrame model, in the latest version of GSI3D, using a higher resolution 2 m DTM, and dissemination of the model to the councils through the Groundhog web viewer. Extension and densification of the existing 3D model into the strategic regeneration areas is desirable, but not as high a priority as in other less well understood areas.
- Research into geology and health in the Swansea Bay City Region, linked with Public Health Wales and partner organisations, should be scoped and developed.
- Ongoing knowledge exchange should continue through externally focused events to raise awareness of availability and uses of BGS data.
- In the longer-term, mapping and characterisation of artificial ground, to provide attributed DiGMap polygons, in areas where this information does not exist is required. This work could initially be progressed through University projects or PhDs.

## Appendix 1 Key Diagrams from LDPs

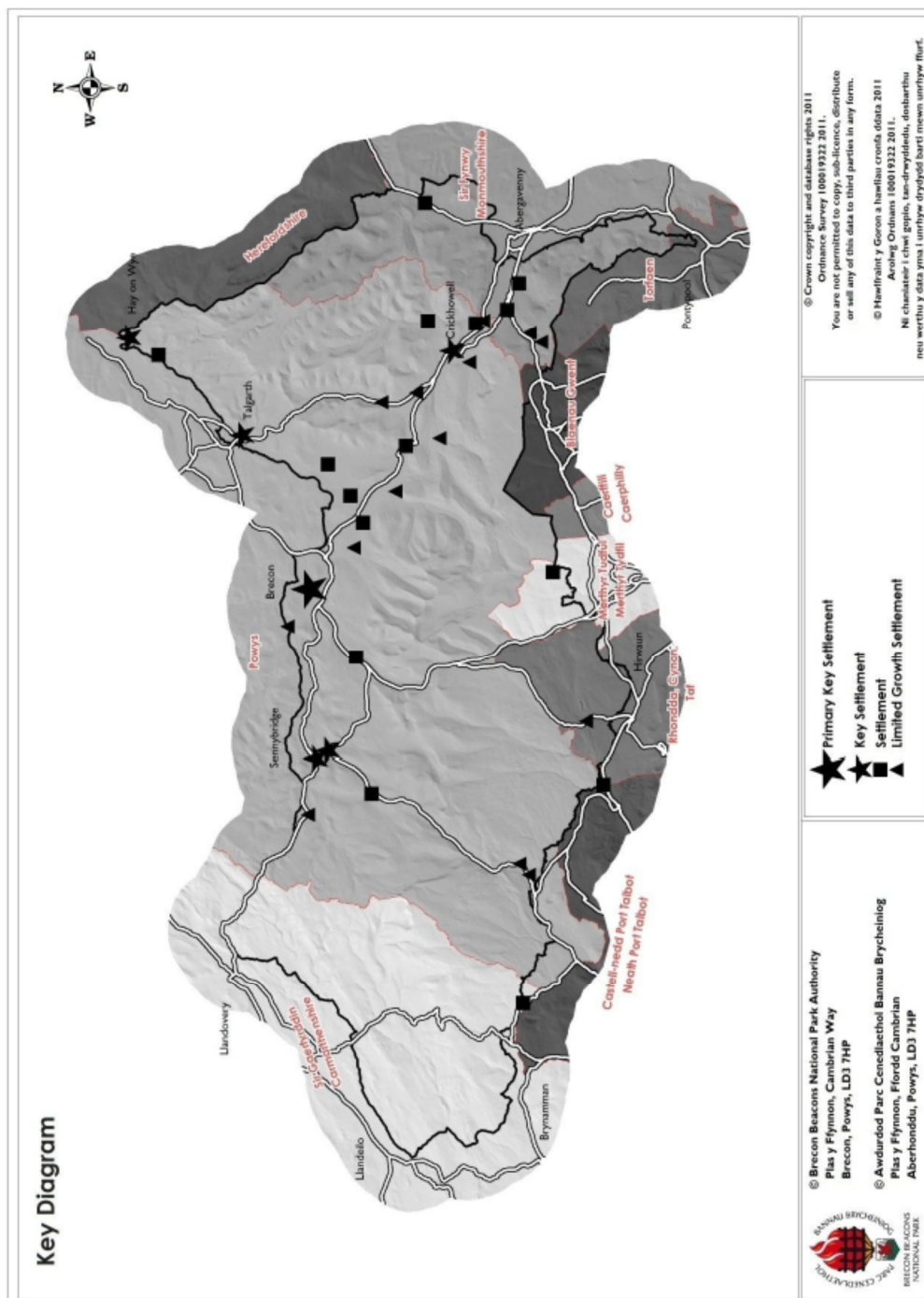
The development plans for each council and local authority are summarised in the key diagrams contained within the LDPs. These have been extracted from the LDPs and supplied below for reference.

### BLAENAU GWENT



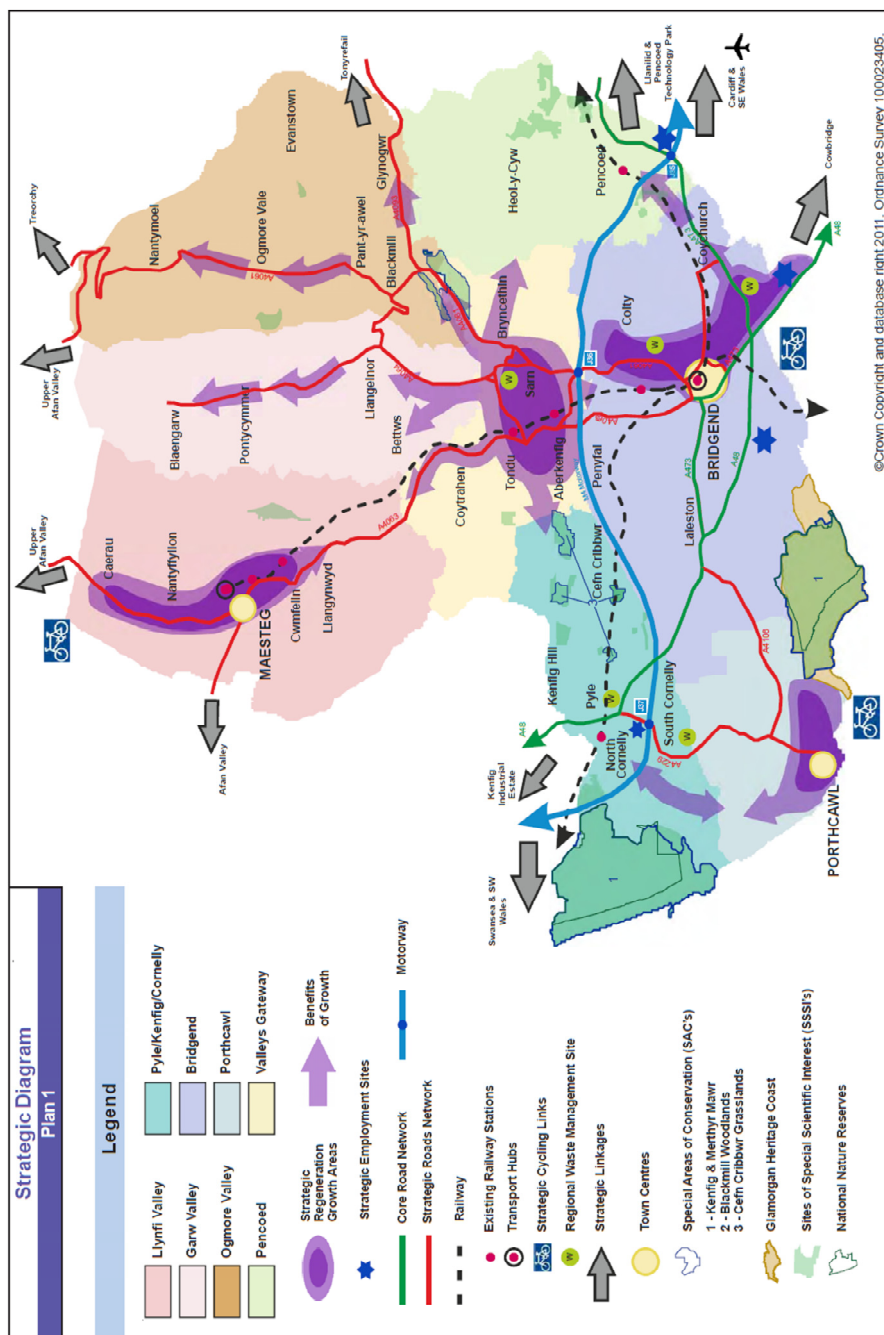
Source: Blaenau Gwent County Borough Council Local Development Plan Up To 2021 (2012)

# BRECON BEACONS NATIONAL PARK



Source: Brecon Beacons National Park Local Development Plan December 2013 (2013)

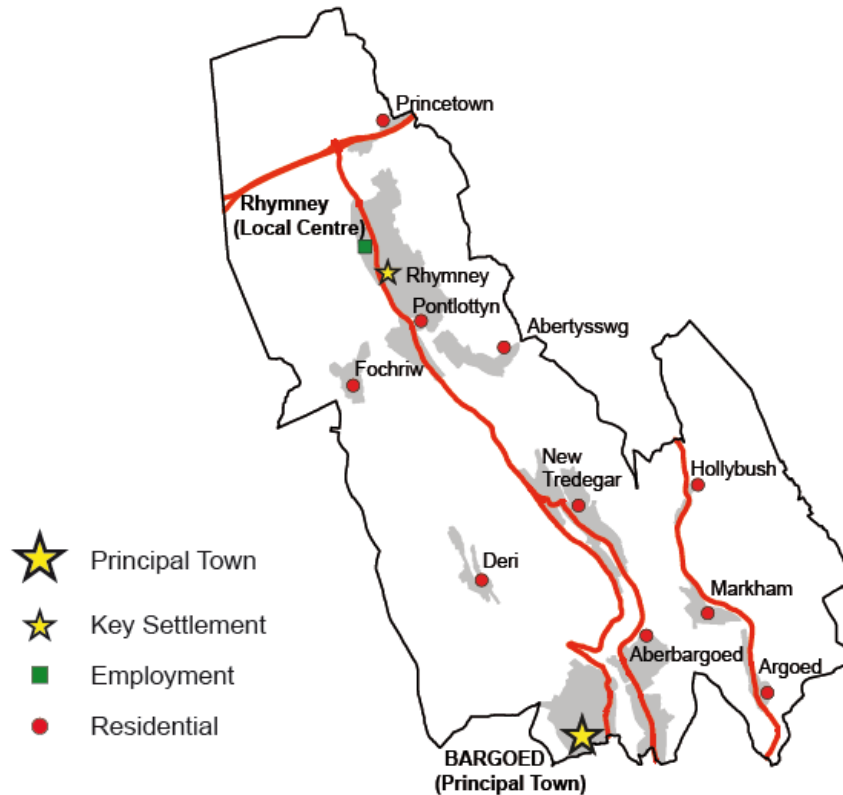
**BRIDGEND**



Source: Bridgend Local Development Plan 2006-2021 Deposit Plan (2011)

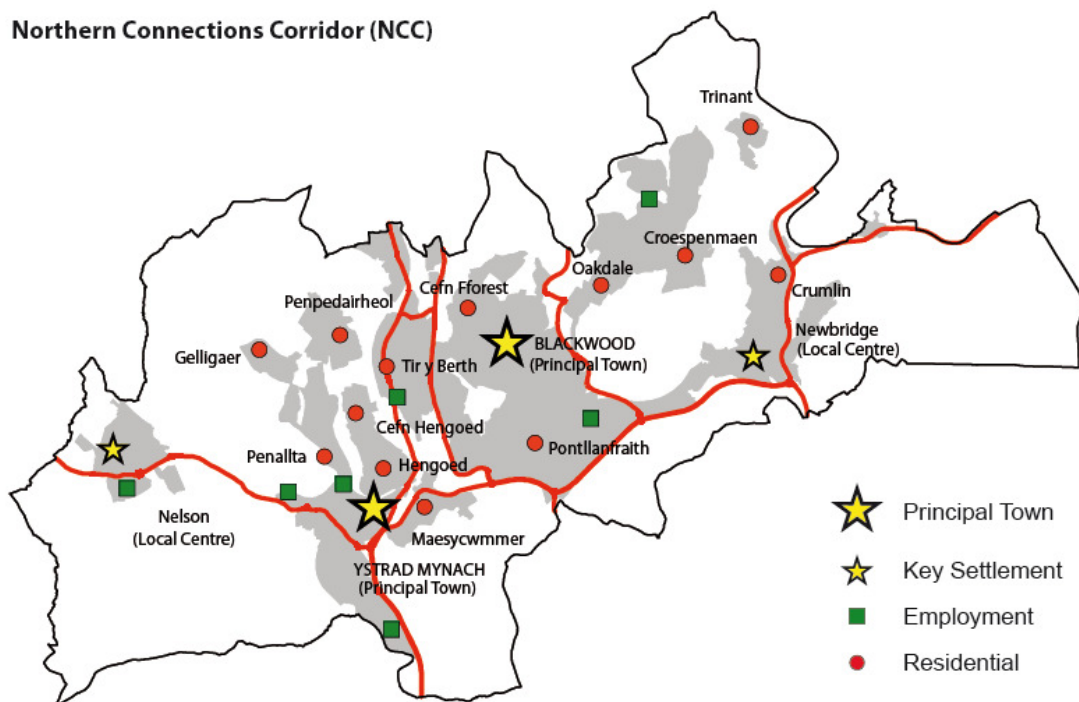
## CAERPHILLY

### Heads of the Valleys Regeneration Area (HOVRA)



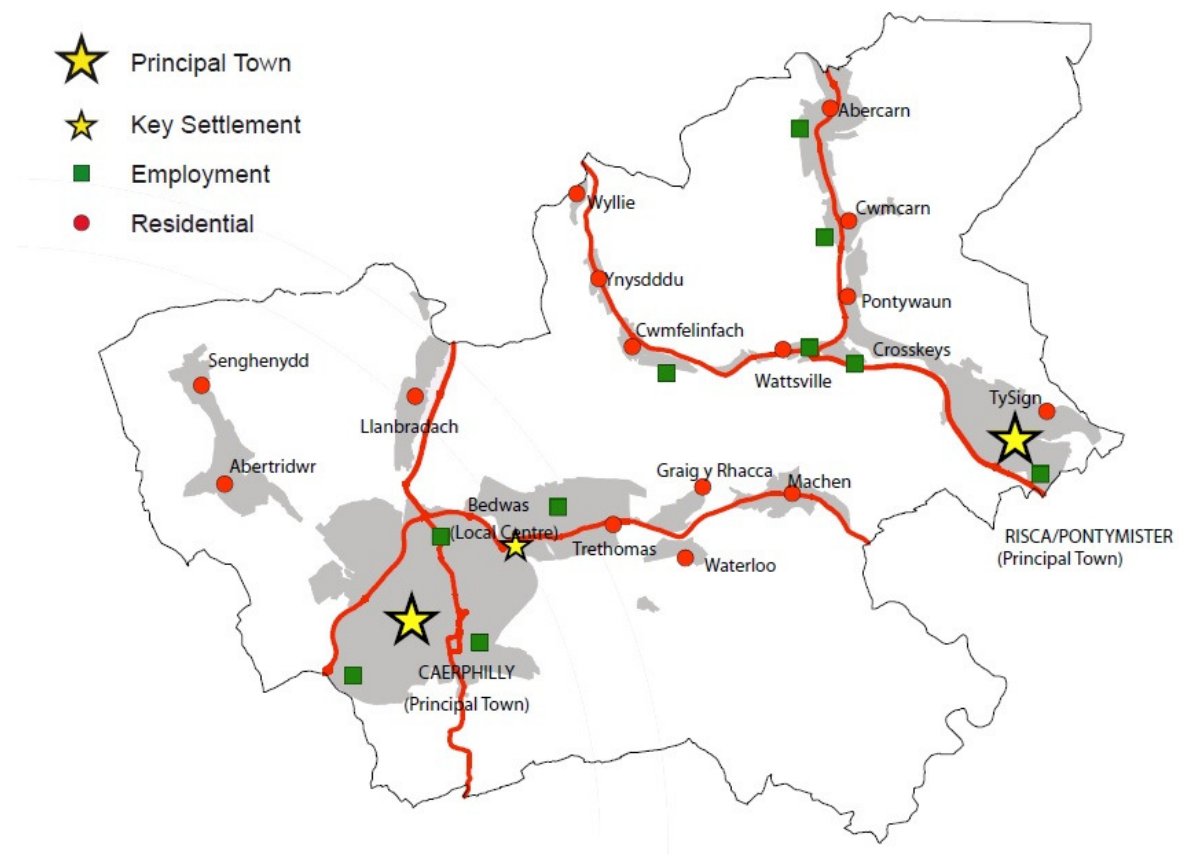
Source: Caerphilly County Borough Local Development Plan Up To 2021 (2010)

### Northern Connections Corridor (NCC)



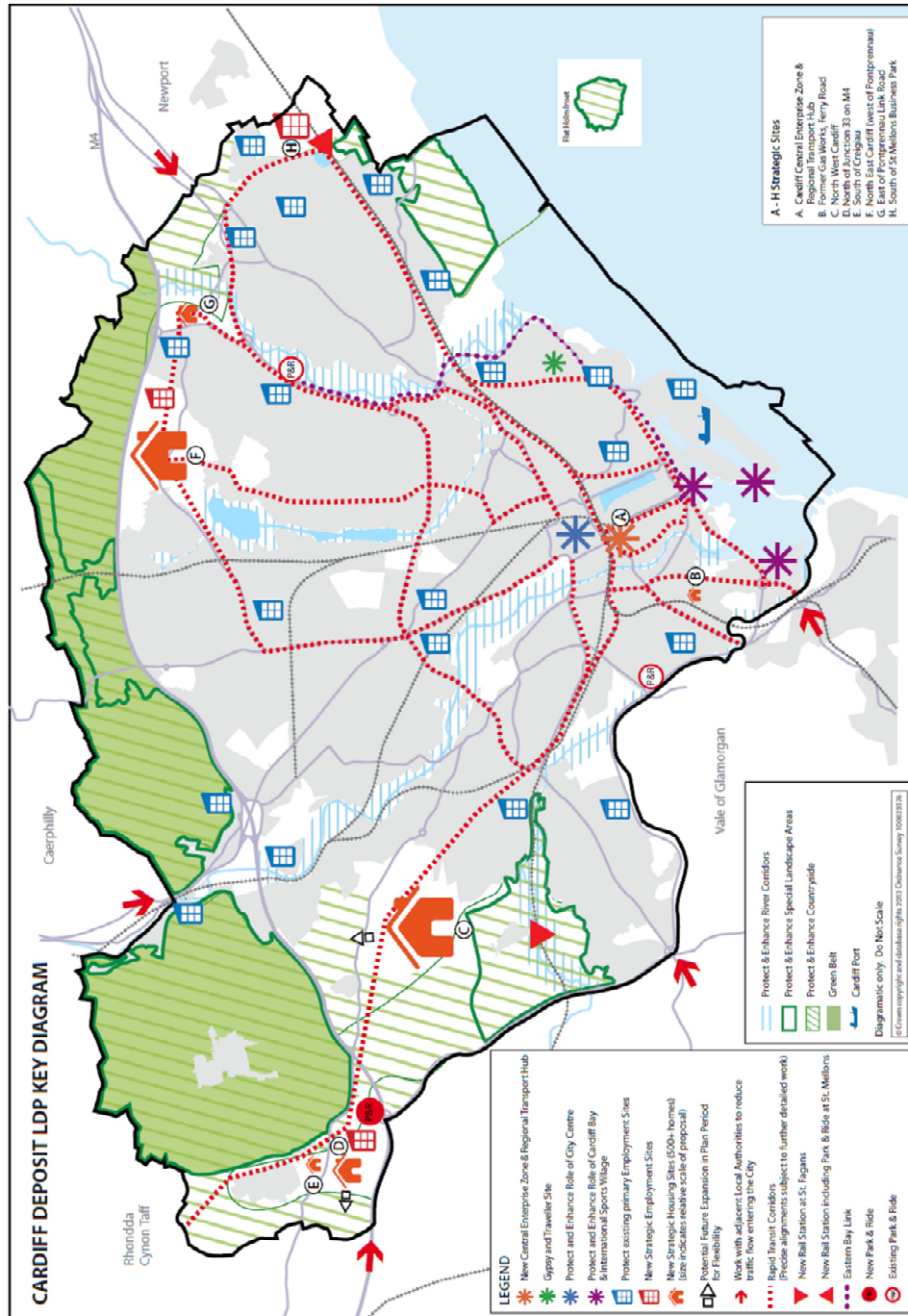
Source: Caerphilly County Borough Local Development Plan Up To 2021 (2010)

### Southern Connections Corridor (SCC)



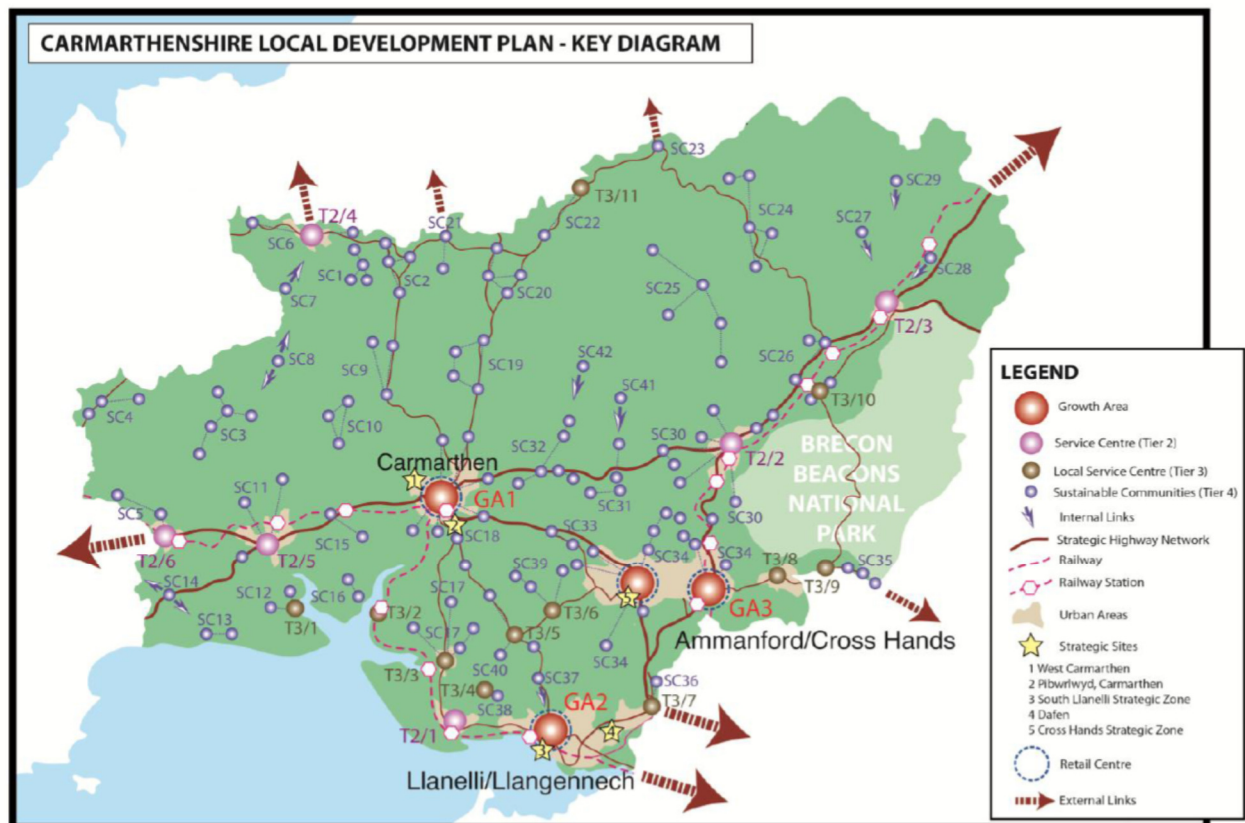
Source: Caerphilly County Borough Local Development Plan Up To 2021 (2010)

# CARDIFF



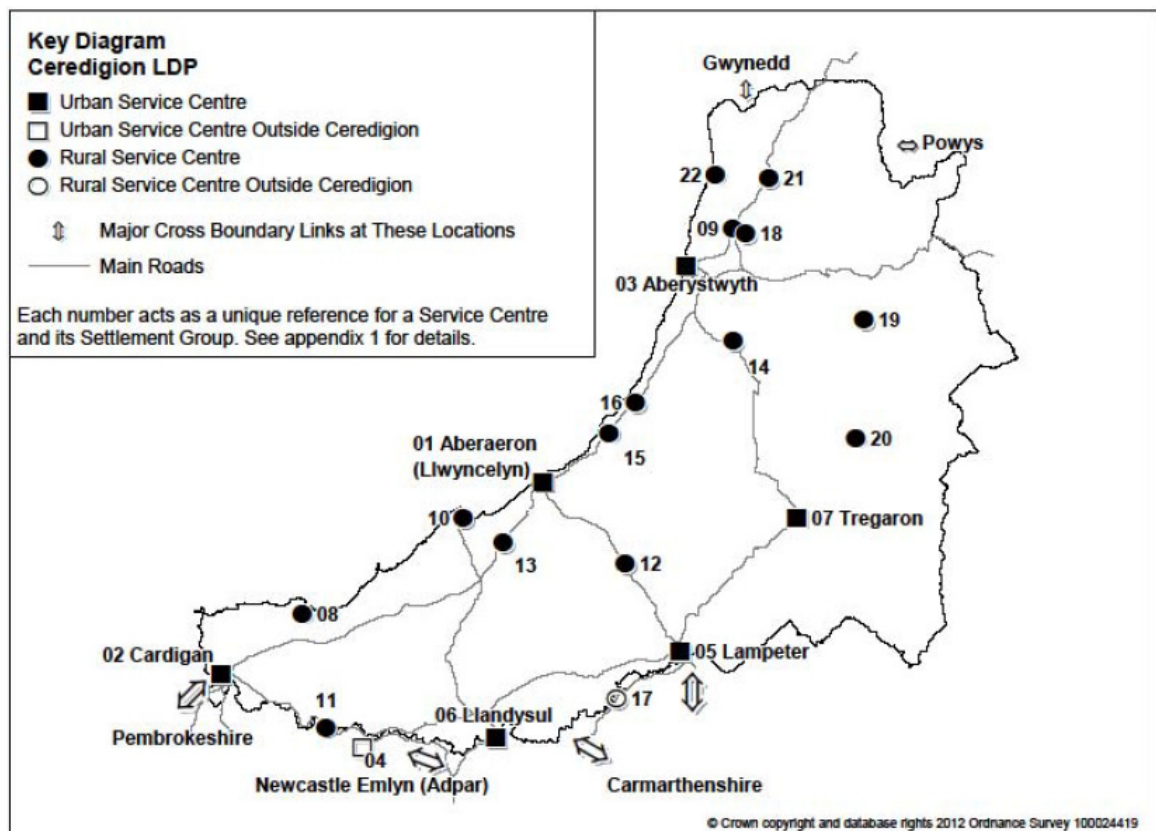
Source: Cardiff Local Development Plan 2006-2026 Deposit Plan (2013)

## CARMARTHENSHIRE

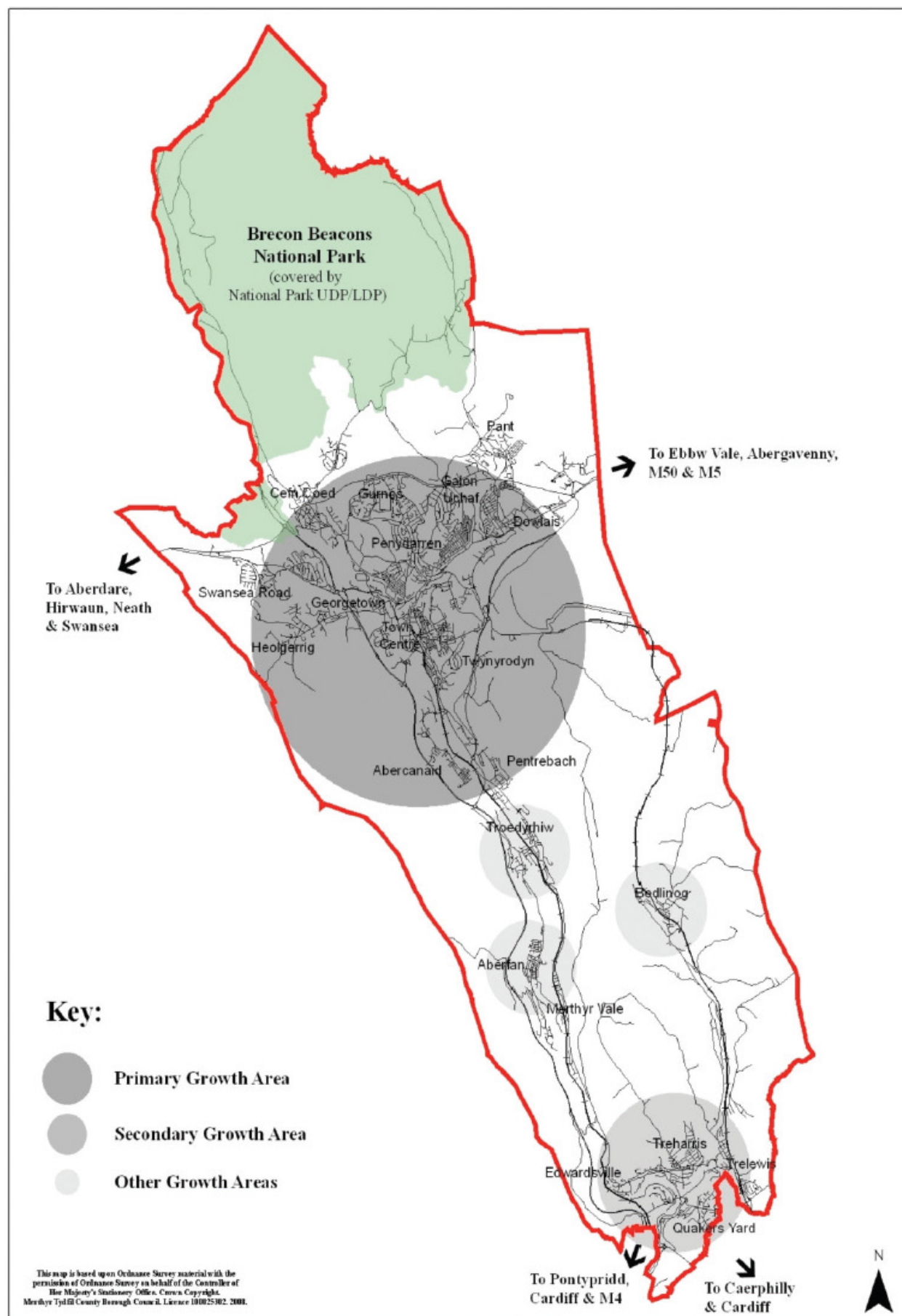


Source: Carmarthenshire County Council Local Development Plan (2014)

## CEREDIGION

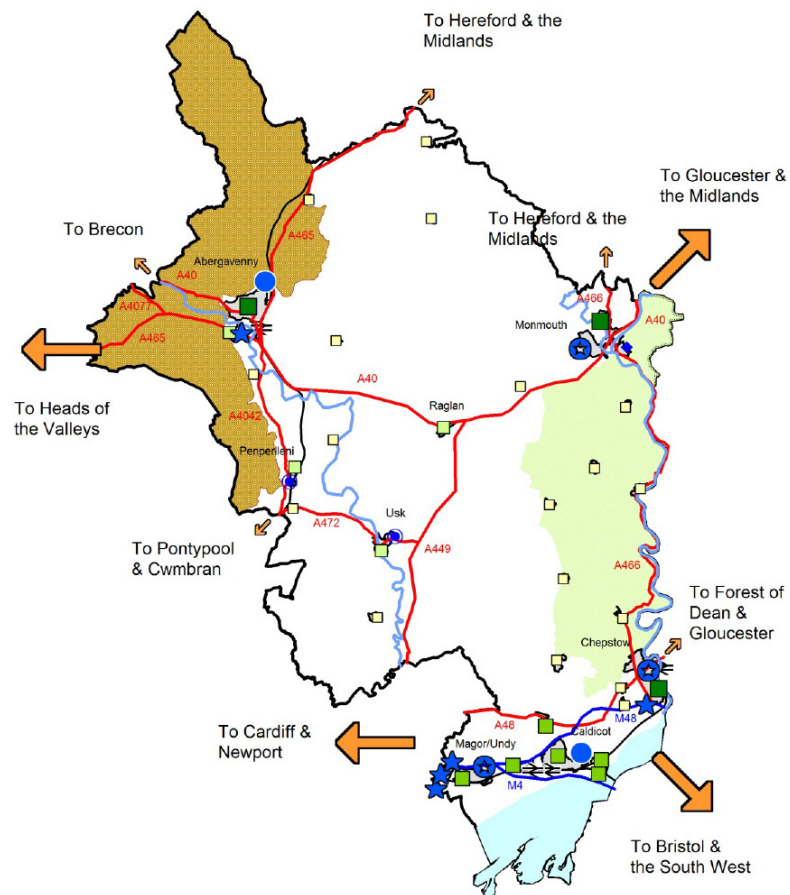


Source: Ceredigion Local Development Plan 2007 – 2022 (2013)

**MERTHYR TYDFIL**

Source: Merthyr Tydfil Local Development Plan 2006-2021 (2011)

## MONMOUTHSHIRE



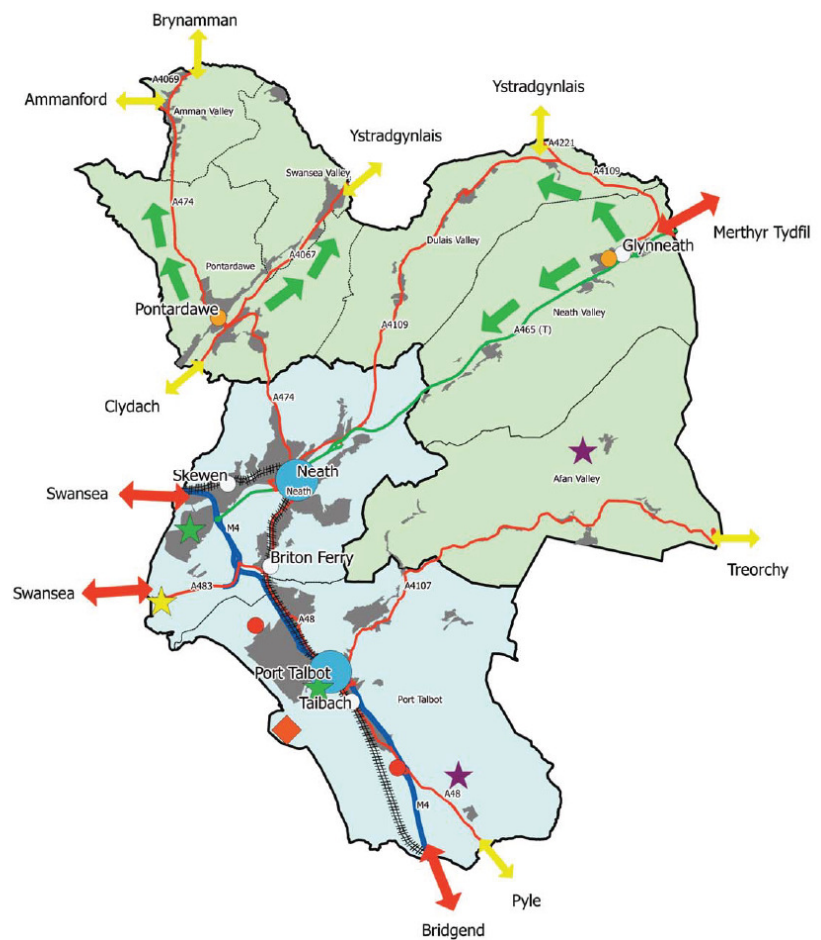
Source: Monmouthshire County Council Adopted Local Development Plan 2011-2021 (2014)

## NEATH PORT TALBOT

Map 2.1 Strategic Diagram

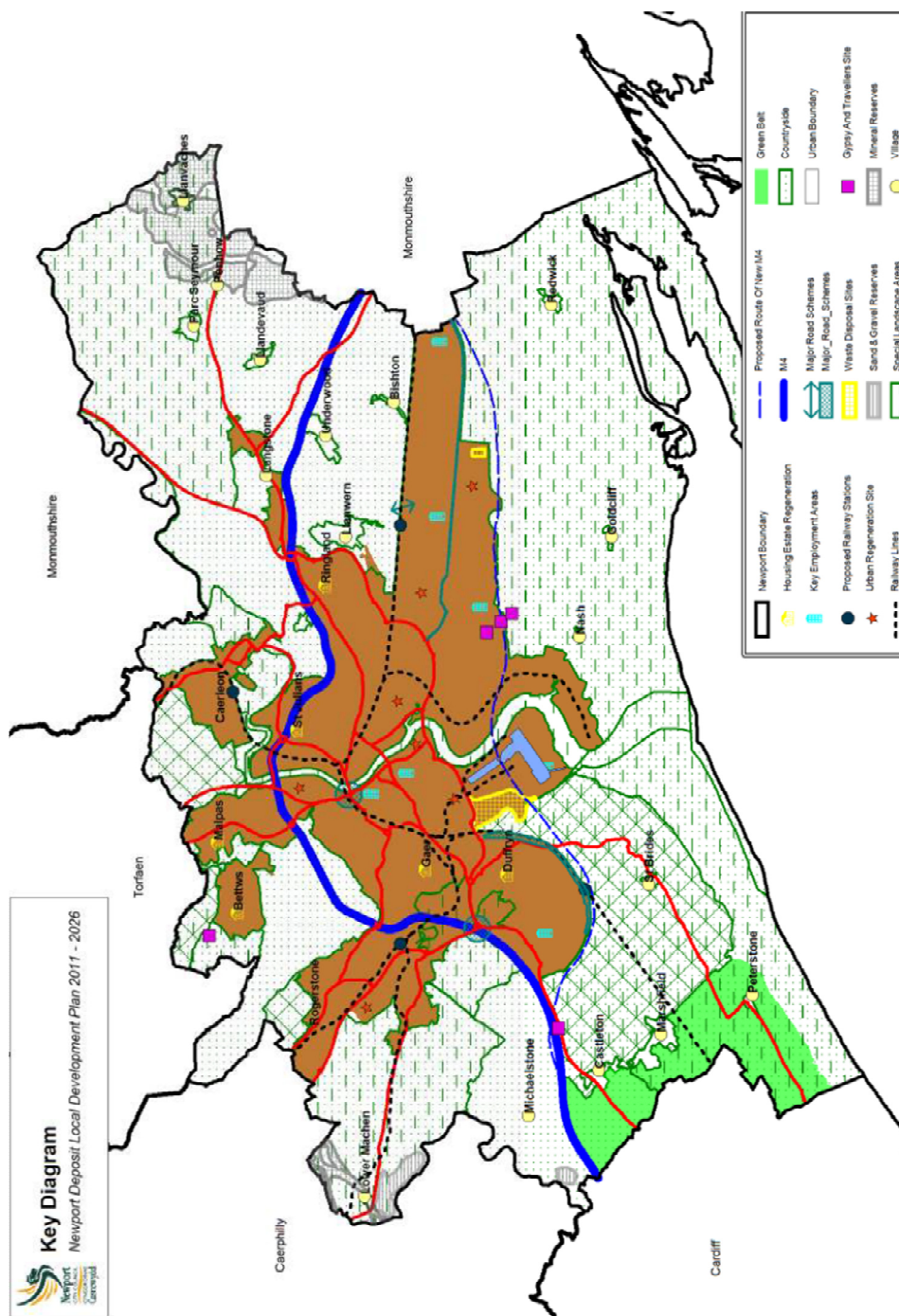
### Strategic Diagram

- Legend**
- Coastal Corridor Strategy Area
  - Valleys Strategy Area
  - Spatial Area
  - Settlement
  - ★ Strategic Regeneration Area
  - Strategic Employment Site
  - Strategic Growth Area
  - Benefits of Growth
  - Town Centre
  - District Centre
  - ★ University Campus
  - ★ Strategic Tourist Destination
  - ↔ Primary Network Link
  - ↔ Core Network Link
  - ◆ Tidal Harbour / Docks
  - M4 Motorway
  - Primary Road Network
  - Core Road Network
  - #### Rail Line



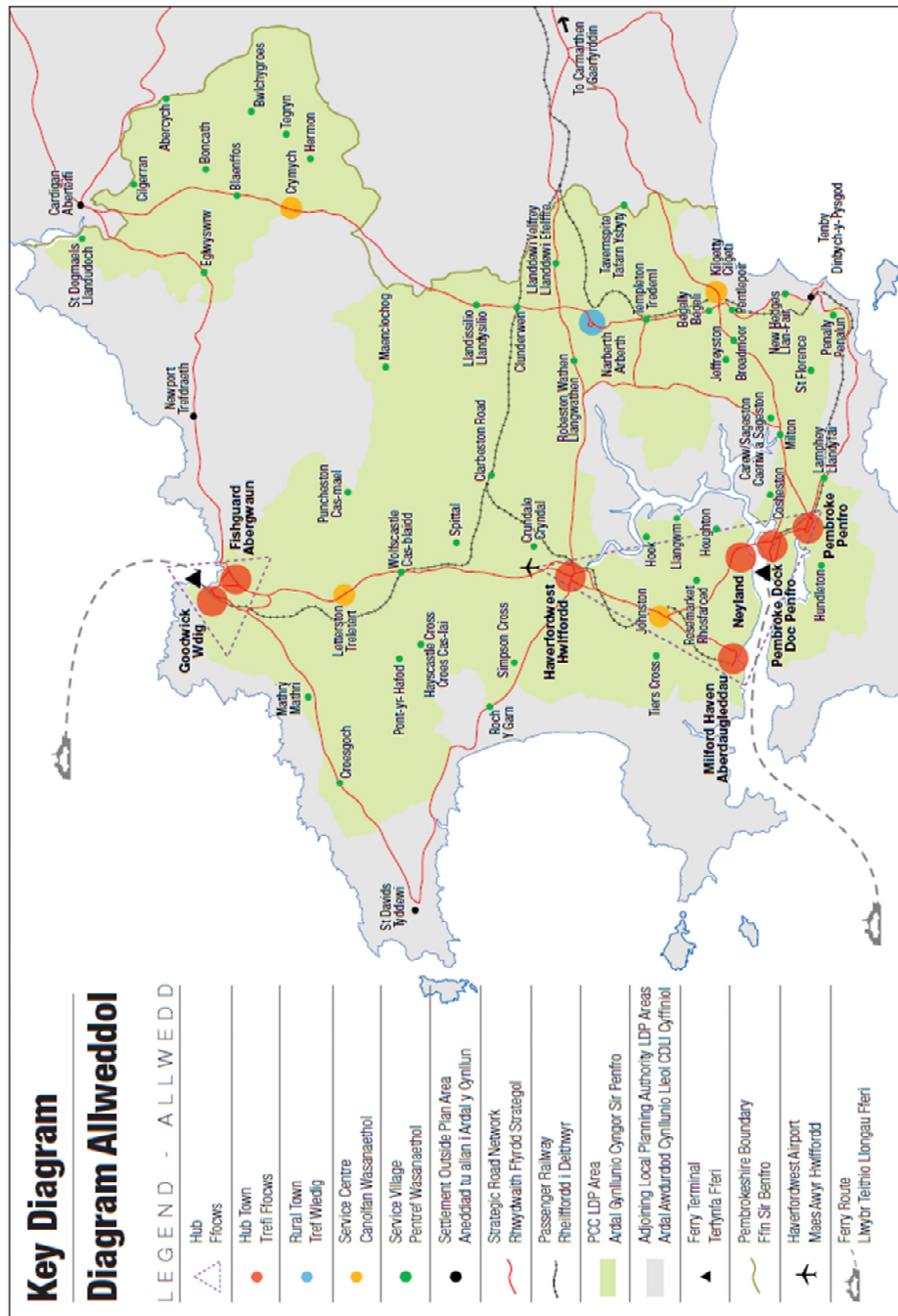
Source: Neath Port Talbot County Borough Council Local Development Plan 2011-2026 Deposit Plan (2013)

# NEWPORT



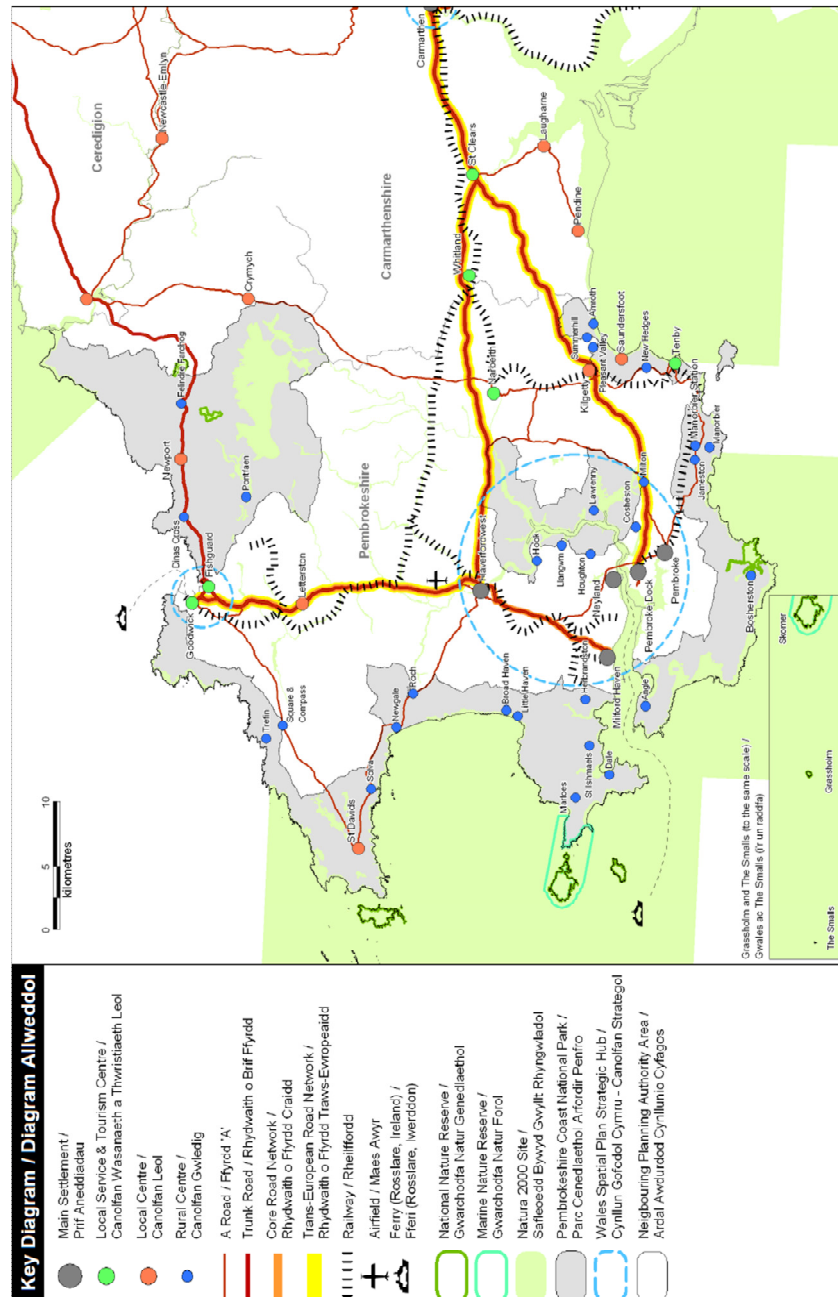
Source: Newport Local Development Plan 2011-26 Deposit Plan (2012)

# PEMBROKESHIRE



Source: Pembrokeshire County Council Local Development Plan. Planning Pembrokeshire's Future (Up To 2021) (2013)

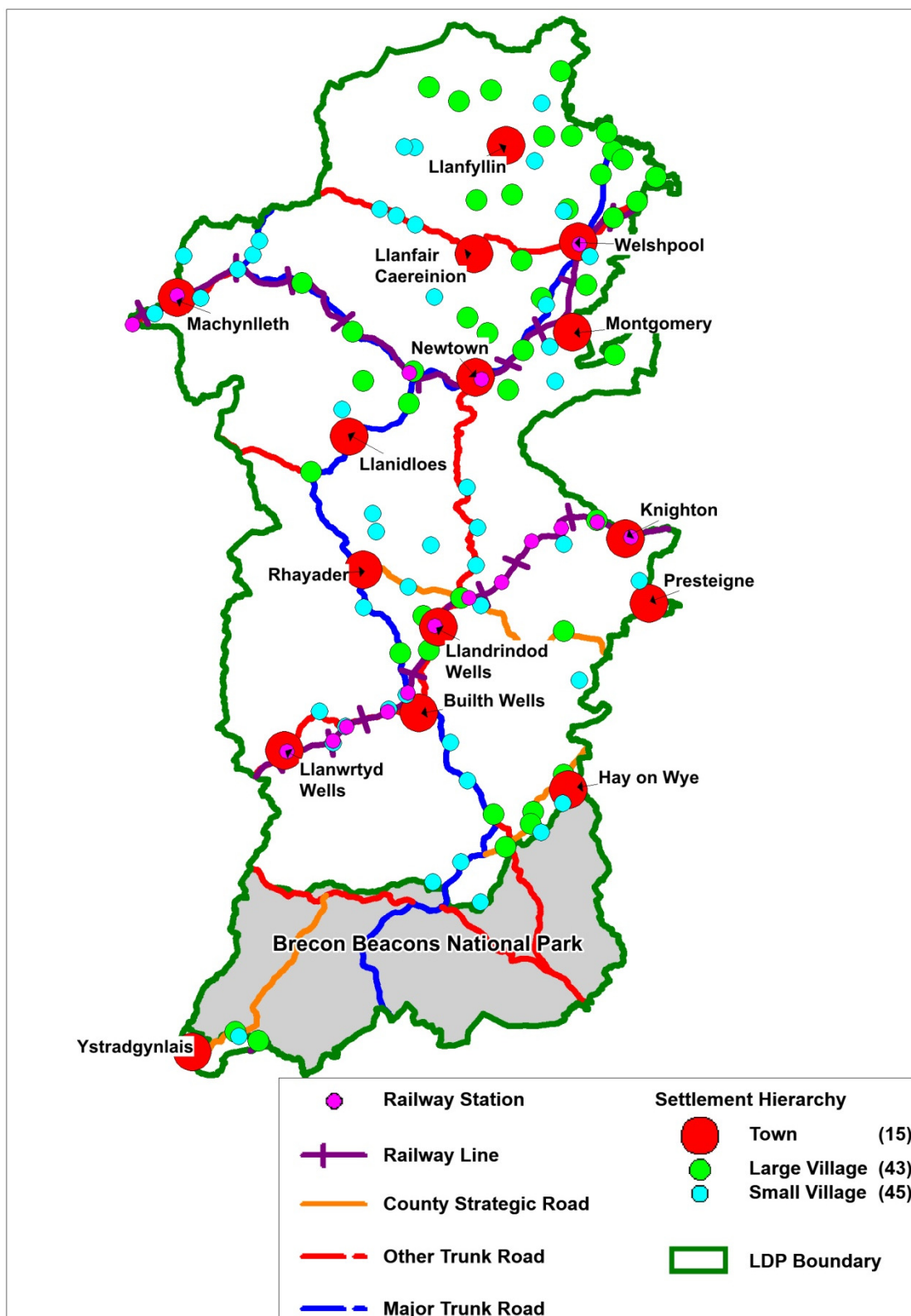
# PEMBROKESHIRE COAST NATIONAL PARK



Source: Pembrokeshire Coast National Park Local Development Plan (End Date 2021) (2010)

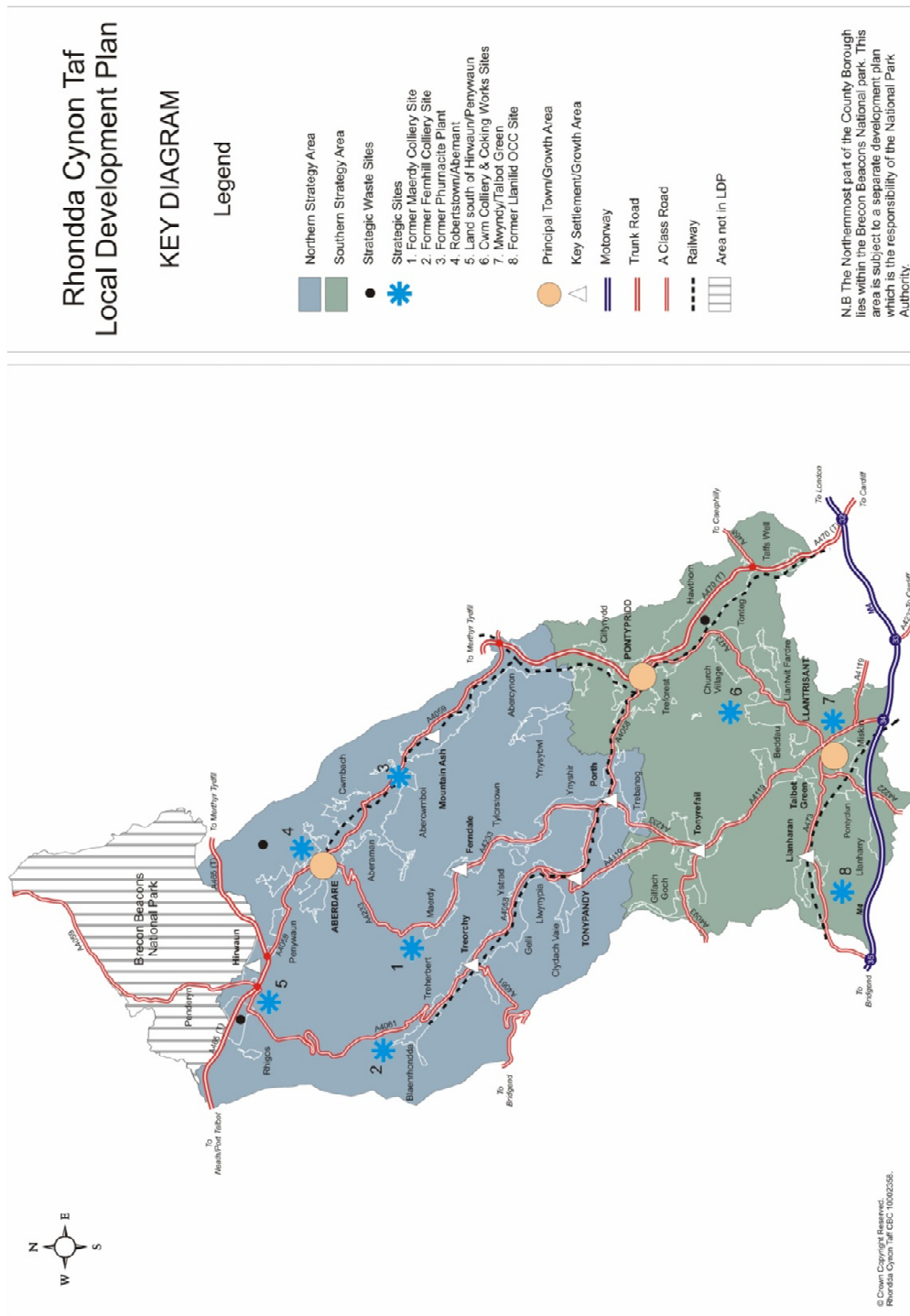


## POWYS

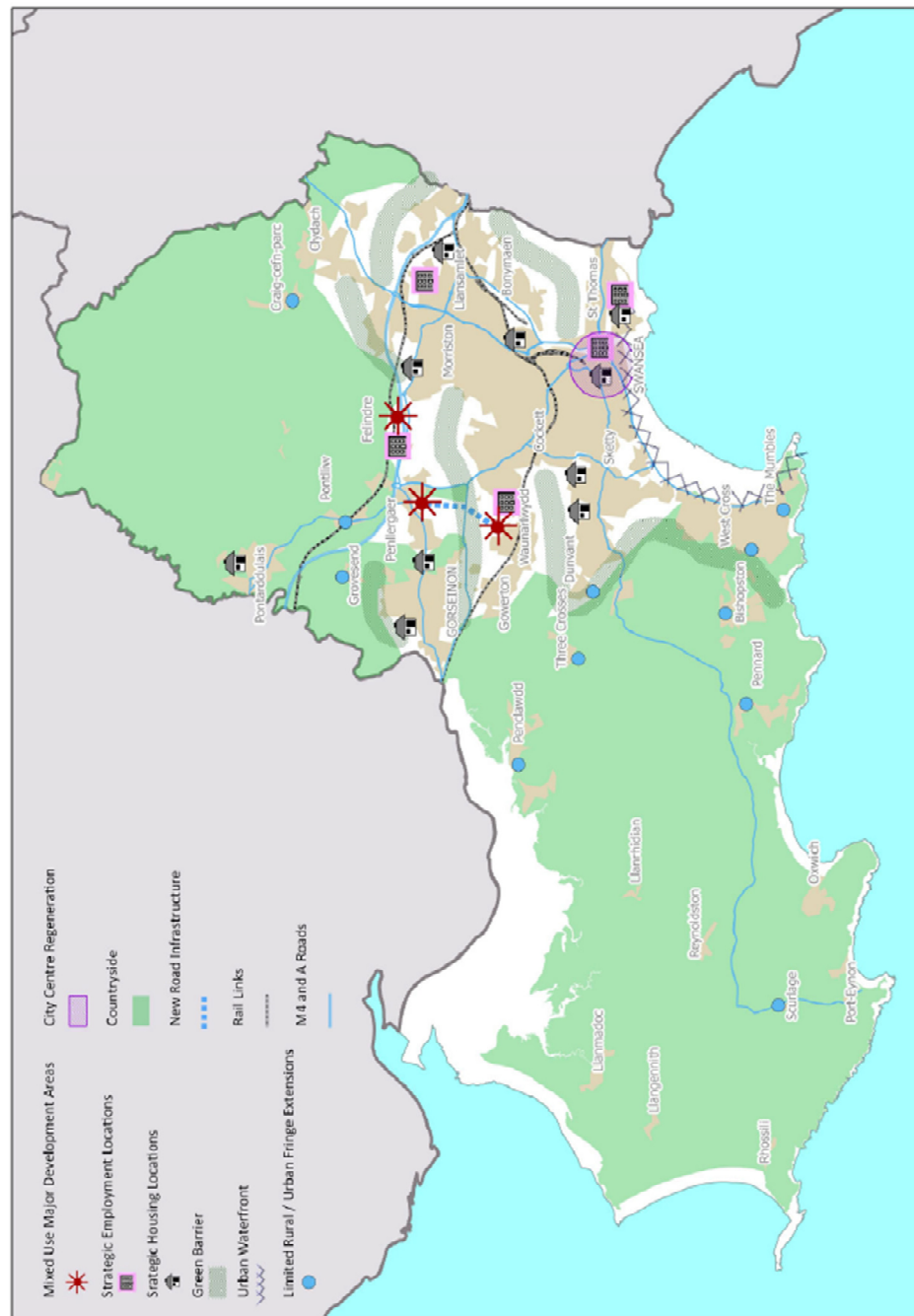


Source: Powys Local Development Plan 2011-2026 Deposit Draft (2014)

## **RHONDDA CYNON TAF**

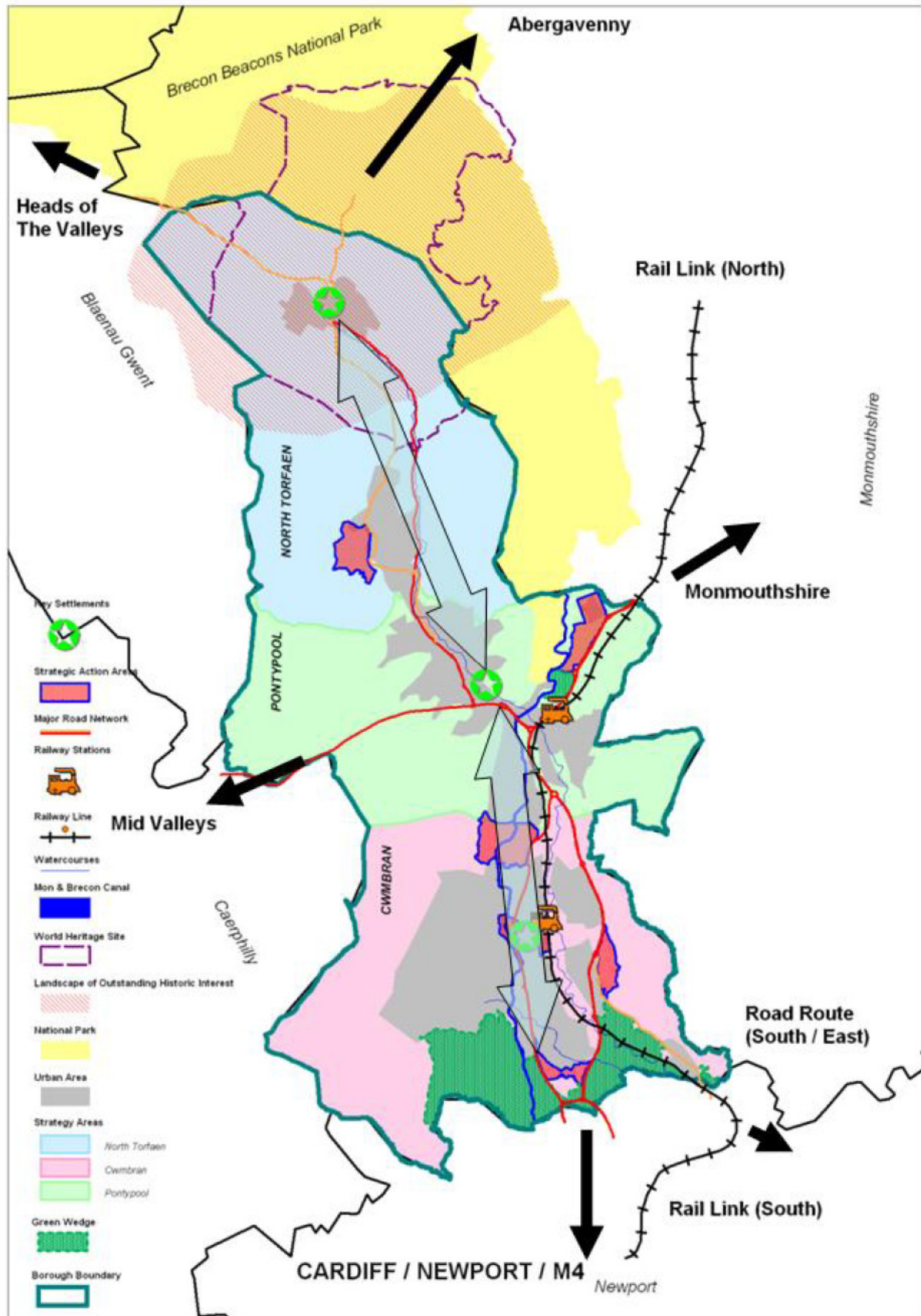


Source: Rhondda Cynon Taf Local Development Plan Up To 2021 (2011)

**SWANSEA**

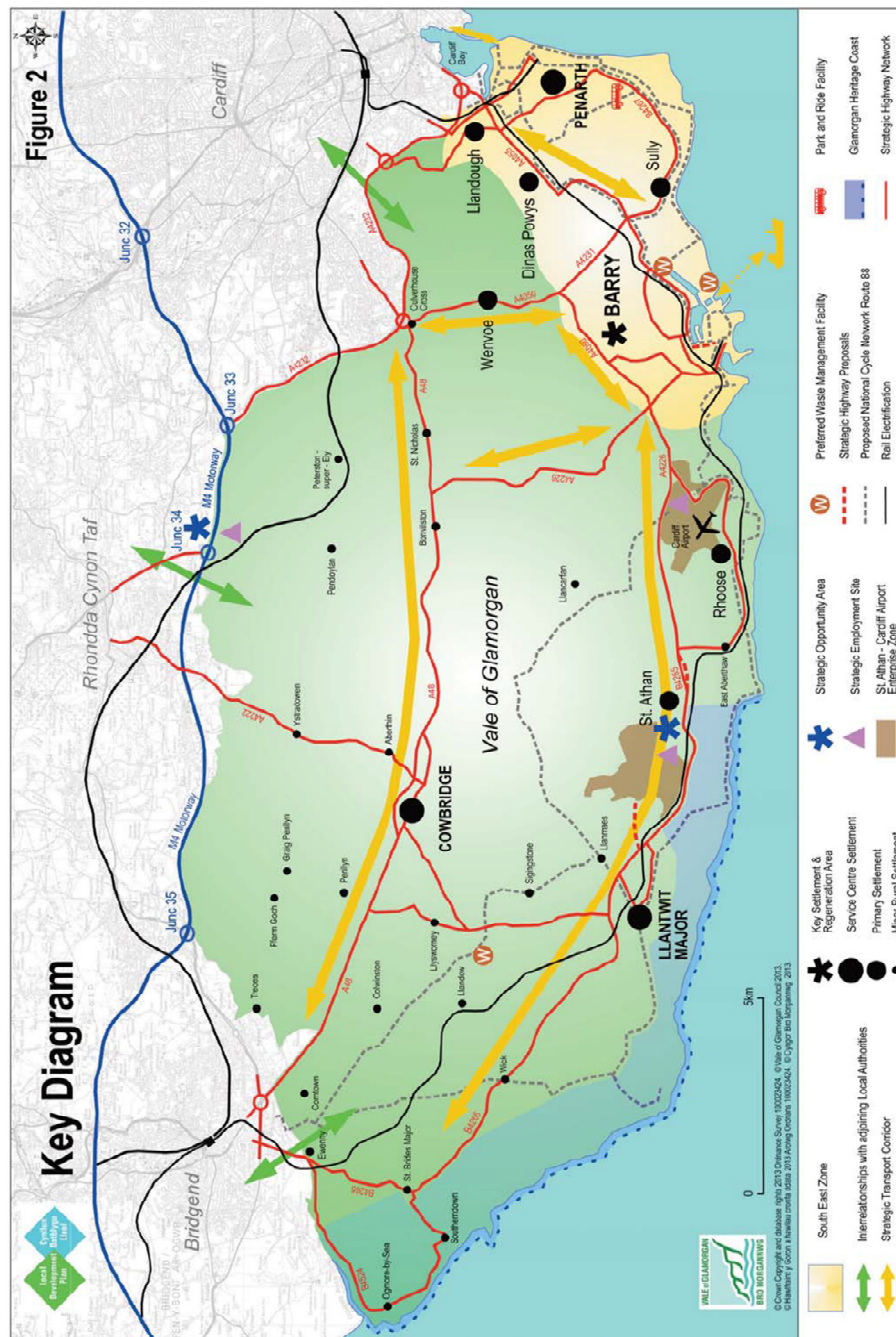
Source: Swansea Local Development Plan Preferred Strategy (2013)

## TORFAEN



Source: Adopted Torfaen Local Development Plan (December 2013)

# VALE OF GLAMORGAN



Source: Vale of Glamorgan Local Development Plan 2011-2026 Deposit Plan (2013)

## Appendix 2 Summary of Local Development Plans

A summarised account of the LDPs outside of Cardiff, Newport and Swansea can be found below. The following are offered as summaries of these documents and are not representative of BGS opinion.

### **ADOPTED LOCAL DEVELOPMENT PLANS**

The following LDPs have been adopted by their local authorities following the consultation period and are summarised here.

#### **BLAENAU GWENT COUNTY BOROUGH COUNCIL LOCAL DEVELOPMENT PLAN UP TO 2021**

The key issues identified in the Blaenau Gwent LDP are economic diversification, establishing new roles for town centres, stabilising the population, housing, education, improving accessibility, creating a network of settlement hubs, supporting sustainable transport, health and well being, the environment, creating places with a distinctive sense of identity, sustainable use of natural resources, sustainable design and the development and spreading of the benefits of regeneration. The plan sets out to make provision for 3,500 new homes, of which 1,000 will be affordable. 10% of housing on all sites is required to be affordable. Transport improvements will be implemented in the form of an upgraded bus interchange, new and extended railway lines and road improvements. In addition to these schemes, the LDP also aims to make provision for four new gypsy and traveller sites, new cycle and pedestrian paths and extended cemeteries. Tourism also features highly in the LDP, with plans to exploit the countryside by providing better access to it for recreation and making a feature of biodiversity and geodiversity. It is important to the LDP, however, that these schemes do not impact on the Brecon Beacons. The topography in the south of the county is a constraint to development.

The key development site in Blaenau Gwent is the Ebbw Vale Regeneration Area which will be redeveloped within an environmental setting paying particular attention to conservation. There will be provision for a wetlands park and an Environmental Resource Centre. The former steelworks site and the Ebbw Vale North Corridor site will be home to brownfield development. Where possible, all new developments will incorporate permeable surfaces and SuDS.

According to the LDP new development must minimise further contributions to climate change and mitigate its effects by maximising land use, reusing and restoring derelict land and buildings, avoiding floodplains unless the risks can be mitigated, reducing energy consumption, increasing renewable energy and decentralising heating. Renewable energy sources which will be considered by Blaenau Gwent are onshore wind, energy crops, energy from waste, anaerobic digestion, landfill gas, sewage gas, hydropower, biomass, combined heat and power and solar power. Incinerating waste may provide a source of energy. Waste management sites are to be chosen carefully in order to minimise the adverse impacts of the operations. There is an aim for there to be a shift away from traditional landfill sites and the LDP considers the use of farmland as sites for anaerobic digestion facilities. Recycling is also key to reducing waste.

Blaenau Gwent has identified a need for 3 million tonnes of minerals which have already been safeguarded. The county also has a 10 year land bank of aggregate. Secondary aggregate will be utilised where appropriate. The materials to be safeguarded are limestone, sandstone and coal and the areas where these can be found have been identified from BGS maps. The council is looking to identify a further 0.76 million tonnes of aggregate and so has allocated three new sites for extraction. Extraction and the associated works will be permitted where the need has been established, secondary sources have been found to be inappropriate, there are clear benefits to the local economy, any detrimental effects of the works can be mitigated, there is no adverse affect on

water or sensitive landscapes, the transportation links are suitable, there will be no adverse effects on nationally protected geological or geomorphological sites unless the benefits of the works outweigh the need for conservation, there is no negative visual impact of the works, the site can be restored after use and there will be no impacts on stability. To ascertain ground instability caused by mining planners are referred to the Coal Mining Referral Area. Where areas of potential instability are identified, a geotechnical assessment will be required to determine the risk of landslides, any disturbance of contaminated land that instability may cause and the potential pollution pathways. Areas of known mineral resources will be safeguarded and development will not be permitted within the area if it will prevent future extraction or sterilise the mineral resource. Development may be permitted if the mineral can be extracted prior to the commencement of work, it is found that extraction of the mineral would be impractical, the development will not sterilise the resource or the development is temporary in nature and the site can be fully restored before the mineral is required.

The county has a total of 131 Sites of Importance for Nature Conservation and has carried out a review of several new sites based on LANDMAP and supplementary criteria to designate Special Landscape Areas. Development in or close to designated sites will only be permitted where it maintains or enhances the ecological or geological importance of the site, or the need for the development outweighs the importance of conservation.

#### BRECON BEACONS NATIONAL PARK LOCAL DEVELOPMENT PLAN DECEMBER 2013

The main issues highlighted in the Brecon Beacons National Park LDP are the special qualities and purpose of the national park, sustainability and climate change (including adapting to and mitigating against its effects), capacity for growth, housing, economic development and employment, thriving communities and ecosystems services. The LDP aims to conserve natural beauty, geodiversity, biodiversity and cultural heritage; be resilient, open and responsive to change and to mitigate and adapt to its effects; be less dependent on external supply chains; have appropriate monitoring; minimise the need for travel; develop brownfield sites; provide adequate utilities; promote sustainable use of air, soil and water; follow the waste hierarchy; protect the National Park against new mineral workings and extensions of existing facilities whilst safeguarding resources; allow small scale renewable energy generation; use energy efficient design; increase tourism; provide improved transport and avoid development that will result in increased flood risk.

The major areas of development will be Brecon, Talgarth, Crickhowell and Hay-On-Wye. Development will focus on housing, retail, community services, sustainable transport, growth compatible with environmental constraints, employment, land re-use and highways capacity. Proposals will be required to include a full biodiversity survey and make provisions for water management to avoid increasing the risks of flooding. The LDP stipulates that at the planning stage, it should also be established whether a site will need remediating against the threat of contamination and instability, and this hazard should be removed. Acceptable development proposals will strengthen and enhance the mix of housing types on land identified as being within the housing limits, incorporate regeneration which will enhance social and cultural status whilst respecting the historical environment, enhance retail whilst maintaining the character of the existing retail core, work to reduce the carbon footprint, enhance tourism, support sustainable transport, strengthen employment and allow the sustainable adaption of existing dwellings where appropriate.

There are five levels of development areas with increasing control at each level, with the maximum control exercised in the countryside. Outside of defined settlements development will be restricted to minor sensitive infilling, extensions no greater than 30% of the original building, proposals for tourism or recreation, enabling accommodation to serve essential farming and those relating to local food production in keeping with the surrounding area. All new development is required to

comply with the scale, design, layout, density, intensity of use and use of materials of the surrounding areas, and be fully integrated with the landscape. Development is not to have an unacceptable impact on the economic, social, cultural and linguistic vitality and identity of any community. Gypsy and traveller sites will be allowed where they will not adversely affect the environment or the character of the national park and where there are sufficient amenities and transport to support the site. No development will be allowed to have any negative impact on the water environment or biodiversity. The LDP expresses fears over licences for water abstraction, therefore development will only be permitted where they have a non-detrimental water supply. Surface water management is key to planning in the national park. SuDS will be mandatory at all new development falling within Water Resource Issue Zones. Outside of these areas it is expected that SuDS be incorporated in the design philosophy.

The LDP states that development must maintain and improve soil quality, structure and functions. It is imperative to prevent soil erosion, shrinkage, contamination, burial, and irreversible declines in soil organic matter and pH levels. Under instruction from the LDP, designs must now take into consideration the effects that increased summer temperatures, drier summers and wetter winters will have on the long term quality of developments. Where possible, designs should be carbon neutral, resilient to change and mitigate the effects of the dynamic climate. Where there will be more than three dwellings on a site, the development is required to receive 20% of its energy from low/zero carbon sources. 92 potential sites for the generation of power by hydro-electric and microgeneration have been identified within the park. Energy may also be extracted from waste which is encouraged by the LDP. The policy of the LDP is that waste generated within the national park should be processed by the park or the adjoining councils. Composting will be allowed within the national park unless it has an unacceptable impact on the environment or on local services. Whilst it is recognised that development will need to adapt to the effects of climate change, planners are also encouraged to find ways of preventing further climatic impacts.

Climate change will induce a great risk of flooding which could have a negative impact on the traditional and historical settlements which are located on floodplains. New developments are to avoid these areas unless the risks can be safely mitigated.

The Minerals Planning Policy Wales sets out the required criteria for mineral safeguarding. Due to the sensitive nature of the national park, no new mineral workings will be permitted within its boundary unless there is a significant overriding need. Under these circumstances, planners will need to demonstrate that other resources are not appropriate and that the site will be suitably mitigated. Sand and gravel, coal, Old Red Sandstone and the Carboniferous Limestone will, however, be safeguarded. Borrow pits will be allowed within the park for short term use where they are in close proximity to the development as long as they will not have a harmful effect on the environment and their restoration is planned at the onset. Secondary/recycled minerals will also be permitted where their use does not harm existing structures, the surrounding environment or local amenities.

## CAERPHILLY COUNTY BOROUGH LOCAL DEVELOPMENT PLAN UP TO 2021

The main aims of the Caerphilly LDP are to protect the environment and create a balance with development needs, minimise greenhouse gases and mitigate the effects of climate change, use resources efficiently, enhance transport facilities, follow the waste hierarchy, develop brownfield sites and prevent causing further contamination, conserve the landscape and protect the earth sciences, concentrate development within existing settlements, promote tourism, employ SuDS, provide a strategic road network and increase sustainable transport, and to reduce the impact of flood by diverting development away from flood-prone areas.

The main focus of development in Caerphilly is the Heads of the Valleys Regeneration Area. This will comprise 24% of the new houses in the county and is made up of 45% greenfield land. There will be wide scale retail development in Bargoed. 67% of the countryside in this area is subject to

environmental protection which the LDP endeavours to maintain. 10% of housing allocations are to be situated in Newbridge, with another 25% in the Northern Connections Corridor Area. 68% of housing in this area will be located on brownfield sites. Ystrad Mynach will become a major employment centre. 76% of the Southern Connections Corridor is subject to environmental protection so development will largely focus in the north. 96% of all housing in this area will need to be on brownfield sites. 40% of housing will be located in Caerphilly town. The total number of new dwellings to be provided during the lifespan of the LDP is 8,625. The main brownfield development sites covered by this LDP are Bargoed Plateau, Okedal Colliery, Penallta Colliery, Bedwas Colliery, the land at Pontypany, Risca Foundry and Ness Tar. Development will follow resource efficient settlement patterns and be located away from floodplains unless suitable mitigation can be provided. Development shall not cause unacceptable impacts to water or the environment.

80% of the Caerphilly County is comprised of countryside. The county is home to one European Special Area of Conservation, 10 SSSIs, four Local Nature Reserves, 190 Sites of Importance for Nature Conservation, six Special Landscape Areas and four Visually Important Local Landscapes. The ability of many areas to accommodate development without causing harm to Special Landscape Areas is limited and the problem is compounded by the topographic constraints. Where greenfield sites are to be used, an assessment of the potential for the development to enhance the landscape and biodiversity will be required. Renewable energy options that do not harm the surrounding environment may be granted planning permission.

Coal, sand and gravel will be safeguarded in accordance with national guidelines. Proposals for development within safeguarding areas will not be approved unless the mineral is no longer required, the mineral can be extracted beforehand, there is an overriding need for the development or the development is temporary and will have ceased completely before the mineral resource is required.

## CARMARTHENSHIRE COUNTY COUNCIL LOCAL DEVELOPMENT PLAN

The drivers of regeneration depicted in the LDP for Carmarthenshire are the sustainable mix of housing, health and recreation, equality, education, attracting inward investment, providing enough infrastructure for development, integration, access to public transport, providing safe environments, good quality environments, being green and sustainable, distinctiveness, access for all, community facilities and safeguarding the social fabric. The vision of the LDP includes Llanelli fulfilling its modern potential, Carmarthen continuing to thrive as a centre, the emergence of Ammanford/Cross Hands as growth areas, efficient local economy centred around market towns and villages, rural community and countryside tourism. The LDP makes provision for 15,197 new dwellings and safeguards land for retail and employment sites. Public transport is promoted as an alternative to private cars and the overall need to travel is to be reduced. Social inclusion will be achieved through improving transport networks. This will include the Cross Hands Economic Link Road, Carmarthen West Link Road, A477, A483, Ammanford Distributor Road, Carmarthen East Link Road and Gwendraeth Valley Link Road.

Sustainability is to be achieved by protecting and enhancing species, townscapes and landscapes; minimising energy demand; distributing development in accord with the settlement framework; employing the waste hierarchy; practising sustainable water management in flood prone areas, promoting well being, utilising sustainable construction methods, minimising waste and pollution and developing a resilient economy.

A twin track approach will be adopted to tackle the issue of climate change; targeting the cause and consequence of the problem. New proposals will incorporate climate responsive design which should give consideration to orientation, layout and construction materials to be used within the project. Proposals affected by flooding will require a Flood Consequences Assessment and designs

should be planned in accordance with the findings. This is to include, where appropriate, the use of SuDS. Where SuDS will not be used, the LDP requires there to be a fully justified explanation of why they will be excluded from the design. Permeable surfaces are also to be considered.

Waste management is an issue for the county, thus Nantycaws Waste Management Facility will be safeguarded. Extra facilities will only be considered where there will be no negative impacts resulting from using the land in this way.

Carmarthenshire has seven Special Areas of Conservation, three Special Protection Areas, one Ramsar site, 80 SSSIs, four National Nature Reserves, five Local Nature Reserves and seven Landscapes of Outstanding Historic Interest. The LDP makes the need to protect nature conservation and biodiversity clear and aims to respect, protect and enhance the local character of the area, however development within conservation areas will be judged against its merits. The LDP stipulates that the potential impact of development on water, soil, air, hydrology, geology and geomorphology must be considered and adverse effects resisted. There are several issues surrounding water sources in the county, especially with regard to the designated sites. Water courses will be safeguarded by biodiversity/ecological buffers. Seascapes are also to be protected, especially those at Giltar Point to Pembrey Burrows; the Taf, Tywi and Gwendraeth Estuaries and Loughor Estuary. Coastal development will only be permitted where the need is justified, the development is in keeping with the surrounding area and the works will not result in erosion, flooding or instability. New coastal management schemes will not be allowed in order to protect new development from flooding or coastal erosion.

Renewable/low carbon energy sources will be explored within the county but all proposals are required to show that they are environmentally friendly. Brechfa Forest has been found to be suitable for a wind farm. Unconventional gas exploitation will only be permitted where there is no significant impact on the surrounding area, or where these impacts can be mitigated. There are areas within the county that may offer coal bed methane or shale gas potential.

Carmarthenshire has a mineral land bank exceeding the requirements outlined in Welsh regulations. Existing quarries to be safeguarded have been identified based on BGS data. Sand and gravel resources have been identified but the county is in need for further sites. Working of minerals is not to cause detrimental impact to the environment and sites are to be restored upon cessation of works. No coal extraction will be allowed within 500m of an existing settlement. Recycled minerals will be utilised where appropriate. In order for new mineral workings to take place, planners are required by the LDP to demonstrate that there is suitable access to the site, they have planned to minimise the impacts of the extraction, mitigation has been provided, the impacts on the local water resources are acceptable, instability issues can be mitigated and the site will be fully restored after use. It is also considered critical to protect geological landscapes that are created by mineral resources and this conservation need is to be considered before planning permission can be granted for new mineral extraction sites.

## CEREDIGION LOCAL DEVELOPMENT PLAN 2007 – 2022

The priorities set out in Ceredigion's LDP are affordable housing, designing for climate change, renewable energy at its impacts on the natural landscape, biodiversity, the protection and enhancement of ecosystems services (including soil, water and geodiversity), the identification and safeguarding of mineral resources, secondary aggregates and avoiding or mitigating flooding. The plan seeks to identify sites for 3,492 houses, of which 1,100 will be affordable and stipulates that all development should be sensitive to preserving Welsh language communities. This is of particular importance when considering sites for affordable houses. The LDP recommends that no new gypsy and traveller sites are needed in the county and that no new camping grounds should be located near the coast.

The LDP instructs that when planning for mineral extraction, proposals should consider the effects of the works on vibrations, instability, conservation, drainage and contamination, as well as set out a plan for restoration of the site after its use. Buffers will be set up around known mineral reserves in order to prevent sensitive structures being placed in at risk areas.

In order to maintain the natural beauty of the area, waste is to be managed effectively through the waste hierarchy and plans are required to identify how topographic features of the landscape are to be retained. Failure to do this would require full justification. The LDP also requires that plans assess the suitability of using SuDS in their design and look forward to how SuDS may be incorporated in the future.

There are a number of RIGS within the county which the LDP has identified as suitable for development provided that the effects of the works can be mitigated. The LANDMAP method is to be used to identify a number of new Special Landscape Areas. Coastal management schemes will be permitted provided they are required for public safety and where it would not contribute to, or transfer the risk of, flooding, coastal erosion, coastal inundation and coastal squeeze. The county aims to balance a programme of coastal defence with managed retreat.

#### MERTHYR TYDFIL LOCAL DEVELOPMENT PLAN 2006-2021

The LDP for Merthyr Tydfil outlines plans to co-locate housing, jobs and transport to reduce the amount of travel required by the county's inhabitants. There is a heavy focus on protecting the natural environment with a clear preference for brownfield development. Development is to promote the use of natural resources, enhance biodiversity, and combat climate change and adapt to its affects by utilising renewable energy and energy efficient design. The primary aim of the LDP is to stabilise the population of the county by reducing out-migration. One of the methods to be used to achieve this goal shall be the building of attractive housing. The LDP aims to make provision for between 3,800 and 3,964 new homes.

All new development will take place within existing settlement patterns. Goatmill Road, Ffos-y-fran, Rhydycar and Hoover Car Park will be allocated for employment land. Merthyr Vale Colliery has been allocated for a mixed use development and Parc Taf Bargoed will be used for tourism. 75% of all land allocations made in the LDP are on brownfield sites. There are also plans to expand the bus services in the area. Permitted development will be of a nature that reduces the need for travel and encourages methods of transport other than private motor car.

Location preferences for land allocations are based on the topography and geography of the area and the need to avoid flood prone areas and the risk of contributing to future flood hazards. Development will not be permitted outside of settlement boundaries unless it is associated with mineral workings, the development is a re-use of an existing site, the development supports the expansion of existing business, the project will enhance tourism, it is for the provision of public utilities that cannot be located elsewhere, it is required for the treatment of contaminated land or the development is associated with renewable energy generation. Physical factors to be considered when making decisions about land allocations and planning permission are the relationship of the development to existing settlement patterns, the existence of demarcation features, topography, ground conditions, the features of the landscape and their conservation importance, and the availability of existing infrastructure and services. Development will not be permitted where it causes harm to the landscape, conservation designations, the natural heritage or biodiversity, and all new development is required to incorporate good landscape design and to be resource and energy efficient in design. Where plans involve previously developed sites, a site assessment of contamination will be carried out. Development will not be permitted unless measures are taken to prevent exposure, protect water and aquifers and avoid contaminating the adjoining land.

Merthyr Tydfil is home to one Local Nature Reserve and two SSSIs. Designated sites, including Sites of Importance, shall not be developed unless works can be carried out in a way that results

in no harm to the areas being conserved. Planners are to seek advice on what they will need to do in order to obtain planning permission for development within protected areas. Park facilities are to be protected and new outdoor facilities created. Conservation will include maintaining the four green wedges in the county and preventing the coalescence of settlements. No land has been allocated for open air waste, although Trecatty has been safeguarded for future waste use. Proposals are to apply the waste hierarchy principles.

Merthyr Tydfil has a greater than 20 year land bank of aggregate, therefore no new extraction will be required. There is one mining operation in the county which is capable of producing 11 million tonnes of coal by 2025. Safeguarding of minerals will take place to guard against development which may hinder or prevent the extraction of a resource. The LDP identifies areas of coal, limestone and sandstone outside of sensitive areas which will be safeguarded. These areas have been recognised from studies of BGS maps. Buffers have been established at Vaynor and Gelligaer Quarries and at Morlais Castle of 200m, and a 500m buffer has been set up at Ffos-y-Fran and Bedlinog. For areas that may be prone to mining-induced instability, developers are asked to consult with the Coal Authority.

Proposals will only be approved where the development avoids floodplains, has no adverse effect on water quality, has adequate water and sewage systems already in place or where they can be created without causing a negative impact on the area, and where the project does not exacerbate the flood risk elsewhere. In order to achieve this, SuDS should be employed where suitable. For sites where SuDS may be inappropriate, planners will be required to show how they will achieve sustainable drainage using other methods.

Renewable energy is a key issue for the county. The LDP sets out plans to explore the potential for onshore wind farms and the use of methane from landfill and coal beds. Developers are required to investigate power generation that harnesses local resources.

Monmouthshire County Council Adopted Local Development Plan 2011-2021

## MONMOUTHSHIRE COUNTY COUNCIL ADOPTED LOCAL DEVELOPMENT PLAN 2011-2021

The Monmouthshire LDP expresses the council's wishes for socioeconomic issues to be considered alongside environmental matters. Baker Associates have been commissioned to act as planning consultants advising the council on sustainability. The five headline indicators of sustainable development that have been identified are sustainable resource use, sustaining the environment, sustainable economy, sustainable society and well being. Together with Cardiff and Newport, the Valleys is part of an interdependent 'networked City Region'. Abergavenny and Chepstow are key settlements in the Capital Region. Development within Monmouthshire may impact upon eight neighbouring counties in England and Wales. The LDP for Monmouthshire has been formulated after careful consideration of the LDPs and Core Strategies (England) for the adjacent counties to ensure that works carried out in Monmouthshire are compatible with the plans of the surrounding areas.

The LDP aims to make provision for 5,250 new dwellings. Employment and retail opportunities and public transport are also of primary concern. Transport schemes being developed in the county include the Severn Tunnel Interchange, M48 Interchange, Monmouthshire Connect 2, Abergavenny and Chepstow Railway Stations park and ride scheme, Chepstow park and ride, Monmouth park and ride and the new motorway developments between Magor and Castleton. Canals and redundant rail routes will be safeguarded. Major housing sites are located at Deri Farm (greenfield), Crick Road (greenfield), Fairfield Mabey (brownfield), Wonastow Road (greenfield) and Rockfield Farm (greenfield). There are limited opportunities within the county for brownfield development but the Contaminated Land Inspection Strategy has not identified any sites as contaminated. Caravan and camping sites will only be permitted where there will be no adverse affects of the surrounding area. Planning permission will not be granted for proposals containing

permanent caravans or where permanent structures are required for warden's. Where new golf courses are planned, a full landscape impact assessment will be required. Clubhouses should make use of existing buildings where possible. This type of development will not be permitted within Areas of Outstanding Natural Beauty.

Of paramount importance to the LDP is the requirement for sustainable communities with accessible amenities, strengthening rural economy, improving access to recreation, providing a range of housing, promoting efficient use of natural resources, ensuring development takes into account present and future flood risk and establishes how flood risk will be avoided, designing for appropriate surface run-off and reducing the use of private cars. In the main towns, all developments which will include five or more dwellings will be required to allocate 35% of the total number of buildings for affordable housing.

New development will not be allowed where it may harm protected sites unless the effects can be mitigated or it can be proven that the project will provide new benefits to biodiversity. There is to be no damage to high quality landscapes or generation of pollution, and development will not be permitted where it is at risk of, or itself induces a risk from, flooding. Developers must prioritise previously used land and identify suitable areas for waste management. All new buildings are to be as energy efficient as possible. Planning obligations may be required to secure improvements in infrastructure, including strategic utilities, community and cultural facilities, green infrastructure, ecological mitigation, education facilities, transport infrastructure, sustainable transport measures, waste management facilities, renewable/low carbon energy infrastructure, climate change mitigation and adaptation, flood risk management measures and broadband services.

Green infrastructure in Monmouthshire includes parks, open spaces, playing fields, trees, hedgerows, allotments, biological and geological conservation sites, landscape and heritage features, water courses, cycleways, bridleways, public rights of way and open access land. Development is expected to maintain, enhance and create new green infrastructure. Development is required to maintain the character and quality of landscapes by recognising, protecting and enhancing landscapes, heritage, geodiversity and biodiversity. This will be achieved by protecting designated sites, preserving local distinctiveness, protecting views and recognising the interdependency of landscape elements. The county has four Special Landscape Areas which have been derived using the LANDMAP method. LANDMAP sets Monmouthshire's landscape baseline amongst the highest in Wales. The county also has five Special Areas of Conservation, 49 SSSIs, three National Nature Reserves, 620 Sites of Importance for Nature Conservation and one Local Nature Reserve. Good water quality is critical to the LDP and Monmouthshire also has nine groundwater source protection zones.

It is necessary for areas of known flood risk to be avoided wherever possible. Where a development will be located on a floodplain, it will be a requirement that the risks are mitigated in a way that does not transfer the risk elsewhere and is environmentally sympathetic. SuDS may be one such method. Areas within the county vulnerable to flooding include Gwent Levels and the floodplains of the Usk and Wye. Chepstow and Monmouth have existing flood defences in place.

Waste management is important to the county and all proposals are to incorporate the waste hierarchy. However all landfill sites will continue to exist outside of the county.

Renewable and low carbon energy sources being considered by the county include small scale wind farms, biomass, small scale hydropower, solar thermal power, solar photovoltaic power and heat pumps. Site by site research is required before development will take place and planning permission will be heavily dependent on the avoidance of negative impacts of the site.

Monmouthshire is not required to make any mineral resource allocations but there is a need to safeguard sand and gravel. The exception to the exemption from the mineral resource requirements is when local building stone is needed. There are sufficient land banks to meet limestone requirements but future extraction would be limited by the needs of conservation. Viable sand and gravel resources are only found at Bedwin Sands and there are no secondary sources of aggregate

within the county. A review of prospective sand and gravel reserves conducted by Symonds Group Ltd found a potential for 157.53 million tonnes of resource, however this figure is an approximation due to a lack of available borehole data.

Proposals for permanent development within safeguarded areas will not be approved unless the resource would not be financially viable to extract or extraction would harm the environment, the mineral can be extracted first, there is a strong overriding need for the development or the proposal is for the infilling or extension of an existing building. Buffers shall also be applied to protect sensitive structures from future mineral workings.

#### PEMBROKESHIRE COAST NATIONAL PARK LOCAL DEVELOPMENT PLAN (END DATE 2021)

The Pembrokeshire Coast National Park LDP highlights the key issues for the area as the special qualities of the park (including biodiversity, geodiversity and landscapes), the balance between demand for development and the availability of suitable land, addressing and adapting to climate change, finding an approach to development that guards against unsustainable development, affordable housing and community facilities. The LDP aims to provide land for 1,600 new dwellings, of which 530 will be affordable, and to improve retail opportunities and transport networks in the park. Tenby has been allocated as a major housing and employment hub, and in addition improvements will be made to the existing harbour. In Newport housing and the protection of the sand dunes are of significant importance. Housing is also the key issue at St. David's, while flooding is the primary concern at Saundersfoot. In rural areas the issues are public transport, sewage treatment, flooding and water supply. Development in the countryside will only be permitted where it represents sensitive infilling of gaps, it is essential to farming, the works involve appropriate conservation of existing structures, it is required for a tourist attraction that requires a countryside setting or it has a low negative impact offset by a high positive incentive. There will be no provision for new camping and caravan sites, and all new holiday accommodation must be on previously developed sites. In coastal settings, development will only be permitted if the benefits of the facilities being built strongly outweigh the damage to the surrounding area. These effects should be investigated and mitigated with the primary concern being the conservation of the coast, geology and the scenery. Coastal defences will be allowed where they are needed to protect existing structures and where they do not jeopardise the long-term, natural evolution of the coast.

All proposals are expected to demonstrate that they are well designed in terms of place and local distinctiveness, environment and biodiversity, community cohesion and health, accessibility, energy use, energy generation, materials and resources, water and drainage, waste, and resilience to climate change. There is a need for planners to consider how they will minimise the creation of new contamination, address instability, be energy efficient, safeguard and enhance soil and water, avoid developing coastal areas at risk from flooding and erosion, and avoid flood-prone areas and the likelihood of increasing the risk of flooding. The LDP requires that development within the park be compatible with conservation or enhancement of the park's qualities. Therefore 64% of the land that has already been granted planning permission is located at brownfield sites. However, 86% of housing, and 72% of mixed use development land allocations have been made on greenfield sites.

Waste disposal and management sites in the national park are only to be used for waste created within the park. Composting proposals will be permitted unless they have unacceptable impacts on local amenities or water, and provided that landscaping and leachate have been considered and designed for. Waste reduction is also to be employed with the effect of reducing the burden on climate. The LDP states that proposals should demonstrate that they understand the effects of climate change and how it will interact with the development over its lifespan. No new development will be permitted in areas where the long term strategy is to allow flooding/inundation to take place, and new facilities should be located away from flood-prone

areas unless it can be demonstrated that they are capable of withstanding flood events. It is a requirement of the LDP that flooding and efficient water use be addressed in all planning documents. Rainwater harvesting and SuDS may be effective ways of addressing these problems, therefore planning applications are to be accompanied by an assessment of how SuDS and source control may be employed.

Small to medium scale renewable energy proposals may be permitted within the national park, however large scale operations will only be approved if planners can demonstrate that the development will not have a detrimental effect on the surrounding area. Recycled, secondary and waste minerals will be supported where the removal of materials will not adversely affect sites and it does not cause harm to the park. It is required by the LDP that the treatment of materials be accommodated at the site of extraction and materials which have been assimilated into the local landscape will not be available for use. Where materials will be used in this way, it must be established that there will be no negative impact on groundwater.

Safeguarding of mineral resources will take place within the national park, however, this does not imply that planning permission for their workings will be granted. No new mineral extraction sites will be permitted within the park except in highly exceptional cases. Borrow pits, however, will be permitted for local building stone needs where the requirement is for a short term supply, extraction will cease upon completion of the works, it is located near the project, there are clear environmental benefits of using this source rather than another, the scale is appropriate to the surrounds, works do not cause irreversible damage and the process does not harm the surrounding environment. The authority will provide guidance on land instability arising from former coal mining works. Further information on instability and non-coal mining instability shall be obtained from the BGS.

#### PEMBROKESHIRE COUNTY COUNCIL LOCAL DEVELOPMENT PLAN. PLANNING PEMBROKESHIRE'S FUTURE (UP TO 2021)

The key issues identified in the Pembrokeshire LDP are the county's lack of affordable housing, gypsy sites, community facilities and retail options; the need to expand industrial activities; the need to meet mineral targets; insufficient sewage capacity; climate change; safeguarding biodiversity; flooding and brownfield development.

The LDP aims to provide land allocations for 7,300 new dwellings, of which 980 are to be affordable. Retail development is a high priority, as is the provision of 173ha of employment land at Blackbridge, Pembrokeshire Science and Technology Park, Withybush Business Park and Trecwn. Development is also planned for the ports at Milford Haven and Fishguard. New waste management facility sites are also to be identified, following the waste hierarchy principles. Regeneration projects must be sensitive to Welsh language issues.

When designing a new development, planners are encouraged to consider whether the nature, location and siting of the proposal are in keeping with the character of the area. The LDP requires that works should not result in detrimental effects on local amenities, water quality or on the landscape, and should protect or enhance the natural environment. The coalescence of settlements is not desired and new developments are to be as resource efficient as possible, especially with regard to climate change, waste, water, SuDS and minerals. Planners are also advised to use LANDMAP when designing their proposals as this will be used by the planning authority when making decisions on whether or not to grant planning permission.

Pembrokeshire has sufficient mineral resources to meet national requirements and will maintain hard rock and sand and gravel reserves. Known resources of coal and aggregate will be safeguarded and buffers applied where appropriate. Where development threatens reserves, prior extraction will be required. Mineral resources should come from recycled sources where possible, as long as these do not harm the sites from which they are sourced, the scale is appropriate for the

needs, they are transported sustainably (preferably by rail or water) and there is provision for the restoration of the site and protection of groundwater. Non-energy mineral needs cannot be fully met by recycled materials and workings of new and previously exploited reserves may be permitted where there is no adverse effect on formally restored land and provision is made for future restoration.

Pembrokeshire County Council is interested in renewable energy and is currently seeking suitable sites for a range of potential sources. These include biomass, hydropower, landfill gas, power from municipal and industrial waste, solar and photovoltaics, sewerage gas, tidal energy, wave energy, offshore wind, onshore wind, microgeneration technologies and ground sources.

#### RHONDDA CYNON TAF LOCAL DEVELOPMENT PLAN UP TO 2021

The key issues outlined in the LDP for Rhondda Cynon Taf are efficient use of land, soil and minerals, the protection of geological sites, the reduction of energy consumption, managing the effects of climate change, focusing development away from flooding, the waste hierarchy, renewable energy, the re-use of land and buildings, and residential and commercial development. There will be mixed use developments at Maerdy Colliery, Fernhill Colliery, Phurnacite Plant, Robertstown, Hirwaun, Cwm Colliery and coking works, Mwyndy and OOC site at Llanilid. The LDP aims to make provision for 5,000-5,450 new dwellings and 63ha of employment land. Retail development will also be of high priority. Residential and commercial development will take place in Aberdare, Tonypany, Mountain Ash, Porth, Ferndale, Treorchy, Hirwaun, Pontypridd, Llantrisant/Talbot Green, Tonyfrefail and Llanharan. Gypsy and traveller sites may also be permitted on previously developed land where their presence will not adversely affect groundwater. The LDP outlines plans for improvements to highway corridors including works at Gelli/Treorchy Road relief road, the A4119 relief road and the A4059 extension. Major road schemes in the area will include Mountain Ash Southern Cross Valley Link, Upper Rhondda Face relief road and Mountain Ash Northern Cross Valley Link. The former freight lines between Aberdare and Hirwaun and between Pontyclun and Beddau will be safeguarded for rail network improvement. Station improvements are also planned for the Former Railway Site, Hirwaun; the Former Freight Head, Hirwaun; Cowbridge Road; Cardiff Road; Llantrisant Road and Parish Road. Areas of major land reclamation have been identified at Aberaman Colliery, Tylorstown and Llanwonno, Lewis Merthyr, Gelli, Craig-y-Dyffryn Tip, Cefnpennar, Maerdy, Coed Ely, Albion Lower Tips, Hetty, Cefn-yr-Hendy and the Former Cwm Colliery and coking works.

Development will be endorsed where the design is of a high standard, it supports the local context, it makes efficient use of the land, there is good connectivity, it protects and enhances biodiversity and landscapes, it promotes good water management using SuDS and porous paving and there is no harm to SSSIs, Sites of Importance for Nature Conservation or RIGS. There will be no approval where plans pose a risk of air pollution, light pollution, landfill gas generation, water pollution, noise pollution, contamination, land instability or flooding and the issue can be suitably overcome. No development will be permitted in Flood Zone C unless it is considered necessary to the regeneration of a principle town or key settlement, or where the development involves the use of a large brownfield site, unless the consequences of building within the flood-prone area are found to be acceptable.

Flooding is also to be considered when selecting suitable sites for the provision of hydroelectric power. Development related to both renewable and non-renewable energy will be permitted where it is proven that there will be no unacceptable effects resulting from their construction. Coal bed methane has been identified within Rhondda Cynon Taf and will be explored and judged on the individual merit of the resource. It will, therefore, not be necessary to safeguard these areas. Safeguarding will, however, take place at sand and gravel resources in Llanilid, Brynsadler, the area south of Tylegarw, Ceulan, Pant Marsh, Llantrisant and Pontyclun Gold Course, Rhiwsaeson Road and Hoel y Creigiau. A search for further sand and gravel reserves is currently underway. Coal

will be safeguarded according to those areas identified on BGS maps of primary and secondary coal resources. When planning in known mineral areas, consideration is to be made to the potential instability issues resulting from mineral extraction.

In addition to the major development planned to take place, it is important to safeguard green wedges and conservation areas. Special Landscape Areas have been identified at Mynydd y Cymmer, Mynydd Troed y Rhiw Slopes, Llwynceilyn Slopes, Cwm Clydach, Cynon Valley Northern Slopes, Cwm Orci, Rhondda Fawr Northern Cwm and Slopes, Hirwaun Common at Cwm Dare and Cwm Aman, the Brecon Beacons Edge at Llwydcoed, Llamharry Surrounds, Talygarn Surrounds, Ely Valley, Coed-y-Hendy and Mywyndy, Llantrisant Surrounds, Mynydd y Glyn and Nant Muchudd Basin, Mynydd Hugh and Llantrisant Forest, Efail Isaf at Garth and Nantgarw Western Slope, Craig yr Allt, Taff Vale Eastern Slopes and Trefforest Western Slopes.

#### TORFAEN LOCAL DEVELOPMENT PLAN (To 2021)

Torfaen, which as a member of the South East Wales Strategic Planning Group and is keen on collaboration, sets out three key issues in the LDP. These are social needs, the environment and the economy. The LDP states that development should take place along existing key transport routes. Due to the steep topography of the county, much of the developable land has already been utilised, therefore a large portion of new projects will be located on brownfield sites. Some greenfield allocations have been made at Mamhiliad, Llanfrechfa Grange Strategic Action Area and the Ty Coch Regional Employment Site. The aim is to make provision for 5,000 new dwellings. A major new mixed use development is planned at Talywain, an employment site at Kays and Kears and a residential site at Blaenavon. A new gypsy and traveller site is also planned under the condition that it does not become over developed. The remaining regeneration areas are focused on a new mixed use development at Llanfechfa Grange; employment and residential sites at Llantarnam Strategic Action Area; residential developments at the former Police College, Tranch and Pontypool College and the South Sebastopol Strategic Action Area; an employment site at Craig Y Felin and Ty Coch, a mixed use development at Mamhiliad Strategic Action Area, retail expansions in Pontypool and a North Torfaen Highway Study. The LDP also makes reference to reopening the Torfaen section of the Monmouthshire and Brecon Canal.

A number of important constraints to the development of the key growth sites have been identified. The main issues in Cwmbran are contaminated land and flood risk. At the ArvinMeritor site the plan is concerned with the remediation of contaminated land and flood alleviation measures. The Canalside Strategic Action Area has issues with contaminated land, a high pressure gas main, overhead power cables and a former gas holder site. The impact on the landscape, strategic highways improvements, overhead power cables, high pressure gas and topographic constraints are fundamental to development at the Llantarnam Strategic Action Area. At the Mamhiliad Strategic Action Area the priorities are buffering the canal against future development and protecting trees and Sites of Importance for Nature Conservation. Flooding, highways improvements, contaminated land, instability due to former coal extraction, biodiversity and archaeology are critical constraints at Talywain. With a heavy industrial history based on iron and coal extraction, land instability and contamination present significant considerations.

Developers are advised to contact the Coal Authority prior to commencing work in order to identify stability issues arising from previous mining works. The Welsh Government Advice Map and Localised Flooding Map are also recommended for consultation prior to development. It is imperative to consider not only the risks to the development site, but also those presented in the neighbouring land. Likewise, it is important to ensure that new projects do not cause problems, such as contamination of land or water courses, to the surrounding area. The LDP requires that the designs of new developments be sympathetic to their setting and not appear 'out of place'. Proposals are not to over develop a site and it is necessary to respect the urban fabric of the area. They are to include landscaping and not result in unacceptable environmental damage, land

contamination, instability or subsidence, pollution, water pollution or flooding. Proposals are required to show that they do not affect a protected site or harm biodiversity, the built environment or water. The plans are also requested to demonstrate how the development has been designed to reduce the likelihood of crime, and where the proposal is for an extension to an existing facility, this is to be proven to be compatible with the original development. New developments are to utilise existing construction material where possible, and have a reliable sewage system that does not burden existing arrangements.

Torfaen is currently investigating potential new locations for waste management sites and aims to follow the waste hierarchy. Recycling is to be extended to the construction industry and, where possible, materials used in developments are to come from recycled or secondary sources. Sustainable construction techniques and efficient land use are to be employed and preference will be given to proposals which feature renewable energy or low carbon sources. Renewable energy schemes being considered in Torfaen are solar power, hydropower, wind turbines and natural gas, wood or biomass boilers. Climate change is of primary concern to Torfaen and measures should be taken to reduce the carbon footprint of new developments. Climate change will lead to increased rainfall and groundwater flooding is to be considered at the planning stage. The LDP advises that areas known to flood should be avoided and designs should be climate responsive. Where viable, SuDS are to be used to the mutual benefit of habitats. Water is to be used efficiently in new development sites. This may include the use of grey water recycling and green infrastructure. Transportation solutions may also play a part in managing climate change and cycle routes are to be safeguarded to promote alternative green methods of movement. Improvements to existing transport networks are also planned, including works at north of Torfaen Highway, improvements to public transport, establishing a Pontypool and New Inn Park and Ride/Share facility, Cwmbran town centre improvements and works on the Llanfrechfa Grange Link Road.

Related to the issue of climate change is Torfaen's aim to conserve green spaces and prevent the coalescence of settlements, encroaching upon natural habitats. The LDP sets out to protect landscapes, geodiversity, biodiversity, water and the historical environment. Geodiversity and biodiversity are of particular concern to the council and development will not be permitted where it may have significant adverse effects on important features unless it can be proven that the facilities cannot be reasonably located elsewhere and that the benefits of the development outweigh the importance of the features to be preserved. In this case mitigation should also be outlined. At the time of writing there were no RIGS located within the county, however the BGS had proposed five new sites. Development in these sites must be accompanied by an appropriate geological survey. Using the LANDMAP method a number of Special Landscape Areas have been established within the county and development within these areas is to be closely monitored. The sites are located at Llandegfedd Reservoir, South Eastern Lowlands, Southern Lowlands, South West Uplands, Blaenavon Heritage Landscape, Eastern Uplands, Afon Lwyd Valley and Western Uplands. Development in these areas will only be acceptable where it is appropriate to the site and compatible with the designation. Where possible, existing buildings are to be reused and full justification of the need to develop the site is expected.

In order to meet the minerals resource requirements of the county, the LDP sets out the safeguarding of minerals and has established buffers at Blaentillary Drift No 2, Johnson Mine, Black Barn Mine and Tirpentwys. No development will take place within safeguarded areas in order to prevent resources from becoming sterilised unless the resource can be extracted before works commence, or it can be proven that the mineral cannot be extracted, or there is a more important demand for the development than the mineral being protected. Safeguarding does not automatically imply that planning permission will be granted, and in the case of coal workings will not usually be found to be acceptable. However, together with limestone and sandstone, coal is to be safeguarded. Currently the county has 5-6 million tonnes of aggregate resources including those from secondary sources.

## DEPOSIT LOCAL DEVELOPMENT PLANS AND PREFERRED STRATEGIES

The following LDPs have been drafted and are under review at the time of writing and are summarised here.

### BRIDGEND LOCAL DEVELOPMENT PLAN 2006-2021 DEPOSIT PLAN

The Bridgend LDP identifies the key issues for the county to be renewable energy, aggregate and coal safeguarding, landscapes and the coast, biodiversity and geodiversity, history, tidal and river flooding, traffic congestion, landfill requirements, housing, tourism, employment, and natural resources such as water, soil and air. Four growth areas are identified in the plan at Bridgend, Porthcawl, Maesteg and the Llynfi Valley, and The Valleys Gateway. Employment areas are shown as Brocastle, Island Farm, Pencoed Technology Park and Ty Draw Farm. Brownfield sites will be favoured over the use of greenfield land. The LDP makes provision for 1,350 new homes in Porthcawl and 1,500 in Parc Darwen. The Northeast Brackla Regeneration Area will become a major employment site and brownfield land at Parc Afan Ewenni has been allocated for a mixed use development. Brownfield land will also house the Porthcawl Waterfront Regeneration. A total of 9,000 new houses are to be constructed over the plan period, of which 1,308 will be affordable housing. Road improvement schemes are also planned at the B4281, M4 Junction 35, Maesteg Road, Parc Afon Ewenni, Island Farm and the A4065. A new railway station is planned at Breckla and old, disused railway lines are to be safeguarded. Walking and cycling routes will also be introduced in a bid to reduce the dependence on motorised traffic. Development which reduces the need to travel will be favoured and that which generates a significant amount of traffic will not be permitted.

All development is required to have a positive contribution to tackling the causes, and mitigate the impacts of climate change by reducing energy demands and promoting efficiency, use locally sourced materials, utilise renewable energy, have a design which assists urban cooling and helps habitats adapt, minimise waste, avoid or adapt to flood risk and promote sustain building and drainage. Development which will conserve and enhance the environment will be favoured.

Development will not be permitted where it results in a negative impact on the character of the landscape, biodiversity or the quality of natural resources except under exceptional circumstances. Development within the countryside is to be strictly controlled but may be acceptable where it is needed for agricultural purposes, the winning and working of minerals, rural enterprise, land reclamation, extensions of existing buildings, recreation or gypsy and traveller sites. Proposals will be required to conserve woodland, trees, hedgerows, wetlands, watercourses, ponds, green lanes, geological features and other nature features and habitats. They will also need to avoid unacceptable harm to health, biodiversity and local amenities through air pollution, noise pollution, light pollution, contamination, instability and water pollution. The LDP seeks to establish and maintain green wedges to prevent the merging of settlements and uphold the natural environment. The county has nine Special Landscape Areas, within which development will only be permitted where it retains or enhances the landscape features, reflects local building traditions and mitigates against negative impacts. The county also has several RIGS, Local Nature Reserves and Sites of Importance for Nature Conservation where development is required to be compatible with the designations.

Bridgend has 40 years of aggregate resources available and can therefore meet government requirements. The LDP is guided by the identification of secondary coal by the BGS and aims to safeguard these reserves. Before any development can take place in safeguarded areas, the minerals are to be extracted first. The exception to this is where the development is a temporary one, and it can be shown that the land will be fully restored before such times as the resource is required. Mineral workings, including for coal bed methane extraction, will be permitted where proposals show how they will reduce/avoid pollution, minimise the impact on the landscape, avoid adverse effects on nature conservation, protect agricultural interests, safeguard archaeological sites, avoid impacting on stability and reduce the potential for mine gas emissions. Proposals may also be

considered if such impacts can be safely mitigated and this is included in the design. The extraction of coal is to be considered unacceptable if it is within 500m of a settlement or it affects a conservation site. Where coal bed methane extraction will be lateral, it may be worked within close proximity to sensitive structures. Renewable energy sources may be given planning permission but proposals will need to demonstrate that no harm will be caused to the environment.

Where development will take place in areas of known instability, planners are requested to assess the risk, provide suitable mitigation measures and monitor the site. The council holds a landslip database but it is not definitive. Developers are advised to learn to recognise the potential for instability to form within karstic limestone and its unpredictable nature. The LDP requires that suitably qualified engineers be contacted before any works can be carried out in drainage areas. Planners working on waste management proposals are also asked to consider the stability and contamination issues related to landfill sites with regards to drainage and seek to eliminate the impacts.

#### NEATH PORT TALBOT COUNTY BOROUGH COUNCIL LOCAL DEVELOPMENT PLAN 2011-2026 DEPOSIT PLAN

The main issues identified in the Neath Port Talbot LDP are the causes and consequences of climate change (with a special focus on flooding), health, economic growth, market demand, housing (including affordable housing), gypsy and traveller sites, open spaces, land allocations for businesses, balancing development with environmental impacts (especially with reference to mineral extraction), loss of habitats, air quality, remediating brownfield sites, new in-building waste treatment facilities, highways improvements, dereliction and the erosion of the Welsh language. The strategy at Neath Port Talbot County Borough Council is to focus development along the coastal corridor and in urban areas of Neath and Port Talbot, and for development to be directed into areas that would not be unacceptably damaged by such works. This is to take into account the dependence on cars, flood risk, air quality and the access to amenities.

The strategic regeneration areas in the county are Coed Darcy and Harbourside. There will be mixed use regeneration at Aberfan, Neath town centre and Port Talbot town centre, and the university campus at Fabian Way is to be redeveloped. The brownfield site at Baglan Bay will also be redeveloped. Major transport provisions and improvements are planned for Baglan Energy Park, Coed Darcy, Ffordd Amazon and Harbour Way. A new interchange and railway station improvements are planned for Port Talbot. Coed Darcy will become home to half of the LDP's planned 8,000 new dwellings, as well as business and retail developments. Harbourside will involve the redevelopment of a brownfield site for a mixed use development, operation of the docks and an environmental regeneration area. Additionally, land allocations have been made in the Valleys, including the Pontardawe and Upper Neath Valleys strategic growth areas, and Glynneath. Tourism land has also been permitted at Rheola. Works related to tourism will only be permitted in areas outside of existing settlements if they are good for the economy, require a countryside setting or could not be situated in a settlement, are environmentally friendly and do not generate heavy traffic. Equally, land outside of settlements will only be permitted for use by gypsy and traveller sites if no suitable sites could be identified within the existing boundaries, and where the new sites are close to amenities and utilities, and do not have a detrimental effect on the environment.

Generally development which takes place outside existing settlement boundaries will only be permitted if it is a sustainable, small scale employment site adjacent to a settlement, it is comprised of live-work units adjacent to a settlement, it is a small housing expansion or the replacement of an existing building, it provides affordable housing or a rural enterprise dwelling, it is for tourism or farming, it involves public utilities that cannot be housed elsewhere or it is related to the mineral or energy industries. Where there will be greater than three new dwellings, proposals will be required to demonstrate the provision of open space around or within the site. All existing open

spaces are to be protected unless they are no longer required or a suitable alternative site can be provided. Additionally, new developments projects are required to make use of existing infrastructure where possible, or justify that there will be no harmful impacts of providing new facilities. Developments are not to have a negative impact on water, groundwater or air, and where possible, should make use of brownfield sites. For brownfield sites where the level of contamination is not known, a full investigation will be required and the site will need to be remediated. No works will be permitted if they will generate an unacceptable risk of air pollution, noise pollution, light pollution, water pollution, contamination or instability unless these can be suitably mitigated. If instability is suspected at a site, an investigation by professionals will be required and they are to subsequently design the mitigation to be employed.

The regeneration of Neath Port Talbot will take place with respect for the protection of the countryside and undeveloped coast by the control of development, the provision of Special Landscape Areas and the protection of green wedges. Works will only take place in areas of undeveloped coast where a coastal location is required, the project is in relation to coastal defence, the development enhances tourism or the proposal related to shipping. Habitats, including dunes, heaths, rivers, farms and woods, should be conserved. Biodiversity and geodiversity are to be protected and enhanced by the identification of Special Areas of Conservation, Ramsar sites, SSSIs and National Nature Reserves. The county currently has 20 SSSIs and two RIGS, and has designated a further six Special Landscape Areas at Mynydd y Garth, Dulais Valley, the Vale of Neath, Margam, Mynydd y Gelli and Foel Trawsant. Development which takes place in designated sites is to have no significant adverse effects of the area to be conserved. Where possible, the projects will aim to conserve or enhance protected sites and negative impacts are to be mitigated where avoidance is not possible. Renewable energy facilities built within designated sites will not be permitted if they appear as an eyesore, and mineral working must be screened from view and suitably restored after works cease.

Schemes that connect to existing renewable energy sources are encouraged by the LDP and new potential green energy sources are being sought. Where a proposal plans for greater than 100 dwellings, or the total floor space will be greater than 1,000 m<sup>2</sup>, planners are required to carry out an energy assessment. An assessment of sites suitable to house small and large scale wind farms, EfW, CHP, biomass, hydropower and solar power generation is required. Large scale onshore wind farms will only be permitted within Strategic Search Areas and measures will be required to reduce/avoid damage to the environment. Renewable energy schemes are not to compromise highway safety or interfere with radar or communications signals, and their sites are to be restored after use. Where renewable energy is considered at the design stage, this reduces the causes of climate change. It is requested that the cause and consequence of climate change be addressed in proposal documents by proving efficiency and sustainability of the County Borough's settlements by means of more cohesive settlement patterns, reducing greenhouse gas emission by using alternatives to road transport, collocating facilities, utilising renewable resources and locating developments away from flood risk areas. Drainage of new sites is to be considered in detail to limit run-off, flooding and pollution. The usual method of drainage will be SuDS. Groundwater and surface water must not be disturbed by development, especially at those sites related to waste management. It is a requirement of the LDP that waste sites be controlled so that they are not harmful to the environment. New waste treatment methods may include composting, thermal treatment, energy recovery, pyrolysis, gasification, anaerobic digestion, mechanical and biological treatment, and recycling. Sites for these facilities will be identified.

Mineral safeguarding in Neath Port Talbot will involve aggregate, coal, hard rock and sand and gravel, and buffers will be applied around known reserves. Development within areas of known mineral resources may not have an unacceptable impact on the reserve or sterilise it from future extraction unless it can be proven that the mineral is no longer valuable, it can be extracted prior to construction, the development is temporary and will be removed before such time as the mineral is required, there is an overriding need for the development which exceeds the needs of the mineral or there is no potential impact of the development on future workings. Neath Port Talbot has

sufficient mineral resources to meet the requirements of the Minerals Planning Policy Wales and can provide Swansea with minerals to make up for the county's shortfall. Extraction will only be permitted where the mineral has been proven; it is not feasible to utilise a secondary source; the environmental damage has been reduced; works do not compromise a highway and there are acceptable plans for the duration of works, waste disposal and restoration of the site. Secondary resources may come from reworking of tips. The council is also keen to explore the possibilities of shale gas and coal bed methane.

#### POWYS LOCAL DEVELOPMENT PLAN 2011-2026 DEPOSIT DRAFT

The LDP for Powys sets out to make provision for the redevelopment of the county including allocating land for 7,700 new dwellings and new 14 gypsy and traveller sites, in addition to 42ha of land being designated for employment. No new retail developments are planned for the county. The key growth areas identified in the LDP are Ystradgynlais, Newtown and Welshpool. New residential development shall follow the settlement hierarchy, with preference given to towns, and then large villages, villages, hamlets, rural settlements and, finally, countryside.

The key considerations for planners identified in the LDP are the economy, energy, sustainable travel, employment, social regeneration, tourism, the environment, ecosystems, biodiversity, landscapes, conservation, flooding, brownfield sites, natural resources, housing, health, recreation facilities, Welsh language, community facilities, transport, utilities, water management, renewable energy, waste management and minerals safeguarding. Due to a large portion of the county comprising natural landscape and countryside, a key issue for the county will be conservation. The LDP states that there should be no loss of open spaces unless planners can show justification for the need of the development and how harmful effects on the environment will be mitigated or compensated. It is critical to the LDP that development should protect and enhance landscapes, biodiversity and geodiversity, and maintain the character of the surrounding area. Powys has a large number of regionally and nationally designated sites including 55 conservation areas, 216 SSSIs, 13 Special Areas of Conservation, three Special Protected Areas, one Ramsar site, eight National Nature Reserves and 78 RIGs. Development in these areas is not desired and would be strictly controlled. Conservation sites attract tourism which is something the county is keen to exploit. Development which enhances tourism in the county will be acceptable where it sustains or improves visitor facilities, extends the visitor season, sustains the local economy and is equally available to locals.

Of key importance to the Powys LDP is climate change. The LDP asks that new development be mindful of this issue and seek to be both energy and resource efficient. Designs should aim to incorporate renewable energy and reduce waste production. Developments are to avoid flood-prone areas and minimise the impacts on air, soil and water. Natural flood alleviation methods should be maintained. Ecosystems are to be protected and maintained, which includes vegetation which acts as a carbon store. Where possible, brownfield sites are to be preferred over greenfield ones, especially where existing transport networks are in place. It is encouraged that alternatives to private motor cars be factored into new development plans.

In order to meet minerals requirements, aggregate resources will continue to be extracted from existing quarries. Waste management is also of concern to Powys and the LDP sets out plans to develop in-building waste sites and civic amenity sites to resolve this problem. The only exception to the use of these methods will be in cases of small amounts of inert waste.

## VALE OF GLAMORGAN LOCAL DEVELOPMENT PLAN 2011-2026 DEPOSIT PLAN

The Vale of Glamorgan is a member of the South East Wales Strategic Planning Group and as such its LDP takes into consideration some of counties surrounding it when making decisions which may affect its neighbours, particularly with reference to minerals and waste management.

The LDP aims to make provisions for 9,950 new dwellings, of which 2,694 should be affordable. The Vale of Glamorgan also plans to establish new employment, retail and recreation facilities across the county. The primary objectives of the plan are providing opportunities for living, learning, working and socialising; reducing and mitigating the effects of climate change; reducing the need to travel; protecting and enhancing the historic, built and natural environment; maintaining and enhancing community facilities; reinforcing vitality in the towns; housing; the economy; tourism; protecting the coast and the effective and efficient use of land.

In order to satisfy these objectives, much of the south east of the Vale of Glamorgan will be redeveloped, including the towns of Barry, Dinas Powys, Llandough, Penarth and Sully. Barry is set to become the site of major regeneration including the provision of new housing, employment sites, highways improvements, walking and cycling routes, and tourist facilities, as well as increasing the sustainability of the port. Cowbridge will also become an area of new housing, with widespread retail development. In Cowbridge, it is important to safeguard open spaces and to preserve the historic and built heritage of the town. Large scale landscaping of the town centre is planned for Llantwit Major as part of a scheme to make the town more attractive, improve walking and cycling facilities and encourage tourism. In Penarth, the priorities are to protect the architecture of the town, enhance the town's attractiveness, provide for tourism and leisure, produce better traffic management schemes and create more walking and cycling routes. The brownfield site at Barry Waterfront will house new mixed use development and landscaped open spaces, while the planned military and aerospace enterprise at St. Athan will create more jobs, housing and community facilities in the area. St. Athan will also be the site of a combined heat and power plant. Land at Hayes Road, Sully has been allocated for a new gypsy and traveller site.

New development plans will be favoured where the need to travel, especially by private car, is minimised. However, major road development schemes are planned for the Barry Island Link Road, Northern Access Road at St. Athan Enterprise Zone, A4226 improvements, A4265 improvements and Cross Common Road Junction improvements, New Park and Ride schemes are to be established and cycle paths set up to provide an alternative to motorised vehicles.

The LDP stipulates that all new development proposals should seek to prove that their designs are sustainable. No unacceptable impact on the environment should be caused by any new development unless this can be suitably mitigated. Developments designs are required to establish their links to sustainable transport, and that they can incorporate existing infrastructure (or new infrastructure may be provided with no harm to the local surrounds), and sustainable construction (particularly related to development within brownfield sites). The LDP states that development plans should show that they minimise the effects on, and avoid areas at risk of flooding; are appropriate to their surrounds; preserve the townscape and biodiversity; minimise the causes of climate change and incorporate low carbon energy sources; have no unacceptable impact on the highway network; provide open spaces; use water efficiently and where possible, contribute to biodiversity by maintaining features such as watercourses, hedgerows and geology. In addition to the above, it should be noted that developments are to cause no negative impact from pollution of land, surface water, groundwater or air; contaminated land; hazardous substances; flood risk; coastal erosion or instability, unless these can be effectively mitigated at the design stage.

It will be a priority for all planners to show how they can develop an area sustainably, respecting the natural environment and built heritage. There is a need in the Vale of Glamorgan to preserve landscapes, parks and gardens, historic buildings, the Glamorgan Heritage Coast, designated sites and important archaeological and geological features. Special Landscape Areas have been designated using the LANDMAP method at Castle Upon Alun, Upper and Lower Thaw Valley, Ely Valley and Ridge Slopes, Nant Llancarfan, Dyffryn Basin and Ridge Slopes and Cwrt-yr-ala

Basin. Development within these areas is not prohibited, but proposals will have to clearly show how they are compatible with the conservation of these sites. Likewise, no unacceptable harm is to be caused to Sites of Importance for Nature Conservation. In addition to the protection of designated sites, new land allocations have been made for public open spaces, green spaces and recreation areas at Cosmeston Lakes Country Park, Porthkerry Country Park, Barry Waterfront, White Farm, the land adjoining Ysgol Maes Dyfan, Headlands School, the land north of the railways line at Rhoose, the land east of the railway line at Bonvilston, ITV Wales at Culverhouse Cross, the land east of St. Nicolas and the land at Sandy Lane.

In order to reduce the carbon footprint of the county, plans which establish a link with renewable energy or low carbon energy sources will be preferred. The county is particularly interested in plans which incorporate biomass, onshore wind, landfill gas, energy crops, efficient energy from waste processes, anaerobic digestion, sewage gas, hydropower, solar energy, combined heat and power, and buildings with integrated renewable power sources. However, renewable energy technologies is not to present an unacceptable impact upon agriculture, communications systems, landscape, natural and cultural heritage, nature conservation, amenities, soil conservation or wildlife. It is worth noting that whilst landfill gas will be a preferred method of power generation, no new open air waste facilities are planned in the LDP. In-building facilities may be suitable at Atlantic Trading Estate, the Operational Port of Barry Docks, Llandow Industrial Estate and at suitable employment sites.

Minerals resources in the county will be safeguarded and buffers have been established at known reserves to ensure that sources are not sterilised and that future workings do not have adverse effects on sensitive structures. A number of potential sand and gravel reserves have been identified and safeguarded against the future when existing marine supplies may have become exhausted. The plan has identified a 56.2 year land bank of hard rock aggregate and a 28 year land bank of hard rock non-aggregate. Currently active workings are located at Aberthaw, Ewenny, Forest Wood, Pant, Pantyffynnon, Longlands, Lithalun and Wenvoe, while inactive reserves are known to exist at Garwa Farm and Ruthin. Workings will only be permitted where there is a proven national or regional requirement and where the environment can be enhanced, or the damages mitigated, the built heritage is not harmed, amenities are safeguarded, the impacts on geology, hydrology and hydrogeology are acceptable, there is no loss to agricultural land, the materials are transported by the most sustainable means, the land is restored after use and the re-use/recycling of waste minerals has been researched. Development will only take place in known mineral reserve areas when the mineral can be extracted before development takes place, it is proven that the mineral is of poor quality, extraction of the reserve would be environmentally unacceptable or the development will not affect future extraction.

# Glossary

*ASK* Accessing Subsurface Knowledge. A subsurface knowledge exchange network currently active in Glasgow

*BGS* British Geological Survey.

*BREEAM* An environmental assessment method and rating system for buildings.

*Brownfield* Land which has previously been developed but is now vacant, derelict or contaminated.

*DCWW* Welsh Water

*EA* Environment Agency.

*Ecosystems Services* The benefits that we derive from the natural world and its constituent ecosystems and their importance to human well-being and economic prospectively.

*GEO* Geotechnical Engineering Office.

*GIS* Geographical Information System.

*Greenfield* Previously undeveloped land.

*INSPIRE* Infrastructure for Spatial Information in the European Community.

*LANDMAP* A GIS based landscape resource where landscape characteristics, qualities and influences on the landscape are recorded and evaluated into a nationally consistent data set.

*LDP* Local Development Plan.

*Natural Capital* Natural Capital can be defined as the world's stocks of natural assets which include geology, soil, air, water.

*NRW* Natural Resources Wales (formerly Environment Agency Wales, Countryside Council for Wales, Forestry Commission Wales).

*Ramsar Site* Wetlands of international importance, designated under the Ramsar Convention.

*RIGS* Regionally Important Geological Site.

*SEPA* Scottish Environment Protection Agency.

*SSSI* Site of Special Scientific Interest.

*SuDS* Sustainable Drainage Systems.

*TAN* Technical Advice Note.

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