Swansea Bay City Deal
Digital Infrastructure Project

Business Case

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Executive Summary

The Digital Infrastructure Project of the Swansea Bay City Deal is an investment in the Digital Connectivity and associated Telecommunications Infrastructure of the region. This includes but is not limited to full fibre fixed connectivity and associated infrastructure, 4G, 5G and Internet of Things wireless networks. It is in essence the deployment of enabling technology that will allow quality digital services to be delivered and accessed over fixed line networks or wireless networks.

The Project will deliver the essential underlying Infrastructure required to support and underpin the regions broader Digital Strategy. It will help to ensure that the region is equipped with future-proofed Digital Infrastructure that will provide the transformative foundations for City Deal interventions and wider regional growth. The Project will also help to ensure social inclusion and cohesion in a post Covid19 world.

This ultra-fast ultra-reliable connectivity will help to ensure that the region capitalises on opportunities to accelerate economic growth and establish itself as a centre of excellence in the key sectors of; energy, life science and well-being and smart manufacturing. Future proofed Digital Infrastructure will help will create a paradigm shift in the design, development, and application of technology within these key sectors across the region.

Strategic Case

The breadth and quality of digital infrastructure available in Wales has fallen behind that found in many other parts of the UK. This is compounded by the fact that there are significant differences within Wales itself. The reasons for this do not only rest with the topology of the region and the fact that it is heavily rural, it is a deeper issue related to digital awareness, affordability and commercial appetite for investment by the communications service providers (CSPs).

There is broad and proven recognition that the provision of digital services drives economic growth and enables social inclusion and cohesion. There is also a growing recognition that the availability of world class digital connectivity stimulates innovation and the creation of new business streams. The clear conclusion is that the Swansea Bay City Deal (SBCD) must address any shortfall in the availability of digital connectivity in the region. It must invest in digital connectivity to obtain a competitive advantage and it must also drive the uptake and quality of those services that are already available.

Improving the Digital Infrastructure of the region is critical[1] as it has suffered from a lack of commercial investment that has consequently resulted in an underlying gap in delivery capability. These gaps need to be closed in order for the SBCD and the region as a whole to achieve its goals. The proposed programme of work will lead to:

- An increase in local productivity and employment
- An uplift in the region's attractiveness for both the telecommunications industry and subsequent inward investment by highly skilled digitally intensive industries
- An enhanced ability to deliver local services, notably education, health, and transport
- Environmental benefits through the facilitation of teleworking and enhanced traffic management
- A reduced gap in access to digital services across the region, notably to isolated communities
- Enabling digital transformation across the public and private sector
- Ensuring the cities and development zones of the region obtain a competitive advantage against other parts of the UK.

The region is not homogenous in its requirements and challenges and the investment priorities need to reflect this. In order to give a focus on the region's needs, and the manner in which they can be met, three intervention areas have been identified to be delivered through the Digital Infrastructure project. These are:

Intervention	Description
Connected Places	This is regional support that will increase the availability of fibre to the premise in key urban areas. Mainly targeted at existing industrial areas and economic growth zones to provide world class connectivity
Rural Connectivity	Intervention where there is shortfall in existing or planned investment to ensure as many rural premises as possible in the region has access to a minimum broadband service, currently considered to be 30Mbs
Next Generation Wireless	This is focussed on the provision of next generation wireless connectivity in the form of 5G and IoT networks. The use cases and business models for these technologies is still to emerge, but supporting early adoption and stimulating innovation within the regions SMEs will ensure that the region stays at the forefront of deploying this technology

1 Many policy documents and strategic intents from both the UK and Welsh government attest to the criticality, see section 1.5

Each area deals with a different regional challenge and calls upon different mixes of digital infrastructure to overcome them. However, all are complimentary and interdependent and together provide the underlying infrastructure for the SBCD to address its goals.

SMART investment objectives have been defined for each of these three areas as follows:

- ***Connected Places; Ensures towns, cities and development zones have access to world class full fibre infrastructure.*** *This will deliver the following spending objectives:*

    - *improve the quality of public service delivery by ensuring all public buildings are digitally connected facilitating improved efficiency and public access to services*
    - *cost savings to the public sector for digital connectivity*
    - *stimulation of competition in digital services*
    - *stimulate inward investment in the region by telecommunications industry and hence improve access to services for residents and businesses*
    - *deliver economic benefits through the usage of digital infrastructure, notably increased efficiency and enhanced productivity.*

- ***Rural: Facilitate equality of access to broadband services across the region.*** *This will deliver the following spending objectives;*

    - *improve the quality of public service delivery by ensuring communities in remote areas have access to services*
    - *social cohesion and inclusion across the region to sustain communities*
    - *stimulate economic growth by enhancing opportunities for employment.*

- ***Next Generation Wireless; Ensure that the region is at the forefront of 5G and Internet of Things (IoT) investment and subsequent innovation.*** *This will deliver;*

    - *Inward investment*
    - *Innovation and ensuring the region is at the forefront of new service roll out and delivery*
    - *Economic growth*

Economic Case

The Digital Infrastructure Project has three areas in which it will directly deliver in order to drive growth and GVA and to close the digital divides across the region.

Options have been considered for all three areas, ranging from Do-Nothing to significant levels of investment. A preferred option has been identified for all three areas which represents a pragmatic approach that maximises the impact of existing interventions and addresses any significant gaps that these might leave.

Connected Places

- An investment in public sector owned duct infrastructure and a procurement of commercial owned full fibre infrastructure

Rural

- Programme of supply side engagement to stimulate investment
- Demand stimulation programme to raise awareness and drive adoption in businesses and residential consumers
- A focused and locally led procurement to in-fill gaps in service provision which is state aid compliant and complementary to existing national and regional programmes

Next Generation Wireless

- Selected funded interventions and proof of concepts to deliver 5G and IoT connectivity in key locations should be executed under a central SBCD mandate and management

Commercial Case

The commercial case defines the recommended procurement routes, service specifications and commercial and contractual considerations. These are different for each stream and shaped by:

- Stakeholders appetite to invest in public sector assets and infrastructure
- Commercial appetite for inward investment
- Ensuring state aid compliance
- Ensuring investments are complementary to the activities of the PSBA
- Complementary to other national and regional schemes

Financial Case

A summary of the proposed expenditure under each of these three streams is presented in the table below. The table splits out that potentially provided by the SBCD along with commercial investment and likely central government grant funding. It should be noted that commercial investment is likely to emerge in two waves; an initial direct contribution to the proposed programme plan. In addition, there will be secondary pull through investment by the commercial sector as subsequent investment will be made to enhance and expand the digital infrastructure facilitated by SBCD.

There are strong positive economic and social impacts for all three of the project streams. The analysis undertaken has been careful to apply economic multipliers that have been used in other government programmes to support their business case.

Stream	Total Budget Spend (Revenue and Capital over 5 year)	Direct SBCD Capital Contribution	Direct SBCD Revenue Contribution	Other Public Sector Contribution	Direct Commercial Contribution	Additional Commercial Sector Pull through Investment	Economic Uplift over 15 years from Budget Investment
Rural							
Option 2; Supplier Engagement	0.5	0.0	0.5	0.0	0.0	0.0	
Option 3: Demand Stimulation	5.0	0.0	1.5	3.5	0.0	28.9	17.5
Option 4: In-fill Procurement	20.0	6.0	0.0	10.0	4.0	20.0	70.0

Connected Places							
Options 3/4 Duct Investment /Procurement	20.0	12.0	0.5	0.0	7.5	70.0	220.0
Next Generation Wireless							
Option 3; Infrastructure Review	2.0	0.0	2.0	0.0	0.0		
Option 5: Support for Specific Projects	7.5	2.5	0.0	0.0	5.0	3.0	11.3
TOTAL	**55.0**	**20.5**	**4.5**	**13.5**	**16.5**	**121.9**	**318.8**

The table above summarises the budget spend and investment sources along with associated benefits

It is estimated that the Digital Programme will result in over £120 million of direct and pull though commercial investment and an economic stimulus to the region of over £300 million over the next 15 years.

Management Case

A clear Programme Management structure has been defined consisting of a Digital Infrastructure Project Board reporting to the Programme Board and Joint Committee.

A central Digital Infrastructure Project team will be established to oversee and steer Digital Infrastructure strategy and policy for the region in liaison with UKG, Welsh Government and the private sector. The Project Team is charged with meeting project aims and objectives as set out in the project business case, overseeing risk and governance, maintaining communication and engagement across all sectors, and achieving project outcomes, including community benefits.

This team will be hosted within Carmarthenshire County Council as the lead authority for the Digital Infrastructure Project.

In order to deliver the business plan the Project team will be responsible for the;

- Development of overall digital strategy
- Maximising and coordinating funding opportunities for the Region
- Interaction with Welsh and UK Govts on digital programmes
- Co-ordination and management of regional Digital procurement activities
- Supply side engagement with industry
- Development of regional procurement frameworks and procurement templates
- State aid guidance
- Development of regional guidelines and approach to demand stimulation
- Market analysis and monitoring of infrastructure deployed.

Where required the project team will utilise external legal (for state aid and procurement) and technical support. This central team would report directly to the project board, project lead authority and Joint Committee as required.

It will also coordinate and draw upon the resources and skills of stakeholders including the local authorities, health boards and universities as required – notably in the course of procurements and demand stimulation activities.

1 Strategic Case

1.1 Strategic Context

1.1.1 Background

The **Digital Infrastructure** project is one of the nine projects within the Swansea Bay City Deal (SBCD). The City Deal was signed by Prime Minister Theresa May and First Minister Carwyn Jones on the 20th March 2017, securing £1.3billion of public and private sector funding over a 15-year programme for economic growth and regeneration for the region.

The Swansea Bay City Region[2] is a critically important driver for the Welsh and UK economy. It is a region with strong urban centres complemented by a wider rural landscape and a significant coastal footprint that has created a diverse economic profile with numerous opportunities and challenges. With a resident population of 688,000[3] supporting some 302,000 jobs and containing around 22,000 businesses, Swansea Bay City Region is a major driver of the Welsh economy. Overall productivity (GVA) growth in the region has been consistently below that of the UK and Wales over the past two decades. It is the key factor underpinning the sub-optimal economic performance and remedying this position is the primary priority of the City Deal.

The key issues to be addressed by the Digital Infrastructure project are mirrored in the overall challenges for the region;

- GVA per employee in the Region was £34,300 in 2015 (at 2011 prices), 74% of the UK average
- Too few businesses and are not growing their business base quickly enough[4];
- There are not enough people with high level qualifications and too many with none at all;
- Economic inactivity remains too high across the region;
- The physical infrastructure is not keeping pace with the needs of growing businesses or our communities. Broadband capacity and digital connectivity are improving, but not quickly enough. Much of the commercial and retail property is low quality and attracts low rents;
- The city centre of the regional capital is under-performing and needs to deliver a commercial, residential and leisure offer to match the ambitions of the innovation proposals; and

2 UK and Welsh Govt Document
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/611685/Swansea_City_Deal_-_English.pdf

3 Swansea Bay City Deal Internet Coast publication

4 Bullet points drawn from The Internet Coast, SBCRD 2016-2035: https://democracy.npt.gov.uk/documents/s20423/City, part of the underpinning rationale for the Swansea Bay Region City Deal

- The rural and visitor economy, region wide, also needs to deliver a step change in performance if the region as an integrated whole is to achieve its long term aims.

The Swansea Bay City Deal works to address these challenges and capitalise on regional opportunities to accelerate economic growth and establish the region as a centre of excellence in the key sectors of; energy, life science and well-beings and smart manufacturing

Key to the success of the City Deal is a future-proofed Digital Infrastructure that will provide the transformative foundations for City Deal interventions and wider regional growth which will create a paradigm shift in the design, development and application of technology within these key sectors across the region. This Infrastructure will support and underpin the regions broader Digital Strategy and help to ensure social inclusion and cohesion in a post Covid19 world by facilitating provision and access to Digital services.

Improving the Digital Infrastructure of the region is critical[5] as the region has suffered from a lack of commercial investment in digital infrastructure that consequently has resulted in an underlying gap in delivery capability compared with other regions of the UK. This gap needs to be closed in order for the SBCD is to achieve its goals. The proposed programme of work will lead to:

- An increase in local productivity and employment
- An uplift in the region's attractiveness for both the telecommunications industry and subsequent inward investment by highly skilled digital intensive industries
- An enhanced ability to deliver local services, notably education, health and transport
- Environmental benefits through the facilitation of teleworking and enhanced traffic management
- A reduced gap in access to digital services across the region, notably to isolated communities
- Enabling and accelerating digital transformation across the public and private sector
- Ensuring the cities and development zones of the region obtain a competitive advantage against some other parts of the UK.

It is acknowledged that all the above benefits will not solely be a direct impact of digital infrastructure, however a failure to address the gaps in digital infrastructure and services will place a sever burden on the achievement of the improvements and gains anticipated within the wider City Deal.

5 Many policy documents and strategic intents from both the UK and Welsh government attest to the criticality, see section 1.5

1.2 Organisational Overview

The Swansea Bay City Deal (SBCD) is a £1.3bn investment in 9 major projects across the Swansea Bay City Region – which is made up of Carmarthenshire, Neath Port Talbot, Pembrokeshire and Swansea.

The Swansea Bay City Deal[6] is being led by the four regional local authorities - Carmarthenshire Council, Swansea Council, Neath Port Talbot Council and Pembrokeshire Council - together with the Abertawe Bro Morgannwg and Hywel Dda University Health Boards, Swansea University, the University of Wales Trinity Saint David, and private sector partners.

An overview of each of the partners is provided below to set the context for this investment proposal.

Carmarthenshire County Council (CCC)

Carmarthenshire is the lead local authority for this programme.

Carmarthenshire has a track record of delivering large scale regeneration programmes for example:

- South West Wales Property Development Fund – £25m
- South West Wales Local Investment Fund – £20m
- Cross Hands East development £13m
- Carmarthenshire Physical Regeneration programme – £11m
- 21st Century Schools Programme
- Vibrant & Viable Places (Welsh Government regeneration programme)

Carmarthenshire facts:

- formed in 1996 after local government reorganisation
- it is the third largest county in Wales covering some 2,365km with a population of 184,681

Neath Port Talbot County Borough Council (NPTCBC)

Neath Port Talbot CBC has a proven track record of managing and delivering large capital programmes, including European structural fund projects, Welsh Government funded projects and other externally funded projects, for example:

- PDR Harbour Way – £111m
- 21st Century Schools Programme - £122m
- Neath Port Talbot Physical Regeneration – £15m
- Vibrant & Viable Places – £35m

NPTCBC key facts:

- formed in April 1996 after local government reorganisation

6 https://democracy.npt.gov.uk/documents/s20423/City

- it is an amalgamation of the former Neath and Port Talbot Borough Councils with parts of Lliw Valley Borough Council and West Glamorgan County Council
- the 8th most populous local authority areas in Wales
- 40k population (2011 census)
- 7 areas are within the top 10% most deprived in Wales

City and County of Swansea (CCS)

Swansea Council has a track record in delivering large scale regeneration programmes, having been involved in the management and delivery of such programmes since its formation in 1996.

Programmes funded and delivered by the Council have included:

- Construction of the Liberty Stadium for Swansea City Football Club & Ospreys Rugby Club
- A £32m Leisure Centre in the city centre
- Joint ventures progressed with Welsh
- Government (and formerly WDA) to deliver:
- Swansea Vale Mixed Use Development
- Felindre Strategic Business Park

Over £120 million of programmes were facilitated during the EU Objective 1 2000-2006 programme including landmark schemes such as the National Waterfront Museum (£28m total cost).

During the Convergence 2007-2013 programme period, a series of large scale initiatives were delivered including:

- Quadrant Bus Station £ 10m
- Waterfront City, which invested £ 30m in a range of improvements to the fabric of the city centre including major public realm and property façade alterations

Swansea Council key facts:

- formed in 1996 after local government reorganisation
- it is the second largest Local Authority in Wales (with a population of 244,513 in 2016)
- it has some of the most deprived areas in Wales, with 12.2% of Lower Super Output Areas (18 of 148) in the top 10% most deprived in Wales

Pembrokeshire County Council (PCC)

Pembrokeshire County Council has a track record in delivering large scale regeneration programmes including:

- Withybush Strategic Development Site (business Infrastructure and access roads)
- Advance build Factory Programme
- Pembrokeshire Technium Development
- Several European Social Fund regional collaborative projects
- 21st Century Schools programme
- Haverfordwest Leisure Centre

- Bulford Road
- Pembroke and Pembroke Dock Physical Regeneration project
- Coastal Tourism Centre of Excellence
- One Historic Garden
- Haverfordwest Townscape Heritage Initiative

The Joint Committee of the SBCD will be responsible and accountable for all financial, staffing, and legal decisions in the delivery of the deal. The Joint Committee will make decisions on City Deal funding based on business cases for specific interventions and the advice of the private sector Economic Strategy Board.

The Joint Committee will also embrace the wider opportunities presented through a regional approach to strategic functions such as planning, transport and economic development.

All interventions will be subject to the submission of detailed business cases and approval by the Welsh and UK Governments[7].

A project delivery structure is provided in the Management Case that will report through to the Joint Committee. The roles and responsibilities of the delivery team will be further defined within the recruitment proposals.

1.1.3 Alignment to existing policies and strategies

Digital transformation and Digital Infrastructure features in a very wide range of strategies across UK Government, Welsh Government and Local Authorities. This is matched by transformation programs within the private sector ranging from Communications Service Providers, (CSPs), themselves to Industry 4.0.

7 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/611685/Swansea_City_Deal_-_English.pdf

UK Strategy	Strategic Intent Summary	Digital Infrastructure Fit	Link
The Grand Challenges DBEIS	Put the UK at the forefront of the AI and data revolution Harness the power of innovation to help meet the needs of an ageing society Maximise the advantages for UK industry from the global shift to clean growth We will become a world leader in shaping the future of mobility	AI and Data require widespread and high capacity digital connectivity Key enabler is technology that has fixed and mobile connectivity widely available and high capacity Reduction in the need to travel and the 'Smart' control of energy systems Mobility demands high capacity and widespread mobile communications	https://www.gov.uk/government/publications/industrial-strategy-the-grand-challenges/industrial-strategy-the-grand-challenges
UK Digital Strategy DCMS	Building World Class Digital Infrastructure, including full fibre and 5G Give everyone access to the digital skills they need Making the UK the best place to start and grow a digital business Helping every British business become a digital business Maintaining the UK government as a world leader in serving its citizens online Unlocking the power of data in the UK economy	A central part of what Digital Infrastructure project will deliver Widespread deployment and hot-spots of 5G will drive the development of skills Digital Infrastructure is a pre-requisite, alongside the other central SBCD projects in digital media Making high quality digital connectivity widely available is a critical enabler Digital transformation requires digital infrastructure to deliver the services Data analytics is core to new digital services	https://www.gov.uk/government/publications/uk-digital-strategy
Future Telecoms Infrastructure DCMS	Fixed and mobile networks will be the enabling infrastructure that drives economic growth Nationwide Full Fibre connectivity, there must be a sharp increase in the pace of full fibre roll out Making the cost of deploying fibre networks as low as possible by addressing barriers to deployment Supporting market entry and expansion by alternative network operators An 'outside in' approach to deployment that means gigabit-capable connectivity across all areas of the UK is achieved at the same time A switchover process to increase demand for full fibre services We want the UK to have high quality mobile connectivity where people live, work and travel Alongside finishing the roll out of 4G networks to meet existing mobile demand, we want the UK to be a world leader in 5G	The Digital Infrastructure project is based upon this Full Fibre is a one of the key objectives under the connected Cities element of Digital Infrastructure project Part of Digital Infrastructure is the deployment of publicly owned infrastructure assets to reduce roll out costs Open procurements are planned for all Digital Infrastructure Rural connectivity is a key objective of Digital Infrastructure project Demand and Supply simulation are both planned within Digital Infrastructure Support for supply side actions and lowering build costs for 4G are included Construction of 5G hot-spots is a key objective	https://www.gov.uk/government/publications/future-telecoms-infrastructure-review
5G Strategy for the UK DCMS	Government has a clear ambition for the UK to be a global leader in the next generation of mobile technology – 5G Digital infrastructure is a building block of the Government's modern Industrial Strategy Deliver three main outcomes: ・accelerating the deployment of 5G networks ・maximising the productivity and efficiency benefits to the UK from 5G ・creating new opportunities for UK businesses at home and abroad, and encouraging inward investment	5G in support of specific and key projects in included Several aspects of the SBCD deal and specifically Digital Infrastructure addresses this directly Accelerating deployment through direct intervention and supporting infrastructure roll-out Projects will demonstrate productivity and efficiency gins across several sectors Availability of leading edge connectivity through Digital Infrastructure project will encourage inward investment	https://www.gov.uk/government/publications/next-generation-mobile-technologies-a-5g-strategy-for-the-uk

Table 1 - Key UK strategies

UK Strategy	Strategic Intent Summary	Digital Infrastructure Fit	Link
Digital Strategy and Leadership DCMS	Developing a local digital infrastructure strategy: ・A senior digital champion to lead the process ・Bringing together local teams involved in deployment of digital infrastructure ・Putting in place the required skills and resources ・Collaborating with network providers	A central SBCD team under a single leadership is proposed Coordination of the 4 Local Authorities is proposed Development and recruitment of key skills and resources in proposed Working closely with communications Service Providers is proposed	https://www.gov.uk/guidance/digital-strategy-and-leadership
5G Briefing Paper - UK Parliament	Gives a date of 2027 for most of the UK POPULATION to have 5G coverage Acknowledges the need for wider fibre deployments to support 5G Acknowledges the costs and comemrciual risks for MNOs to roll out 5G	The papers are more aspirational than concrete requirements on CSPs to roll out 5G. However, the commitments are there and engagement by the SBCD team with the intent and how these evolve into full policy and perhaps intervention funding should be kept under constant review	https://www.researchbriefings.files.parliament - CBP 07883
SRN Ofcom Notice of 4G Coverange Compliance	SRN is a joint agreement with MNOs to cover the UK with 4G services, Match funded £1bn 90% of the UK Landmass must be covered 87% of Wales landmass must be covered Baselined in 2020, additional coverage must be in Not-Spots	The timescales for SRN are unclear, 14 years is identified asa the period this will apply, but no end date is given for the 88% or 90%+ The SBCD team would have the opportunity to examine the proposals of the MNOs for coverage in Q3/4 of 2020 and thereby lobby for changes or to be early in additional deployments	https://www.ofcom.org.uk/__data/assets/pdf_file/0031/192919/notice-of-compliance-verification-methodology.pdf
Innovate UK, Industrial Challenge Fund DBEIS	Next Generation services are predicated on leading edge digital infrastructure Transforming construction envisages digital design and IoT Robotics across a wide number of sectors Next Generation services for AI and embeded digital technology Leading edge healthcare, including digital technologies Driverless Cars Creative Industries clusters	Includes digital technologies as a key component which will require leading edge connectivity in fibre and 4G/5G Distributed design and IoT are all included in the project Robotics require leading edge fixed and mobile connectivity AI and analytics require leading edge fixed and mobile connectivity Healthcare requires leading edge fixed and mobile connectivity, particularly the new wave of wearable devices Autonomous vehicles need widespread 5G Creative industries are primarily digitally based and need leading edge fixed and mobile connectivity	https://www.gov.uk/government/collections/industrial-strategy-challenge-fund-joint-research-and-innovation
Catapults	Various Streams, including: Digital, Energy, Future Cities, High Value Manufacturing, Offshore renewable energy and transport systems	Although these are not government entities, they are closely linked with Innovate UK and act as a delivery partner in many cases. A large number of their interest areas align directly with the Digital Infrastructure project	https://catapult.org.uk/catapult-centres/

Table 2 - Key UK Strategies – cont.

Wales			
Strategy	**Outline**	**Fit**	**Link**
Well-being of Future Generations (Wales) Act 2015	A prosperous Wales	Directly supports the goal through delivering innovation, low carbon, expands skills and employment to new high-value roles	http://futuregenerations.wales/about-us/future-generations-act/
	A resilient Wales	Supports economic change through digital transformation	
	A healthier Wales	Supports technology's part in delivering health of the nation	
	A more equal Wales	Supports the removal f the digital divide across all sectors	
		Supports well connected communities and governments	
	A Wales of cohesive communities		
Well-being of Future Generations (Wales) Act 2016 5 Ways of Working	Long Term - Balancing short term needs with safeguarding the long term needs	Digital infrastructure is a long term investment that enables transformative actions at many levels	http://futuregenerations.wales/about-us/future-generations-act/
	Prevention - Preventing problems occurring or getting worse	Digital service delivery represents an opportunity to improve services and a stable platform for future change	
	Integration - Impact of Well-Being objectives may have on their objectives or other's	Digital infrastructure is a critical enabler across many sectors and makes integration simpler and more effective	
	Collaboration - Working with others	Digital collaboration opens significant new opportunities to involve people and organisations in working together	
	Involvement - An inclusive approach to involving people inn achieving the goals	Part of the project is to deliver digital inclusion, a fundamental to opening opportunities for involvement across the widest breadth of participants	
Digital First Welsh Government	Helping the public sector provide excellent online digital services to the people and business of Wales	Delivering online services requires digital connectivity to those services, through fixed of mobile networks being supported by the project	https://gov.wales/topics/science-and-technology/digital/public-services/digital-first/?lang=en
	Seek to develop the infrastructure required to support digital service delivery	A key element of the infrastructure is the digital connectivity with the right coverage and quality, both delivered by the project	
	Digital Transformation forms a central part of the Welsh Governments plans to make public services more meaningful to users	Digital Transformation is enabled and driven by the availability of digital infrastructure	
Delivering Digital Inclusion Welsh Government	To ensure that everyone who wants to be online can get online, protect themselves and their friends and families online and do more online to fully benefit from the opportunities the internet and other digital technologies offer	The Digital Infrastructure project is directly focused on this vision and expands upon it to ensure everyone has network access, but also that access meets the demand of the user, including ultrafast and full fibre links and 4G/5G links	https://gov.wales/docs/dsilg/publications/comm/160316-digital-inclusion-strategic-framework-en.pdf
Mobile Action Plan Welsh Government	The planning system has a key part to play in maximising mobile phone coverage across Wales	Specific proposals are made related to a central SBCD function to support efficient planning processes	https://gov.wales/topics/science-and-technology/digital/infrastructure/mobile-action-plan/?lang=en
	The public sector in Wales has thousands of assets that could be used to site mobile telecommunications infrastructure on public land, public highway and buildings	Specific proposals are made related to a central SBCD function to support efficient asset management processes	
	The topography and population density in Wales throws up specific challenges for mobile coverage. Extending coverage as far as possible is likely to require innovative solutions particularly in rural areas.	The use of new ways to achieve rural connectivity is included for both fixed and wireless technologies	
	The investment being made by the mobile industry towards regulatory targets will significantly improve mobile connectivity in Wales both in terms of voice and data. However, it is likely that there will still be areas of Wales without a usable and reliable mobile signal	A central team is proposed for SBCD to act as a voice for the region in both investment and regulatory compliance and to work with the Emergency Service coverage requirements	

Table 3 - Key Welsh Strategies

Wales - Health			
Strategy	**Outline**	**Fit**	**Link**
Digital Wales **Welsh Government**	Inclusivity: Making sure everyone can enjoy the benefits of technology is a key part Skills: We will use technology to improve teaching methods and learning. Beyond schools, we will ensure that everyone in Wales can acquire the basic skills and confidence to get online and use digital technologies. Economy: We want to drive economic growth. We will support Welsh companies to network with research departments to create and commercialise new digital technologies. We will help more Welsh companies to exploit these developments to innovate, grow and access new markets, especially in our priority sectors Public services: We will make more public and government services digital so they are easier to access Infrastructure: To deliver all the benefits of digital technology, we aim to ensure that all residential premises and businesses in Wales will have access to high speed broadband. We will continue to work to eliminate 'not spots' and to ensure that there is fair and equal access to higher speed broadband and to improve mobile coverage	Digital Infrastructure project has a key objective of the widest possible connectivity services Utilising technology for skills and education requires underpinning digital infrastructure of the highest quality as delivery moves into video and augmented reality, both considerations for the project Leading edge digital infrastructure will support inward investment and innovation directly Digital Transformation in services requires access via digital networks A fundamental aspect of the project is to ensure the widest possible coverage of both fixed and mobile communications	https://gov.wales/topics/science-and-technology/digital/?lang=en
Informed Health and Care - Wales	This strategy outlines how we will use technology and greater access to information to help improve the health and well-being of the people of Wales. It describes a Wales where citizens have more control of their health and social care, can access their information and interact with services online as easily as they do with other public sectors or other aspects of their lives, promoting equity between those that provide and those that use our services in line with prudent healthcare and sustainable social services. Information for You Supporting Professionals Improvement & Innovation A Planned Future	Digital Infrastructure is a direct enabler of all the strategic objectives within this Digital Health and Social Care Strategy for Wales. Specifically, some of the proposed projects under the 5G and IoT actions are directly involved with health projects such as the Well Being village. Generally, an supporting the widest deployment of digital infrastructure, many of the strategic aims become easier to deliver and maintain. Wider digital access directly promotes this aim System integration directly is supported Service change and data availability directly supported Digital working directly supported	https://gov.wales/docs/dhss/publications/151211reporten.pdf
The Parliamentary Review of Health and Social Care in Wales **Transforming Health and Care in Wales**	The current situation is of great concern for service users, health and care organisations, health and social care workers, and society more broadly. Health and social care services experience workforce shortages; Wales' outcomes for health and care are not improving as fast as desired; and service delivery is not consistently good. In this final repor t, we recommend to the Welsh Government some key actions that need to be taken to do that, including: clarifying what a set of new models of care might look like; strengthening the power of citizens and users to make change; improving the local leadership and governance needed to implement change; harnessing digital, scientific, technological and infrastructure developments to underpin modernised models of care as well as unlock efficiencies; and at a national level designing the system to expedite and incentivise progress through increased transparency.	Recommendations 7 - Harnessing innovation and accelerate technology and infrastructure developments is directly supported. Digital Infrastructure is a critical enabler to achieve this recommendation. Recommendation 8 - Align system design to achieve results. Transformative change happens at several levels, but digital transformation of services is a key driving force that is supported directly by the actions in this business case.	https://beta.gov.wales/sites/default/files/publications/2018-01/Review-health-social-care-report-final.pdf

Table 4 - Wales Health

Authority Strategy	Outline	Fit	Link
Swansea Bay City Deal	A future-proofed digital infrastructure will provide the transformative foundations for interventions in the Deal The Internet of Economic Acceleration. To deliver a coherent and integrated economic development strategy for the region that incorporates next generation digital infrastructure The Internet of Life Science & Well-Being. Expansion of research and innovation infrastructure and the piloting of a digitally integrated healthcare environment The Internet of Energy. Areas of sustainable house building and in the creation of a centre of excellence to develop and exploit aspects of marine and other energy Smart Manufacturing. To support digital assets and research and development provision under Industry 4.0 and innovation capability to support R&D within the steel industry in Wales and the wider UK.	The Digital Infrastructure project is a direct response to the needs of the underlying themes and objectives of the SBCD	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/611685/Swansea_City_Deal_-_English.pdf
Swansea Bay City Region Regeneration Strategy	By 2030, South West Wales will be a confident, ambitious & connected City Region, recognised internationally for its emerging Knowledge and Innovation economy Strategic Aim 1: Business Growth, Retention & Specialisation Strategic Aim 2: Skilled & Ambitious for long-term success Strategic Aim 3: Maximising job creation for all Strategic Aim 4: Knowledge Economy and Innovation Strategic Aim 5: Distinctive Places and Competitive Infrastructures	Knowledge and innovation are strongly supported by digital infrastructure and digital services. The delivery of both are primary objectives for the Digital Infrastructure project Inward investment can be made more attractive by the availability of high quality digital infrastructure. Digital sector businesses tend to drive higher value jobs Digital Transformation affects many sectors and will drive skills and resources to meet the demand. Digital infrastructure is a key enabler for the transformation process High quality digital infrastructure stimulates innovation and digital/media clusters, creating new opportunities First class digital infrastructure is a prerequisite for any knowledge and innovation based approach The project directly supports the widest access to next generation fixed and mobile broadband, including 5G	https://www.swansea.gov.uk/swanseabaycityregioneconomicregenerationstrategy
Neath Port Talbot Digital Strategy	A better everyday life for everyone in Neath Port Talbot by being smart and connected, Outcomes Expected: ・State of the art digital infrastructure and next generation wireless connectivity; ・Creation of new digital commercial opportunities ・Creation of smart manufacturing capabilities; ・Improved digital skills base; ・New employment opportunities for local people; ・Wider economic growth; ・Reduction in energy costs; ・Alleviation of fuel poverty; ・Improved well-being ・Greater equality in service access and outcomes; ・Reduced carbon footprint; ・Fewer people digitally excluded;	All of the objectives are addressed by the Digital Infrastructure project.	https://www.npt.gov.uk/media/9938/smart_and_connected_strategy_draft_aug_2018.pdf
Carmarthenshire County Council Digital Transformation Strategy	・Provide transactional services and information online in a user-friendly and inclusive way. ・Use technology to change the way traditional face-to-face services are delivered, enabling us to deliver effective and efficient services for our residents. ・Create a digital workforce which is agile, mobile and using the most appropriate technologies to support service delivery. ・Support our residents to use digital technology and enable access to technology for those that do not have it. ・Support our businesses to compete in the digital economy. ・Use digital technology to work and collaborate with our partners seamlessly, including the effective sharing and use of data.	All of the objectives are addressed by the Digital Infrastructure project.	http://democracy.carmarthenshire.gov.wales/documents/s13030/REPORT.pdf
Swansea Council Regeneration Strategy	Has direct links to the City Deal, but highlights City Centre Regeneration The Kingsway Co-Operative Housing Beyond Bricks & Mortar	Several aspects of the strategies are related to digital infrastructure improvements	https://www.swansea.gov.uk/regenerationplans

Table 5 - Key Regional Authority Strategies

1.2 Case for Change

1.2.1 Spending Objectives

SBCD will need to work alongside the UK Government, the Welsh Government, Local Authorities, and industry to deliver world class, high-quality, full fibre and wireless digital services across the region.

> *'Our vision is that by 2035 the Swansea Bay City Region will be recognised internationally as a lead innovator in developing and commercialising applications using the transformational economic power of digital economy. The Swansea Bay City Deal (SBCD) aims to put the region at the forefront of the digital age and fourth industrial revolution; where value is created by knowledge extracted from vast data resources, the internet of things and communications mobility. These are the factors that will fundamentally change and enhance the way we work and live'.*

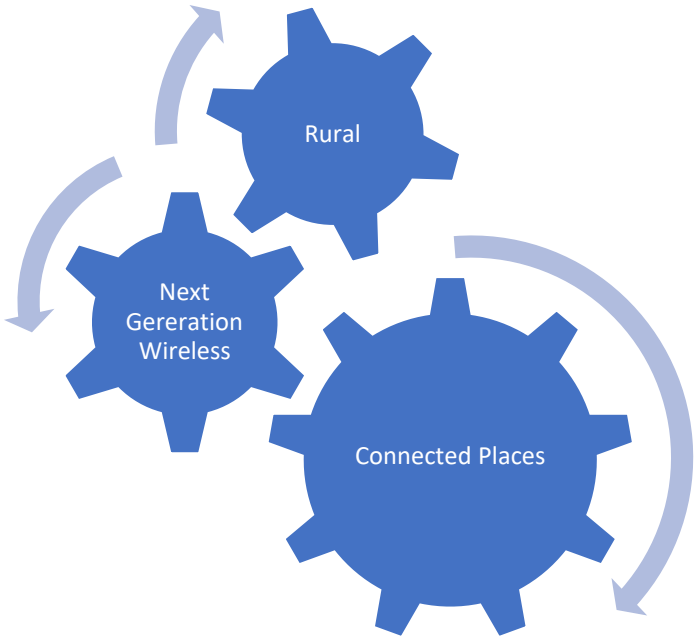
Cllr Rob Stewart, Chair of the Swansea Bay City Deal Joint Committee

City Deal's Digital Infrastructure will deliver its objectives by supporting intervention in specific areas and for specific projects through a combination of connectivity types, depending on what is most suited. It must be remembered that the Digital Infrastructure project rests within a dynamic service provision environment, operated by large independent private sector organisations. It also exists within a number of existing digital infrastructure intervention programmes operated by the UK and Welsh governments.

The region is not homogenous in its requirements and challenges, with the investment priorities reflecting this. In order to give a focus on the region's needs and the manner in which they can be met, three intervention areas have been identified to be delivered through the Digital Infrastructure project. These are:

- Connected Places: Targeted at the main urban and economic development centres within the region to realise a full fibre network of connectivity.
- Rural; Addressing the market failure to provide many rural communities with broadband that reaches at least the UK standard.
- Next Generation Wireless; Targeted at the early deployment and use of 4G-Adv and 5G to support use cases across the City Deal aims and region wide.

Each area deals with a different regional challenge and calls upon different mixes of digital infrastructure to overcome them. However, all are complimentary and interdependent. All three Digital Infrastructure deployment types are complimentary and importantly amplify each other. Strong and widespread fibre deployments is a precursor for advanced mobile services, while many Use Cases are enhanced by the fact that they are able to deliver through both fixed and mobile applications and services.



In order to address these issues SMART investment objectives have been defined for each of these three areas as follows:

- ***Connected Places; Ensures towns, cities and development zones have access to world class full fibre infrastructure.*** *This will deliver the following spending objectives:*
  - *improve the quality of public service delivery by ensuring all public buildings are digitally connected facilitating improved efficiency and public access to services*
  - *cost savings to the public sector for digital connectivity*
  - *stimulation of competition in digital services*
  - *stimulate inward investment in the region by telecommunications industry and hence improve access to services for residents and businesses*
  - *deliver economic benefits through the usage of digital infrastructure, notably increased efficiency and enhanced productivity.*

- ***Rural: Facilitate equality of access to broadband services across the region.*** *This will deliver the following spending objectives;*

  - *improve the quality of public service delivery by ensuring communities in remote areas have access to services*
  - *social cohesion and inclusion across the region to sustain communities*
  - *stimulate economic growth by enhancing opportunities for employment.*

- ***Next Generation Wireless; Ensure that the region is at the forefront of 5G and Internet of Things (IoT) investment and subsequent innovation.*** *This will deliver;*

  - *Inward investment*
  - *Innovation and ensuring the region is at the forefront of new service roll out and delivery*
  - *Economic growth*

Harmonising with meeting City Deal challenges, Digital Infrastructure can be seen as a core part of the ecosystem for driving up GVA, Skills and Jobs[8].

The Digital Infrastructure project represents the building of a critical **enabling** digital environment within which a wider, but completely complimentary, set of strategic aims can be articulated;

1. existing businesses exploiting Digital Infrastructure applications to generate **productivity improvements**

2. existing businesses exploiting Digital Infrastructure applications to **innovate new business models[9] and open new markets**

3. **new business start-ups** capitalising on Digital Infrastructure to operate new digitally dependent business models at lower cost and more flexibly than established businesses

4. economic and employment impacts associated with any new **network infrastructure build**, including ongoing network and application support

5. **Skills development** across digital sectors to drive higher value employment opportunities

6. a rise in **new working practices**, enabled through Digital Infrastructure[10], communications/conferencing/collaborative tools, applications and delivering additional digital transformation benefits

7. Opening the way for **teleworking to stimulate Rural business models** which positively impacts the environment, maintaining communities, as well as job creation through distributed working

8. **private household benefits,** via increases in house price and housing wealth

9. **Sustaining communities** through remote access to digital services and by allowing rural SMEs to work and conduct business through digital platforms

10. the enablement of **5G** mobile networks and associated Use Cases to accelerate its deployment to lead the way rather than historically being a follower

11. **smart cities/homes infrastructure** offering reductions in energy use, congestion and fuel costs stemming from smart management, smart energy and smart travel systems

8 Ofcom, The Benefits of Ultrafast Broadband Feb 2018

9 This is particularly pertinent to Covid 19 driven change with more on-line businesses and changing working practices

10 Specifically 'Cloud' based operation and services and Digital Transformation

12. increased manufacturing productivity secured from the emerging digital revolution in manufacturing (**Industry 4.0)** and connected **Internet of Things (IoT)**

Advanced Digital Infrastructure also enables many other social benefits, such as;

13. **healthcare benefits** through advances in connected health technologies

14. **environmental impacts** through carbon reduction, travel reduction, home working etc.

15. **social inclusion** and removal of any Digital Divide

1.3 Connected Places

1.3.1 Spending Objectives

It is the overarching investment objective of the Swansea Bay City Region Deal to ensure that the regions cities, towns and development zones have access to world class infrastructure to deliver economic growth and attract inward investment. As stated in section 1.2 this will deliver the following SMART spending objectives

Objective	Benefit
Improve quality of public service delivery	• Facilitate SMART cities e.g. enhanced transport management, waste disposal, environmental monitoring etc • Improved efficiency of public sector in areas such as health, social care and education
Cost savings	• Reduced operational costs in public service delivery • Savings in on-going revenue costs for digital services
Stimulation of competition and choice	• Enhanced availability of services to local businesses and residents • Price and service level competition
Inward investment	• Telecoms investment in fixed and mobile infrastructure
Economic benefits	• Employment growth • Start ups • Productivity improvements

Table 6 – Connected Places Spending Objectives

1.3.2 Existing Arrangements

The cities and development zones in the region have a very low penetration of full fibre to the premise. Table 1 shows the 2020 Ofcom Spring data[11] that reveals the penetration of full fibre[12] in the region.

Authority	Percentage Premises Served
Carmarthenshire	16.7%
Neath Port Talbot	2.6%
Pembrokeshire	5.2%
Swansea	18.5%

Table 7 - Full Fibre Availability (UK 10%)

In contrast the City of London has 32.7% availability of Full Fibre. Internationally the comparisons are starker with Japan 97%, Sweden 44% and a total EU average of 14%. In fact, the situation has improved markedly in the past year in Swansea where BT announced a programme of investment in the key commercial centres, and In Carmarthenshire where BT is investing in Carmarthen and Cross Hands. However, Neath Port Talbot and Pembrokeshire remain poorly served. Similarly, alternative network operators are prioritising other centres in the UK. The Swansea Bay City Deal must therefore have an objective to address this challenge.

Ultra-Fast[13] Broadband shows a better penetration (notably in Virgin Media areas), but in some parts still extremely low penetration for the region.

Authority	Percentage Premises Served
Carmarthenshire	16.2%
Neath Port Talbot	59.2%
Pembrokeshire	5.2%
Swansea	73.2%

Table 8 - Ultra-Fast Broadband Availability (UK 53%)

[11] https://app.powerbi.com/view?r=eyJrIjoiZTg4NDMyZjctNWJhZS00MjNjLWIxYzMtZjkwYzljNDk2NzdmIiwidCI6IjBhZjY0OGRlLTMxMGMtNDA2OC04YWU0LWY5NDE4YmFlMjRjYyIsImMiOjh9

[12] Able to deliver Gigabit speeds

[13] Identified as download speeds above 300Mbs being available

In order to improve the position and unlock the benefits available to business and homes, the objectives for Connected Places will focus on the provision of new duct and dark fibre (or equivalent) infrastructure which will need to be built in key development corridors and zones to underpin strategic aims. For state aid reasons SBCD can only invest in connecting public sector assets but experience elsewhere has shown that such investment anchors pump primes additional commercial investment into business parks, commercial centres and residential premises. Indeed, other cities have experienced a multiplier of 6:1 between commercial and public sector investment[14]. For example, in Aberdeen an initial £6m anchor tenancy project by Aberdeen City Council leveraged a further £40m of investment by City Fibre and Vodafone[15].

The key areas for investment are;

- Llanelli/Central Swansea/Neath Port Talbot; This is a contiguous area where a number of the SBCD and private sector initiatives are located. This infrastructure will help to facilitate a world class marine energy hub and support existing and emerging industries including those in media, digital, life sciences and engineering.

- Pembroke and Milford Haven: The location of Pembroke Dock Marine will create a world class marine engineering fabrication, test and deployment hub.

- It should be noted that Carmarthen and Cross Hands were also identified as areas for full fibre investment, but BT has now announced full fibre investment programmes in these areas.

[14] Example city from primary research, Aberdeen

[15] https://investaberdeen.co.uk/index.cfm?topNav=success-stories&subNav=case-studies&subsubNav=cityfibre-building-aberdeen%E2%80%99s-full-fibre-future

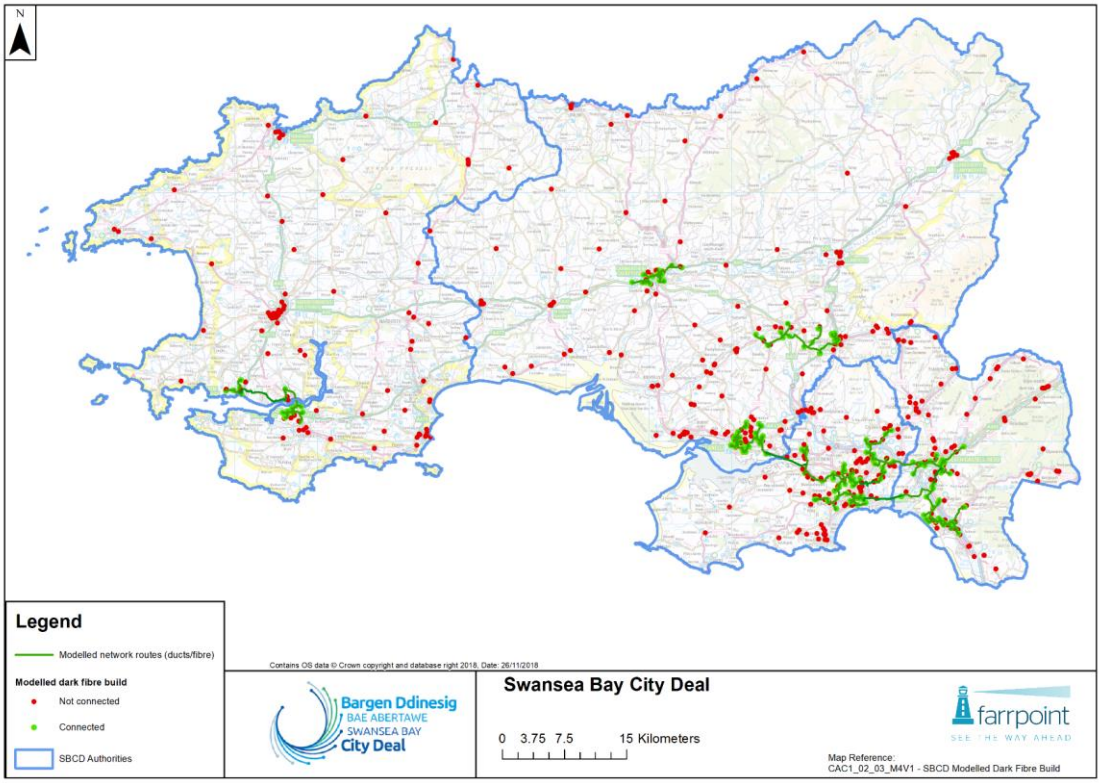


Figure 1 - Scenarios for the deployment of fibre and duct infrastructure into the Connected Places of the region

The full fibre build across the connected places/ development zones may be addressed in a number of ways and different approaches are required in different parts of the region to reflect the geographical and demographic diversity of the region as follows:

- In Swansea/Neath Port Talbot and Llanelli a blend of public sector duct usage, PIA and new commercial build will be delivered to complement and enhance the existing commercial appetite for investment. This should build on the duct programmes already commencing in Swansea, notably on Kingsway and Oystermouth Rod. This will be explored during market testing and procurement. In some parts of the region there is an appetite to invest in public sector infrastructure whilst in others, commercially owned infrastructure is favoured. This is discussed in the commercial case.

- In areas such as Milford Haven and Pembroke Dock a duct build programme will be required to enhance transport and energy sectors. The City Deal will aim to facilitate infrastructure across the region and beyond by enabling enhanced regional and international connectivity. In reality, the SBCD deal initiatives are key to enabling commercial industry and the Welsh Government to achieve many of their proposed digital programmes.

The public sector will also be a key beneficiary of the connectivity provided and as such will gain through the accelerated and improved digital transformation of their services, offering efficiency and cost saving improvements.

The UK Government Future Telecoms Infrastructure Review[16], (FTIR), sets out the UK position on enhancing connectivity, including fibre to the premise and 4G/5G. In addition, the UK Government Department for Digital Culture Media and Sports funding for Local Full Fibre Networks programme is entirely based on achieving wider access to fibre based services. Connected Places is therefore directly aligned to current UK and Welsh Government interventions and to their wider policies.

Currently BT Openreach is the dominant provider of telecommunication infrastructure across the region, although Virgin Media also has a significant presence in Swansea and Neath Port Talbot. Other alternative carriers in the UK such as City Fibre, Talk Talk and Vodafone have yet to announce any investment in the region.

The services provided by the PSBA, a Welsh government organisation providing broadband services within the public sector, uses connectivity provided primarily by BT Openreach. Within the region, the provision of fibre connectivity will need to integrate with PSBA responsibilities, potentially integrating their current role and business model with SBCD interventions.

In addition, the west coast of Wales is a termination point for the proposed Greenlink power (and potentially fibre) link from Ireland[17]. This could also link with the proposed Welsh Govt Trunk Road Fibre network. It is essential these projects are interlinked by the fibre connectivity that is envisaged under this SBCD programme. The programmes are complementary and interdependent. Feedback from both the telecommunications industry as well as other key sectors (e.g. media and digital content) looking to invest in South Wales has stated that they require diverse routing[18] across South Wales to Ireland and beyond. Examples of companies who have stated this include major international telecommunications companies such as Zayo and media organisations.

Supporting and coordinating these initiatives would give the Swansea Bay City Region and Wales a large capacity diverse route in the form of a loop taking in Dublin and linking across via another undersea cable to Liverpool and Manchester. If a fibre route such as this was constructed it would immediately put Swansea and the region on a par with Manchester in terms of digital access, opening opportunities that are currently out of reach for data centres and cloud services, as well as inward investment from media and content providers.

[16]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/732496/Future_Telecoms_Infrastructure_Review.pdf

[17] https://www.greenlinkinterconnector.eu/

[18] This is a business requirement for the UK broadcasters on a security and availability issue. Comments from BBC and S4C have been made directly to this point.

1.3.3 Business Needs

Intervention is required by SBCD in order to deliver the current and future digital requirements of the cities and development areas of the region. It is imperative to facilitate a digital economy in the region and ensure that the region has an infrastructure that prepares and future proofs the area for future social, economic, and commercial change. Without such an intervention the SMART objectives will not be met, notably;

- The ability to deliver cost effective, wide ranging public services at a lower cost will be constrained.

- The local economy will not have access to the digital infrastructure it requires to deliver the economic growth and benefits identified.

Experience has shown that market forces alone will not deliver the desired digital infrastructure footprint and action is required by the SBCD to anchor investment and act as a catalyst for further investment. This is because;

- Telecommunications industry is resource constrained (both capital and operational resources) and will prioritise areas of the country that are the most commercially attractive and can be delivered at greatest efficiency. It is faced with a wide range of opportunities and will priorities investments based on the parts of the country that have been proactive in the stimulation of digital investment (e.g. York, Milton Keynes, Aberdeen)

- Market forces are likely to lead to significant gaps in service provision – even within Cities and development zones and there is a risk that commercial investment would be focussed solely on central Swansea rather than the development areas across the region as a whole.

1.3.4 Scope and Service Requirements

Several options present themselves for consideration in developing wider full fibre connectivity across the region;

Investment in infrastructure, such as underground ducts to carry fibre optic cables

The investment is the building of ducts that would be made available on an open-access basis to allow companies to place their own fibre cables through them. The action would effectively create an asset for the city deal from which it could expect a return from companies renting space in the ducts. The leverage effect is to make it cheaper and less capital intensive for the building of Gigabit fibre networks. The investment is long term in that the infrastructure would be expected to last for at least twenty years.

Investment in fibre connectivity, (which would include ducts)

In addition to simply constructing passive infrastructure for telecoms companies to use, it is also possible to deploy fibre at the same time and then to make this connectivity available to others, either as dark fibre which they can light and use for their own purposes or as managed fibre that is ready to use for connecting different locations. The leverage effect is the same as for ducts. Fibre optic cables have a life of at least ten years, but in reality, their useful life may run to at least twenty years.

Investment through managed services such as from the PSBA

Organisations with existing fibre assets can be partnered with in order to encourage them to upgrade their existing infrastructure. Such investments are often to extend the coverage to new locations or to improve the capacity of their existing infrastructure by updating the active equipment in exchanges and points of presence. Building on existing digital assets is often a way to reduce timescales and accelerate the uptake of digital services.

The blend of the above approaches will be required across the region. This will be a function of:

- Whether the authorities have existing ducting that they wish to expand and open to the market
- Authorities appetite for owning assets versus procuring services over commercial owned infrastructure
- State aid constraints
- Commercial industry appetite to invest in any given part of the region
- The role of the PSBA and its proposed service portfolio and tariffs

These issues are discussed in detail in the Commercial Case

It is critical to apply the business needs across the region and not focus only on dense urban locations found in Swansea. Digital connectivity offers the opportunity to leverage and distribute work across a wide geographic area rather than concentrate it in urban locations.

1.3.5 Benefits

In the Urban /Economic Development Zones segment a report by the economics consultancy Regeneris[19] has assessed the direct and indirect economic impacts of full fibre infrastructure over 100 UK cities. Specifically, in the Swansea Bay City region, the modelled impacts of the direct benefits are >£200m against a projected investment for the region of £17m, a multiplier of 11. In fact, Swansea City itself has a multiplier of 20. These benefits are broken down as follows;

[19] Regeneris report on the Economic impact of Full Fibre

https://www.cityfibre.com/wp-content/uploads/2018/03/The-Economic-Impact-of-Full-Fibre-Infrastructure-in-100-UK-Towns-and-Cities-12.03.18.pdf

- Productivity improvements to businesses - 8%
- Start-ups – 9%
- Innovation - 8%
- Network build – 19%
- Enhanced teleworking and worker flexibility – 11%
- Household benefits – 45%

This assumes a build up as follows;

- services enabled: 1 year after the start of network build
- 35% adoption rate reached: after 5 years
- productivity benefits achieved: 1 year after adoption
- innovation benefits realised: 4 years after adoption.

The range of benefits that can be achieved are laid out in section 1.2, with the understanding that both private and public sector bodies can achieve multiple benefits through enhanced connectivity. However, the benefits available and then secured are dependent on many factors, such as the sector in which the organisation operates and the skills and knowledge they have around digital innovation and application. A general overview of benefits are;

Benefit Outline	Connected Places
Productivity improvements	Digital Transformation enabler
Innovate new business models and open new markets	Digital Transformation enabler
New business start-ups	Innovation in digital services
Network Building & Support Employment	Civil engineering and Technical Skills
Skills Development	Demand for digital skills increased
New Working Practices	Collaborative and distributed working
Teleworking to Stimulate Rural Business Models	
Private Household Benefits	Attraction to area
Sustaining Communities	
Enablement of 5G	Access to fibre
Smart Cities/Homes Infrastructure	Enablement of IoT services
Industry 4.0	Enablement of IoT services

Healthcare Benefits	Innovation in services delivered digitally
Positive Environmental Impacts	Reduced need to travel
Social Inclusion and Removal of any Digital Divide	

Table 9 - Benefits for Connected Places

1.3.6 Risks, Constraints and Dependencies

The constraints for Digital Infrastructure intervention in the Connected Places workstream are shaped by:

- SBCD governance procedures.
- Stakeholder co-ordination and participation in any proposed intervention. In particular the authorities (and potentially other public sector bodies in the region) will need to use and anchor any infrastructure deployed. This will have implications for delivery of ICT and other services
- State aid that limits the ability of the public sector to invest directly into commercial opportunities in the sector without access to state aid clearance or the establishment of commercial ventures
- Supplier appetite to invest in the region
- Available funds which may require intervention scale prioritisation by SBCD leadership
- PSBA policies for the delivery of services over dark fibre infrastructure
- Resources and skills necessary to lead and manage the interventions.

In terms of the dependencies, these are more aligned to co-investment opportunities. A range of national and rural telecommunication interventions will need to be complementary and aligned to SBCD actions. Aligning interventions to take account of other funding sources would be efficient and allow wider scale impacts to be achieved, rather than acting alone and possibly duplicating other interventions.

In additional the SBCD Digital Infrastructure project is a cross cutting project that will provide the underlying infrastructure for many of the other SBCD programmes and initiatives to be delivered. There is a risk that many of the other SBCD projects may be sub-optimal if they are not able to access the infrastructure envisaged here. Innovation, competitiveness and employment opportunities would be risked.

Potential Risks are outlined in table below

Risk	Mitigation
Resources constraints	SBCD will require a dedicated Digital team to manage the range of interventions envisioned. This will include funding applications, procurements, stakeholder liaison, supplier engagement and interaction with external national and regional schemes
State aid challenges	Clearly defined legal and regulatory guidance required to frame selected options and activities
Integration with other interventions is challenging on timescales and governance	Be clear on the actions that City Deal are undertaking to clearly identify boundaries and overlaps. Work with other interventions to frame areas of joint interest and where joint action is called for
Other sources of funding become available to integrate into the City Deal funding for specific objectives and to leverage outcomes	Ensure the business case is able to adapt to external changes in overall funding scope and availability
Other interventions overlap with the City Deal, with early investment by SBCD possibly losing other funding to the region	Work with other interventions to frame areas of joint interest and where joint action is **not** called for
Intervention timescales under Digital Infrastructure exceed five years due to governance or management issues	Prioritise actions within the Commercial and Management case to ensure benefits are delivered
There is a risk that operators may be selective in their deployment within the region. Supplier appetite is not stimulated	The telecommunications industry has finite capacity and multiple opportunities. Potential participants should be encouraged to consider the opportunity, particularly the lowering of their risk

Digital Infrastructure is delivered in a fragmented way, lessening the impact and leverage that could be achieved	Make the interdependencies between the intervention types clear and include these within the critical success factors
Sourcing from service aggregators or suppliers such as the PSBA may prove commercially challenging	Ensure that stakeholders and the PSBA are clear on the rationale and objectives to allow the greatest level of involvement

Table 10 – Connected Places Risk Register

1.4 Rural

1.4.1 Spending Objectives

It is the overarching investment objective of the Digital Infrastructure project to ensure widespread equality of access to broadband services across the region (notably in rural areas) to deliver social cohesion, efficient delivery of public services and economic growth.

Objective	Benefit
Improve quality of public service delivery	• Improved access to public services in remote areas such as health, social care and education • Ensure rural schools, community centres, libraries etc have access to the same quality of information and digital services
Social cohesion and sustain communities	• Reduce population decline • Facilitate community services
Economic benefits	• Employment growth • Facilitate teleworking

Table 11 - Rural Spending Objectives

1.4.2 Existing Arrangements

Rural communities in the region have long suffered from poor internet connectivity. Ofcom's Spring 2020 data showing the % of properties able to receive superfast services (defined as >30Mbps) in the table below.

Superfast Broadband Availability	
Authority	**Percentage Premises Served**
Carmarthenshire	86.2%
Neath Port Talbot	97.6%
Pembrokeshire	87.2%
Swansea	97.6%

Table 12 - Superfast Availability

The Ofcom data also shows those **unable** to receive minimal internet connectivity.

NOT able to receive 2Mbs	
Authority	**Percentage Premises**
Carmarthenshire	2.0%
Neath Port Talbot	0.1%
Pembrokeshire	1.6%
Swansea	0.1%

Table 13 - Premises < 2Mbs Percentage

NOT able to receive 5Mbs	
Authority	**Percentage Premises**
Carmarthenshire	4.5%
Neath Port Talbot	0.2%
Pembrokeshire	4.0%
Swansea	0.2%

Table 14 - Below 5Mbs Percentage

NOT able to receive 10Mbs – Universal Service Threshold	
Authority	**Percentage Premises**
Carmarthenshire	7.1%
Neath Port Talbot	0.3%
Pembrokeshire	6.8%
Swansea	0.5%

Table 15 – USO Percentages Spring 2020

In all cases there is a distinct variation across the region showing a level of market failure due to the cost of delivering services to areas that are more rural in their makeup.

As part of the Welsh Government Superfast Cymru programme Open Market Review, dialogue with industry was undertaken to establish if a premise was able to receive a 30Mbps download service currently, or whether it will be delivered over the next three years under the programme. The results revealed a significant gap in service provision of 20,548 premises across the region, as shown in the table below;

Authority	White Premise[20]
Carmarthenshire	9,480
Neath Port Talbot	1,650
Pembrokeshire	6,366
Swansea	3,052

Table 16 - White Premises Totals

The Ofcom Spring 2020 data set also provides statistics on actual premises by broadband speed. In particular it identifies the number of premises in the region that are currently beneath the envisaged minimum Universal Service Obligation of a 10Mbps download speed. These are as follows:

[20] The EU term 'White Premises' indicates unable to receive NGA broadband < 30Mbs

Authority	Premises below USO
Carmarthenshire	6,170
Neath Port Talbot	223
Pembrokeshire	4,079
Swansea	602

Table 17 - Premises Numbers beneath Universal Service Threshold of 10Mbps

In total there are 11,074 sites – largely concentrated in the rural areas of Carmarthenshire and Pembrokeshire that are below the UK governments stated USO.

The Welsh Governments Superfast Cymru programme was put in place to address this market failure, whereby the costs of delivering superfast broadband to challenging locations in some rural and urban locations meant they had lagged behind significantly. It does need to be noted that the figures above are post Pre-Superfast Cymru 2 but funding constraints and the ability of suppliers to address easier to reach low cost sites means that the SBCD region will still have significant gaps in coverage. The Welsh Government has collated the impact of the programme along with other initiatives such as LFFN and voucher schemes and there will remain approx. 20,500 white premises to be addressed in the region.

A detailed mapping exercise has been undertaken of the location of these white premises with poor digital connectivity. This is shown in the following maps for each authority area that shows the concentration of sites not able to receive a 30Mbs broadband service. In areas shaded red there is a greater concentration of poorly served premises. Although there are challenges across the region there are particular issues in the following areas:

- Swansea; Gower, Forestfach, Pontarddulais
- Neath Port Talbot; Kenfig, Bryn-Coch, Vale of Neath
- Carmarthenshire; Widespread across County
- Pembrokeshire; Widespread except Haverfordwest and A40 corridor.

All of these areas are therefore disadvantaged across the broad range of benefits being sought by the City Deal, in some cases to the point where they will not be able to participate in any of them.

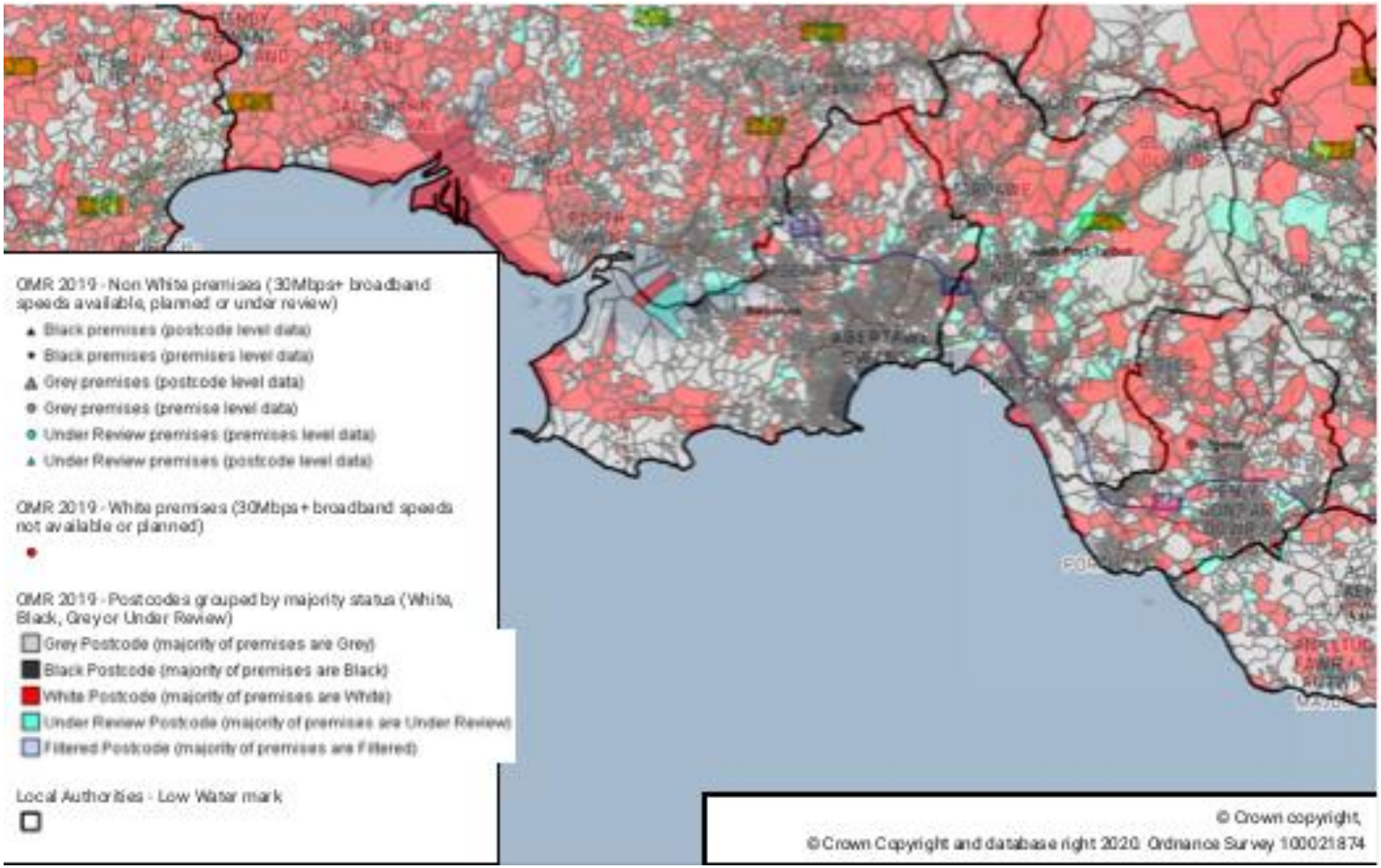


Figure 2 - Swansea & Neath Port Talbot OMR

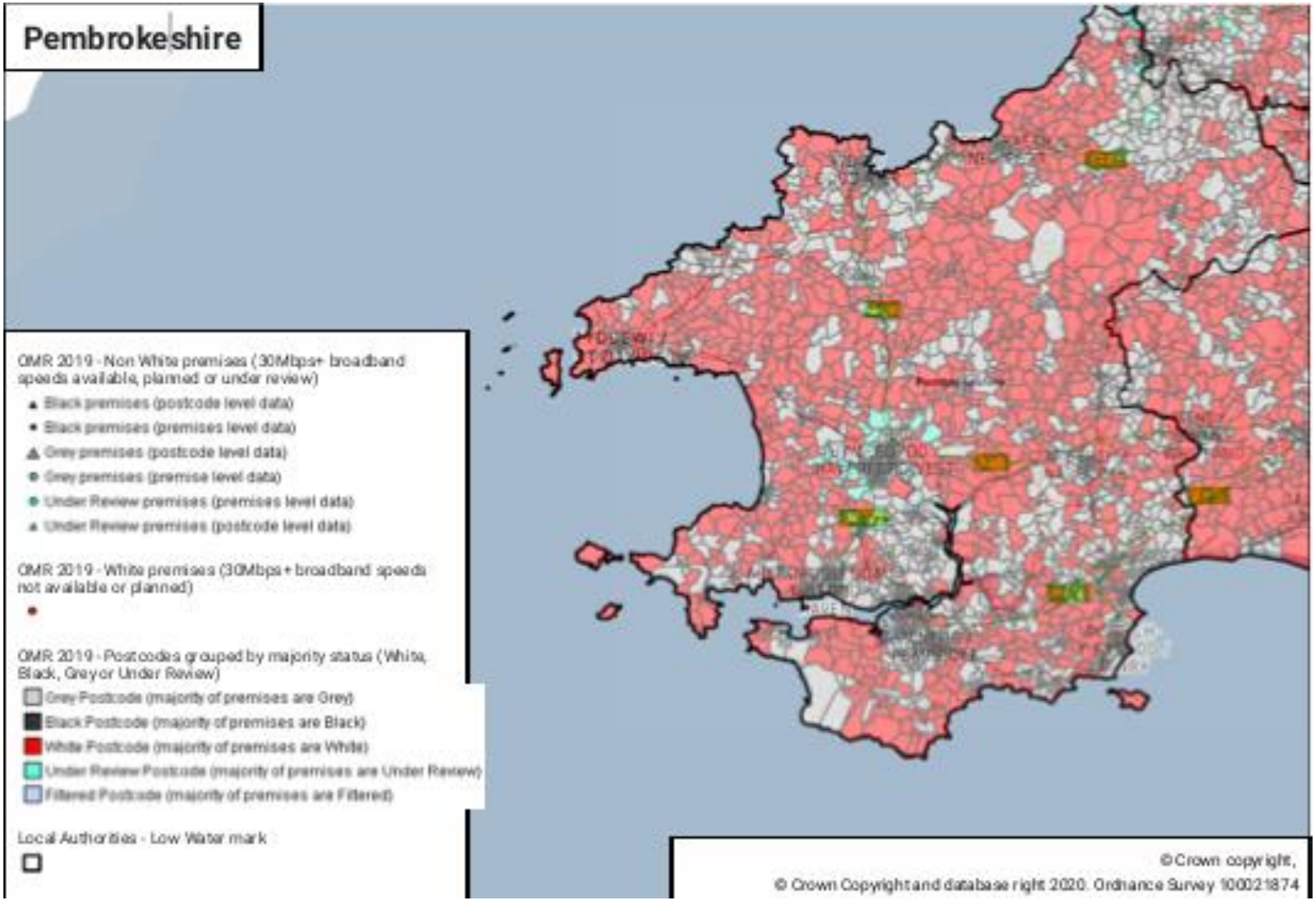


Figure 3 - Pembrokeshire OMR

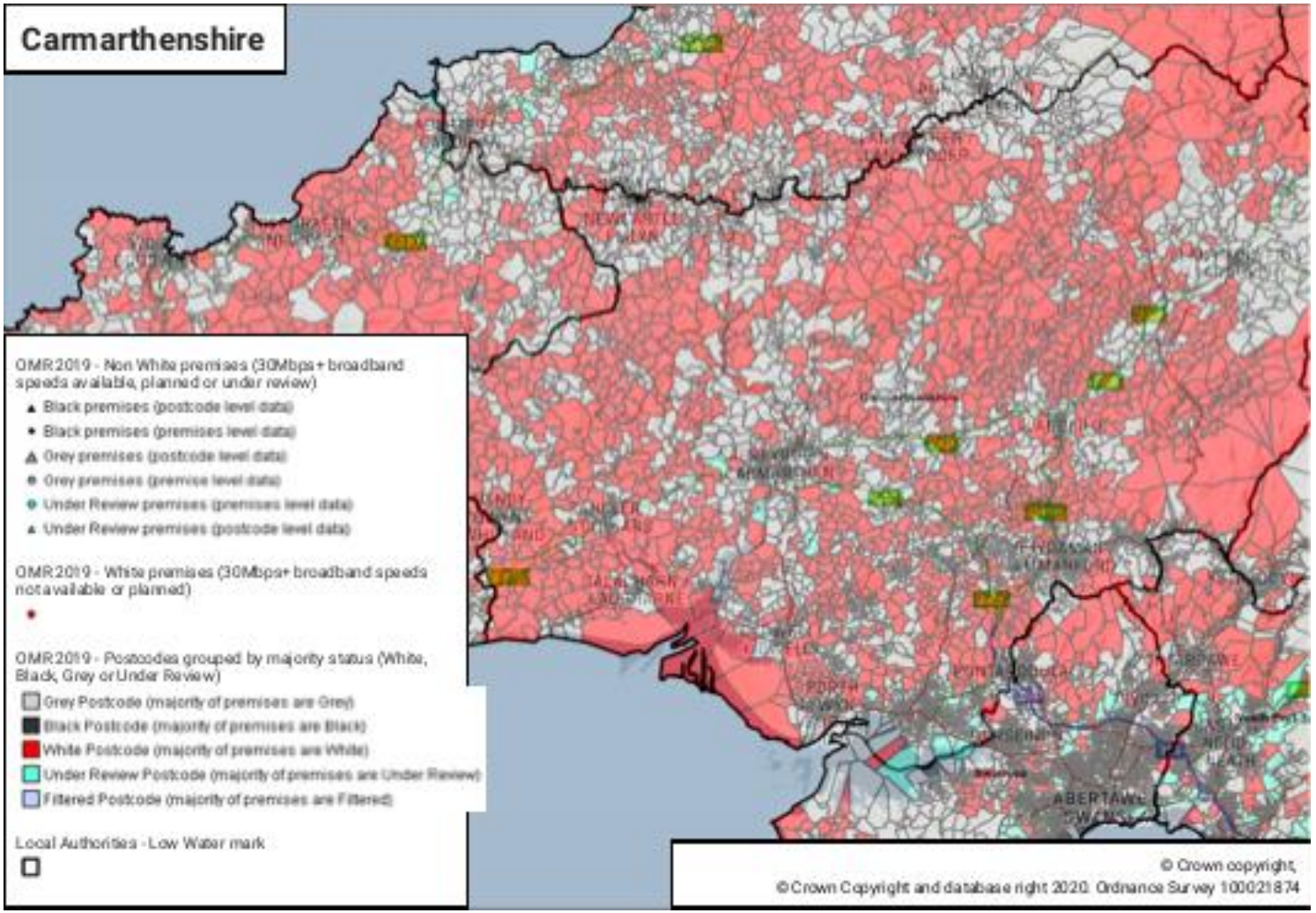


Figure 4 - Carmarthenshire OMR

1.4.3 Business Needs

The challenge of bridging the rural gap is recognised by both the UK and Welsh Government and a range of initiatives are either planned or in place including;

- Currently in operation, Access Broadband Cymru (ABC) scheme; A De Minimis grant of £400 or £800 towards the installation costs of a better broadband connection.

- DCMS Local Full Fibre Network Fund (LFFN Waves 2 & 3) funded investment into public sector sites in rural areas: Pembrokeshire was successful in applying for LFFN funding. Under this programme 53 public sector sites are being upgraded from copper to Full Fibre using Openreach FFIB infrastructure. At the time of writing it is hoped that this scheme may be extended across the region.

- The Welsh Govt is considering setting up a national Dynamic Purchasing Scheme to enable local additional investment to Superfast Cymru.

- A Universal Service Obligation (USO) for broadband was launched in March 2020. Regulated by Ofcom, everyone has a legal right to request a broadband connection of at least 10 Mbps although users have to cover costs if they exceed £3400, which will often be the case in rural Swansea Bay Region. Further details are available at:

  https://www.ofcom.org.uk/phones-telecoms-and-internet/advice-for-consumers/broadband-uso-need-to-know

- DCMS Rural Gigabit Connectivity Fund. This scheme provides funding to connect rural hubs in a village or market town with a fibre connection. This must be a public sector site such as GP, health centre, library or school. Full details are provided at

  https://www.gov.uk/government/publications/rgc-programme-key-information

- The Rural Gigabit Voucher scheme is a UK wide subsidy scheme aimed at groups of individuals or businesses based in rural areas. The scheme offers funding towards the cost of installing gigabit capable broadband to residential and business premises and who currently have broadband speeds less than 100 Mbps. (https://gigabitvoucher.culture.gov.uk). Residential properties can receive a connection voucher for up to £1500 and SMEs £3500.

- Autumn 2019 Boris Johnson announced a target of 2025 for all premises to receive “gigabit capable” broadband connectivity. Up to £5billion has been allocated nationally to achieve this goal which is targeted at the final 20% of premises across the UK i.e. the 20% worst served premises. At the time of writing it remains unclear how this will be implemented and the cross impact on existing schemes.

The net impact of these schemes is likely to reduce the scale of the problem facing the SBCD region in its goal of quality broadband service access.

All of these initiatives have lower take-up than has been achieved in other parts of the UK, indicating that the demand-stimulation actions undertaken so far require attention.

A feature of all of the above schemes is that they are national in focus and often lack the local knowledge, resources and presence to address regional requirements. It is this role that the SBCD can address. There will continue to be gaps in coverage across the region and this needs to be addressed by a locally driven programmes that are complementary to national schemes.

1.4.4 Scope and Service Requirements

Although there are a range of regional and national initiatives to improve rural access to digital services it is clear that gaps in service, take up and availability will remain across the region. SBCD propose a range of intervention measures to complement current and future national and regional schemes to address these gaps. These will include;

- A programme of demand stimulation activities to increase awareness in communities and drive service adoption
- A regionally led procurement of broadband infrastructure in those areas not served by the commercial sector and other national and regional interventions. This should seek to deliver a minimum of 30Mbps download speeds to as many commercial and residential premises as possible
- Supplier side engagement to raise awareness of gaps in service provision and encourage investment through the removal of barriers such as planning
- Engagement and funding applications to central and regional government to ensure the region is targeted for funding.

1.4.5 Benefits

A direct comparator in this case is the work undertaken by Ofcom to determine the business case for the introduction of a Universal Service Obligation[21] so that every premise in the UK has connectivity at 10Mbs or above. This directly compares with the rural areas of the region. In their economic assessment, a benefit multiplier of 3.4-3.6:1 is set out. Independent research[22] for BT undertaken to assess the impact of investment in rural connectivity for Northern Ireland gave the following;

[21] https://www.ofcom.org.uk/phones-telecoms-and-internet/advice-for-consumers/broadband-uso-need-to-know

A limit of £3,400 has been placed on any single connection, if the cost of connectivity is in excess of this, then a contribution will be required. It is also limited to customers who will NOT benefit from another publicly funded programme.

[22] The analysis was the delivery of 30Mbs services across rural areas in NI, DotEcon report for BT

Benefit Category	Absolute Benefit	Benefit Multiple
Productivity Growth	£50m - £410	0.3 – 2.7
Employment Benefits	£290m - £890m	1.9 – 5.9
Teleworking	£40m	0.3

Table 18 - Rural Connectivity Investment Impacts in NI (Source BT)

In effect this gives a range of benefit multipliers of between 2.5 and 8.9. However, as the economic impact undertaken for the USO is very recent and is more conservative, the 3.5:1 figure is preferred for rural Digital Infrastructure.

Benefit Outline	Rural Connectivity
Productivity improvements	Digital Transformation enabler
Innovate new business models and open new markets	Digital Transformation enabler
New business start-ups	Innovation in digital services
Network Building & Support Employment	Civil engineering and Technical Skills
Skills Development	Demand for digital skills increased
New Working Practices	Collaborative and distributed working
Teleworking to Stimulate Rural Business Models	Remote working
Private Household Benefits	Attraction to area
Sustaining Communities	Teleworking and distributed working
Enablement of 5G	Access to fibre
Smart Cities/Homes Infrastructure	
Industry 4.0	
Healthcare Benefits	Innovation in services delivered digitally
Positive Environmental Impacts	Reduced need to travel
Social Inclusion and Removal of any Digital Divide	Widespread access to advanced digital services

Table 19 - Benefits for Rural Connectivity

1.4.6 Risks, Constraints and Dependencies

The constraints for SBCD Digital Infrastructure to address the rural connectivity issue are shaped by:

- Ensuring that SCBD in-fills the connectivity gaps in the region following the national and rural interventions. This will need close alignment and monitoring between stakeholders and programmes
- State aid is a challenge and SBCD should utilise existing clearances wherever possible. It will not be timely or feasible to apply for a new state aid clearance
- Supplier appetite
- Community pressure.
- Available funds which may require intervention scale prioritisation by SBCD leadership
- Resources and skills necessary to lead and manage the interventions.

It is also very likely that in the rural dimension of Digital Infrastructure, some of the spending options to deliver infrastructure will require grant funding, with little likelihood of achieving a claw-back should the revenue generated by the infrastructure become net positive to the supplier. The options and approach will be defined in the Commercial Case.

In terms of the dependencies, these are more aligned to co-investment opportunities rather than true dependencies. As an example, the USO may offer a capped grant fund of up to £3,400 per premise. Aligning interventions to take account of such funding sources would be efficient and allow wider scale impacts to be achieved, rather than acting alone and possibly duplicating other interventions.

The primary risks associated with the Rural Programme are given in the table below;

Risk	Mitigation
Resources constraints	SBCD will require a dedicated Digital team to manage the range of interventions envisioned. This will include, funding applications, procurements, stakeholder liaison, supplier engagement and interaction with external national and regional schemes
State aid challenges	Clearly defined legal and regulatory guidance required to frame selected options and activities
Integration with other interventions is challenging on timescales and governance	Be clear on the actions that City Deal are undertaking to clearly identify boundaries and overlaps

	Work with other interventions to frame areas of joint interest and where joint action is called for
Other sources of funding become available to integrate into the City Deal funding for specific objectives and to leverage outcomes	Ensure the business case is able to adapt to external changes in overall funding scope and availability
Other interventions overlap with the City Deal, with early investment by SBCD possibly losing other funding to the region	Work with other interventions to frame areas of joint interest and where joint action is **not** called for
Intervention timescales under Digital Infrastructure exceed five years due to governance or management issues	Prioritise actions within the Commercial and Management case to ensure benefits are delivered
Demand side interventions are not fully harmonised with connectivity interventions	Ensure project plans have clear timelines and actions that recognise the interdependency with demand side stimulation Extend the skills and training remit within the City Deal to encompass supporting digital transformation and innovation of use cases making us of the Digital Infrastructure
Levels of skills around digital innovation and transformation within SMEs mean that take-up is low.	Extend the skills and training remit within the City Deal to encompass supporting digital transformation. In particular, digital skills around the technology such as 5G, but also the way in which innovation of sector specific use cases could make use of the Digital Infrastructure being provided. In addition to technical skills, there will potentially be significant work within Civil Engineering areas. If this is an area of skills shortages, then support in this area should also be considered.
Digital Infrastructure is delivered in a fragmented way, lessening the impact and leverage that could be achieved	Make the interdependencies between the intervention types clear and include these within the critical success factors

Table 20 - Primary Risks

1.5 Next Generation Wireless

1.5.1 Spending Objectives

5G and to some extent 4G, are widely seen and accepted as the next General-Purpose Technology (GPT). The term is used to describe something that will have a protracted aggregate impact across many economic and social structures. Often, electricity is sited as the primary example in the way that its introduction spawned so many innovations and change. To this end, 5G is the first mobile telecoms technology to receive support for both its application and deployment directly through government[23] funding.

The overarching objectives of SBCD in relation to next generation wireless technology is to ***ensure that the region is at the forefront of 5G and Internet of Things (IoT) investment and subsequent innovation.***

Objective	Benefit
Inward investment	• Mobile infrastructure and service providers to invest in improved coverage in region • SBCD to be an area of early investment in new technologies and services
Innovation	• Digital infrastructure to stimulate local businesses and innovative start ups • Use of innovation to enhance public service delivery and lower costs
Economic benefits	• Employment growth • Start ups • Usage of new applications and services to drive competitiveness of local economy

Table 21 - Next Generation Wireless Spending Objectives

1.5.2 Existing Arrangements

In relation to current wireless mobile coverage, it is primarily 4G that is of concern to the region. Overall, Wales has the biggest urban/rural divide for 4G coverage in the UK. Coverage is behind the UK averages with Ofcom[24] stating that 10% of the geographic area of Wales has no coverage. Also, only 36% of rural areas have complete 4G coverage, with 10% of A and B roads having no coverage. When compared to England, the corresponding figures are 3% in both cases.

[23] Trials and testbeds sponsored by industry and national governments are happening across the globe.

[24] Ofcom Connected Nations 2019 – Wales Report.
https://www.ofcom.org.uk/__data/assets/pdf_file/0016/130822/Connected-Nations-2018-Wales.pdf

The 4G coverage map in Figure 4 uses Ofcom's 2019 data updated to March 2020:

Figure 5 – 4G Coverage Map Carmarthenshire

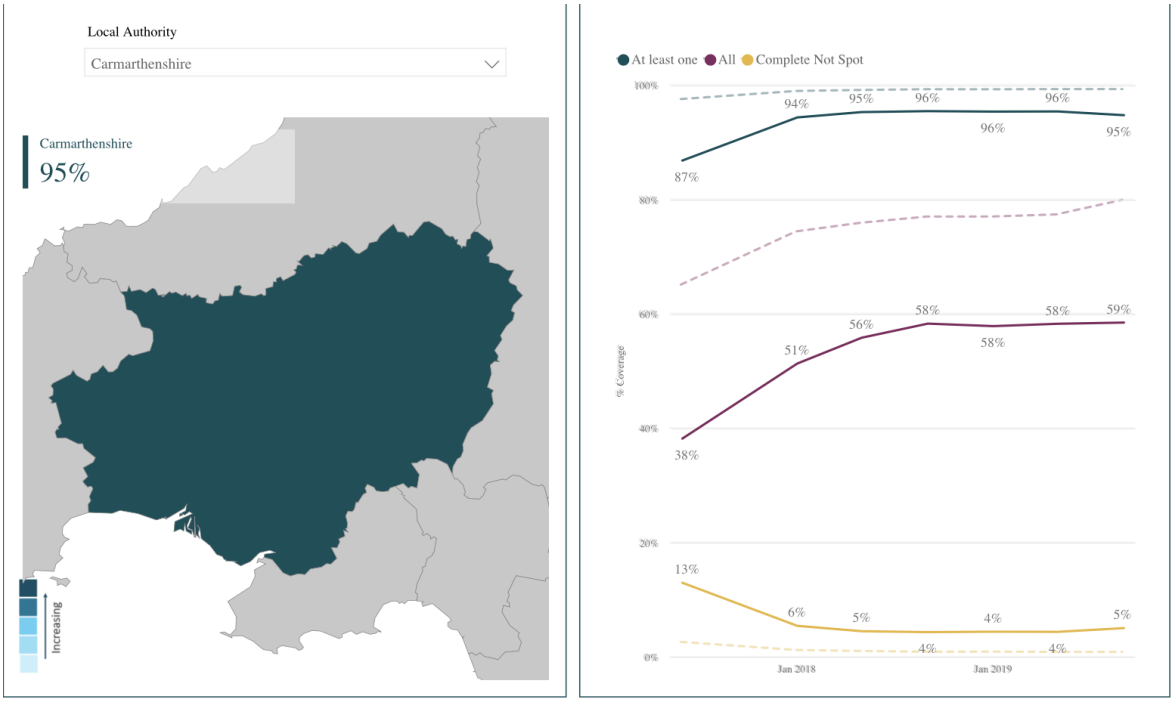
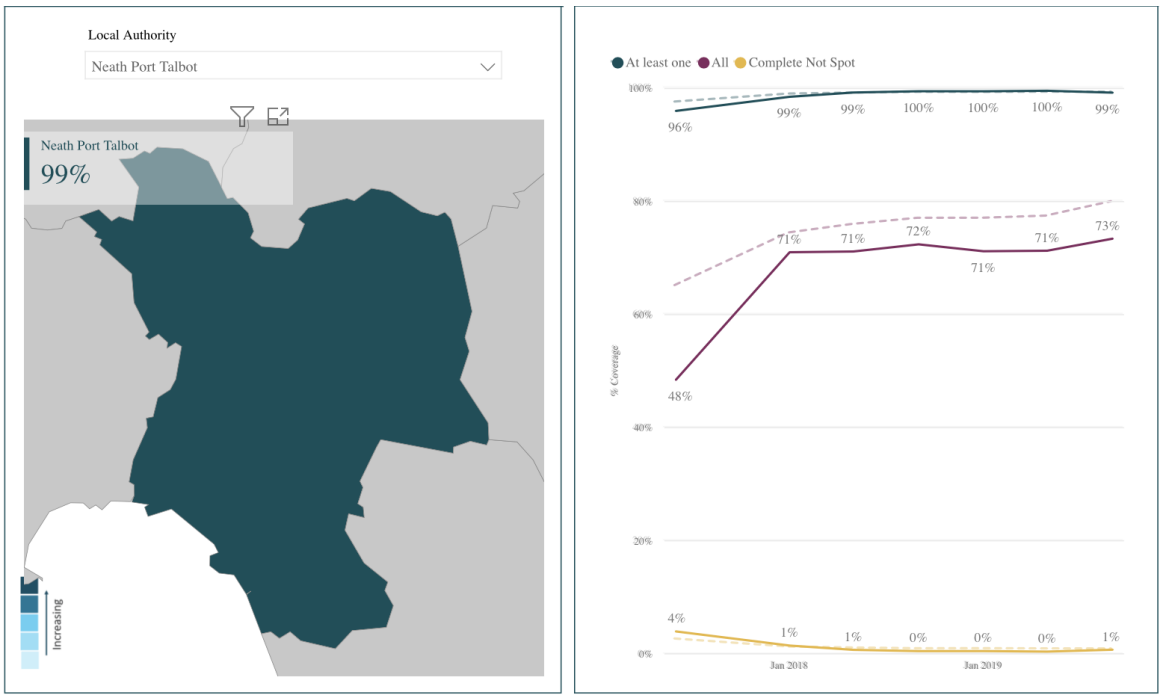


Figure 6 – 4G Coverage Map Neath Port Talbot



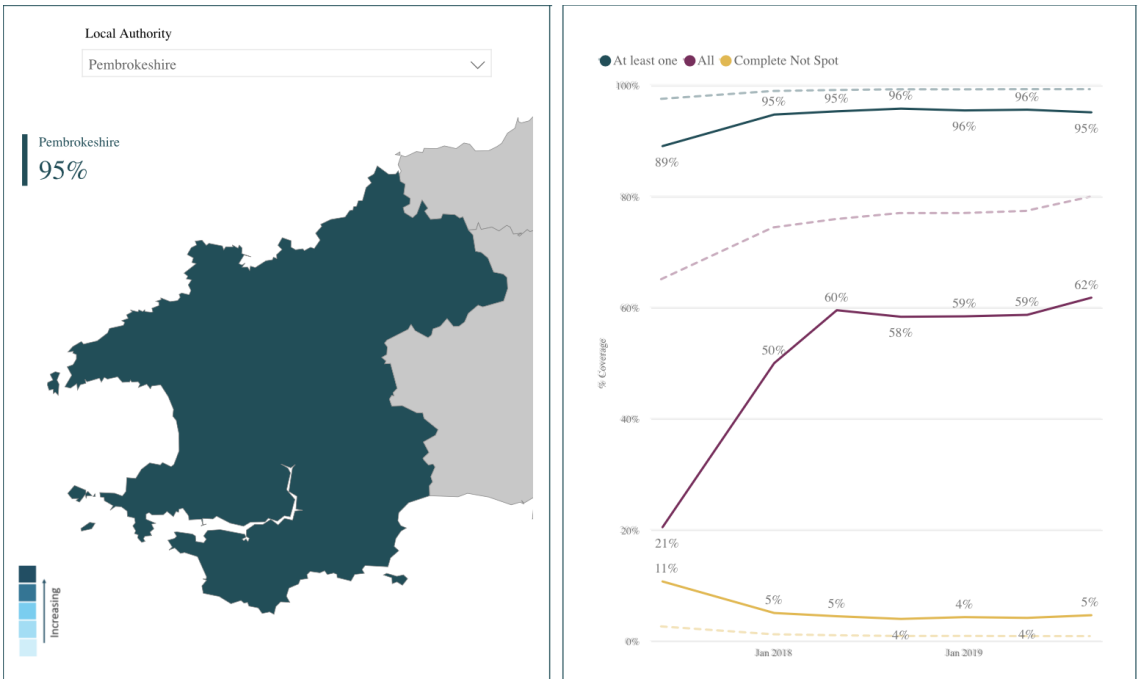


Figure 7 – 4G Coverage Map Pembrokeshire

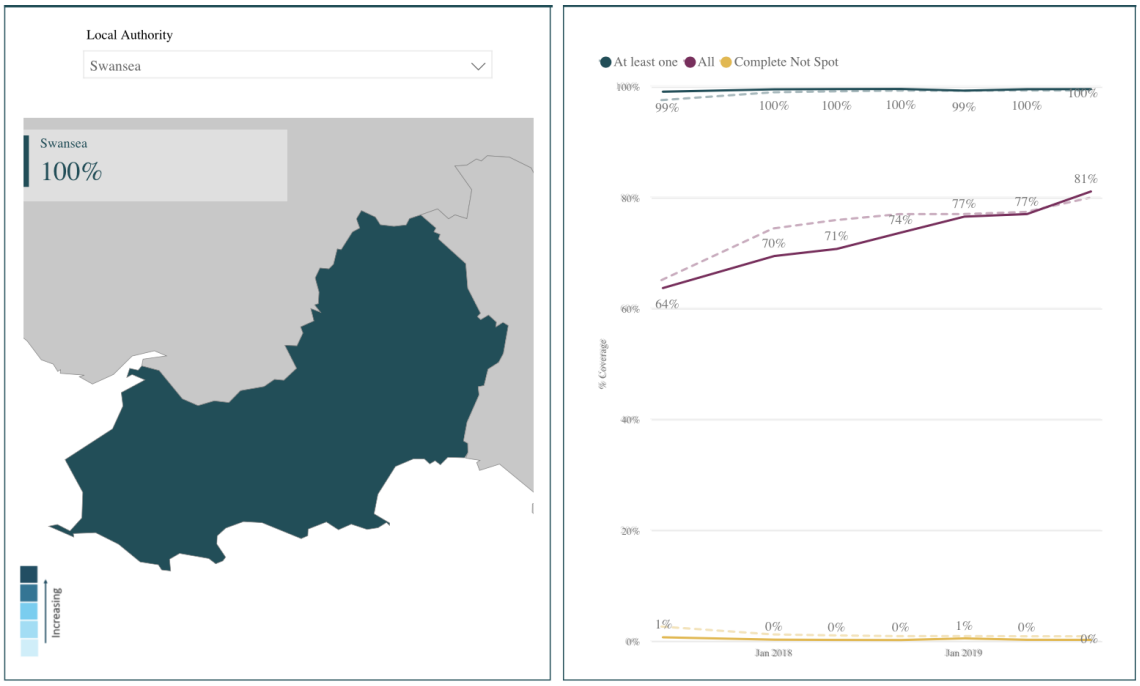


Figure 8 – 4G Coverage Map Swansea

This illustrates that there remain significant Not-Spots in 4G coverage in rural areas:

- Carmarthenshire – 8% by Geography, 11% by Indoor of Premises
- Neath Port Talbot - 7% by Geography, 4% by Indoor of Premises
- Pembrokeshire - 8% by Geography, 9% by Indoor of Premises
- Swansea - 2% by Geography, 2% by Indoor of Premises

4G coverage in Wales compares poorly with England with the likes of Bristol and Brighton having 100% coverage as a comparison for Cardiff and Swansea. While more rural counties in England such as Cornwall are on a par with Swansea. Within Wales there are poorer areas with Ceredigion with 16% geographic Not-Spots, but within England nearly all counties are now 100% geographic and indoor coverage. The National picture is shown below.

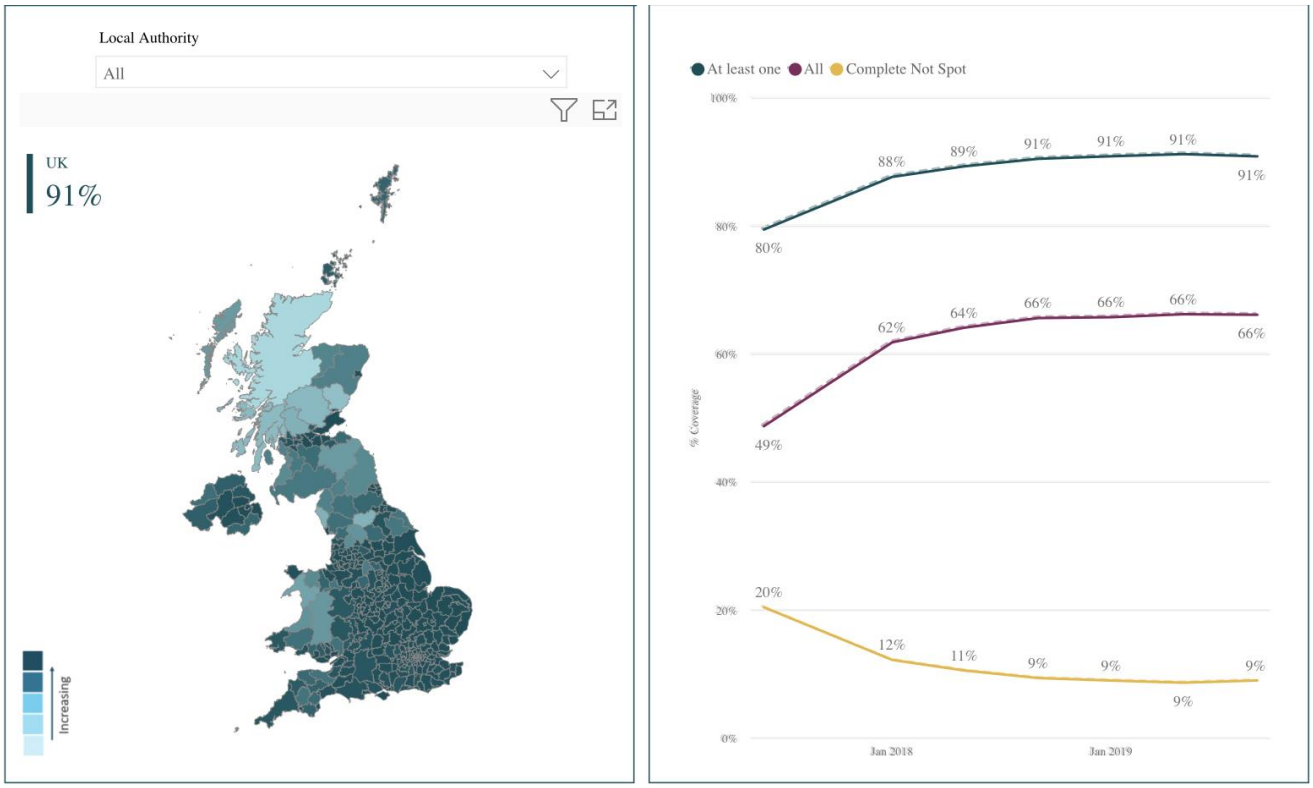


Figure 9 – Current National Coverage Perspective

Ofcom has identified several interventions to address this issue. Specifically, additional obligations for 4G coverage as part of any operator's bids for new spectrum has been dropped in favour of the Shared Rural Network[25], (SRN). From the Ofcom SRN Compliance document there will be specific geographic targets set for Wales;

> [*MNO specific value, which is 83% for EE Limited and Hutchison 3G UK Limited, 82% for Telefónica UK Limited and Vodafone Limited*] of the geographic landmass of Wales.

This leaves Wales some way behind the overall National required coverage of 88%. This disparity is likely to be in some part due to the more extensive and remote rural areas of Wales. Nevertheless, unless managed carefully this could put Wales even further behind England and Northern Ireland in terms of 4G coverage, which will also have a direct impact on 5G roll out in the coming years.

[25] https://www.ofcom.org.uk/spectrum/information/cellular-coverage

An interesting topic related to the use of satellites has emerged over the last year with broadband, remote 4G/5G base stations and even IoT being able to connect to space based services. The current crop of Low Earth Orbit (LEO) constellations are primarily targeted at bringing internet services to the underserved, particularly across the most Digitally underserved and challenging parts of the World i.e. Africa. However, these new satellite-based services will have footprints that cover the UK as well, potentially presenting opportunities to serve remote areas with broadband connectivity. The primary challenge for emerging satellite broadband providers to overcome is the inherent latency on any such service. 5G offers single digit millisecond latency, which is one of its highly desirable characteristics relevant to numerous innovative use cases. Utilising satellite connectivity will increase this latency between 10 and 100 times. For domestic and some business broadband only, this latency is potentially negligible and therefore these types of services may be appropriate. One significant factor will be the timing of service availability, which is likely to be around 2024. By this time, it is likely that further fibre and wireless broadband expansion will have reached remote rural locations making this type of service relevant to only a very niche number of customers. It is also likely to be far more expensive than current broadband prices, especially for early adopters.

The Emergency services network is a Home Office lead programme to deliver the new Emergency Services Network (ESN) critical communications system across the UK. Through the emergency services network contract, awarded to EE, there is an ongoing program of mobile network coverage expansion across Wales. Current data shows that 35 additional mobile sites have been delivered and another 37 are planned across Wales at primarily rural locations, with a total of 86 sites planned over the next two years.There is very limited 5G coverage in Wales with only Cardiff central currently benefiting. There is also a planned deployment for Swansea central this year. This is likely to increase over the next three to five years with commitments by operators to extend coverage and services to major Urban areas[26]. The Digital Infrastructure project will target the acceleration of the roll out of 5G and IoT services ensuring the region plays a leading role in demonstrating the benefits and innovation[27] that next generation wireless services offer.

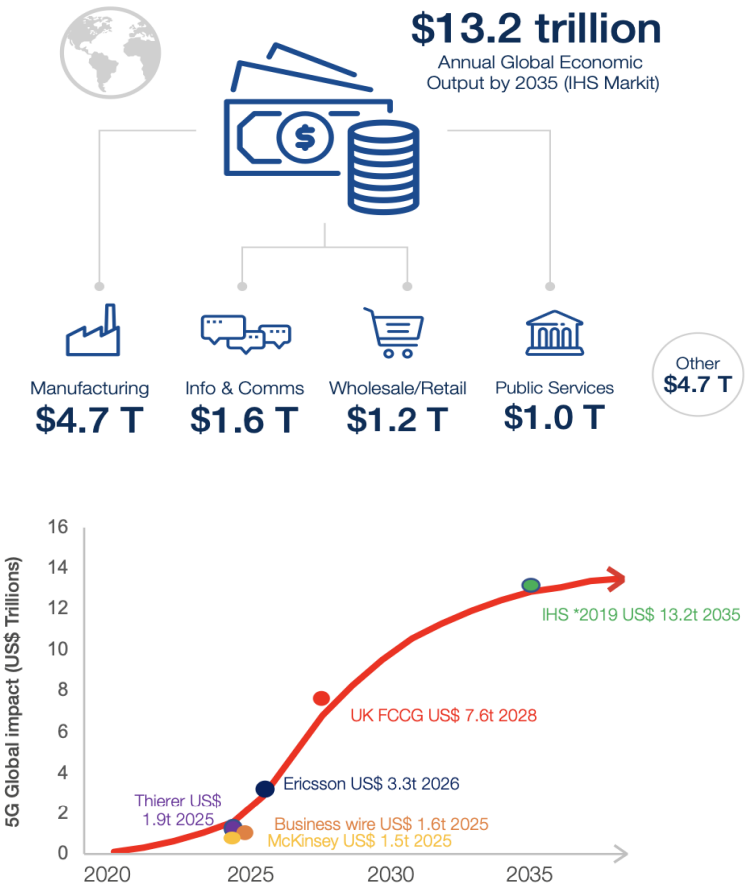
Commercial deployment of 5G in the region remains embryonic and largely focused on Swansea. In particular:

- 3 announced deployment in Swansea in February 2020
- Vodafone launched 5G services in pockets of central Swansea in summer 2020
- O_2 and EE have yet to deploy 5G in the region.

[26] Statements by all mobile operators support this as their strategic intent. The head of BT even challenged the need for 5G in 2018

[27] In line with the DCMS funded 5G Urban and Rural Connected Communities initiatives

The Next generation Wireless workstream of the Digital infrastructure project primarily relates to and is concerned with 5G and IoT networks and use case, although in all 5G cases the option of utilising advanced 4G technologies may be appropriate. This option should be determined on a case by case basis. As a matter of preference, 5G should be the deployment and the service of choice to enhance the regions capability in next generation wireless services. However, where costs and speed of implementation might be paramount, the use of 4G-Adv should remain an option. As the Next Generation Wireless workstream of the Digital Infrastructure project will primarily be dealing with new and innovative services and use cases, there is currently very little evidence on which to estimate their socio/economic impact. However, many within the industry are forecasting material improvements in services and applications driven by the availability of 5G. The two charts below provide global prediction figures for 5G impact over the next 15 years[28].



There is a general trend of positive economic impact from 5G across all sectors with the largest impact in Manufacturing. This may not be considering the SME sector in its estimates. The chart is drawn from a number of reports and studies that show a consistent growth curve. They are heavily grossed up figures and are not necessarily applicable to the region and its sectorial ecosystem. However, they do indicate significant opportunities provided the right stimulus is given to supply and demand side.

Figure 10 - 5G Impacts Globally

The focus for the SBCD should be to use a limited number of interventions to accelerate deployment of 5G in localised areas and thereby prove the market such that further investment by the mobile operators to establish wider 5G coverage is encouraged.

[28] World economic Forum – Impact of 5G

By taking this approach, it will be possible to deliver evidence-based increases in productivity, innovation, skills and knowledge transfer, and in particular for the Mobile Network Operators, actual or potential revenue generation.

Due to the fact that 4G-Adv and 5G coverage will be deployed in hot-spots through normal commercial pressures, either by the operators, or as part of Digital Infrastructure interventions, drawing out widespread regional economic impacts or uplifts to GVA is very challenging and will have a high degree of uncertainty. In order to remove or mitigate that uncertainty, this business case lays out a selection of specific projects to be supported. These will act as a proof of concept against which decision about further investment by the operators, in cooperation with SBCD or directly, can be made. Key topics are:

- Enhancement of the Digital aspects of other City Deal projects, such as the Digital Clusters, Life-Science and Well-Being, Industry 4.0 and Energy
- Fixed Wireless Access for rural communities, 'Wireless fibre' for 'last-mile' distribution of digital services
- Connected vehicle demonstration along a section of trunk road
- Education related use cases, distance learning and augmented reality
- Digital transformation in industry, additive manufacturing, distributed design
- IoT demonstrator in logistics and supply chain management

In essence, each project under Next Generation Wireless will need to have a business case developed for them, with the Digital Infrastructure being provided acting as a key enabler for transformation and innovation.

The Welsh government recently completed a 5G strategy study supported by Innovation Point which is focused on Agri-Tech, Transport and Tourism. Some elements of this are likely to be of interest to SBCD.

In terms of national government supported 5G, DCMS on behalf of the UK Government, is operating several funded testbeds and trials. At this time, none are within the SBCD region. Wales did enter a bid for the DCMS lead Rural Connected Communities competition based around Tech Valleys and was successful. Planning is now complete and the grant funding about to be drawn down to enable 6 use cases to be undertaken. The model being used to provide the 5G coverage is particularly designed to allow other grant funding bodies to put in place interventions to accelerate 5G deployment. It is likely that any SBCD 5G interventions should be done in cooperation with the RCC and potentially 5G Create[29] programmes.

[29] 5G Create is the latest phase of the DCMA 5G Trials and Test bed programme. Cardiff has submitted a bid based on the creative sector that is under evaluation. The model used for the 5G coverage is the same as for RCC.

1.5.3 Business Needs

The overarching objectives of the SBCD should be to ensure that it is at the forefront of 5G and IoT investment and to accelerate deployment of coverage to match or exceed that in the UK. It is also to provide market confidence in deploying 5G widely through strong demonstrations of commercially successful use cases.

Many regions of the UK are targeting the deployment of innovative 5G use cases with a view to enhancing commercial investment in their region. A failure to do this in the SBCD area would lead to the region being given a lower priority in planned commercial deployment.

A critical need in underpinning network and service deployment is to enhance the demand and the skills in the region. The Use Cases around 5G are in their infancy and offer significant opportunity in creating new jobs and services. Innovation will be what determines the beneficial use of this technology. Interventions that involve the supply side must therefore be balanced with supporting sectors in their digital transformation journeys. In addition, skills in digital infrastructure, applications and data need to be enhanced to increase the local talent pool for potential inward investors seeking to take advantage of the enhanced digital infrastructure, including 5G.

The leveraging of all the intellectual and physical assets within the region will be an important differentiator and capturing this must be a key objective and need.

1.5.4 Scope

The core scope for the Next generation Wireless Workstream is 5G deployments. This is simply because, without intervention in Digital Infrastructure, it is very unlikely that 5G will be deployed across the region other than dense urban locations with the added danger that if this is left to supply-side market forces they may simply be MNO show cases and not generate any impact on GVA.

As part of the effort to secure 5G coverage, some of the actions taken in respect of following the guidance in the Future Telecoms Infrastructure Review will also benefit the improvement of the coverage for 4G, a supplemental goal might be added to increase 4G to at least that in England, a thorough and intense engagement with SRN would be necessary. SBCD should work closely with Ofcom and the Welsh Government to ensure that policy objectives and funding are focused on the region. With several initiatives from Ofcom and the Welsh government seeking to reinforce 4G coverage in Wales, this benefit can be driven through ensuring there is a strong, clear and open dialogue with the mobile operators around their objectives and the way in which they intend to ensure Wales keeps pace with the expansion of general 4G coverage.

1.5.5 Benefits

There is little direct evidence available as yet for the impact of better 4G coverage and almost none for 5G, (as it has not been deployed at this time in more than testbeds). Despite this, the general opinion of the industry is that 4G and 5G coverage is essential for both their general customer base and also industry and the service sector as a whole.

Work undertaken for the EU in relation to 4G services being made widely available in Sweden and Estonia, has estimated a benefit ratio of 1.5:1. In light of the very large impacts of deploying full fibre, 4G in particular is enhancing and accelerating benefits further purely as a result of its mobility. This provides a baseline for deployment of 5G. It is highly likely that 5G will in the end be significantly higher than a benefit ratio of 1.5:1 simply because it will open significantly more opportunities for new services and innovation than 4G. The diagram below, (from the WEF document) gives the roadmap for 5G impact areas which goes far beyond 4G.

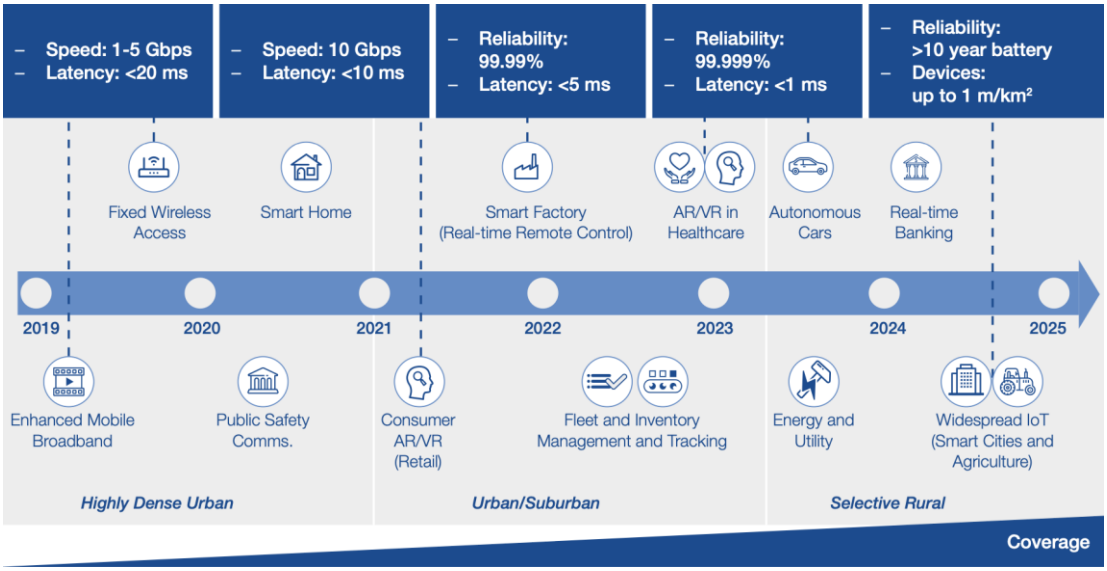


Figure 11 - 5G Journey

A critical need to underpin network and service deployment is to enhance the demand and the skills in the region. The Use Cases around 5G are in their infancy but offer significant opportunity in creating new jobs and services. Innovation will be what determines the beneficial use of this technology. Interventions that involve the supply side must therefore also include ways in which to gain skills in the technology itself but also in supporting different sectors in their digital transformation journeys.

The range of benefits that can be achieved are laid out in section 1.2, with the understanding that both private and public sector bodies can achieve multiple benefits through enhanced connectivity. However, the benefits available which then go on to be secured are dependent on many factors, often depending on the sector in which the organisation operates and the skills and knowledge they have around digital innovation and application. A general overview of expected benefits is;

- Uplift in GVA[30]
- Safeguarding jobs
- Creation of new high value jobs
- Development of new sectors and inward investment

Benefit Outline	Next Generation Wireless
Productivity improvements	Digital Transformation enabler
Innovate new business models and open new markets	Digital Transformation enabler
New business start-ups	Innovation in digital services
Network Building & Support Employment	Wider skills needed at the network edge as functionality migrates outward from the traditional Data Centre approach
Skills Development	Demand for digital skills increased
New Working Practices	Collaborative and distributed working[31]
Teleworking to Stimulate Rural Business Models	Wireless digital service access
Private Household Benefits	Smart Homes
Sustaining Communities	Teleworking and distributed working
Enablement of 5G	Access to fibre
Smart Cities/Homes Infrastructure	Enablement of IoT services
Industry 4.0	Smart Manufacturing
Healthcare Benefits	Innovation in services delivered digitally[32]
Positive Environmental Impacts	Reduced need to travel
Social Inclusion and Removal of any Digital Divide	Widespread access to advanced digital services

[30] Report from dot.econ for BT NI gives a GVA uplift range of 3% - 11% across four rural counties of England. These figures are much higher than others.

WIK report to Ofcom 2018 gives a 0.5% uplift

[31] Covid 19 has been a driver which will have long term consequences for working practices

[32] Covid 19 experiences will continue to drive this service sector

Table 22 - Benefits for Next Generation Wireless

Quantifying benefits across what is a very diverse set of private sector and public sector enterprises in the region is not possible at this stage, it can only be assessed in aggregate in line with the economic assessments that have been undertaken on the impact of digital connectivity in the UK and Europe.

1.5.6 Risks, Constraints and Dependencies

The constraints for Digital Infrastructure are bound within;

- SBCD governance procedures.
- Stakeholder co-ordination and participation in any proposed intervention. In particular the authorities (and potentially other public sector bodies in the region) will need to use and anchor any infrastructure deployed. This will have implications for delivery of IT and other services
- Supplier appetite to invest in the region
- Available funds which may require intervention scale prioritisation by SBCD leadership
- Resources and skills necessary to lead and manage the interventions
- The appetite for SMEs in the region to adopt and innovate new digital ways of working
- Coordination with other regions in Wales to ensure a joined-up approach and shared learnings
- State Aid considerations

Intervention funding by SBCD should be on a match funded basis with the private sector and spending should target the delivery of specific 5G coverage.

It is very likely that in the rural dimension of 4G, some of the spending options to deliver infrastructure could require significant grant funding, with little likelihood of achieving a claw-back should the revenue generated by the infrastructure become net positive to the supplier. It would be sensible to refrain from entering into any 4G interventions directly while the SRN[33] intervention is defined. What would be worth investing in is driving the agenda for the region in terms of SRN outcomes for the region. The benefit ratio for this could be significant considering the low cost of investment required.

In terms of the dependencies, the key issue is to ensure that any 5G use cases deployed in the region are effective, deliverable and subsequently stimulate commercial investment in the region.

[33] SRN is a match funded £1bn fund

The primary risks associated with the Next Generation Wireless are given in the table below;

Risk	Mitigation
Resources constraints	SBCD will require a dedicated Digital team to manage the range of interventions envisioned. This will include, funding applications, procurements, stakeholder liaison, supplier engagement and interaction with external national and regional schemes
State aid challenges	Clearly defined legal and regulatory guidance required to frame selected options and activities
Intervention timescales under Digital Infrastructure exceed five years due to governance or management issues	Prioritise actions within the Commercial and Management case to ensure benefits are delivered against early adoption, (first 2 years)
Demand side interventions are not fully harmonised with connectivity interventions	Ensure project plans have clear timelines and actions that recognise the interdependency with demand side stimulation. Extend the skills and training remit within the City Deal to encompass supporting digital transformation and innovation of use cases making use of the Digital Infrastructure
Use Cases are not well defined and benefits are not specific	Ensure a simplified 5 Case model is used to draw up the business case for each project to be supported under Next Generation Wireless. Assessment should take a wider view related to achieving proof of concepts and market viability demonstration
Levels of skills around digital innovation and transformation within SMEs mean that take-up is low.	Extend the skills and training remit within the City Deal to encompass supporting digital transformation and innovation of use cases making use of the Digital Infrastructure Consider the creation of a digital transformation centre of excellence that can support multiple sectors in an economic manner
5G network availability fails to attract other uses once deployed, the initial use case project being the only user	Utilise demand side stimulation and innovation support to exploit the availability of 5G services across the SMEs and organisations within the coverage range of the network
Digital Infrastructure is delivered in a fragmented way, lessening the impact and the leverage that could be achieved by wider fibre and 5G services	Make the interdependencies between the intervention types clear and include these within the critical success factors

Table 23 – Next Generation Wireless Risks

2 Economic Case

2.1 Introduction

The outcomes from the strategic case are to ensure that:

- Towns, cities and development zones have access to world class full fibre infrastructure to deliver economic growth and inward investment
- There is widespread equality of access to broadband services across the region (notably in rural areas) to deliver social cohesion, efficient delivery of public services and economic growth
- SBCD is at the forefront of development and roll out of world class next generation wireless services.

A secondary objective is to identify and facilitate any additional digital infrastructure required to ensure the success of the 9 other City Deal projects.

A long list of options has been defined for each of these segments. Each of these will also have a different mix of success factors applied in the selection of the preferred option(s).

2.2 Critical Success Factors

In order to give a completely rounded consideration, the critical success factors for the digital infrastructure project should include;

Success factor	Measurement Criteria
Strategic fit	• Meets the strategic goals of the SBCD • Delivers future proofed digital infrastructure to enable to achieve economic and social objectives • Supports wider Welsh priorities and strategies • Is at least comparable with elsewhere in UK
Economic return	• Achieves a viable cost benefit ratio when compared with the other available options
Achievability	• Fits with the region's resources • Follows a clear, timely and deliverable approval route and delivery timeframe • Has political and stakeholder support across region and delivers benefits to all parties • Is fully state aid compliant and does not require new state aid applications • Is sustainable with the flexibility and scalability to serve the regions requirements as the economy grows.
Attractiveness to Supply side	• A clear delivery model is agreed • There is supplier appetite for investment in the region
Compatibility with other programmes	• No overlap or duplication of effort with other national or regional digital infrastructure investment programmes. • Fully aligned with UK and Welsh digital policy objectives
Risk Management	• Financial • Operational • Legal and Regulator, N.B. state aid

Table 24 - Digital Infrastructure Specific Success Factors

2.3 Long List Options

This section presents the long list of options. This has been analysed and presented for each of the three areas of the Digital Infrastructure project as previously defined. This is because:

- The economic impacts and cost benefit ratios are different between rural and urban areas
- The range of options differs by area as each has different requirements and potential delivery mechanisms
- External issues such as the role national programmes and the impact of state aid are varied across the pillars
- Supplier appetite for investment will vary across the region.

2.3.1 Rural Programme

It should be noted that the options laid out are not mutually exclusive. They can, and in many cases, should be combined to achieve the most beneficial outcomes.

A long list of options for SBCD to address the challenges within the rural communities has been defined.

As seen in the strategic case there are currently over 20,500 white premises in the region unable to receive a 30Mbps broadband service following all planned interventions. These are shown below

Authority	White Premise[34]
Carmarthenshire	9,480
Neath Port Talbot	16,506
Pembrokeshire	6,366
Swansea	3,052

Table 25 - White Premises by Local Authority

In addition, some 11,000 of these are beneath the Universal Service Obligation of 10Mbps as shown below;

Authority	Premises below USO
Carmarthenshire	6,170
Neath Port Talbot	223
Pembrokeshire	4,079
Swansea	602

Table 26 - Premise Counts by Local Authority

We estimate that there will remain a significant gap in service provision in the region, even after the role out of DCMS and Welsh Government led interventions. Therefore,

[34] The EU term 'White Premises' indicates unable to receive an NGA broadband service

the following options offer opportunity for the Digital Infrastructure intervention to address these areas.

Long List Options

Option 1: Do Nothing
Description and Rationale: No actions or funding provided by SBCD. Market left to deploy infrastructure against their own investment criteria, or with support of the UK and Welsh Governments programmes
Costs: **£ 0** It should be noted there is an opportunity cost to the region of doing nothing. This will include: • A loss on inward investment; If SBCD fails to intervene in the market and/or anchor investments there will be a loss of commercial investment. • A % of the region will not receive commercial broadband services. If 5000 households and SMEs were to be excluded in this manner the loss of economic benefit over a 15-year period is estimated to be >£80m
Benefits: **£ 0** NOTE: Once the USO and Superfast Cymru 2 interventions take place, they in themselves they will produce a positive economic impact. Typically, an investment into a remote rural site produces a benefit: cost ratio of 3.5:1 over 15 years. Hence if the number of white premises was reduced by 10,000 at a cost of £3000 per site, the economic benefit can be expected to be over £100m over 15 years. However initial indications are that the SBCD is likely to receive proportionally less investment than other more densely populated parts of South Wales and Superfast Cymru will not have the financial resources to address the requirements of the most remote and costly parts of the SBCD region to serve.
Issues/Risks: • There will be a risk of deepening the digital inclusion gap across region • No local control of priorities – dependent on industry and national initiatives • Lack of inward investment. Elsewhere in the UK public sector intervention has resulted in leveraged commercial investment. • Social loss – percentage of households with limited access to healthcare, education, access to social care and public services will increase but potentially very slowly, leaving some areas with no or minimal connectivity • Economic loss – lower productivity, inability to work in flexible manner, reduced employment opportunities • Environmental – increased carbon footprint

Option 2: Do Minimum: Supply Side Engagement

Description and Rationale:

SBCD to proactively engage with market. Activities to include:

- Briefing industry on regional plans and requirements
- Lobby for inward investment
- Promotion of region as test bed for new technologies and services
- Arranging site visits, events etc
- Providing single interface between industry and the regional public sector bodies and a point of contact for issues such as planning, way leaves etc
- Co-ordination of programmes with UK Govt and Welsh Government

Such activity has proven a key catalyst for inward investment elsewhere in the country and there have been examples of plans changed by operators such as City Fibre and Virgin Media. Suppliers are faced with multiple opportunities and are often responsive in their planning.

Costs:

£ 100k per annum

Benefits:

Easier to target support and to coordinate other funding channels to benefit the region and SBCD. Increased investment by operators over and above 'Do Nothing'. Harmonisation with other initiatives such as SRN for 4G and maximising its impact.

To be monitored against clearly defined targets for inward investment and service provision.

Target additional £5m of inward investment stimulated over the five-year programme plus successfully obtained £10m of public grant funding

Issues/Risks:

- Limited financial exposure to SBCD
- Time to implementation reducing potential impact achieved
- Regional priorities may be ignored
- Service take-up may not improve
- Competition for investment from other parts of UK leaves the region behind
- Supplier appetite for regional investment may be limited
- The most remote, commercially challenged part of the region will be difficult to attract inward investment to

Option 3: Do Something: SBCD Demand Stimulation Programme

Description and Rationale:

SBCD establish a local programme to increase user awareness and adoption of digital services across the entire population of SMEs and households. Activities would include:

- PR and promotion
- Establishment of case studies of benefits and usage
- Engagement with local stakeholders such as business groups, community organisations etc
- Events
- Promotion of connection voucher schemes of UK and regional Govt
- Engagement with suppliers
- Engagement with local businesses and residents
- Support and training programmes
- Use of social media
- Web based support
- Provision of technical, commercial and legal support to community groups

Costs:

- Local team of 2 staff per authority area – £100k per area, £400K per annum across the region. For a five-year programme, £2m
- Additional promotional materials and support, £600k per annum
- To be monitored against clearly defined targets for inward investment and service provision.

Benefits:

Key measures of success will be monitored on an annual basis and will include:

- service adoption by business and residents
- business productivity
- employment and start up rates

Target an additional 5% uptake in Next Generation Broadband Access services over 5-year period i.e. approx. 17,000 premises in the region

Research commissioned by DCMS the economic, social and environmental impacts of faster broadband – UK Economic Impact Study. Economic benefits identified were local enterprise employment, teleworker productivity, productivity growth, labour force participation and network construction. Enhanced productivity is the key productivity with benefits growing by 0.3% as speeds double. A more direct comparison of the proposed SBCD intervention is the Impact Analysis undertaken for the Universal Service scheme. This analysis discounts benefits due to the nature of the programme under a range of speeds and subsidy scenarios. However, all options deliver a positive outcome and value for money (over 15 years) with a Benefit Cost Ratio of between 3.4 to 3.6

In addition, there are currently 3000 business sites in the region unable to access 30Mbps services. It is likely that some of these business sites will receive services as a result of Superfast Cymru 2, DCMS LFFN and USO initiatives.

It is estimated that there may be up to 2000 SMEs that would benefit from a local business support programme.

Issues/Risks:

- Limited financial exposure to SBCD
- Time to implementation
- Service take-up may not improve
- Need for co-ordination with national and regional schemes
- Demand stimulation only serves to increase take up in those areas that have infrastructure to take up. There will still be parts of the region without any infrastructure and demand stimulation does not address their requirements or lead to infrastructure investment

Option 4: Do Something: SBCD In-Fill Procurement

Description and Rationale:

It is acknowledged that the existing proposed national and regional initiatives will still leave a number of SME and residential premises un-served or poorly served. This is because:

- Welsh Government Superfast Cymru 2 lacks the funding to achieve ubiquitous coverage
- Superfast Cymru 2 targets an uplift in connectivity speeds to at least 30Mbps. It does not prioritise premises beyond this. Hence the supply side response is to target premises with the lowest upgrade costs. This will likely lead to premises with current broadband services below the threshold speed, (10 – 30Mbs), being prioritised over those with very poor, (<10Mbs), or no services at all.
- DCMS programmes are dependent on proximity to public sector sites. This is a state aid issue. DCMS does not have a state aid clearance for its LFFN and RGC programmes and hence can only fund connectivity to internal public sector sites which is a 'no aid' measure
- USO schemes will provide funding for in-fill are not timely for this programme with potentially years before services and delivery options are determined
- The number of premises in the region to be addressed following the impact of these schemes estimated at <5000 premises
- SBCD implements its own procurement programme to address this gap. The procurement would be similar in scope to Superfast Cymru 2. However, SBCD MUST be clearly able to define local priorities, evaluation criteria and targets and not be dependent on those of the Welsh Government

Costs:

Superfast Cymru 2 is likely to primarily address the 'low hanging fruit' i.e. those sites that are cheapest and easiest to serve in urban centres. The outlying 20,500 sites are estimated to have a typical cost per site of £4500. This would result in a funding requirement of £92m.

However other national funding interventions are coming on stream over the next 2 years and SBCD will need to address what these measures will not fund rather than the total requirement.

In particular

- Number of USO sites in region is currently 11k. Hence there is the potential for central govt USO funding of approx. £37m in the region.
- DCMS Rural Gigabit Connectivity funding, this programme is limited to £200m per year nationally, so a reasonable assumption is that the region receives a further £10m

Provided DCMS and Welsh Govt initiatives and USO funds are delivered, SBCD will require a focused and relatively modest intervention to complement these other initiatives - £20m based on 4500 premises at £4,500 per premise.

In addition, there will be one off costs for the conduct of the procurement. This will be approx. 250k over a nine month to a year period

Benefits:

Economic benefit impact analysis undertaken as part of the audit of rural broadband programmes range from;

- The DCMS UK Economic Impact Study concludes that every £1 invested in broadband delivered £20 in benefit over a 15-year period.
- A similar analysis of the benefit of Superfast Cymru presented a cost benefit ratio of 6 to 1

Within the assessments, economic impacts identified include local enterprise employment, teleworker productivity, productivity growth, labour force participation and network construction.

In addition, a range of social benefits also accrue including; reduced travel time, access to education, improved health, consumer access to e-commerce, enhance employment opportunities, rural community resilience and environmental benefits (e.g. reduced emissions).

This USO economic impact analysis discounts benefits due to the nature of the programme under a range of speeds and subsidy scenarios. However, all options deliver a positive outcome and value for money (over 15 years) with a Benefit Cost Ratio of between 3.4 to 3.6

Hence an intervention of £15m by SBCD is likely to deliver positive benefits of approx. £50m to the region

The other key benefits of such an approach are;

- speed of delivery
- reduced dependency on national programmes
- more control over national programmes
- improved local focus and prioritisation

Issues/Risks:

There are two major issues/risks

- ensuring any SBCD led procurement is complementary to, and not competitive with, other national and regional programmes and there is no overlap or duplication of finance or effort. This will require co-ordination with the UK and Welsh Government
- State Aid: The telecommunications market is highly regulated with strict state aid regulations. SBCD could not undertake its own procurement without state aid clearance as it will effectively be funding services in the same intervention area as national programmes. The ability to get a state aid clearance is time consuming (typically 18 months) and resource intensive. Telecoms state aid is also administered and controlled at an EU level and it remains how this will be resolved moving forward given Brexit

An alternative way to mitigate against these risks is to utilise any state aid clearances and procurement resources of the Welsh and UK Governments. Consideration is being given to the establishment of a Welsh Dynamic Purchasing System that would enable Welsh regions to procure enhanced broadband coverage. This is still to be defined and much will depend how it will operate. SBCD will not wish to simply ‘top up’ a national scheme. However, there may be

benefits to using the national procurement resources if SBCD is able to shape its own targeted requirements

Option 5: Do Something: SBCD Community Programmes

Description and Rationale:

A number of communities have collaborated to define and procure their own telecoms infrastructure or establish themselves as a micro service provider in their community. Such activity has been supported by public funding schemes (e.g. Community Broadband Scotland). The Welsh Government is also defining a Communities Initiative. In addition, support and guidance can be provided in areas such as procurement, legal support and state aid.

Costs:

Typically grants are made available to a community. These may range from small grants community size but across other parts of the country typical community grants were low hundreds of thousands pound per community with some rare larger exceptions. The Scottish Government spent £6.4m supporting 64 communities but in practise only 13 of these are fully operational. The scheme has now ceased

A modest fund in the region of £1m could be allocated to an SBCD community programme but MUST be complemented by technical, procurement and legal support to be effective. The support function should be limited to a team whose cost is capped at 20% of the fund.

Benefits:

The benefits are focused on speed to service provision for the most rural communities that are often neglected by the roll out plan of the commercial operators and, indeed, national procurement programmes.

Issues/Risks:

All cite challenges;

- There are limited (if any) communities in the region prepared for such a scheme
- State Aid rules apply to all projects irrespective of grant amount (even de-minimis) and state aid schemes are not suited to small community projects
- Empowering communities should not imply communities leading procurements. It is challenging to expect communities to be responsibility for public sector procurement rules and SBCD support will be required here.
- Projects need to happen alongside a national and regional programme. Agreeing scope with national projects can be complex and sensitive: who (and when) agrees a de-scoping of an area from the national programme for local investment?
- What is the appetite of local communities for bespoke projects involving potentially small ISPs (no choice of national providers)?
- Engaging with communities is essential to identify projects suitable for the fund, but engagement with the market to understand appetite in delivering to small communities is critical

- There is a high failure rate with such schemes due to administrative complexity, low supplier appetite, a lack of resources and skills and the challenges of on-going operation and management.
- Importance of management of communication and expectations with communities (timescales, funding, solutions, ISP choice …)

2.3.2 Connected Places Programme

In addition to the rural sites there is a requirement for new duct and fibre infrastructure to be built in key development corridors and zones to underpin the innovative projects outlined in the Strategic Case.

Long List Options

Option 1: Do Nothing
Description and Rationale: • No actions or funding provided by SBCD. Market left to deploy infrastructure against their own investment criteria. • No co-ordination or aggregation of purchasing power of public sector in the region to stimulate additional investment
Costs: **£0**
Benefits: **£0**
Issues/Risks: • There is a risk that there will be a concentration of investment into the key urban centres of the region only. e.g. BT has announced investment programmes into central Swansea postcodes along with Carmarthen and Cross Hands. Other towns and suburban areas may not see investment in the foreseeable future. The impact would be negative, with limited or no inward investment and digital transformation, including digital led innovation. It would inevitable reinforce the drift of employment towards the Urban areas, particularly Swansea or outside the region. • There will be a lack of competition and choice in the region that will impact service availability and pricing • Social loss – very limited improvement to households with access to healthcare, education, access to social care and public services, • Economic loss – productivity, inability to telework, reduced employment opportunities, • Reduced ability to attract digital intensive sectors into region (e.g. media, finance)

Option 2: Do Minimum: Supply Side Engagement

Description and Rationale:

SBCD to proactively engage with market. Activities to include:

- Briefing industry on regional plans and requirements
- Co-ordinate public sector procurement activities
- Lobby for inward investment
- Promotion of region as test bed for new technologies and services
- Arranging site visits, events etc
- Providing single interface between industry and the regional public sector bodies and a point of contact for issues such as planning, way leaves etc
- Co-ordination of programmes with UK Govt and Welsh Government

Such activity has proven a key catalyst for inward investment elsewhere in the country and there have been examples of plans changed by operators such as City Fibre and Virgin Media. Suppliers are faced with multiple opportunities and are often responsive in their planning.

Stakeholders within the SBCD region have been following this policy for a number of years but the impact has been constrained by the challenges and cost of deploying infrastructure in a large diverse region. In addition, the level of competition in the region is low compared with other parts of the UK which has resulted in a limited incentive for investment by incumbent infrastructure providers.

Costs:

£ 100k - £150k per annum

Benefits:

Easier to target support and to coordinate other funding channels to benefit the region and SBCD. Increased investment by operators over and above 'Do Nothing'. Harmonisation with other initiatives such as Welsh Mobile Action Plan and delivering on its recommendations.

To be monitored against clearly defined targets for inward investment and service provision. An indicative target could be to attract an additional £5m of inward investment stimulated over the five-year programme plus successfully obtained £10m of public grant funding.

It should be noted that projected digital infrastructure grant funding streams from central Govt are planned to be in the order of £200m per annum across the UK with perhaps £10-£20m likely to come to Wales.

Issues/Risks:

- Limited financial exposure to SBCD
- Time to implementation reducing potential impact achieved
- Regional priorities may be ignored
- Competition for investment from other parts of UK

- Supplier appetite for regional investment may be limited and, if so, Option 2 will not deliver the required infrastructure and resulting economic benefits to the Connected Cities in the region.

Option 3: Do Something: Asset Investment Programme

Description and Rationale:

- SBCD authorities to invest in duct infrastructure or encourage third parties to do so. Duct infrastructure to be built in key transport corridors and economic development areas
- Local policies and initiatives put in place to encourage duct build whenever regional building or transport infrastructure is being deployed
- Potential to allow third party telecommunications operators to deploy fibre in ducting to reduce deployment costs

Costs:

- Estimated duct costs of £50-£100per metre dependent on terrain. May be reduced if sharing dig costs with other infrastructure.
- Estimated duct mileage required across key identified development zones is approx. 150-200 km, giving an indicative investment range of approx. £10m

Benefits:

- Reduced cost of investment for fibre service providers seeking to invest into region
- A return on the investment can be gained over a 15-year timeline from access charges.
- Stimulate inward investment and deployment by commercial operators
- As there is no guarantee of investment by operators in laying and operating new fibre in the ducts, the economic impact is not certain. If routes are carefully chosen and the roll out is staged by only preceding with phases when some commitment is given by the private sector, then a multiplier of 6 to 1 would be appropriate leading to the investment of £10m returning of the order of £60m

Issues/Risks:

- Ducting will have to be offered to the market in compliance with state aid regulations. Will require state aid assessment and benchmarked pricing
- SBCD authorities responsible for ownership and operational maintenance and operation of ducting
- May be limited appetite by industry to use the ducting outside of key commercial areas
- Ducting will have to be built to a standard acceptable to the industry for use, (Carrier Grade)
- The procurement, planning and build of infrastructure is likely to be take a minimum of 2-3 years to deliver
- If SBCD authorities are to facilitate commercial usage of the ducting a state aid opinion will need to be sought (see commercial case).

Option 4: Do Something: SBCD procurement

Description and Rationale

- SBCD authorities to procure either a managed service and/or fibre infrastructure to all public sites across the defined development zones. (Note public sector sites only chosen to comply with state aid regulations). Service definition may be a blend across the region based on local requirements and commercial appetite to deliver services.
- Anchor investment by the public sector will seek to stimulate additional private sector investment by commercial sector in area
- Procurement to deliver full fibre connectivity across Milford Haven/Pembroke Dock, Llanelli, Haverfordwest, Fishguard, Swansea city area and key development areas in Neath/Port Talbot.

Costs:

- Estimated capital investment of £20m across region
- Note this estimate in an upper ceiling based on building new duct and fibre to an indicative footprint on public sector sites in the region as developed for the regions LFFN bid. It is an upper limited on costs for Options 3 and 4 combined (e.g. if the region had investment £10m of ducting in Option 3 and facilitated commercial use of the ducting the resulting costs of commercial investment would be reduced. In contrast if no public ducting was available the commercial sector would need to invest £20m.

Benefits:

Stimulate inward investment by commercial telecoms sector into region. Experience has shown that commercial investment in a City region typically has a leverage of 6:1. Hence a £20m investment into such infrastructure could deliver a further an additional £120m of private sector investment

Enhanced service choice in the region

An analysis of direct economic benefits to only the Swansea City area of such investment is estimated at £133m over 15 years, broken down as follows; (source Regeneris)

- network build £25m
- productivity improvements in local businesses £11m
- innovation £10m
- business start-ups £12m
- worker flexibility £14m
- housing wealth £61m.

In addition, Regeneris also modelled other indirect benefits not included in the £133m

- enhanced ability to deliver 5G £240m
- smart city £44m

- industry 4.0/IoT £92m

If such a network was deployed beyond the City of Swansea to include Neath Port Talbot Llanelli, Pembroke and Milford Haven the estimated economic impact over 15 years would be approx. £200m.

Issues/Risks:

- SBCD will need to undertake the procurement. Cost approx. £250k over a 9-month timeframe
- Funding would need to be filled by a blend of public sector and commercial contributions (NOTE in other areas of the UK some authorities have capitalised future telecoms revenue expenditure as a contribution to projects of this nature)
- The PSBA will need to deliver its services over any new infrastructure built/deployed in the region. This will need co-ordination and possible investment in new equipment and service provision
- The question remains, will there be industry appetite to invest across the regions priority zones or only in Swansea City
- The procurement can only address connectivity to public sector sites to avoid the risk of state aid challenge.

2.3.3 Next Generation Wireless Programme

The options range across mobile connectivity and are related to coverage and capacity for 4G and 5G networks, also IoT networks which may or may not be specific to IoT services, as outlined in the Strategic Case.

Long List Options

Option 1: Do Nothing
Description and Rationale: No actions or funding provided by SBCD. Market left to deploy infrastructure against their own investment criteria
Costs: **£0**
Benefits: **£0**
Issues/Risks: • 4G coverage is in this case likely to improve slowly and mainly be based upon actions by the MNOs related to SRN[35]. 5G will not progress deployment beyond Swansea City Centre until after 2021 and would only reach all regional Urban areas by 2023 at the earliest. Targeted deployments to support areas of concentrations of digital sector businesses unlikely before 2023. • Gaps will remain across the region, in particular the variation in coverage between the mobile operators will continue to mean that the selection of a mobile service provider further reduces the coverage perceived. • Limited commercial support from MNOs for the deployment of advanced mobile services in the region, so reducing the opportunities for innovation and digital transformation • This has been the situation in the region for the last fifteen years, which has resulted in the region being behind on 3G and 4G coverage when compared to the rest of the UK. In economic impact terms, there is general consensus that the absence of 4G services has a detrimental impact to consumers and businesses in terms of productivity and to jobs. However, the range of figures applied to these measures is wide and focussed on the applications 4G enables rather than the technology itself. • Economic loss – Direct negative impact on productivity, GVA and consumer adoption of digital services. Reduced ability to attract digital intensive sectors into region (e.g. media, finance). Delay or frustrate the adoption of 5G enabled use cases across multiple sectors. • Environmental – reduction in carbon footprint, but likely over a long period of time

[35] Timeframes for SRN are still unclear and any impact can be expected to be at three years away, 2023/4

Option 2: Do Minimum: Supply Side Engagement

Description and Rationale:

SBCD to liaise with mobile industry to;

- Briefing industry on regional plans and requirements
- Lobby for inward investment
- Promotion of region as test bed for new technologies and services
- Arranging site visits, events etc
- Providing single interface between industry and the regional public sector bodies and a point of contact for issues such as planning, base-stations location, asset location, etc
- Co-ordination of programmes with UK Govt and Welsh Government

Such activities have not yet been executed fully in the UK, although digital leads for fixed infrastructure do cover mobile as well. Suppliers are faced with multiple opportunities and are often responsive in their planning if they can simply;

- **access the processes needed for deployment of infrastructure,**
- **more fully understand the market they are addressing and**
- **have a good understanding of the initiatives and plans of the public sector that affect the market and density of consumers.**

Costs:

£100k - £150k per annum, with a cap of a five-year programme reaching £500k to £750k

Benefits:

- Easier to target support and to coordinate other funding channels to benefit the region and SBCD. Increased 4G investment by operators over and above 'Do Nothing'. Harmonisation with other initiatives such as SRN and maximising the benefits they can deliver to SBCD. To be monitored against clearly defined targets for inward investment and service provision.
- Additional £3-5m of inward investment stimulated over 3 years.

Issues/Risks:

- Limited financial exposure for SBCD
- Time to deployment for 4G may be 3 years as Wales is not high priority under SRN, reducing potential impact achieved
- Regional priorities for 5G will have to be limited to dense urban locations
- Service take-up for 5G may not be extensive due to device costs
- Innovation in usage not addressed fully
- As there is little certainty around the impact of undertaking this option, the issues and risks around 'Do Nothing' also apply. The level to which they can be truly mitigated through supply side engagement is uncertain and there is little evidence from other areas of the UK where this approach has made a material difference

Option 3: Do Something: Undertake Future Telecom Infrastructure Review guidance in full & Driving SRN

Description and Rationale:

The thrust of the Telecoms Review and the SRN is to make it easier and cheaper for mobile operators to expand 4G coverage and introduce new services such as 5G and IoT. Fundamentally, this requires SBCD, along with support from local authorities in allowing their asset usage and in addition streamlining the planning and licensing processes. A higher degree of responsibility and autonomy would be required over Option 2, Supply Side Market Engagement. Responsibilities would include:

- Building a small central team to organise and support Local Authorities to deliver streamlined access and services to support mobile operators in building more coverage and services in 4G, 5G and IoT. In effect following the guidance provided for lowering the cost to MNOs of building infrastructure and shortening the time this takes
- Briefing industry on regional plans and requirements
- Lobby for inward investment
- Lobby Ofcom and DCMS to support a more targeted approach to regulation in Wales, to assist with the specific issues around lack of investment in mobile services and coverage
- Promotion of the region as a strong market for new technologies and services
- Innovation stimulation through knowledge transfer events and information promotion
- Joint business and industry events with connectivity service providers to promote innovation and identify key development areas in which deploying 4G and 5G can stimulate growth and inward investment
- Providing a highly effective and efficient single interface between mobile operators, industry and the regional public sector bodies to enable all aspects of deployment support
- Co-ordination of programmes with UK Govt and Welsh Government

Such a role has not yet been executed fully in the UK, although digital leads for fixed infrastructure do cover mobile as well. Suppliers are faced with multiple opportunities and are often responsive in their planning if they can more fully understand the market they are addressing and have a good understanding of the initiative and plans of the public sector.

Costs:

£250k - £500k per annum, with a cap of a five-year programme reaching £1.25m to £2.5m

Benefits:

Strong focus and leadership to target supportive interventions and to coordinate other funding channels such as DCSM, to benefit the region and SBCD.

Materially increased investment by operators over and above ‘Do Nothing’ through supporting actions.

Lowering the threshold for mobile operator's investment decisions through lowering the cost of deployment and doing business in the region. In addition, leveraging the market information held by the authorities on business locations, sectors and numbers to provide better revenue forecasts for the mobile operators.

Working closely with mobile operators would enhance their knowledge of the region and improve the identification of skills needed and the promotion of providing those skills from local resources. Mobile operators through a knowledge transfer programme would be made aware of other inward investment activities and jobs creation to inform their opportunity to enhance services and coverage to seize market share as early as possible.

Promoting the ideas of infrastructure sharing, including access to fibre connectivity for backhaul services.

Harmonisation with other initiatives such as SRN and delivering on its recommendations. To be monitored against clearly defined targets for inward investment and service provision, notably 4G and 5G coverage in key corridors, capacity and data rates comparable with elsewhere in the UK. Increasing the effective choice of mobile service providers, notably in rural areas by having competing deployments.

Additional £7m of inward investment stimulated after 3 years.

Issues/Risks:

- Limited financial exposure for SBCD
- Participation of all four local authorities necessary and a significant uplift in local skills and expertise
- Local Authority willingness to cede some responsibility and delivery to SBCD to support mobile operator's deployment of networks, including information and access to infrastructure assets
- Local Authorities undertaking this type of action individually[36] would miss significant efficiency gains by having a single central team and likely mean that skills overall would be lower
- Single point through which to do business not consistent, caused by variability in local authority engagement
- **Telecoms operators** fail to engage because there is no material improvement in their prioritisation and future planning for investment in the region due to a perceived weak uptake of 5G services

[36] The FTIR document set seems to anticipate that Local Authorities would act individually. This would be very inefficient for the region.

Option 4: Do Something: Funded Intervention to extend 4G coverage

Description and Rationale:

Work in conjunction with the mobile operators to gap-fund mobile services in areas with poor indoor and outdoor coverage. Maximise the regional benefits from the SRN by fully engaging with DCMS and Welsh Governments on the process and how SBCD can be prioritised for additional 4G coverage. Organising and supporting Local Authorities to deliver streamlined access and their planning services etc. to support mobile operators in building more coverage and services in 4G & 5G, including the public sector providing intervention funding for radio access infrastructure (towers, roof-top sites and ducting) and offering these to operators under a site sharing regime to simplify and reduce the operators cost base. This would also include:

- Providing single business interface between Telco industry and the regional public sector bodies and a central resolution point for issues such as planning, wayleaves etc. Duplication of Option 3
- Co-ordination of intervention programmes with UK Govt and Welsh Government
- Providing Capex and Opex funding to support loss making 4G sites in terms of their usage and data throughput. This could include;
    - Upgrading all 3G sites to 4G equipment, accelerating deployment
    - Building new passive infrastructure sites, (towers, mono-poles and roof-top sites)
    - Deployment of 4G/5G active equipment to new sites
    - Building new duct work to support fibre backhaul links to sites

Costs:

Costs: £250k - £500k per annum, with a cap of a five-year programme of £1.25, to £2.5m.

Capex for infrastructure costs would range between £30k and £150k per site and be additional, assume 100-300 macro sites with a 40/60 risk share and half of these sites falling within SRN = 150 sites at average £60k = £9m.

Benefits:

- Increased investment by operators by lowering their threshold in terms of direct costs and the cost of doing business in the region for Mobile operators.
- Harmonisation with other initiatives such as SRN and delivering on its recommendations.
- To be monitored against clearly defined targets for inward investment and service provision, reflected in coverage improvement across multiple mobile operators and service enhancements to 4G & 5G.
- This should be delivered over a 3-year window and thereby quickly reduce the timescales in which parts of the region are likely to remain a poor or not spot.
- Additional £30m of inward investment stimulated after 5 years.

Issues/Risks:

- Currently the Mobile Action Zone consultation documents indicate that there is a need to build a large number of sites. This is based on latent demand, NOT areas with poor coverage, SRN would be targeted at a large number of sites, but this is unquantified at this time[37].
- Funding would need to be flexible, as any infrastructure to be built by the public sector would need to have a fixed tenancy agreement from one or more mobile operators, take up is therefore uncertain.
- Any infrastructure asset constructed by the public sector would need to be 'Open Access' and would represent an asset that would be expected to make a return. If sites where rented to mobile operators at a market rate (which may be a requirement under state aid) then the real savings to mobile operators would represent a cash-flow impact, not a true cost reduction.
- Agreement on where to build new infrastructure assets may be difficult to achieve, Operators would in all cases seek to maximise a return on their investment, resulting in current not-spots remaining so, unless SRN or individual investment cases for the operators demonstrate viability
- The Emergency Services Network already has a programme of extending 4G coverage and supporting the building of infrastructure in terms of Macro base station sites. There is an opportunity to work closely with this programme to encourage a wider extension to the coverage provided.
- Active equipment within the network being funded is an asset that could achieve a return through customer usage increasing.
- Investment in active equipment would need to carefully be considered as it could breech state aid rules and benefit a single supplier. Making active equipment 'Open Access' is highly problematic in terms of the current business model operated by mobile operators.

[37] https://www.ofcom.org.uk/__data/assets/pdf_file/0031/192919/notice-of-compliance-verification-methodology.pdf

Option 5: Do Something: Support for Specific 5G/IoT Projects

Description and Rationale:

Work in conjunction with the mobile operators to operate a risk-based gap-funded mobile services in areas where there is a good use case to demonstrate the commercial and innovation impact of 5G/IoT. This option should be undertaken in conjunction with Option 3. Gap funding would be on the basis of joint investment in infrastructure and active network equipment and involve either a competitive process or partnership with a mobile operator on a case by case basis.

Purely as an example of projects, both core SBCD projects and others that should be considered are shown in the following table as 5G opportunities:

Project	Example Use Cases	5G	IoT	FttP	4G Adv
Waterfront Digital District	Media & Content production Cloud services	✓	✗	✓	✗
Pembroke Dock Marine	5G IoT Sensor Array - Manufacturing IoT Sensor Array - Energy Mgt	✓	✓	✓	✓
Life Science and Well-being Campus	Asset Tracking Health IoT Health Ultra-Fast Broadband	✓	✗	✗	✗
Life Science and Well-being Village	Wearables Smart Home Location tracking Analytics Tele-Support	✓	✓	✓	✗
Centre in Next Generation Services	Cloud and SaaS 5G Use Case Development IoT Use Case Development	✓	✓	✓	✗
Creative Digital Cluster	Media and content Cloud services	✓	✗	✓	✗
Rural 5G Fixed Wireless Access delivering 'Wireless Fibre' Services	Teleworking Digital Health	✓	✗	✓	✗
Bay Studios	Media & Content Non-Specific Fast Connectivity	✓	✗	✓	✗

It should be very much kept in mind that this is an example list and others can and will be added. However, it is a reasonable place to start. It should also be kept in mind that 5G is one enabling digital service, in almost every case Gbs fibre connectivity and IoT services will co-exist and will leverage each-others performance in digital transformation. All of the networks deployed will also be open for other use cases to exploit, they are in no way dedicated to a single project function or service delivery, they remain public-open networks exactly as current 4G networks.

There are also a number of projects that can be IoT led;

Rural Working TechHub - PoC Made as additional to 5G FWA above	Teleworking Digital Sector SME Innovation Digital Sector SME Growth				
Internet of Energy	Smart Grid Smart Home				
Homes as Power Stations	Smart Grid Smart Home				
Factory of the Future	IoT Sensor Array - Specific Control - Specific Data exchange - Real Time				

Costs:

Gap funding of between £300k and £500k per project depending on the technology being deployed and assuming match funding from industry for each location. Assuming five core SBCD projects, plus a further ten proof of concepts, a total investment of £7.5m.

Benefits:

Enable supported projects to fully reach their potential while acting as Proof of Concept for 5G and IoT. Accelerating the deployment of 5G and IoT will have a positive impact on inward investment and the growth of digital clusters where it is present. Focus initially on the core SBCD projects to ensure they reach their maximum potential in terms of technology enablement, plus a further ten projects of mixed 5G and IoT within key zones of; manufacturing, transport, energy and health. Assuming match funding, industry would invest £7m. Further potential gains are challenging to define without the inputs of the individual projects.

Issues/Risks:

Each project supported would have its own set of risks and issues that are not dependent on the provision of next generation wireless connectivity. In effect if any project does not have a positive business case for the services it will deliver, the deployment of 5G or IoT services is unlikely to change the position to a positive business case, in which case the digital infrastructure would not be supported and deployed.

Limited financial exposure for SBCD as only deployed against a separate business case

2.4 Economic Appraisal

2.4.1 Summary of long list

A summary of the long list options, possible targets and success measures, costs and economic benefits[38] is presented in the following tables:

Rural	Targets/ Measures	Costs over 5 years (2020-25)	Estimated Economic Impact 15y	Key qualitative impacts and benefits
1. Do nothing	-	-	-	
2: Do Minimum ***Supply Side Engagement***	• Increase commercial inward investment by £5m over 5y Obtain £5-10m from funding applications	£0.5m	£15m	• Productivity enhanced • Aids start ups • Teleworking • Household benefits • Sustains communities • Delivers public services • Environmental
3: Do Something ***Demand stimulation programme***	• Additional 5% uptake in NGA services over 5-year period i.e. approx. 17,000 premises in the region	£5m	>£15 - 20m	• Productivity enhanced • Aids start ups • Teleworking • Household benefits • Sustains communities • Delivers public services • Environmental benefits
4: Do Something ***SBCD Procurement***	• 100% premises connected • 4,500 outlying premises	- £20m	- >£70m	• Productivity enhanced • Aids start ups • Teleworking • Household benefits • Sustains communities • Facilitates mobile deployment • Delivers public services • Environmental benefits
5: Do Something ***Community Programmes***	• 10 rural community schemes	<£1m	<£3m	• Household benefits • Sustains communities • Delivers public services

Table 27 - Rural Economic Summary

[38] See Annex 4 for economic analysis and impact multipliers

Connected Places	Targets/ measures	Costs over 5 years (2020-2025)	Estimated Economic Impact 15y	Key qualitative impacts and benefits
1. Do Nothing	-	-	-	-
2. Do Minimum ***Supply Side Engagement***	• Increase commercial inward investment by £10m over 5 years • Obtain £5-10m from funding applications	£0.75m	£20m	• Productivity enhanced • Aids start ups • Stimulates network build and inward investment • Teleworking • Household benefits • Sustains communities • Facilitates mobile deployment • Industrial benefits • Delivers public services
3. Do Something ***SBCD Asset Investment***	• Build and upgrade 150-200km of duct infrastructure	£10m (see note below)	£60m	• Productivity enhanced • Aids start ups • Stimulates network build and inward investment • Teleworking • Household benefits • Sustains communities • Facilitates mobile deployment • Industrial benefits • Delivers public services
4: Do Something ***SBCD procurement***	• Minimum of 281 public sector sites connected • 184km of ducts and fibre infrastructure deployed	£20m (see note below)	>200m (£133m in Swansea City alone)	• Productivity enhanced • Aids start ups • Stimulates network build and inward investment • Teleworking • Household benefits • Sustains communities • Facilitates mobile deployment • Industrial benefits • Delivers public services

Table 28 - Connected Places Summary

NOTE; The blend of public sector owned ducts and commercial owned duct investment will be determined in procurement. In option 4 in the table above we estimated the total blended costs of these two options is £20m i.e. if a procurement takes place it will include costs of options 3.

Next Generation Wireless	Targets/ measures	Costs over 5 years (2020-25)	Estimated Economic Impact 15y	Key qualitative impacts and benefits
1. Do Nothing	-	-	-	
2. Do Minimum: **Supply side market engagement**	• Increase commercial inward investment by £3m over 3 years	£0.75m	£3m	• Stimulates network build and inward investment
3. Do Something: **Undertake Future Telecom Infrastructure Review guidance in full & Driving SRN**	• Increase commercial inward investment by £7m over 3 years	£2.0m	£7m	• Stimulates network build and inward investment • Teleworking • Household benefits • Sustains communities • Facilitates mobile deployment
4. Do Something **Funded Intervention to extend 4G coverage to at least parity with other parts of**	• Increased investment by operators to improve coverage, £10m - £30m	£9m	£10m - £30m	• Productivity enhanced • Stimulates network build and inward investment • Teleworking • Sustains communities • Facilitates mobile deployment
5. Do Something **Funded intervention to deliver 5G and IoT connectivity in selected locations**	• Accelerated deployment by operators of 5G and IoT services over the first 5 years	£7.5m	£13.5m	• Productivity enhanced • Aids start ups • Stimulates network build and inward investment • Teleworking • Household benefits • Sustains communities • Facilitates mobile deployment • Industrial benefits •

Table 29 – Next Generation Wireless Summary

It should be noted that many of these options are complementary and should be undertaken as part of a package of interventions for each of the three target market segments.

In addition, options should not be evaluated on total economic impact alone as each option will have different economic and social implications and risks.

In all cases there are significant benefits that are non-quantifiable. The challenge is that all options offer these benefits, other than the do-nothing option. The measure is to what degree the benefits can be achieved rather than there being a fixed differential of the different benefits available. The identification of non-quantifiable benefits is a well-trodden path when considering digital connectivity and services and includes;

- Avoiding isolation and loneliness
- Social inclusion
- Digital inclusion
- Empowering communities
- Access to information sources for social benefits
- Access to a wider market of suppliers and money saving
- Time savings in accessing goods and services
- Entertainment access
- Educational resource access
- Health resource access

2.4.2 Long list to short list criteria assessment

In order to derive a preferred short list of options, each of the long list options has been assessed against the critical success factors for the programme as summarised in Table 18 above.

The table presents each long list option against each of these success factors and colour codes accordingly with green strongly achieving the criteria through to red where there is limited benefit.

Rural Options	Aligned to Strategy	Economic Impact	Achievability	Affordability	Attraction to Supply Chain	Programme Compatibility	Risk	Rank
1.Do Nothing	Poor	Poor	Poor	Good	Poor	Good	Poor	5th
2. Supply Side Engagement	Good	Medium	Good	Good	Medium	Good	Good	2nd
3. Demand Stimulation	Good	Good	Good	Good	Good	Good	Good	1st
4. SBCD Procurement	Good	Good	Medium	Medium	Medium	Medium	Medium	3rd
5. Community Programmes	Good	Poor	Poor	Medium	Poor	Medium	Poor	4th

Connected Places	Aligned to Strategy	Economic Impact	Achievability	Affordability	Attraction to Supply Chain	Programme Compatibility	Risk	Rank
1. Do Nothing	Poor	Poor	Poor	Good	Poor	Good	Poor	4th
2. Supply Side Engagement	Good	Medium	Good	Good	Good	Good	Good	1st
3. SBCD Asset Investment	Good	Good	Good	Good	Medium	Good	Medium	2nd
4. SBCD Procurement	Good	Good	Medium	Good	Medium	Good	Medium	2nd

Next Generation Wireless	Aligned to Strategy	Economic Impact	Achievability	Affordability	Attraction to Supply Chain	Programme Compatibility	Risk	Rank
1. Do Nothing	Poor	Poor	Poor	Poor	Poor	Good	Poor	5th
2. Supply Side Engagement	Good	Poor	Good	Good	Good	Good	Good	1st
3. Udertake 'Future Telecom Infrastructure Review guidance	Good	Medium	Good	Good	Good	Medium	Good	2nd
4. Funded Extension of 4G Coverage	Good	Medium	Medium	Poor	Medium	Medium	Medium	4th
5. Funded Intervention for 5G and IoT deployment	Good	Poor	Good	Good	Good	Good	Medium	3rd

Table 30 - Success Factor Map[39]

[39] See Annex 5 for analysis framework

In order to derive these scores an economic case workshop was held attended by the digital leads from each of the authorities. The scores were discussed, captured and circulated for comment. The analysis in Table 24 presents the consolidated view.

There are a number of key external risks and challenges that could potentially impact the delivery of the proposed SBCD Digital Infrastructure project, these are:

- **State Aid:** It will be time consuming and costly for SBCD to undertake its own state aid application – typically 2 years and several man years of resources. In addition, the process remains uncertain given Brexit. If SBCD wishes to minimise risk in this field, it should:
  - Prioritise demand side measures (e.g. vouchers, demand stimulation) which do not attract state aid issues
  - Undertake rural in-fill procurements working in conjunction with national or regional programmes that have or are obtaining state aid clearance (e.g. Welsh Govt or DCMS Rural Gigabit Connectivity). This also applies to Community led schemes. However, SBCD should retain local control and direction of any intervention
- **Supplier appetite:** Industry is constrained in its capacity and the SBCD is competing with similar measures across the country, including in Wales. The key risks are:
  - Community schemes may attract smaller specialist operators, but there is a risk they do not attract sufficient industry appetite
  - Connected City/ Economic development full fibre projects may be viewed as less attractive outside central urban areas such as Swansea. In this case a blend of Full fibre procurement and public asset investment may be more appropriate
  - 5G Use Case projects are likely to overlap with those being undertaken within the UK and particularly across Wales. It will be necessary to harmonise efforts within Wales to maximise the opportunities of 5G and to benefit from the outcomes of other's Use Cases, particularly where this involves commercial models of intervention
- **UK and Welsh Government Programmes:** Such programmes will part fund and address the challenges the region faces. The key challenges are;
  - Funding and programmes do not materialise in a timely manner
  - Such funding does not fairly reflect the needs of the SBCD region
  - SBCD funding is used in-lieu of funding when other sources are available.
- **Ability to recruit and attract resources** to lead the digital programme and undertake all procurement, stimulation and co-ordination activities. Failure to have such resources would lead to a failure to deliver economic benefits
- **Stakeholder co-ordination** between authorities and other key stakeholders such as Welsh Govt and PSBA could result in delay and increased costs
- Under any heading, **Do-nothing will be in breach of UK and Welsh policy** objectives and commitments at the local authority level, but not SBCD level

These risks will be captured, monitored and reported. A summary of the risks under each of the intervention areas has been described in sections 1.3.6 (Connected Places), 1.4.6 (Rural) and 1.5.6 (Next Generation Wireless)

De-Selected Options

- Do-Nothing is negative in all cases and is therefore not considered further

Rural

- Option 5 is negative on nearly all measures and is therefore rejected

Next Generation Wireless

- Option 2 offers very limited economic impact and is therefore rejected
- Option 4 offers a neutral position and will be provided through SRN

2.4.3 The Preferred Option(s)

Given the above analysis a recommended strategy will consist of the following blend of activities

Rural

- Option 2: Supply side engagement
- Option 3: Demand stimulation programme
- Option 4: SCCD led in-fill procurement BUT only if;
  - State aid compliant
  - Utilising national state aid and procurement programmes but under SBCD financial and operational control

Connected Places/Economic Development

- Blend of Options 3- an investment in public sector owned duct infrastructure and 4, a procurement of commercial owned full fibre infrastructure should be undertaken. The blend of these two options will depend on supplier appetite to be defined in market testing with a total budget of ceiling of £20m

Next Generation Wireless

- Option 3, namely compliance with the guidance provided in the Future Telecoms Review should be executed under a central SBCD mandate and management, but would require the agreement and cooperation of all member authorities. In addition, the provisions of SRN should be a key focus with the aim of ensuring Wales receives the right level of additional coverage and that it is first in the queue for action with at least two mobile operators
- Option 5, selected funded interventions to deliver 5G and IoT connectivity in key locations should be executed under a central SBCD mandate and management

2.4.4 Sensitivity Analysis

Rural

The following sensitivity analysis has been considered

Demand stimulation activities deliver a lower take up of next generation services

In this analysis an industry standard benchmark has been used, demand stimulation delivers a 5% uptake in next generation services over 5 years equating to approximately 17,000 properties delivering an economic benefit of >£100m over 15 years. Hence a failure to deliver each 1% rise in take up results in a reduction in connectivity of 3400 premises and >£20 of economic benefit.

Lack of state aid compatible procurement channels restricts ability of SBCD to undertake in-fill procurement

This would result in an estimated 3-5000 outlying premises being without access to broadband services and an economic loss of approx. £50m over 15 years as well as social and environmental consequences. This cannot be replaced by demand stimulation activities.

Connected Places

The following sensitivity analysis has been considered

Industry unwilling to utilise public sector assets

If there is an unwillingness of industry to use public sector duct assets as a result of commercial or state aid concerns there will be an estimated economic loss of £60m to the region, notably in the development zones outside of central Swansea (e.g. Milford Haven/Pembroke Dock)

Industry only wishing to respond to procurement addressing central Swansea rather than region as a whole

A detailed cost model has been produced showing the costs of required infrastructure investment in each of the connected cities/ development zones areas. This is presented below:

	Length of network	Cost (£)
Carmarthenshire	63.2Km	£5.7m
Neath Port Talbot	42.7Km	£4.1m
Pembrokeshire	17.9Km	£2.1m
Swansea	60.7Km	£5.7m

Table 31 – Fibre Network length & cost

However, it should be noted that Carmarthenshire build is focused on Carmarthen and Cross Hands which are now subject to a BT build programme. This is likely to restrict supplier appetite.

In the event that industry only had the commercial appetite to invest in Swansea the cost would fall to £5.7m, delivering an economic benefit of over £133m over 15 years. This high cost benefit ratio derives from the concentration and density of business in Swansea compared with the other proposed build areas of Pembroke, Milford Haven, Llanelli and Neath/Port Talbot.

Failure of Welsh Govt to deliver trunk road infrastructure

The Welsh Government has developed its own business case for the development of a Trunk Road Network across the SBCD region. This network (if built) would deliver significant economic benefit for the SBCD region as it will enhance inward investment opportunities and facilitate enhanced backhaul for mobile deployment. It would also be complementary to the proposed asset upgrade and full fibre procurement programme.

Next Generation Wireless

The following sensitivity analysis has been considered

Limited industry appetite to deliver 5G and IoT in region

This would result in a loss of investment of between £5-£10m in the region by the operators. It could also impact the deployment by operators of extended 4G and lead to a wireless infrastructure being of lower capacity and speed than that deployed elsewhere in the UK.

SRN allowed to evolve without support or attention from Wales/SBCD region

If SRN is allowed to develop without monitoring or proactively driving an SBCD agenda then it will in every likelihood reach the required Ofcom levels of coverage, but localised issues will be left in the margin. The measure is a percentage for the whole of Wales and there is significant variation in how this might be achieved. This sensitivity is really a lost opportunity

2.4.5 Conclusions

The economic analysis for the digital infrastructure programme scheme has concluded that the most economically viable and beneficial interventions of the three areas of the Digital Infrastructure programme are:

Rural Programme

- A blend of rural options 2 (Supplier engagement) ,3 (Demand stimulation) and 4 (In-fill Procurement) should be undertaken.
- Options 2 and 3 offer a low risk, economic beneficial approach in a deliverable manner.
- In-fill procurement will be dependent on an appropriate procurement channel and state aid but does offer a strong economic impact along with significant qualitative benefits.

Connected Places Programme

- Should be undertaken with a blend of Options 3 (asset investment) and 4 (full fibre procurement) depending on supplier appetite to be defined in market testing.

Next Generation Wireless Programme

- Option 3 should be executed under a central SBCD mandate and management but will require the agreement and cooperation of all member authorities.
- Option 5 should be executed under a central SBCD mandate and management.

A summary of the economic appraisal for each of the three streams within this digital programme is presented in the following table:

	Portfolio	Rural	Connected Places	Next Generation Wireless
A. Economic Impact		£87.5m	£220m	£11.7m
B. Public sector cost (or appropriate value for cost). Note Cost includes total public sector expenditure by SBCD, DCMS and Welsh Government	**Note:** Additional commercial investment in leveraged by public sector investment	£21.5m	£12.5m	£4.5m
C. Appropriate BCR		3.5	11	1.5
D. Significant unmonetizable costs/benefits		• Productivity enhanced • Aids start ups • Teleworking • Household benefits • Sustains communities • Facilitates mobile deployment • Delivers public services • Environmental benefits	• Productivity enhanced • Aids start ups • Stimulates network build and inward investment • Teleworking • Household benefits • Sustains communities • Facilitates mobile deployment • Industrial benefits • Delivers public services	• Stimulates network build and inward investment • Teleworking • Household benefits • Sustains communities • Facilitates mobile deployment • Productivity enhanced • Environmental impacts (e.g. reduced Co2) •
E. Significant unquantifiable factors		• Central and Welsh Govt Funding	• Commercial appetite to invest	• Commercial appetite to invest in region

		policy and subsidies • State Aid • Levels and locations of commercial investment • Ofcom regulatory policy	• Role of PSBA • State Aid	•
F. Risk costs by type and residual optimism bias				
G. Switching values (for the preferred option only)				
H. Time horizon and reason		2021 - 2025	2021- 2023	2021 – 2025

Table 32 - Economic Appraisal Summary

A summary of the proposed expenditure under each of these three streams is presented in the table below. The table splits out to what potentially is provided by SBCD along with commercial investment and assumed central government grant funding. It should be noted that commercial investment is likely to emerge in two waves. An initial direct contribution to the proposed programme plan. Then in addition, there will be secondary pull through investment by the commercial sector as subsequent investment will be made to enhance and expand the digital infrastructure facilitated by SBCD. This has been presented in the table below. The key assumptions are as follows:

- In the rural stream Openreach is likely to make an initial contribution of up to 20% of project costs. A subsequent second wave of commercial investment will arise as unserved premises are connected and SBCD demand stimulation activities increase take up and demand. There are currently 20,500 white premises. If the SBCD and DCMS programmes establish FFIB in most of these locations and there is a 30% adoption rate, we can expect around 7000 new FTTP customers. In addition, demand stimulation programmes will increase demand for Openreach products and services across the region. A 5% increase in adoption would lead to around 15-20k new connections.

- In Connected Places experience in cities such as Aberdeen has shown, a multiplier between public and commercial sector investment of >6:1. Hence based on £12m of SBCD investment, commercial contribution of at least >£70m can be expected.

Stream	Proposed Budget	SBCD	Central Funding	Commercial Contribution to Initial Budget	Additional Commercial Pull Through Investment 15 Years
Rural	£25.5m	£8m	£13.5m	£5.0m	>£48m
Connected Places	£20.0m	£12.5m		£9.5m	> £70m
Next Generation Wireless	£9.5m	£4.5m		£6m	>3m
TOTAL	£55.0m	£25.0m	£10.0m	£12.0m	>£120m

Table 33 - Budget & Source outline

A split of this expenditure between revenue and capital for the programmes is shown below

Stream	Proposed Budget	Capital	Revenue over 5 years
Rural	£25.5m	£20.0m	£5.5m
Connected Places	£20.0m	£19.5m	£0.5m
Next Generation Wireless	£9.5m	£7.5m	£2.0m
TOTAL	£55.0m	£47.0m	£8.0m

Table 34 - Revenue & Capital splits

3 Commercial Case

3.1 Background

This section presents the commercial case for the short-listed options. It should be noted that there are a range of commercial choices to be made under each of the proposed workstreams and external factors that shape the commercial choices to be made. The following sections are discussed in turn:

- Potential procurement routes
- Service requirements
- Risk transfer
- Commercial and contractual considerations.

The section concludes with a summary of the key commercial questions faced by SBCD and the dependencies.

Throughout this commercial case frequent references are made to how any intervention will be managed and undertaken by SBCD.

In addition, there are two key external factors that will impact the commercial model chosen; state aid and the roll of PSBA. These are summarised below as background introduction to the analysis.

3.2 State Aid

Through the commercial case frequent mention is made of state aid. As a general principle a public sector body cannot intervene in the digital marketplace unless clear market failure can be demonstrated.

In the case of next generation broadband services, it must be demonstrated that there is no commercial service available to a commercial or business premise and this must be demonstrated by asking suppliers through a consultation process what their existing and planned (over a 3-year period) infrastructure is to be. State aid clearance is then obtained at an EU level and administered by BDUK. This approach has been used by Welsh Govt for Superfast Cymru. Typically, a state aid clearance of such nature takes 1-2 years to obtain. If a further intervention is required in the same areas for a further upgrades of infrastructure (e.g. to increase speed or capacity) a further clearance is obtained. **This is relevant to the rural stream**

An alternative intervention approach is for the public sector to procure infrastructure and services to serve its *own sites only*. This may, as a consequence, serve to anchor investment in the region by a commercial operator as the public sector contracts stimulates inward investment and reduces commercial risk. This is the approach being undertaken by other regions under the DCMS LFFN programme. DCMS has not made a Notification to the EU Commission and so BDUK does not have any delegated authority. This means that it is a matter for SBCD to confirm that they are working within the State aid regulations and to deliver projects through "no aid" routes. The DCMS assessment is that the purchase of gigabit capable connections by public bodies, either

as an aggregated, regional approach or for individual sites is ‘no aid’ on the basis that it is not market distorting, as long as the public bodies only buy what they need. **This is the approach that would need to be adopted under the Connected Places stream.**

The final relevant scenario is if the SBCD wish to upgrade assets such as ducts and makes these available to the market. Here the approach is to demonstrate ‘no aid’ through the Market Economy Operating Principle (MEOP). The State Aid regulations treat the delivery of goods or services by the public, or private sector organisations in the same way. The MEOP provides a mechanism to demonstrate whether there is a market distorting effect from a public sector organisation delivering goods or services. If there is not a distorting effect, there is no State aid. For Public Sector Assets expansion and upgrade SBCD must be able to demonstrate through the MEOP principle that there is no aid and that the project is a genuine investment, including clearly demonstrating risks and profits and market-based pricing.

The above principles shape the commercial and ownership model that can be used.

3.3 PSBA

The Public Sector Broadband Aggregation (PSBA) is a managed network that connects public sector organisations in Wales to a private secure Information and Communications Technology (ICT) Wide Area Network (WAN).

It is highly desirable that all rural and connected cities interventions are complementary to the PSBA to ensure that public sector sites continue to receive services. In addition, the PSBA effectively acts as a channel for the local authorities to easily procure connectivity services.

In the case of rural public sector sites, the PSBA is already working closely with Openreach and a number of Welsh Authorities to ensure that any full fibre upgrade to rural sites can be procured through the PSBA. This eliminates the need for SBCD to undertake a procurement for its public sector site connectivity. Pembrokeshire has been working alongside PSBA on this matter.

The situation in the Connected Places is more complex. In the Connected Places, SBCD has a choice between;

- Procuring a managed gigabit service to its sites. This could be procured through PSBA
- Procuring a new dark fibre or equivalent infrastructure in the footprint of the Connected Places over which PSBA (and others) could deliver services.

The usage of dark fibre network infrastructure sits outside the existing PSBA product set and as well as its commercial supplier BT. As a result, the PSBA will have to light any dark fibre procured in the Connected Places stream and deliver its service wrap over a third-party network infrastructure provider with whom it does not a commercial and operational relationship. This is a bespoke deployment by PSBA and involves additional costs in terms of equipment, design and programme management. Although achievable, experience in CCRCD has shown that it is slow and adds cost. It is however necessary if the SBCD commercial strategy is to widen choice at the infrastructure level.

3.4 Procurement Strategy

3.4.1 Background

A sub-set of the recommended shortlisted options will require the conduct of a procurement of assets and/or services. These are:

- Rural: Option 4; SBCD led in-fill procurement
- Connected Places: Options 3 (asset upgrade) and 4 (infrastructure procurement)

All will need to be undertaken in accordance with public sector procurement regulations and be fully compliant with relevant state aid regulations.

All procurements must be undertaken within the current procurement standards operated by the Local Authorities and other partners involved in the SBCD and be

aligned to overarching SBCD Procurement Principles. The procuring party will be specific to the procurement exercise and agreement by the Digital Infrastructure Board and / or Joint Committee as appropriate.

The chosen procurement strategies must take into account existing contractual arrangements and the role of the Welsh Government and the Public Sector Broadband Aggregation (PSBA). It is used by all authorities in the region from which they source connectivity services and a service wrap (note there are a small number of sites not sourced from PSBA). It is desirable that any new infrastructure or services procured are either via the PSBA or through a third-party infrastructure provider over which the PSBA is able to provide existing services to the local authorities.

The scope and services for each of the three main areas of the Digital Infrastructure project are different and will be carried out within a different environment of other intervention actions by the UK and Welsh Governments. To this end, each heading is treated separately.

3.4.2 Rural Connectivity

- **Preferred Option 2 - Supply Side engagement**
- **Preferred Option 3 - Demand Stimulation programme**
- **Preferred Option 4 - SBCD led in-fill procurement**

Options 2 and 3 represent an **internal team** providing support services, possibly with some external professional support. This does not require procurement.

Option 4 represents a procurement activity of some form.

Option 4 - SBCD led In-fill procurement

The procurement is the provision of connectivity to residential and commercial premises with no, or poor, internet access. All of the exact locations to be reached are to be specified within each procurement action, as well as the level of service[40] to be provided.

The actual procurement is complex due to state-aid issues. State aid clearance is required for each market intervention by the public sector at any given step change in technology. Currently there is a national state aid clearance for the provision of broadband services in accordance with the EU Broadband Guidelines (https://www.gov.uk/government/publications/state-aid-eu-guidelines-for-the-application-of-state-aid-rules). Obtaining a state aid clearance at a City Deal or authority level is NOT recommended due to timescales involved (typically 1-2 years), cost, replication of national clearances and Brexit uncertainties.

On this basis, the optimum procurement path is through the use of other existing procurement facilities, but against an SBCD provided scope. Several options may be available, including working through Welsh Government procurement channels and UK

[40] Service should be defined as a minimum Mbs

USO programme[41].The procurement is further complicated by the fact that the SBCD scope cannot be fully determined until such time as the next phase of Superfast Cymru is identified and the processes that underpin the UK USO are known.

SBCD must be allowed to specify the locations and service level to be provided for each premise for any other funding mechanism that might be available.

Possible state aid compliant procurement routes currently open to SBCD are:

- PSBA; This can be the used for connection of the public sector estate in rural areas and PSBA is already in discussions with some of the local authorities in the region on this matter. (Note; If SBCD is successful in obtaining funding from the DCMS Rural Gigabit Connectivity Programme which seeks to drive fibre into public sector hubs in rural locations the PSBA can be used for delivery under this programme)
- Welsh Government Dynamic Purchasing System; For clarity it is NOT proposed that SBCD simply top-up the funding to subsequent Superfast Cymru waves as local control and prioritisation will be lost. However, the Welsh Govt is considering establishing a Dynamic Purchasing System whereby the region can call off its requirements from an approved list of suppliers under the shelter of a national state aid clearance. At the time of writing this scheme is yet to be finalised but SBCD should liaise with Welsh Govt on this matter to ensure its technical and commercial requirements are addressed in the design of the scheme
- DCMS USO channels; It is recommended that discussions are begun immediately with the DCMS to ascertain the best way for interaction. If at all possible, SBCD should take control of the funding and delivery of the USO in the region, and top-up individual connections where they exceed the £3,400 cap. This will introduce a local knowledge capability that a national scheme could not hope to fulfil. It would also allow more effective aggregation of the fee for each connection, sharing some of the costs to provide main fibre bearers into an area. This approach would also open the market for provision to smaller Alt-Net providers who may well agree to recruit from the local population for construction and on-going service support.

3.4.3 Connected Places

Option 3 – Infrastructure asset investment

Under this scenario SBCD fund the expansion and upgrade of public sector ducting within the region. The following points should be noted:

- Any ducting built or upgraded with public sector funding must be used by the authorities for their own use and the delivery of public sector services – it cannot be built purely for commercial objectives
- Any spare duct capacity can subsequently be offered to the commercial market to lower its costs of deploying fibre infrastructure in the region. However, this must be at benchmarked market prices and open access. Any investment in ducting which is subsequently offered to the market is subject to state aid and SBCD will

[41] Announced but yet to be put in place.

need to ensure compliance. The approach is to demonstrate 'no aid' through a Market Economy Operating Principle (MEOP). The MEOP provides a mechanism to demonstrate whether there is a market distorting effect from a public sector organisation delivering goods or services. If there is not a distorting effect, there is no state aid. SBCD must be able to demonstrate through the MEOP principle that there is no aid and that the project is a genuinely commercial investment, including clearly demonstrating risks and profits and market-based pricing. In practice this requires SBCD commissioning a state aid lawyer or auditing company to prepare a report on the investment undertaken and express formal advice that there is no aid.

- With the exception of central Swansea, authorities have indicated there is limited ducting in the region that is suitable for fibre deployment.

Any duct infrastructure built must be for public sector use, linking property or street assets.

In terms of procurement planning SBCD will need to segment the initial design and build of duct infrastructure from any subsequent operation.

Initial design and build of ducting are typically undertaken by the preferred highways contractor of each of the respective authorities. This can be procured using existing frameworks and contracts but under an agreed, common, commercial grade duct specification

The planning and permissions required from local authorities to build the duct network should wherever possible be put in place prior to the tender process to give certainty to the bidders and allow a fast start to the work.

Upon building of the duct there will be a requirement to facilitate the opening of the ducts to commercial operators. There are effectively three commercial models to do this:

- A concession (e.g. Welsh Govt Trunk Road Network)
- A Co-Op (e.g. Tameside Council)
- An open model (e.g. Aberdeen City Council)

A fuller description and the merits of each approach are described in the enclosed link (https://www.gov.uk/guidance/commercial-models)

From a procurement perspective an open model is the simplest to undertake. In contrast a concession will require a full OJEU procurement process, usually under the Open or CPN procedures. A Co-Operative involves the transfer of duct assets into a co-operative venture which can be time consuming in terms of establishing the entity, its governance. establishment of operational contracts and asset transfer.

Option 4: Procurement of infrastructure and/or managed service

Under this Option the SBCD authorities procure either:

- Infrastructure; Notably the build and use of dark fibre (or an equivalent wavelength service) to a defined portfolio of public sector sites
- A Managed Service; Gigabit capable connectivity to sites.

This procurement will represent a service driven approach; whereby specific locations[42] are to be provided with a service rather than a specified physical network connection. The manner in which the service is provided will have some limitations placed upon it, but in general it is left to the supplier to provide the service through their selection of the most appropriate network connectivity.

a) Infrastructure procurement

If SBCD wishes to procure digital infrastructure it is typical to undertake an OJEU procurement (although some authorities have attempted to use existing frameworks' such as SWAN, YHPSN etc but these are typically limited in terms of their flexibility and suitability for an infrastructure procurement). A list of mandatory (and potential optional sites) are defined along with a proposed budgetary ceiling.

The cost, timescales and complexity of such a procurement process means that it would be beneficial to undertake this on a pan SBCD level led either by the City Deal or an agreed lead authority.

There are two approaches that can be undertaken;

- Establishment of an SBCD framework contract from which the authorities (and potentially other public sector bodies in the region) can call off as and when required. This maintains a higher degree of control at the authority level but is a two-stage procurement process. This is illustrated in Figure 1 below
- A one-off pan-regional procurement (possibly with regional lots). This is quicker but more centralised and is being used by Greater Manchester Combined Authority. It also constrains future public sector aggregation as bodies not party to the initial procurement cannot subsequently participate.

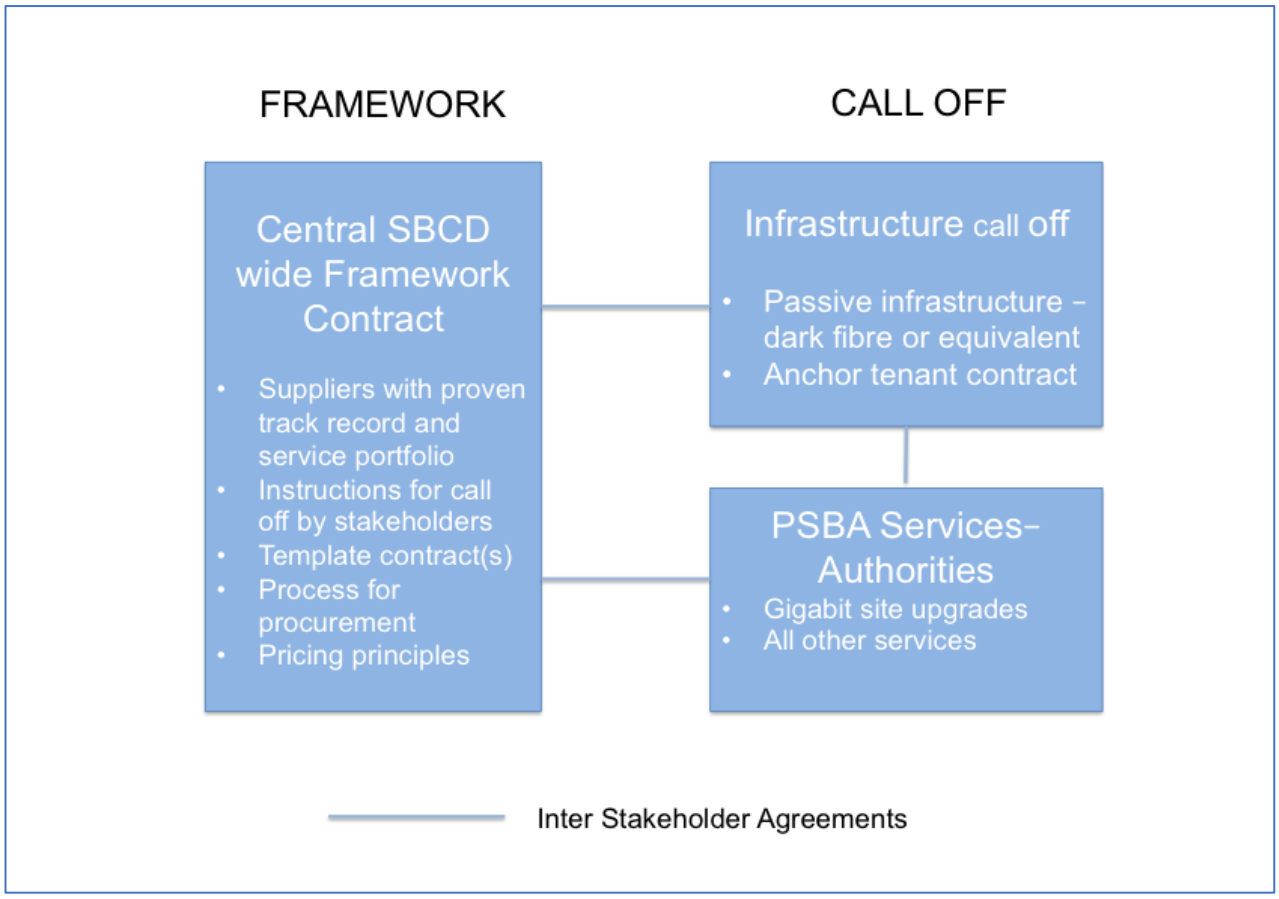
Under the framework approach, a central framework will be procured by SBCD on behalf the participating stakeholders. Points to note about this central framework are as follows:

- Suppliers will be placed on the framework following a competitive process – possibly using an Open Procedure
- Suppliers must have demonstrated a track record and capability to deliver at least one of the following services; dark fibre, Gigabit capable connectivity, additional services.
- The framework will include a template contract
- It will include instructions on how to call off
- Although pricing will be bespoke for each call off based on local requirements, the framework will specify high level pricing principles to ensure value for money. This will include benchmarking.

[42] Locations are public sector locations which represent an anchor customer for services

- Each authority of groups of authorities will then define a call off contract based on their individual service needs, coverage and budgets.
- Each authority sources a service wrap from PSBA who delivers services over the new infrastructure
- There will be inter-stakeholder legal and financial agreements between all respective purchasing bodies as appropriate across this structure.

Figure 12 - Procurement Framework



The alternative approach is a single procurement for agreed coverage across the region as a one-off. This will be quicker but will prevent further call-off actions at a later stage, including other public sector bodies in the region aggregating their requirements and connectivity spend.

Under either procurement approach it is likely that new ducting and fibre will be built across the region. ***The key commercial question is the ownership of this duct and fibre asset and whether it is in the public sector or commercial sector. This will need to be specified in the procurement as it will shape the commercial model and evaluation criteria***.

The table below summarises the merits of each approach;

Benefits	Ownership of ducts/fibre	Challenges
Public sector	Public sector owns an asset in return for its investment Scope to use to deliver other public sector services Potential for a revenue stream to recoup initial investment	Public sector unable to expand reach to commercial and residential market unless assets moved to commercially viable SPV Public sector responsible for operations, SLAs, sales etc Access to capital for future expansion Transfer of public assets into a new vehicle such as a co-op or SPV? Supplier appetite toward use of state-owned infrastructure may be limited
Commercial sector	Commercial sector owns assets but gives public sector an IRU in return for capital investment Likely to lower authority's revenue spend on connectivity No state aid constraints on expansion of network to commercial and residential areas	Public sector does not control coverage and reach Risk commercial parties will concentrate on limited number of high value commercial areas.

Table 35 - Ownership Models

Effectively there is a risk reward trade-off for SBCD, a commercially led approach reduces state aid and operational risk but does not deliver a revenue stream or asset to the public sector. Much depends on the motivation for the procurement. If driven by a desire for inward investment and connectivity to businesses and resident's commercial ownership tends to be favoured. If driven by a desire for the public sector to have an asset and a revenue stream, public sector ownership is favoured. To meet the SBCD core strategic objectives, the former is recommended.

However, there is not a consensus across the country on this matter. Both approaches deliver connectivity to the public sector estate and much depends on political priorities. Cities that have sought to maximise commercial inward investment into their region to serve businesses and residents have tended to favour an IRU on a commercial asset. These include Peterborough, Aberdeen, Newport and York. In contrast other have

favoured public ownership for political and social reasons and to generate an income stream. These include Bristol, Mid Sussex and Liverpool.

It should also be noted that some bidders may also be willing to take on risk, building some of the network and providing services at their own cost. Risk appetite will be reflected in the overall cost.

As part of the economic case the estimated build cost of Options3/4 across the key connected Places of the region was £17m. It is likely that this cost would not be fully carried by the public sector as the winning tenderer would be able to use the infrastructure for commercial use. A key element of the procurement process could be to score the level of contribution offered by the commercial sector in the selection of the winner. A further variation should be allowed. Bidders can explicitly show their risk appetite by committing to building and offering services across a wider footprint than that specified in the tender. A wider build-out at their cost would represent an inward investment. The weighting for this would need to be determined during the tender process.

The sources of capital funds from the public sector is typically derived from a blend of three sources;

- SBCD funds
- Other DCMS funding streams (e.g. LFFN)
- A local contribution by the authority.

In the latter case, authorities have looked at their on-going expenditure on connectivity services over a period of say 15-20 years. A percentage of this has then been capitalised to fund the building of a dark fibre network over which they will have a right to use. By using the IRU on a dedicated dark fibre savings can be made on an on-going basis as there will be a reduced requirement to procure circuits. As an illustrative example the Cardiff region analysed its PSBA costs across a time period. These costs are actually a blend of circuit cost with BT and a service wrap and management fee. PSBA provided this breakdown. It assumes that there is still a need to pay for the service wrap and management fee along with one-off costs for equipment upgrades and interest charges. However, there was a saving in circuit expenditure by migrating to an IRU approach and hence spend was migrated from the revenue account to the capital account to fund the initial build. This approach has also been used around the country by bodies such as Greater Manchester Combined Authority.

b) Managed Service Procurement

Under this approach SBCD authorities procure a gigabit cable managed service. This in turn will drive investment in fibre within the chosen footprint.

Under this approach services would be procured directly from PSBA without the need for a further procurement.

3.4.4 Next Generation Wireless

Option 3 – Undertake Future Telecom Infrastructure Review guidance in full & Drive SRN

There is no direct procurement action necessary.

The action will require the set-up and recruitment of a dedicated specialist team to provide, on behalf of the four local authorities, a service in line with that proposed in the Future Telecoms Infrastructure Review, (FTIR). A team of five is thought sufficient, provided each authority provides a single point of contact through which to deliver the streamlined services as proposed in the FTIR.

Due to the specialised nature of the staff, it is recommended that an external agency is used to identify internal and external candidates and to negotiate their selection and recruitment.

Option 5 – Funded intervention to deliver 5G and IoT connectivity in selected locations

It is considered that the team brought together for Option 3 will also be able to provide the additional support necessary to execute Option 5.

Procurement will be undertaken in respect of a project by project requirement, covering one, or a combination of two actions;

- 5G coverage and services
- IoT coverage and services

The only source for providing such coverage and services are the existing mobile operators and a few specialist 5G neutral host providers. For IoT services there are a number of IoT specialists, including ones that utilise semi-proprietary standards such as LoRaWAN.

Several options exist for securing 5G coverage and services, some of which are being explored in CCRCD and under the Wales RCC programme. As a first step, it is suggested that a dialogue is undertaken with interested parties. This may best be done through a formal market engagement using an RFI, seeking to gauge market interest and to establish direct contact with those CSP's interested and capable of deploying 5G services that match the use cases envisaged. It is likely that there will be a need to conduct one-to-one briefings of the CSPs to discuss the options. It is not recommended to have a single supplier briefing as there are different commercial options that bidders may choose to offer.

An important note is that any network coverage and services deployed through SBCD intervention or partnership would be open to the public and businesses to use, they would not be limited to the specifics of any one use case project. In this way, the benefits associated with the services being made available will be spread across a wide range of topics.

The specification that will be provided to the CSPs is simply the geographic coverage required and the type of service needed to support the intended use cases. CSPs may respond in several ways;

1. Where the coverage request intersects with the operator's own coverage plans and meets their own investment criteria, then a timetable can be agreed, with adjustments made to this depending on willingness to cooperate. In effect this would be an acceleration of commercial deployment by one or more CSPs and would represent a near zero cost to SBCD.
2. Where the coverage request is not in the CSPs current one-year planning horizon, then an accelerated timetable can be agreed, with adjustments made to this depending on willingness to cooperate. This is again an acceleration of deployment but may involve some level of commitment to purchase service in the coverage area. Again, this would represent a zero cost to SBCD, but the project use cases being supported will need to give a commitment to purchase services at a defined level and over a period of time. This might be particularly suited to IoT networks.
3. Where the coverage request is not in the CSPs current one -ear planning horizon and there is no commercial justifiable cause to accelerate deployment, then proposals can be invited from the CSPs to identify their individual *risk increment* in providing the coverage requested.
    a. The *risk increment* is the amount of co-investment they would need to have from SBCD in order to cover their losses over the initial three-year operational period, after which time the risk increment is ended and no further support is offered. This is in effect, assisting the CSP to establish a customer base within a fixed window, continuation of the service beyond this window is at risk, but it is highly unlikely than a CSP would cease services as the cost of removing the equipment would be prohibitive as would the public response.
    b. Different CSPs will have a different view of the risk increment, depending on their five-year horizon for coverage in the identified geographic area. The lowest *risk increment* would then be agreed with one or more CSPs that can achieve immediate deployment and service offering
    c. The project benefiting from the coverage would then be able to proceed and the SBCD team promote further use of the network coverage being provided for new use cases and further innovation
    d. Chosen CSPs would also be expected to promote the service and maximise usage and thereby their own direct revenue. Should the revenue being gained by the operator in the coverage area reach an agreed level during the three-year period when the *risk increment* is being paid, then the payment will stop immediately
    e. A mechanism will also be included by which the *risk increment* paid can be recovered on a quarterly basis should the coverage deployed exceed a level of agreed usage, (revenue), this would be reflecting a now profitable deployment, (i.e. the risk perceived at deployment did not materialise or ended sooner than anticipated through stronger user uptake).

The procurement is therefore a process undertaken on a use case project by project basis, with different SBCD cost and payment arrangements depending on the risk the

deployment represents. The procurement would also be treated as an investment with the potential for successful deployments returning the investment made by SBCD.

As there are significant numbers of variables in play, it will not be possible to specify the costs until there has been engagement with the operators on the specifics of the use case projects; service need, geographical coverage area and the wider market opportunity that the coverage might represent. An average risk increment per project has been calculated at £450,000[43] over a three-year period.

A single set of template requirements documents and contractual framework should be developed and used for all deployments. These documents will be novel.

The procurement itself should be in the form of a framework agreement for the supply of network coverage. Within the framework, there will be provision to run mini-competitions against each project's needs. The basis of the framework award will be on capability and willingness to accept the structure of a risk increment approach and in providing a return on the SBCD investments, made against set pre-determined success criteria. The risk increment value will be allowed to vary between 0% and 80%[44] of the total deployment and service provision cost.

It is not anticipated that there should or would be a case where the risk increment is 100%. This would represent a severe challenge to the CSP's own business case and indicate it is thought likely by the CSP to fail.

3.5 Service Requirement

3.5.1 Rural Connectivity

Option 2 and 3

There is no procurement under Options 2 and 3 and therefore no service requirement[45].

Option 4

Option 4 will involve a procurement. The service requirement will consist of;

- Specified locations at which a defined service is to be delivered[46]. It will be essential to identify target premises and locations in order to scope the requirement and satisfy state aid requirements (Note; a given area is not allowed to receive aid from two intervention programmes given a comparable technical

[43] 5G projects would represent this figure, while IoT would be lower. An average has been used here.

[44] 80% is given as an upper bound to ensure some risk is taken by the CSP and some investment is made. The selection of projects will affect the risk increment applied.

[45] The management case will outline the internal organisation and services that are to be provided

[46] Service to be defined as an internet access speed

solution. Hence any area addressed by an SBCD intervention would need to be ring-fenced from Welsh Govt or DCMS interventions).

- Minimum download and upload speeds to be provided[47]. It should be noted that Superfast Cymru 2 (and other interventions such as R100 in Scotland) have specified either 24Mbps or 50 Mbps as minimum download speeds whereas the USO is 10 Mbps. Experience has shown that a rigid adherence to a single technical solution or speed is often unobtainable if reach is to be maximised and a blended approach of technologies and speed targets may be more appropriate[48].
- If procured through another funding intervention such as the Welsh Government Dynamic Purchasing System, there will be a series of operational, performance and financial guarantees.

3.5.2 Connected Places

Option 3

Construction of communications ducting to Telco standards, (carrier grade), to specified locations. Working to the appropriate UK standards, the duct work must be suitable for any service provider to lay and operate new fibre connections, given adherence to SBCD technical and operational policies governing duct access and maintenance.

Primary supplier(s) would be Civil Engineers and Telecom operators

Option 4

It is envisaged that the framework procurement will specify three services. Suppliers will be expected to offer one or more of these product sets but not necessarily the full set:

- Dark fibre or virtual dark fibre connectivity to sites: This will be defined as dark fibre tails between a site and an agreed point of presence. Such fibre will be used by stakeholders or their service provider. This dark fibre will provide the optimum level of scalability and future proofing over such a long investment period (minimum 20-year period Indefeasible Right of Use – IRU)
- Gigabit Connectivity: Suppliers should offer Gigabit capable services to sites. These will be active services as delivered by PSBA
- Other Services: Stakeholders may choose to procure other services from framework suppliers. These may include active wide area services, IT services, consultancy, mobility solutions etc.

[47] The requirement for premises to have fibre connectivity by 2033 may require a level of future need to be accommodated

[48] A balance will be drawn at the time of procurement to ensure a sufficient level of futureproofing is included

3.5.3 Next Generation Wireless

In terms of the Digital Infrastructure, the service requirement is simply the provision of 3gpp standard coverage for 5G services over a specified area[49]. The specific requirements of what use the wireless connectivity will be used for is held within each specific use case. In many cases, even within the projects, generic services will be deployed by utilising the mobile networks, for instance, ultra-fast mobile broadband. All wireless networks are by their nature, open access, that is, any service can be operated over them, by any application provider[50].

Within the 5G ecosystem, there are requirements to support ultra-low latency, that is extremely fast response times as might be needed by smart/autonomous vehicles, ultra-fast speeds (>300Mbs to mobile devices) and vast numbers of IoT devices. Some of this is represented by edge computing and extremely high bandwidth connections in mm band spectrum, it is felt that the use cases being considered will not be at the leading edge of research in these areas, but more direct application of fast mobile data. Each use case once developed may have some enhanced requirements, but these should be dealt with as they emerge.

For IoT networks, there are several semi-proprietary solutions. However, it is highly recommended that any IoT use cases are deployed utilising the 4G or 5G network services in order to maximise the Open Access nature of SBCD interventions and support the emerging 5G/IoT ecosystems.

3.6 Risk Transfer

Across all the intervention types within Digital Infrastructure there are operational or deployment risks. If any of the assets remain within the public sector elements, these risks will remain with SBCD or the authorities.

Where SBCD is to deploy a team to provide interfaces or support to the public, SMEs and operators, then the risks associated with these team's performance reside with SBCD. An alternative does exist in the form of a Special Purpose Vehicle, (SPV), – InfraCo[51]. In this case the risks associated with coordinating local authorities' actions to meet the FTIR, procurement of services and demand stimulation can be placed within a single commercial entity, potentially wholly owned by the public sector. Such an option has strong merits and should be considered, provided it can;

- Operate in an autonomous manner to make faster decision
- Provide the centralised functions necessary and achieve scale efficiency
- Have sufficient delegated powers from Local Authorities and SBCD

[49] The specification may define the ability to access the mobile network indoors as well as outdoors. In some cases, it might be necessary to define the signal strength that the network will deliver

[50] There are some uses which Ofcom or operators would not permit, but they are not ones envisaged by the projects being supported

[51] InfraCo and CommunityCo described in further detail in the Management Case

The risk profile of all the options selected are relatively low. The table below shows the overall risks, how they are allocated and whether they are high or low respectively under a Red/Amber/Green indication.

Risk Transfer							
Rural	Design Risk	Construction Risk	Operational Risk	Technology Risk	Commercial Risk	Residual Value Risk	Reputational Risk
Option 2	None	None	None	None	SBCD	None	SBCD
Option 3	None	None	None	None	SBCD	None	SBCD
Option 4	None	None	None	SBCD	SBCD	SBCD	SBCD
Connected Places	Design Risk	Construction Risk	Operational Risk	Technology Risk	Commercial Risk	Residual Value Risk	Reputational Risk
Option 3	None	None	None	None	SBCD	SBCD	SBCD
Option 4	None	None	None	None	Shared	Shared	Shared
Next Gen Wireless	Design Risk	Construction Risk	Operational Risk	Technology Risk	Commercial Risk	Residual Value Risk	Reputational Risk
Option 3	None	None	None	None	None	None	None
Option 5	None	None	None	Shared	Shared	Shared	Shared

Table 36 - Risk Profiles

The highest risk with the lowest risk transfer is option 3, under Connected Places. The rationale for this, is that the duct to be commissioned and built will have no certainty of being utilised for fibre distribution and thereby services being offered which equates to Commercial Risk, Residual Value risk and Reputation risk. Likewise, should there be a poor uptake, the reputational risk for SBCD would be high in terms of an investment that failed to achieve its objectives.

3.7 Key Contractual Arrangements

3.7.1 Rural Connectivity

Option 2 and 3

No contractual arrangements are needed.

Option 4 - SBCD led procurement to In-fill un-served or poorly served locations

If SBCD utilises an established procurement route (e.g. Welsh Government Dynamic Purchasing System) it will call off from an approved list of suppliers and service specification. In this case requirements will be defined in terms of local SBCD priorities for service roll out, target areas and timescales. These may include;

- Specified locations to be connected within available budget and timescale
- Compliance of roll out to SBCD defined priorities
- Performance guarantees (speeds, availability etc)
- Technology to be used

- Initial Award Payment and then payment by connection completed.
- SLAs to cover initial services and commitment to improve services
- Fixed period of two years in which to complete the work[52]
- Investment recovery mechanism where revenues become greater than cost, operating for a period of 'n' years after completion[53]
- Single lump sum price
- Single prime supplier.

3.7.2 Connected Places

Preferred Option 3

A distinction needs to be made between the initial duct build and the on-going commercialisation of the assets.

It is presumed that the initial build of ducts will be undertaken with an existing supplier of highways infrastructure and under an existing agreed contract. Key issues to be defined are;

- Specified public sector sites to be connected by duct.
- Built to Telco industry standards
- Compliance to health and safety regulations
- Initial Award Payment and then payment by build milestone completed.
- Warranty period of at least fifteen years for passive infrastructure.
- Target period of two years in which to complete the work?[54]
- Single lump sum price for passive infrastructure
- Single prime contractor
- On-going maintenance and support.

The on-going operation and commercialisation will be undertaken under an open contract, concession or SPV/Co-Op. In all cases the key contractual considerations are as follows:

- Coverage; what will be offered to the market and where?
- Service specification
- Term (typically a minimum of ten years)
- Exclusivity rights
- Assets to be used
- Termination procedures
- Health and safety compliance
- State aid compliance

[52] Timescales to be determined

[53] The period over which a clawback mechanism can work is yet to be determined

[54] Timescale to be determined

- Operations (including customer service, service management, project team, project management, project delivery, interworking with SBCD and term contractor)
- Reporting
- Installation
- Adherence to planning
- Community benefits (e.g. local employment)
- Commercial arrangements including potential assets rental fees to authorities and proposed revenue share arrangements.

Preferred Option 4 – Infrastructure or Managed Service Procurement

If an infrastructure procurement is undertaken, any framework contract is typically awarded based on service portfolio and track record along with pricing principles. Detailed specification, evaluation and contractual negotiations occur at the call-off level and should include the following issues:

- Locations to be connected by fibre. Typically, a mandatory list of sites to be connected within a budget ceiling is stated along with additional desirable sites with suppliers scoring higher for wider coverage
- Term length; Tenderers increase their evaluation scores for a longer IRU length
- Level of financial contribution to build costs by tenderer
- On-going operation and support / maintenance processes and costs
- Overall technical design and solution; PoPs, resilience, routes, capacity, use of existing infrastructure, dimensioning, interface to WAN supplier
- Open access
- Future proof and upgrade plans
- Optional service provided
- Compliance to regulations and standards
- Health and safety
- Testing
- Programme of works including street works and interface with local bodies
- Environmental and social considerations.

Any Managed Service contract would be sourced from PSBA under existing contractual and procurement terms.

3.7.3 Next Generation Wireless

Option 3 – Undertake Future Telecom Infrastructure Review guidance in full & Drive SRN

None applicable.

Option 5 – Funded intervention to deliver 5G and IoT connectivity in selected locations

The key contractual components should be;

- Framework agreement with all or some of the mobile operators and other neutral host operators able to provide the service

- The requirement will be set out as a service defined coverage in a geographical area
- Service levels will be set, such as good indoor coverage and minimum data speeds
- An upper limit on the risk increment should be set at 80% of the operator's cost of deployment
- Where it is necessary for new infrastructure to be built, use of infrastructure assets owned and controlled by the public sector should have a favoured-nation status and be utilised at commercial rates whenever they are suitable
- The fair market cost of using public sector infrastructure can be used as an offset within the risk increment
- The risk increment funding should be structured as an investment and is provided to ***accelerate*** the deployment of 5G coverage rather than specifically purchasing a service
- Any supported deployment must be open access, that is other services and users can make use of the network at the standard national service rate or its equivalent
- A threshold should be set against which the success of the deployment is measured. The measure can be revenue generated or throughput of data. Once the threshold is reached a return should be made on the investment represented by the risk increment
- Risk increments will be paid on a quarterly basis for a maximum of 3 years
- Returns upon success will be paid quarterly over 6 years from service commencement to the maximum of the total risk increment invested by SBCD

3.8 Summary and Key Commercial Considerations

3.8.1 Key commercial questions

With the chosen short-listed options, there are a number of options in terms of procurement, delivery model and ownership.

Each of these decisions are dependent on both internal factors such as budgets, resources, existing contracts and political preferences and external dependencies such as national and regional programmes and state aid.

A Digital Infrastructure team will work with regional partners through the governance arrangements outlined in the management case to determine the appropriate approach.

Rural Issues	Key dependencies
How should an SBCD rural in-fill procurement be defined and undertaken? • **What is the service specification?** • **What is the reach?**	Number of un-served premises Effectiveness of complementary programmes State aid compliance Availability of suitable procurement route Budget
Would SBCD offer loans to commercial players to stimulate inward investment (see section below)	Industry appetite Need for careful due diligence and on-going governance State aid compliance Budget
Connected Places	
What is the desire to invest in public sector assets (e.g. ducting)?	Willingness of SBCD authorities to use new ducting Appetite of commercial bodies to use public sector owned ducting State aid challenges
What is the scope of the procurement for commercial full fibre services in the region?	Available budget Integration with PSBA

• **Infrastructure or managed service?** • **Geographic coverage?** • **SBCD framework or one-off procurement?**	Integration with WAN and other contracts Supplier appetite to invest in region State aid
What is the level of commercial risk/reward that SBCD wishes to take?	Is the key motivation for the procurement to; • Enhance public sector connectivity? • Deliver additionality i.e. connectivity to businesses and residents in the region • Generate revenue and value?
Next Generation Wireless	
Selection of projects to be supported with coverage **Service types to be deployed** **Level of risk increment that is acceptable to SBCD**	SBCD core projects such as the Wellness Village and Milford Haven being supportive of the need for digital infrastructure a thorough review of the SBCD projects and any initiatives related to 5G within each partner local authority should be undertaken to select the most appropriate Use Cases. There may be a case to harmonise with CCRCD and RCC use cases. Appetite of CSPs to engage and support the use cases and the coverage areas proposed Funding structure to be applied

Table 37 - Commercial Issues

3.8.2 SBCD Financial Support

Some City Deals elsewhere in the UK have moved away from the concept of GAP funding towards an investment driven model. This may involve facilitating loans to digital infrastructure providers to enable investment in the region.

Typically, such loans are made at commercial rates and targeted at both infrastructure deployment and innovation. An example is the Cardiff Capital Region City Deal which has an innovation, infrastructure and challenge fund. This approach also satisfies state aid.

https://www.cardiffcapitalregion.wales/wp-content/uploads/2019/06/ccr-investment-framework.pdf

Broadway Partners have used such facilities in Monmouthshire where a loan was granted for the provision of broadband radio access services and fibre backhaul in

the hardest to reach parts of the County not reached by the Welsh Government national programmes.

Points to note are that:

- Typically, financial support is offered as debt not equity funding. Hence there are no SPVs to be established and managed
- Deals of this nature typically stimulate emerging innovative players to invest in rural areas and hence competition is stimulated
- In the event that the investment venture fails, SBCD would have step in rights and would take ownership of any assets deployed

4 Financial Case

4.1 Introduction

This section presents the financial case for the Digital Infrastructure programme. Key assumptions in this case are;

- All capital-intensive procurements take place in the financial year 2021/22
- All capital programmes are spent over a four-year period between 2021/22 and 2025/26
- A Digital Infrastructure programme team is recruited and commences work from Q4 2020
- All demand stimulation and supplier engagement activities commence in Q4 2020 and continue throughout a 5-year period

For the sake of consistency costs are presented for each of the rural, connected Places and Next Generation Wireless themes.

In additional the following points should be noted:

- **Income Streams:** An income stream in not envisaged under this programme. Expenditure is incurred for the purposes of procuring infrastructure for the public sector own use or GAP funding telecommunications infrastructure investment into areas that are not commercially viable. It should be noted that some authorities in the UK have sought to generate income though the commercial use of public sector assets (notably ducts). However, this is not envisaged in the SBCD region at present

4.2 Funding Sources - Capital Expenditure

This section presents the capital expenditure profile for each of the themes. The following points should be noted;

- In each table the anticipated contribution from SBCD, commercial sector and central government has been estimated
- In a number of cases it is anticipated that the programme will encourage additional further on-going commercial investment. This has been estimated wherever possible
- No commercial or central funding sources are guaranteed at the time of writing and will be dependent on the outcome of procurements and the region successfully applying for central government grant funding.

4.2.1 Rural

Rural capital expenditure will rest on the conduct of:

- SBCD led in-fill procurement
- Any SBCD funding to community schemes

- Central government investment in rural connectivity in the region through national schemes such as the DCMS Rural Gigabit Connectivity. Such funds will be for capital only. The Govt has stated that £200m of grants annually will be provided and distributed across the UK. SBCD will need to apply for such grant funding. We have used a conservative baseline assumption that the region captures 1% of national funds per year but this will dependent on the rules for fund allocation and the strength and merits of the region compared with other competitive bids.

In addition, the USO fund is also anticipated to provide extensive capital investment in rural infrastructure in the region but the scale and timing is unknown at the time of writing.

It should be noted that there is limited pro-active commercial appetite for investment in outlying rural areas for the provision of digital services. Such activity has to be initially largely stimulated by public sector intervention. However, in the event that such an intervention occurs, the private sector may subsequently invest. For example, in a rural settlement the initial delivery of fibre into the settlement is likely to be public sector funded and targeted at a community hub such as a school or health centre. However, once this footprint has been established the commercial sector may connect contiguous residential or business premises as the marginal cost of such a connection will have been reduced.

Project Capital Expenditure						
(£m)	**Year 1 (20/21)**	**Year 2 (21/22)**	**Year 3 (22/23)**	**Year 4 (23/24)**	**Year 5 (24/25)**	**Total**
SBCD	-	3.0	2.0	1.0	-	**6.0**
Central Government Grants	2.0	2.0	2.0	2.0	2.0	**10.0**
Private Sector		1.0	1.0	1.0	1.0	**4.0**
Total	**2.0**	**6.0**	**5.0**	**4.0**	**3.0**	**20.0**

Table 38 - Estimated Rural Capital Expenditure Profile and Funding Sources

4.2.2 Connected Places/ Economic Development Areas

The chosen options include a requirement for new duct and fibre infrastructure to be built in the key cities and development zone of the region. A detailed bottom-up cost modelling exercise was undertaken and the projected capital costs of the build programme was £19.5m. This assumes:

- Infrastructure is built in each of the priority areas identified in the economic case, notably Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke Dock, Haverfordwest, Crosshands and Milford Haven.
- There is a build of new duct infrastructure across the region to facilitate this fibre deployment. It is possible that costs might be lowered through wholesale access

to commercial owned ducting (notably from BT). However, this will not be known until the procurement process is completed. Some telecommunications providers do not use third party ducting as they prefer to own their own infrastructure for reasons of financial, operational and management control. In addition, there may be a desire on behalf of the public sector to build and own its own ducting over some routes.

There is a greater commercial appetite for investment in key urban economic development areas and significant commercial investment has been leveraged elsewhere in the country. This is typically in two stages; an initial contribution to the building of a network to public sector sites followed by further waves of investment as the commercial sector connects residential and business premises.

Once again, such activity has to be initially stimulated by public sector intervention though the state aid compliant approach of connecting public sector premises. A number of other Cities have adopted this approach and these are attracting inward investment from industry. For example, Vodafone has announced a plan to build FTTP connectivity to 5m homes by 2025. So far, the cities that have been chosen are those where it has access to a dark fibre network infrastructure of the type envisaged in this programme. They include Peterborough, Milton Keynes, Aberdeen, Stirling, Coventry, Edinburgh and Huddersfield. In all of the above cases the Councils have driven inward investment through the use of public sector purchasing power to anchor investment.

Table 33 below presents the estimated capital expenditure profile for this programme of work. It assumes that;

- A procurement is conducted throughout 2021 with contract award by end of the year
- A three-year build programme commencing in 2021/22
- Capital costs are paid upon delivery of key build milestones (e.g. routes completed, or sites connected)
- The commercial sector contributes 40% of initial build costs for connectivity to public sector sites as it will subsequently be in a position to commercialise this infrastructure.

Project Capital Expenditure						
(£m)	**Year 1 (20/21)**	**Year 2 (21/22)**	**Year 3 (22/23)**	**Year 4 (23/24)**	**Year 5 (24/25)**	**Total**
SBCD	-	4.0	5.0	3.0	-	**12.0**
Central Government Grants	-	-	-	-	-	**0.0**
Private Sector	-	2.5	2.5	2.5	-	**7.5**
Total	**0.0**	**6.5**	**8.0**	**5.0**	**0.0**	**19.5**

Table 39 - Estimated Connected Places Capital Expenditure Profile and Funding Source

4.2.3 Next Generation Wireless

Table 34 presents the capital expenditure profile for the Next Generation Wireless theme. This is driven by the accelerated deployment by CSPs and potentially neutral host providers of 5G and IoT services over 5 years. This investment will be primarily commercially led under an intervention model supported by SBCD.

The tables show a front ended expenditure, this is considered reasonable and indeed necessary as all of the digital infrastructure will enable later benefits. The sooner the infrastructure is in place the sooner benefits can be realised. It is also stand-alone in that much of the expenditure is time limited only by the availability of resources within the digital infrastructure team.

Project Capital Expenditure						
(£m)	**Year1 (20/21)**	**Year 2 (21/22)**	**Year 3 (22/23)**	**Year 4 (23/24)**	**Year 5 (24/25)**	**Total**
SBCD	-	1.5	0.5	0.5	-	2.5
Central Government Grants	-	-	-	-	-	0.0
Private Sector	-	3.0	1.0	1.0	-	5.0
Total	**0.0**	**4.5**	**1.5**	**1.5**	**0.0**	**7.5**

Table 40 - Estimated Capital Expenditure Profile and Funding Sources

4.3 Funding Sources - Revenue Expenditure

4.3.1 Rural

Revenue costs will be incurred under the rural programme for:

- Supply side engagement
- Demand stimulation.

In addition, costs are incurred during any procurement undertaken. These will be both in-house staff resources and external consultancy and legal support (procurement and state aid). It is assumed an in-fill procurement is undertaken in 2021/22

Estimated costs by activity are presented below.

Estimated Revenue Costs						
(£m)	**Year1 (20/21)**	**Year 2 (21/22)**	**Year 3 (22/23)**	**Year 4 (23/24)**	**Year 5 (24/25)**	**Total**
Supply side engagement	0.15	0.15	0.15	0.15	0.15	**0.75**
Demand stimulation	0.8	1.0	1.0	1.0	1.0	**5.0**
Procurement support:						
internal	-	0.1	-	-	-	**0.25**
external		0.15				
Total	**1.15**	**1.4**	**1.15**	**1.15**	**1.15**	**5.8**

Table 41 - Estimated Rural Programme Revenue Costs

4.3.2 Connected Places

It is assumed that any duct/fibre infrastructure built as part of this programme will be maintained and commercialised by a commercial partner. As a result, revenue costs are relatively light and limited to;

- On-going supplier engagement and demand stimulation. However, it has been assumed that the resources recruited and tasked with this activity for the rural programme will also address these activities in the urban areas. Hence an additional expenditure of £50k per annum has been included
- One-off procurement of duct and full fibre infrastructure assumed in 2021/22

Estimated Revenue Costs						
(£m)	**Year1 (20/21)**	**Year 2 (21/22)**	**Year 3 (22/23)**	**Year 4 (23/24)**	**Year 5 (24/25)**	**Total**
Supply side engagement and demand stimulation	0.05	0.05	0.05	0.05	0.05	**0.25**
Procurement support: **internal** **external**	-	0.1 0.15	-	-	-	**0.25**
Total	**0.05**	**0.3**	**0.05**	**0.05**	**0.05**	**0.5**

Table 42 - Estimated Connected Places Programme Revenue Costs

4.3.3 Next Generation Wireless Corridor

Estimated Revenue Costs						
(£m)	**Year1 (20/21)**	**Year 2 (21/22)**	**Year 3 (22/23)**	**Year 4 (23/24)**	**Year 5 (24/25)**	**Total**
Next Generation Wireless	-	0.5	0.5	0.5	0.5	**2.0**
Total	**-**	**0.5**	**0.5**	**0.5**	**0.5**	**2.0**

Table 43 - Estimated Next Generation Wireless Programme Revenue Costs

4.3.4 Revenue Expenditure Summary

Estimated Revenue Costs						
(£m)	**Year1 (20/21)**	**Year 2 (21/22)**	**Year 3 (22/23)**	**Year 4 (23/24)**	**Year 5 (24/25)**	**Total**
Rural	1.0	1.5	1.0	1.0	1.0	**5.5**
Connected Places	0.05	0.3	0.05	0.05	0.05	**0.5**
Next Generation Wireless	-	0.5	0.5	0.5	0.5	**2.0**

Total	**1.05**	**2.3**	**1.55**	**1.55**	**1.55**	**8.0**

Table 44 - Estimated Digital Programme Revenue Costs

4.4 Funding Summary

The table below summarises the budget spend and investment sources along with associated benefits. Assumptions are presented in enclosed Annex.

Stream	Total Budget Spend (Revenue and Capital over 5 years)	Direct SBCD Capital Contribution	Direct SBCD Revenue Contribution	Other Public Sector Contribution	Direct Commercial Contribution	Additional Commercial Sector Pull through Investment	GVA Uplift over 15 years from Budget Investment]
Rural							
Option 2; Supplier Engagement	0.5	-	0.5	-	-	-	-
Option 3; Demand Stimulation	5.0	-	1.5	3.5	-	28.9	17.5
Option 4; In-fill Procurement	20.0	6.0	-	10.0	4.0	20.0	70.0
Connected Places							
Options 3/4 Duct Investment/Procurement	20.0	12.0	0.5	-	7.5	70.0	220.0
Next Generation Wireless							
Option 3; Infrastructure Review	2.0	-	2.0	-	-	-	-
Option 5; Support for Specific Projects	7.5	2.5	-	-	5.0	3.0	11.3
Total	**55.0**	**20.5**	**4.5**	**13.5**	**16.5**	**121.9**	**318.8**

Table 45 - Funding Summary

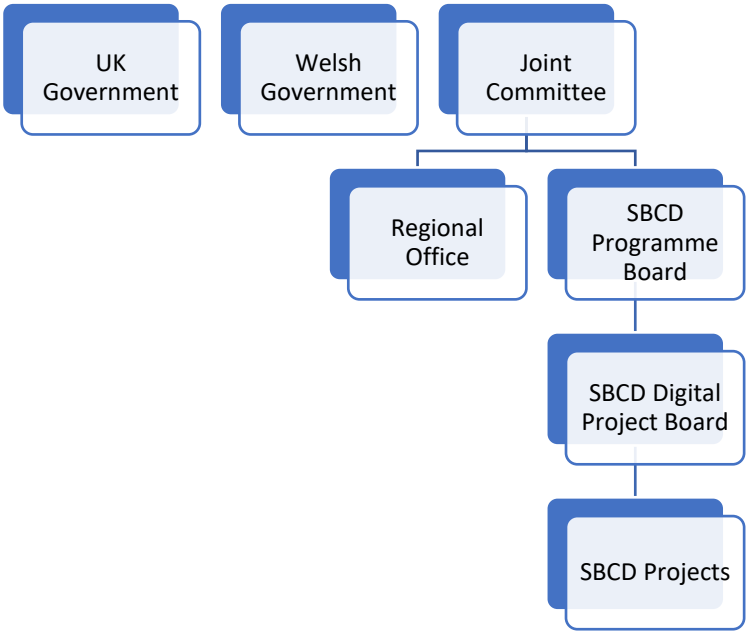
5 Management Case

5.1 Programme Management

The following structure will be established to deliver the SBCD Digital Infrastructure project.

5.1.1 Roles and Responsibilities

Figure 13 - SBCD Overarching Governance Structure



The Digital Infrastructure project is one of the nine Swansea Bay City Deal projects and, as such, is bound by the overarching governance operating model of the Swansea Bay City Region in the above figure, as defined in the Heads of Terms agreed by both the UK and Welsh Governments and the four Local Authorities. The Project will conduct its business in accordance with the City Deal regional strategy and parameters set out by the SBCR Joint Committee, Economic Strategy Board and Programme Board. Further detail on programme governance can be found in the Heads of Terms and the SBCD Implementation Plan.

- The **Joint Committee** has overall responsibility and accountability for the management and delivery of the Swansea Bay City Deal. The Joint Committee consists of membership from the four local authorities of Carmarthenshire, Neath Port Talbot, Pembrokeshire and Swansea as well as the University of Wales Trinity Saint David; Swansea University, Hywel Dda Health Board and Abertawe Bro Morgannwg Health Board as co-opted members. The Joint Committee is responsible and accountable for all decisions pertaining to the delivery of the City Deal. This includes; the identification, approval and implementation of governance

structures, management of financial and legal matters, performance management and monitoring as well as the progression of the regionalisation agenda.

- The **Economic Strategy Board** (ESB), which is representative of the private sector, provides strategic direction and advice to the Joint Committee on matters relating to the City Deal particularly in relation to investment proposals and in monitoring progress of the Deal. Its role also involves ensuring that the wider business community is fully engaged with the City Deal delivery in order to secure the programme's long-term legacy. The ESB will identify activity required to support the growth of the City Deal sectors with particular reference to the wider supply chain and make recommendations on this and other opportunities to maximise the impact of the City Deal across the region to the Joint Committee.
- The **Programme Board** consists of the 4 local authorities and wider membership from primary Stakeholder Partners: University of Wales Trinity St David; Swansea University and Abertawe Bro Morgannwg and Hywel Dda University Health Boards. In maintaining the role of an 'overseer', the Programme Board is responsible for ensuring the practical delivery of the Deal in its entirety with a particular role in supporting and monitoring project development; overseeing financial implications and managing risks, identifying benefits and constraints and ensuring that synergies between projects are maximised and activities are in strategic and economic concurrence with the 15 year City Deal plan.
- The **Accountable Body** is the legal entity which acts on behalf of the City Deal Joint Committee in discharging all statutory requirements in respect of the City Deal. The Accountable Body is responsible for ensuring that correct and robust financial, legal and governance arrangements and frameworks are in place for managing the City Deal. It also has a compliance and assurance role in ensuring that all decisions made by the Joint Committee are handled within financial and legal frameworks and are therefore lawful, appropriate and within budget. The Accountable Body provides technical expertise and support to the Joint Committee, Programme Board, Regional Office and other City Deal functions as appropriate in discharging its responsibilities
- The **Regional Office** is the central support and coordinating function to facilitate the delivery of all projects within the City Deal portfolio. This will involve consultative support on governance, project monitoring and evaluation, communication/engagement and liaison with Welsh and UK Governments. Operating within a well-defined regional framework delivers overall governance and ensures that the interrelationship between the projects can be utilised to deliver optimal outcomes and benefit maximisation across the City Region.

Digital Project Board –

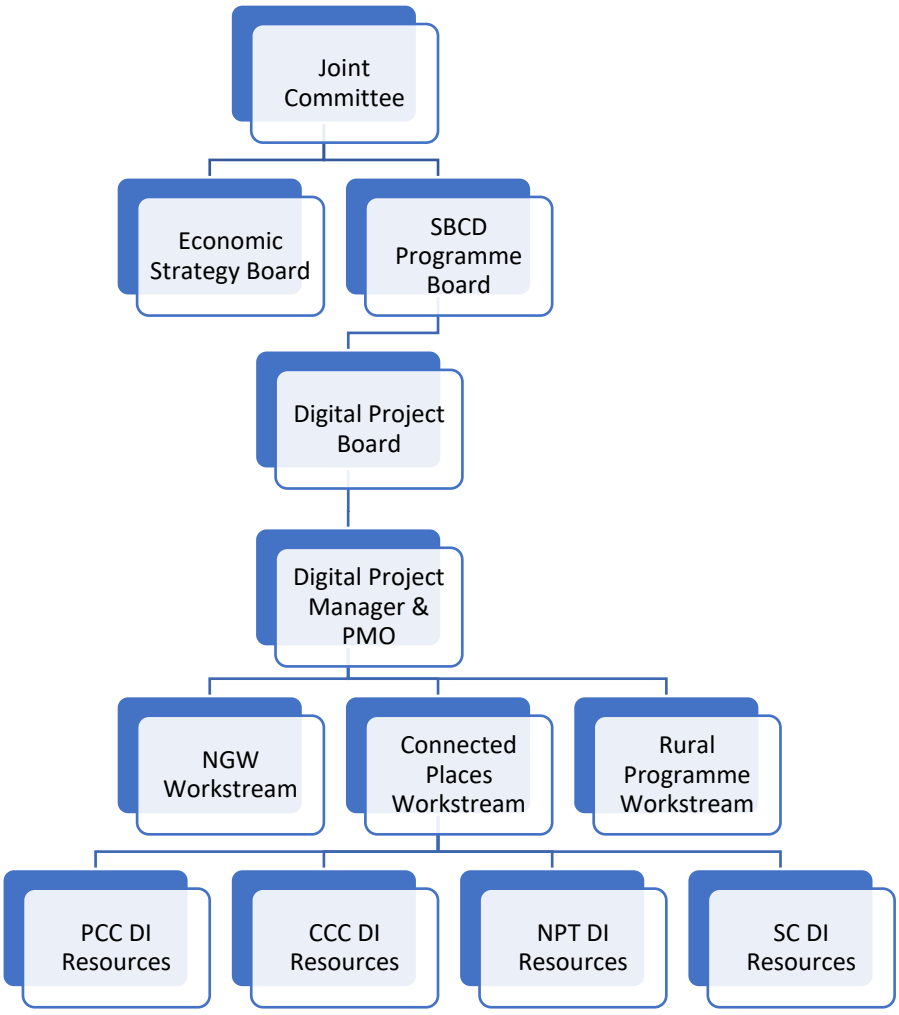
The Digital Project Board will head the governance structure for the project and through the Digital PM will ensure the project is managed effectively, to approved timescales and in line with the governance structure of partner organisations. The Digital Project Board has overall responsibility for decisions pertaining to the strategic direction and, where appropriate, the operational delivery of the Digital Infrastructure scheme.

These responsibilities include but are not exclusive to:

- Approval of all major plans
- Approval of all deviations from agreed tolerances
- Arbitration on any conflicts that cannot be resolved at Project level
- Taking ownership of major risks and issues
- Approval and sign off of key project documentation
- Approving and funding key changes

SBCD will identify a Digital Project Board Chair and Senior Responsible Owner. The regional Digital Project Board will consist of senior lead officers from all regional Local Authorities, Universities and Health Boards and identified lead officers for Procurement, Legal, Communications and Finance. The Board will invite representation from Welsh and UK Governments. This regional Digital Project Board is responsible for guaranteeing equity and catering for the divers needs of all partners and stakeholders. The Board will be accountable to the Swansea Bay City Deal Programme Board, as defined in its formal terms of reference.

Figure 14 - Organisational Structure



Digital Infrastructure Project Team –

A central Digital Infrastructure Project Manager (PM) and Project Management Office (PMO) team will be established to oversee and steer digital strategy and policy for the region in liaison with UKG, WG and the private sector. The Project Manager is charged with meeting project aims and objectives as set out in the project business case, overseeing risk and governance, maintaining communication and engagement across all sectors, and achieving project outcomes, including community benefits.

The PMO will be hosted by Carmarthenshire who are the named lead authority for the Digital Project within the City Deal and will be accountable to the Digital Project Board, Programme Board and Joint Committee as required. The central PMO team will comprise of:

- Digital Project Manager – SBCD
- Digital Infrastructure Officer x 3

In order to deliver the business plan the Project team will be responsible for the;

- Development of overall digital strategy
- Maximising and coordinating funding opportunities for the Region
- Interaction with Welsh and UK Govts on digital programmes
- Co-ordination and management of regional Digital procurement activities
- Supply side engagement with industry
- Development of regional procurement frameworks and procurement templates
- State aid guidance
- Development of regional guidelines and approach to demand stimulation
- Market analysis and monitoring of infrastructure deployed.

Where required the project team will utilise internal Local Authority services for procurement and other technical support. Also, where required the project team will utilise external legal (for state aid and procurement) and technical support.

Work streams –

Each work stream comprises of appropriate multidisciplinary membership to progress the key themes of the SBCD Digital Infrastructure Project

Local Authorities –

- Each authority continues to buy its own managed services from PSBA
- Each authority undertakes demand stimulation activities in its own area – possibly using a regionally agreed approach and collateral.
- Each authority owns and controls its own assets within its area
- Authorities provide dedicated support to procurement teams as required to support procurement activity and are responsible for definition of local requirements and installation planning

The Digital Infrastructure team will comprise of the following roles;

Resource	Number of FTE	Role	Locations
Project Manager – SBCD Digital Programme	1	Strategy, Fundraising, Stakeholder co-ordination, Interaction with Welsh and UK Govts	Swansea Bay City Deal (Hosted by Carmarthenshire)
Digital Project Officer	3	Support above activities	Swansea Bay City Deal (Hosted by Carmarthenshire)
Local authority, Health Board and University procurement support as required	0.25	Procurement	Each authority as required
Commercial /State aid legal advisor	0.25	Procurement	External
Local Authority, Health Board and University ICT Lead	0.25 per authority	Procurement and Build	Each authority
Local Authority, Health Board and University Asset management	0.25 per authority	Procurement and Build	Each authority
Local Authority, Health Board and University Network Analyst	0.25 per authority	Procurement and Build	Each authority
Local Authority, Health Board and University Marketing Officers	1per authority	Co-Ordination Marketing Demand stimulation	Each authority

Table 46 – Resources

5.1.2 Procurement resources and responsibilities

Two major procurements are envisaged under the Digital Infrastructure business case;

- Rural; Community hubs and in-fill of business and residential premises
- Connected Places; Full fibre/Duct Infrastructure

The above structure will require that these activities are completed as follows;

Rural

For procurement under the Rural element of the project, SBCD will be undertaking one or both of the following activities depending on identified need;

- Prioritising public sector sites to be used as hubs under the Regional Gigabit Connectivity Fund
- Procuring in-fill solutions to un-served residential and business premises through a national Dynamic Purchasing System/Framework

For both activities it is recommended that:

- Regional requirements be quantified and identified by the central Digital project team with the support of Digital leads from each authority and other key stakeholders who can prioritise target areas and service requirements in their local authority / service area
- The Central Digital project team will manage call off contracts from national programmes with Local Authority Digital Leads to co-ordinate local implementation and associated activities such as planning, street works and community engagement.

Connected Places

For procurement under the Connected Places element of the Digital project a SBCD regional framework will be established from which local authorities are able to call off procurements.

- The framework will be developed and procured by the central Digital projects Team with the call off contract scope defined by Local Authority leads. The scope will include sites, service requirements, operations, service and support and budgets. Where the footprint of the network procurement is likely to cross authority boundaries one local authority may take a co-ordination lead of behalf of some or all authorities if agreed.
- Local Authority Leads to manage and co-ordinate local implementation as with the Rural programme.

Supply Side Engagement and Next Generation Wireless

The central Digital Project team will be responsible for regional co-ordination of supply side engagement with industry. This will include:

- Briefing industry on regional plans and requirements
- Lobby for inward investment
- Promotion of regional opportunities for deployment of new technologies and services

- Arranging site visits, events etc
- Providing single interface between industry and the regional public sector bodies and a point of contact for issues such as planning, way leaves etc
- Co-ordination of programmes with UK Govt and Welsh Government

In addition, the team will be responsible for liaising with mobile operators and wireless service providers to manage all aspects of the Next Generation Wireless stream.

5.1.3 Demand Stimulation

The central Digital Project team will undertake a co-ordinating role and prepare regional collateral. Roles will include;

- PR and promotion
- Establishment of case studies of benefits and usage
- Events
- Promotion of connection voucher schemes of UK and regional Govt
- Provision of technical, commercial and legal support to community groups

The team will therefore be a resource to support each local authorities' own staff who are dedicated to local demand stimulation activities including;

- Engagement with local stakeholders such as business groups, community organisations etc
- Support and training programmes
- Use of social media
- Web based support

5.1.4 Programme Plan

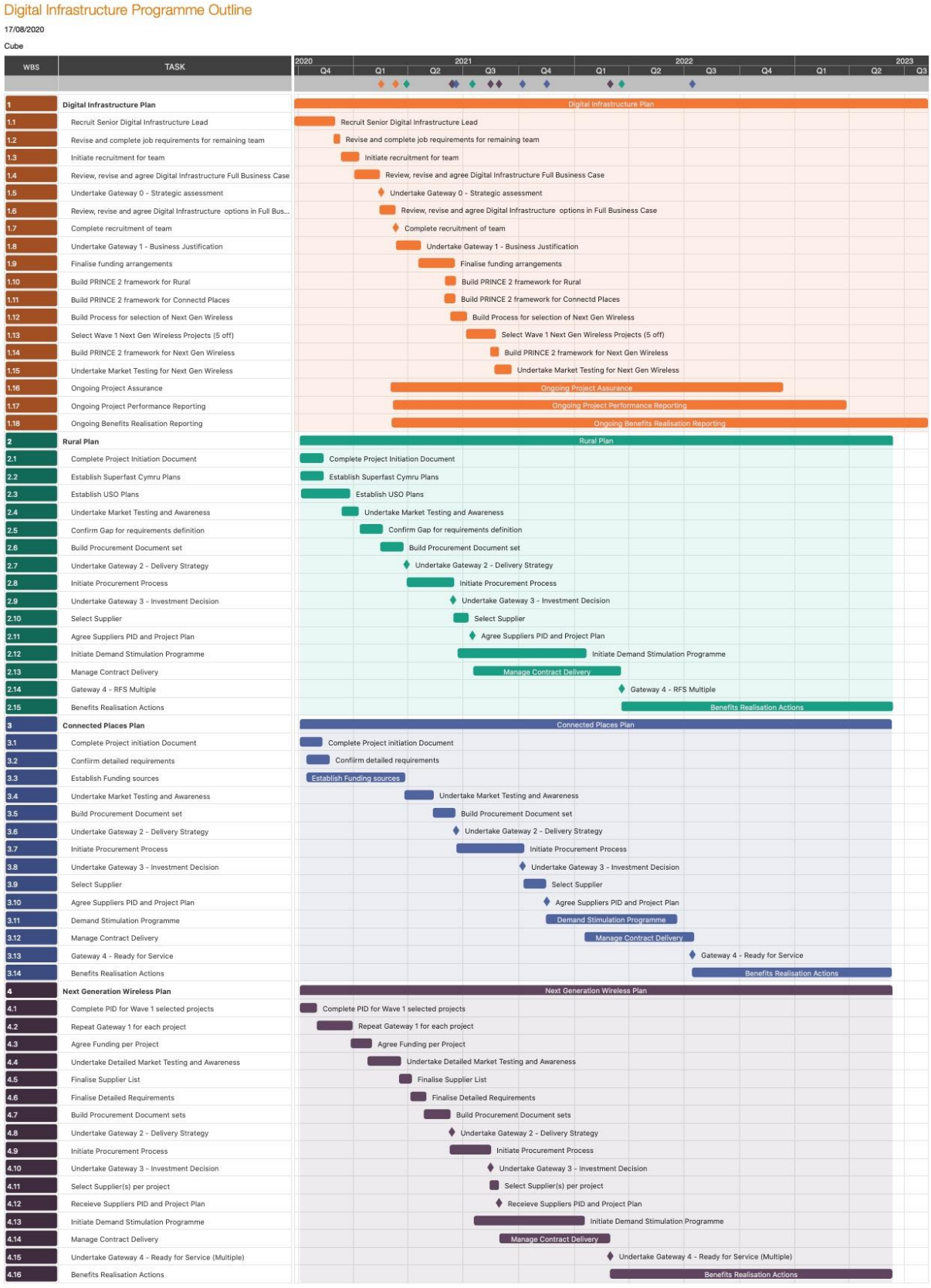


Figure 15 - Gantt Chart

5.1.5 The Work Breakdown Structure

WBS	TASK NAME	TASK KIND	START	FINISH
1	**Digital Infrastructure Plan**	**Task group**	**25-Sep-20**	**09-Aug-23**
1.1	Recruit Senior Digital Infrastructure Lead	Task	25-Sep-20	01-Dec-20
1.2	Revise and complete job requirements for remaining team	Task	29-Nov-20	09-Dec-20
1.3	Initiate recruitment for team	Task	11-Dec-20	10-Jan-21
1.4	Review, revise and agree Digital Infrastructure Full Business Case	Task	02-Jan-21	13-Feb-21
1.5	Undertake Gateway 0 - Strategic assessment	Milestone	14-Feb-21	14-Feb-21
1.6	Review, revise and agree Digital Infrastructure options in Full Busines	Task	13-Feb-21	11-Mar-21
1.7	Complete recruitment of team	Milestone	10-Mar-21	10-Mar-21
1.8	Undertake Gateway 1 - Business Justification	Task	12-Mar-21	22-Apr-21
1.9	Finalise funding arrangements	Task	18-Apr-21	17-Jun-21
1.10	Build PRINCE 2 framework for Rural	Task	01-Jun-21	19-Jun-21
1.11	Build PRINCE 2 framework for Connectd Places	Task	31-May-21	18-Jun-21
1.12	Build Process for selection of Next Gen Wireless	Task	10-Jun-21	07-Jul-21
1.13	Select Wave 1 Next Gen Wireless Projects (5 off)	Task	06-Jul-21	24-Aug-21
1.14	Build PRINCE 2 framework for Next Gen Wireless	Task	15-Aug-21	29-Aug-21
1.15	Undertake Market Testing for Next Gen Wireless	Task	22-Aug-21	19-Sep-21
1.16	Ongoing Project Assurance	Task	03-Mar-21	12-Dec-22
1.17	Ongoing Project Performance Reporting	Task	07-Mar-21	27-Mar-23
1.18	Ongoing Benefits Realisation Reporting	Task	05-Mar-21	09-Aug-23
2	**Rural Plan**	**Task group**	**04-Oct-20**	**12-Jun-23**
2.1	Complete Project Initiation Document	Task	04-Oct-20	12-Nov-20
2.2	Establish Superfast Cymru Plans	Task	05-Oct-20	12-Nov-20
2.3	Establish USO Plans	Task	06-Oct-20	26-Dec-20
2.4	Undertake Market Testing and Awareness	Task	12-Dec-20	09-Jan-21
2.5	Confirm Gap for requirements definition	Task	11-Jan-21	18-Feb-21
2.6	Build Procurement Document set	Task	14-Feb-21	24-Mar-21
2.7	Undertake Gateway 2 - Delivery Strategy	Milestone	28-Mar-21	28-Mar-21
2.8	Initiate Procurement Process	Task	30-Mar-21	16-Jun-21
2.9	Undertake Gateway 3 - Investment Decision	Milestone	13-Jun-21	13-Jun-21
2.10	Select Supplier	Task	15-Jun-21	10-Jul-21
2.11	Agree Suppliers PID and Project Plan	Milestone	15-Jul-21	15-Jul-21
2.12	Initiate Demand Stimulation Programme	Task	22-Jun-21	21-Jan-22
2.13	Manage Contract Delivery	Task	18-Jul-21	19-Mar-22
2.14	Gateway 4 - RFS Multiple	Milestone	19-Mar-22	19-Mar-22
2.15	Benefits Realisation Actions	Task	20-Mar-22	12-Jun-23
3	**Connected Places Plan**	**Task group**	**04-Oct-20**	**10-Jun-23**
3.1	Complete Project initiation Document	Task	04-Oct-20	10-Nov-20
3.2	Confiirm detailed requirements	Task	15-Oct-20	22-Nov-20
3.3	Establish Funding sources	Task	15-Oct-20	27-Mar-21
3.4	Undertake Market Testing and Awareness	Task	26-Mar-21	13-May-21
3.5	Build Procurement Document set	Task	12-May-21	18-Jun-21
3.6	Undertake Gateway 2 - Delivery Strategy	Milestone	18-Jun-21	18-Jun-21
3.7	Initiate Procurement Process	Task	20-Jun-21	10-Oct-21
3.8	Undertake Gateway 3 - Investment Decision	Milestone	06-Oct-21	06-Oct-21
3.9	Select Supplier	Task	09-Oct-21	15-Nov-21
3.1	Agree Suppliers PID and Project Plan	Milestone	15-Nov-21	15-Nov-21
3.11	Demand Stimulation Programme	Task	15-Nov-21	20-Jun-22
3.12	Manage Contract Delivery	Task	18-Jan-22	18-Jul-22
3.13	Gateway 4 - Ready for Service	Milestone	14-Jul-22	14-Jul-22
3.14	Benefits Realisation Actions	Task	15-Jul-22	10-Jun-23
4	**Next Generation Wireless Plan**	**Task group**	**04-Oct-20**	**11-Jun-23**
4.1	Complete PID for Wave 1 selected projects	Task	04-Oct-20	01-Nov-20
4.2	Repeat Gateway 1 for each project	Task	01-Nov-20	30-Dec-20
4.3	Agree Funding per Project	Task	27-Dec-20	31-Jan-21
4.4	Undertake Detailed Market Testing and Awareness	Task	24-Jan-21	20-Mar-21
4.5	Finalise Supplier List	Task	17-Mar-21	07-Apr-21
4.6	Finalise Detailed Requirements	Task	05-Apr-21	01-May-21
4.7	Build Procurement Document sets	Task	27-Apr-21	10-Jun-21
4.8	Undertake Gateway 2 - Delivery Strategy	Milestone	11-Jun-21	11-Jun-21
4.9	Initiate Procurement Process	Task	09-Jun-21	16-Aug-21
4.1	Undertake Gateway 3 - Investment Decision	Milestone	14-Aug-21	14-Aug-21
4.11	Select Supplier(s) per project	Task	14-Aug-21	29-Aug-21
4.12	Receieve Suppliers PID and Project Plan	Milestone	28-Aug-21	28-Aug-21
4.13	Initiate Demand Stimulation Programme	Task	19-Jul-21	18-Jan-22
4.14	Manage Contract Delivery	Task	30-Aug-21	01-Mar-22
4.15	Undertake Gateway 4 - Ready for Service (Multiple)	Milestone	28-Feb-22	28-Feb-22
4.16	Benefits Realisation Actions	Task	01-Mar-22	11-Jun-23

5.1.6 Use of special advisors

Specialist advisors may be necessary in the following areas:

- Technical
  - Capture of requirements
  - Production of service definitions
  - Production of procurement documentation
  - Interaction with stakeholders and national and regional governments
  - Supplier dialogue
- Legal
  - Draft contracts
  - State aid guidance and judgements
  - Procurement support in dialogue and contract finalisation

Such advisors are readily available from most large consultancy firms, but also from smaller bespoke consultancies.

There are a small number of legal companies with a track record in digital infrastructure procurements and specialist state aid units.

5.2 Arrangements for Contract and Change Management

The programme and project management approach will vary between each of the three Digital Infrastructure strands. However, in general terms, the approach will fall into one of two;

- For options that do not involve a procurement, there will be an objective setting phase and a project plan of actions, many of which will be ongoing rather than a specific fixed outcome, as an example Demand Stimulation activities
- For procurements, the SBCD programme and project management functions will be the responsibility of the supplier, SBCD will monitor, manage and provide assurance against the contracted requirements

In all cases PRINCE 2 will be adopted as the project management tool set. Where external suppliers are responsible for the programme and project management, they will be required in contract to adopt PRINCE 2, or they shall certify their practices meet or exceed the standards within PRINCE 2. Any and all project plans must be fully integrated across the relevant workstreams.

All projects will be required to construct a fully resourced project plan using Microsoft Planner or an equivalent professional level planning tool. Progress updates will be provided to the SBCD management team on a monthly basis. All plans will be baselined

and agreed with the SRO prior to project initiation. Revised plans can be proposed quarterly and adopted by the SRO programme team at their discretion.

5.3 Benefits Realisation

The measurement of benefits within the supply of an enabling digital infrastructure is problematic as there are so many moving parts that change and benefits could be assigned to. The key SMART objectives will be fully laid out under the Prince 2 methodology so that the delivery can be clearly identified in terms of physical assets and digital service coverage delivered.

An overarching benefits measure should be the percentage of households or SMEs in a given area taking up the digital services available. Some reports have indicated that an 80% take up could be expected for services of 30Mbs and more. Currently the regional take up is nearer 40%. Movement from the current level upwards once the Digital Infrastructure project is launched should be monitored quarterly as a key benefits realisation metric.

The use of the assets and service coverage once deployed are unrestricted, and benefits can flow from a wide range identified within the strategic case and also other as yet unspecified Use Cases that may emerge.

In order to measure a benefit against this list, ideally a base-line position would need to be identified, so that improvement or degradation can be seen. Unfortunately, the setting of a base-line would be open to interpretation and take a considerable amount of time and effort. It is therefore proposed that use is made of a sampling based primary research is used to identify improvements and hence benefits.

A Benefits Register template is given in Annex 3.

The measurement is not meant to be comprehensive, but focus instead on the most likely indicators that would give a positive measure of the introduction and use of digital infrastructure. The measurement itself will need to be carried out through sample based primary research programme, which will allow additional benefits to surface.

If possible, the benefit register should be utilised as part of any voucher scheme or connectivity engagement and support given to households or SMEs. By getting the actual users of the digital infrastructure to provide a before and after view in relation to the introduction or increased use of digital services would act as a very strong evidence base.

5.4 Arrangements for Risk Management

5.4.1 Risk Management Strategy

Within Prince 2, risk management, is fundamental to the process

5.4.2 Risk Register

The risk register should be a live document that is updated and referred to across the project delivery timescales and only retired once projects have been completed. The document is a fundamental input to the assurance and monitoring activities and to the final project impact assessment and evaluation.

A proposed layout for the anticipated projects is given in Annex 2.

5.5 Monitoring and Assurance

5.5.1 Assurance Framework

An assurance framework is included within the Prince 2 methodology and it is recommended this is adopted.

5.5.2 Post Project Evaluation

It is recommended that an independent body is tasked with post project evaluation, measured against the objectives and risk management within the business case. It is likely that further cross-cutting analysis would be beneficial, particularly in the role digital infrastructure has played within the areas of social cohesion and sustainability of communities.

It is also recommended that an independent project review is undertaken after 3 years of the digital infrastructure is approved. This will be initial findings and help bed down the assessment criteria and allow any adjustments in the information being collected by the interventions themselves to help clarify the inputs to the post project work.

Glossary

Ref	Expansion
SBCD	Swansea Bay City Region Deal
GVA	Gross Value Added
3G	Third Generation Mobile Services
4G	Fourth Generation Mobile Services
4G-Adv	4G using spectrum aggregation for higher speeds
5G	Fifth Generation Monile Services
FttP	Fibre to the Premises
FttC	Fibre to the Cabnet
Industry 4.0	4th generation industrial - digital control
IoT	Internet of Things, Machine to Machine
WiFi	Wireless Local Area Network connectivity
Full Fibre	Gigabit/Sec connectivity
USO	Universal Service Obligation - Broadband
CSP	Communication Service Provider
DCMS	Department of Digital, Culture, Media & Sport
FTIR	DCMS, Future of Telecoms Infrastructure Review
LFFN	Local Full Fibre Networks
BT	British Telecoms
PSBA	Wales - Public Sector Broadband Aggregation
Prince 2	Project Management Process
NEC	New Engineering Contract Model
GPT	General Purpose Technology
EE	Everything Everywhere Mobile Operator
MNO	Mobile Network Operator
Mbs	Megebits of data per second
Gbs	Gigabits of data per second
Ultrafast	>100Mbs < 300Mbs
Superfast	>30Mbs < 100Mbs
SME	Small to Medium size Enterprise

Annex 1

Key Reference Sources

Ref	Document	Doc Page	Ref Page
Sec 1	UK & Welsh Govt Swansea Bay City Deal MoU https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/611685/Swansea_City_Deal_-_English.pdf	5	1
Sec 1	Department for Business, Energy & Industrial Strategy The Grand Challenges https://www.gov.uk/government/publications/industrial-strategy-the-grand-challenges/industrial-strategy-the-grand-challenges	5	1
Sec 1	DCMS Policy paper Connectivity - building world-class digital infrastructure for the UK https://www.gov.uk/government/publications/uk-digital-strategy/1-connectivity-building-world-class-digital-infrastructure-for-the-uk	5	1
Sec 1.2	UK & Welsh Govt Swansea Bay City Deal MoU https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/611685/Swansea_City_Deal_-_English.pdf	8	5
Sec 1.2	The Internet Coast, SBCRD 2016-2035 https://democracy.npt.gov.uk/documents/s20423/City	8	6
Sec 1.2	Ofcom - Achieving decent broadband connectivity for everyone https://www.ofcom.org.uk/__data/assets/pdf_file/0028/95581/final-report.pdf	11	1
Sec 1.3 Fig 2	Connected Cities Multiplier - Regeneris Report Rural Multiplier - Ofcom USO (see above) Transport Corridor - The Benefits of 4G, Stockholm School of Economics http://www.biceps.org/assets/docs/petijumu-serija/TSIDP16	12	25
1.4	Regeneris report: The Economic Impact of Full Fibre Infrastructure (Data Filtered for Swansea Only) https://www.cityfibre.com/wp-content/uploads/2018/03/The-Economic-Impact-of-Full-Fibre-Infrastructure-in-100-UK-Towns-and-Cities-12.03.18.pdf	13	1
1.4	Deployment of FTTP in rural Northern Ireland A DotEcon report for NI Networks, part of BT https://www.dotecon.com/assets/images/Deployment-of-FTTP-in-rural-Northern-Ireland.pdf	14	4
2.1	Ofcom Data Sources https://app.powerbi.com/view?r=eyJrIjoiZTg4NDMyZjctNWJhZS00MjNjLWIxYzMtZjkwYzljNDk2NzdmIiwidCI6IjBhZjY0OGRlLTMxMGMtNDA2OC04YWU0LWY5NDE4YmFlMjRjYyIsImMiOjh9	22	Data
2.1.1	DCMS Future Telecoms Infrastructure Review https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/732496/Future_Telecoms_Infrastructure_Review.pdf	25	Report
2.1.5	WIK Report to Ofcom - The Benefits of Ultrafast Broadband Deployment	26	Report
2.3	Ofcom data sources as in section 2.1	39	Data
2.3.1	SQW Impact Assessment report on Next Gen Broadband Wales	40	60
2.3.1	Ofcom data sources as in section 2.1	40	Data

Annex 2 Risk Register. Showing early major risks. – Update to headings and review

Risk ID	Raised By	Date Raised	Risk Category	Description	Impact	Impact	Probability	Mitigation	Responsible Owner	Action Owner
No.	Name	Date	Source	Narrative	Time	Cost	Percent	Narrative	Name	
1			Business Case	There is currently a lack of resources engaged to deal with the Digital Infrastructure project. Urget recruitment is necessary			100%	1. Appoint recrutiment agency 2. Second authority staff 3. Utilise external consultants to cover short term		
2			Business Case	Stakeholder coordination within the City Deal delays kick off			50%	Appoint digital lead as soon as possible		
3			Business Case	State Aid issues			30%	Seek legal advice across all three digital infrastructure streams		
4			Business Case	Supplier appetite to engage			30%	Appoint digital lead as soon as possible Engage with telecoms companies as widely as possible during project start-up		
5			Business Case	Prioritisation of funding from within SBCD funding allocation is low			10%	Ensure SBCD is fully enagaged with the Digital Infrastructure project and aware of the enabling and transformative aspects of its delivery		
6			Projects	Integration with other funding interventions is not achieved leading to a loss of investment from external public sector sources			30%	Ensure the digital lead has this as a primary KPI and that it is a reported item for all risk management activities		
7			Projects	Demand side stimulation is not coordinated with digital infrastructure delivery timescales			20%	Ensure actions around demand stimulation is coordinated with the requisite digital infrastructure becoming available or are least assured in delivery		
8			Projects	Digital infrastructure interventions happen in a peicemeal manner and the leverage achievable between them is lost			20%	The digital lead must coordinate all three streams to maximise the impact they can achieve. It is likely that the investment in one stream will enable or encourage investment in another. Identify KPIs to support the leveraged poutcomes		
9			Rural Project	The unserved premises are not identified accurately			25%	Both the USO and Superfast Cymru must identify the premises they cover, if they are unable to do this clearly then the project will need to develop localised resources to identify premises with no or poor services		

Risk ID	Raised By	Date Raised	Risk Category	Description	Impact	Impact	Probability	Mitigation	Responsible Owner	Action Owner
No.	Name	Date	Source	Narrative	Time	Cost	Percent	Narrative	Name	
10			Rural Project	The number of premises to be connected by SBCD is higher due to unfroseen limitations in other intervention fund			20%	Prioritisation may be necessary and would be done in consultation between the digital lead and each authority		
11			Connected Places	Private sector will not utilise public sector assets due to quality or commercial arrangements			20%	Project team to fully understand the motivations and concerns of oprivate sector investors to establish levels of challenges		
12			Connected Places	PSBA integration is problematic or PSBA is unable to extend its reach to rural communities			10%	Digital lead must work closely with the PSBA to ensure support and intagration with their programmes and actions		
13			Connected Places	Fragmentation across Authorities in priority to support digital infrastructure			20%	Digital lead and project team to have close relationship with authorities infrastructure and ICT teams on deployment options and actions		
14			Connected Places	Local business fail to take up services once provided			20%	Demand side stimulation must lead the provision of digital infrastructure		
15			Next Generation Wireless	Use Cases are weak in support of SBCD projects and other innovative projects			30%	The project team will help shape and technically outline projects to ensure they are attractive to 5G investments		
16			Next Generation Wireless	The MNOs are challenged with multiple opportunities across the UK and SBCD projects are not seen as a priority			20%	Digital lead must engage with ooperators to ensure they are fully aware of both the ambitions and objectives of the SBCD projects		
17			Next Generation Wireless	Other 5G intervention funds are not capataised upon			40%	The digital lead and project team must work with other interested parties to ensure high quality proposals are delivered for additional UK national funding opportunitires		

Annex 3

Benefits Register

The benefits register has been developed under different stages of the projects and against both quantitative and qualitative assessments. The first table references the Implementation Stage, representing a number of areas that will stimulate inward investment by the public sector in constructing the digital infrastructure assets and can all be measured to reveal quantitative outcomes.

The next two tables represent the operational benefits to be accrued by the digital infrastructure deployed. Again, these are quantitative measures that will give direct benefits to both the citizens and business communities in the region. Digital Infrastructure is an enabling environment and as such the benefits are dependent on uptake and usage and as such benefits are built across several actions, not just the availability of the infrastructure.

The final table is representative of qualitative benefits. In many cases, digital infrastructure will stimulate usage across a broad range social and business areas that although not delivering clear and measurable outcomes, will nevertheless offer significant improvements in current ways of delivering services and information to both the public and private sector.

The benefits registers should become living documents through the life of the SBCD Digital Infrastructure project. The benefits registers represented here are a starting point.

BENEFITS REGISTER

Project Name: ***Digital Infrastreucture*** **Date:** Aug-20

Responsible Officer/Register Owner: xxxx

This Benefits Register will be reviewed regularly and will form part a standing Agenda on the Project Board.

Note: All the benefits in the Strategic Case and Economic Case must be accounted for within the Benefits Register - this includes the Economic Appraisal for the Preferred Option.

This Register should cover all benefits - Financial, Non-Financial and Qualitative identified during the Implementation and Operational Phases of the project.

Benefit No:	Benefit Description	Benefit Target	Targeted End Achievement Date	Year Time Value			Data Sources	Activities Required/Critical Dates	Responsible Officer/Who will deliver it	How will it be evidenced	Reporting
(unique no. in this register)	*(including enabling project or activity)*	*Measurable Target - Expected level of change*	*Specific date when will the benefit be realised*	*(what benefits will be delivered over the 5yr, 10yr, 15yr period)*			*(what aspect of the project will give rise to the benefit - to facilitate monitoring)*	*(to secure the benefit)*			
IMPLEMENTATION PHASE				**5yrs**	**10 yrs**	**15yrs**					
QUANTITATIVE INDICATORS											
IP 1	*Connected Places:Increased commercial investment leveraged by SBCD project*	*£10m initial investment; £50m pull through investment*	*2021-2025*	*£30m*	*£30m*		*Reporting from telecommunications operators. Initial investment and build out reporting to form part of contractual obligations*	*Procurement and finalise contracts by 2020/21; Followed by initial 18month build programme*	*SBCD Project Manager, Digital Procurement Officer and Legal/State aid advisor*	*Tempates in contracts to provide evidence of km of duct and fibre built; Number of public sector sites served with gigabit connectivity monitored by IT departsments and SBCD Project Team*	*Monthly reporting on steps to achieve benefits realisation to the Project Board. Quarterly reporting to the SBCD Regional Office by the Project Lead and the SBCD Project Local Authority Lead to inform on progress towards achievement of the benefit. Project Lead to report to SBCD Regional Office when benefit target achieved. Project Lead to quartely reports to SBCD Regional Office to highlight all changes to benefits outputs and outcomes.*
IP2	*Connected Places: Improved public sector assets and connectivity*	*Number of public sector sites with gigabit capable fibre (281 sites) plus building of duct infrastructure*	*2020-2023*	*£20m*			*Reporting from telecommunications operators. Initial investment reporting to form part of contractual obligations*	*Procurement and finalise contracts by 2020/21; Followed by initial 18month build programme*	*SBCD Project Manager, Digital procurement Officer and Legal/State aid advisor*	*Tempates in contracts to provide evidence of km of duct and fibre built; Number of public sector sites served with gigabit connectivity monitored by IT departments and SBCD Project Team*	*Quarterly Reports to Project Board as above*
IP3	*Next Generation Wireless; Accelerated deployment of 5G and IoT*	*£9m of initial investment*	*2020-2025*	*£9m*	*£9m*		*Reporting from mobile operators and servcie providers*	*Establish funding inventions by 2021*	*SBCD Project Manager & Digital Procurement Officer*	*Joint working with mobile service providers to establish reporting of deployment and investment levels*	*Quarterly Reports to Project Board as above*
IP4	*Rural: Demand stimulation programme to increase service take up*	*Number of business and residential premises with NGS servcies*	*2020-2025*	*£5m*	*£15m*		*Reporting from Ofcom and telecoms industry*	*Stilumation activities on-going from 2019-2025*	*Local authority Marketing officers and analysts*	*Reporting from trlecommunications companies and national and regional Govt monitoring*	*Quarterly Reports to Project Board as above*
IP5	*Rural in-fill procurement*	*Number of premises passed and service adoption rates*	*2020-2025*	*£20m*	*£5m*		*Reporting from telecommunications operators. Initial investment reporting to form part of contractual obligations*	*Procurement and finalise contracts by 2021; Followed by initial 2 year build build programme*	*SBCD Project Manager, Digital procurement Officer and Legal/State aid advisor*	*Tempates in contracts to provide evidence of premises passed;*	*Quarterly Reports to Project Board as above*

BENEFITS REGISTER

Project Name: ***Digital Infrastreucture*** **Date:** Aug-20

Responsible Officer/Register Owner: xxxx

This Benefits Register will be reviewed regularly and will form part a standing Agenda on the Project Board.

Note: All the benefits in the Strategic Case and Economic Case must be accounted for within the Benefits Register - this includes the Economic Appraisal for the Preferred Option.

This Register should cover all benefits - Financial, Non-Financial and Qualitative identified during the Implementation and Operational Phases of the project.

Benefit No:	Benefit Description	Benefit Target	Targeted End Achievement Date	Year Time Value			Data Sources	Activities Required/Critical Dates	Responsible Officer/Who will deliver it	How will it be evidenced	Reporting
(unique no. in this register)	*(including enabling project or activity)*	*Measurable Target - Expected level of change*	*Specific date when will the benefit be realised*	*(what benefits will be delivered over the 5yr, 10yr, 15yr period)*			*(what aspect of the project will give rise to the benefit - to facilitate monitoring)*	*(to secure the benefit)*			
OPERATIONAL PHASE				**5yrs**	**10 yrs**	**15yrs**					
QUANTITATIVE INDICATORS											
OP1	*Gross new jobs directly created by the SBCD project*	*Direct employment in digital infrastructure deployment; Track employment levels in regional digital intensive industries; Track overall regional employment*	*15 years*				*Project Manager Monitoring Reports. Internal Management Information Systems' reporting data & HR records.*	*Ongoing from 2020*	*Project Lead*	*Project Manager project monitoring records. Floor/unit/building plans to show no of jobs that can be accommodated. Names of the businesses occupying the units/building/premises. Occupancy levels of buildings/no of businesses /jobs created in each business/total building & length of tenancies. Any documents to show that the jobs have been created and how many. Any other documents showing that these directly relate to the project - business' staff structure chart etc*	*Quarterly Reports to Project Board as above*
OP2	*Gross Value Added (GVA)*	*Monitor investment levels in programme; Apply national benchmarks and multipliers to derive GVA*	*15 years*			*>£350m (£200m Connected Places, £150m rural)*	*Utilise national and regional digital impact surveys*	*Ongoing from 2020*	*Digital Project Office and Economic Development to Monitor*		*Quarterly Reports to Project Board as above*
OP3	*Improve the quality of public service delivery by ensuring all public buildings are digitally connected facilitating improved efficiency and public access to services*	*In-house operational records for service availability and cost of service delivery*	*15 years*				*Service delivery reporting*	*Ongoing from 2020*	*Heads of Service to monitor service deliver and operational costs*		*Quarterly Reports to Project Board as above*
OP4	*Cost savings to the public sector for digital connectivity*	*Telecommunications service providers and PSBA billing records*	*15 years*				*ICT infrastructure billing*	*Ongoing from 2020*	*ICT leads and network analysts*	*Monitor on-going ICT connectivity expenditure*	*Quarterly Reports to Project Board as above*
OP5	*Stimulation of competition in digital services*	*Track operator and service provider presence in region; Benchmark services and tariffs*	*15 years*				*Monitoring of services and costs - benchmarked against national and regional service offerings*	*Ongoing from 2020*	*Network analysts and marketing officers*	*Ofcom reports, analysts reports, Welsh Govt monitoring*	*Quarterly Reports to Project Board as above*
OP6	*Deliver economic benefits through the usage of digital infrastructure, notably increased efficiency and enhanced productivity.*	*Local authority and health boards operational reports*	*15 years*				*Industry surveys and case studies*	*Ongoing from 2020*	*ICT leads and Heads of service*	*Service delivery operational cost reporting*	*Quarterly Reports to Project Board as above*
OP7	*Improve the quality of public service delivery by ensuring communities in remote areas have access to services*		*15 years*				*Monitor service access and delivery and benchmark against urban availability*	*Ongoing from 2020*	*ICT leads and Heads of service*	*Service delivery operational reporting*	*Quarterly Reports to Project Board as above*
OP8	*Social cohesion and inclusion across the region to sustain communities*		*15 years*				*Monitor population levels, employment and migration from rural communities*	*Ongoing from 2020*	*Economic development officers, Community officers*		*Quarterly Reports to Project Board as above*
OP9	*Stimulate economic growth by enhancing opportunities for employment*	*Business start up reports, inward investment by digital intensive industries*	*15 years*				*Monitor employment records, job creation and number of business start ups*	*Ongoing from 2020*	*Economic development officers, Community officers*		*Quarterly Reports to Project Board as above*
OP10	*Innovation and ensuring the region is at the forefront of new service roll out and delivery*	*On-going monitoring of service availability from telecommunications industry*	*15 years*				*Liaise with wireless service providers. Monitor service availability and applications against national benchmarks*	*Ongoing from 2020*	*ICT leads, Economic Development*	*Surveys*	*Quarterly Reports to Project Board as above*
OP11	*Environmental benefits (reduced transport congestion and lowered carbon footprint)*	*Transport monitoring reports and surveys*	*15 years*				*Survey commuting patterns; Monitor congestion*	*Ongoing from 2020*	*Transport Planning*	*Transport monitoring reports*	*Quarterly Reports to Project Board as above*

BENEFITS REGISTER

Project Name: ***Digital Infrastreucture*** **Date:** Aug-20

Responsible Officer/Register Owner: xxxx

This Benefits Register will be reviewed regularly and will form part a standing Agenda on the Project Board.

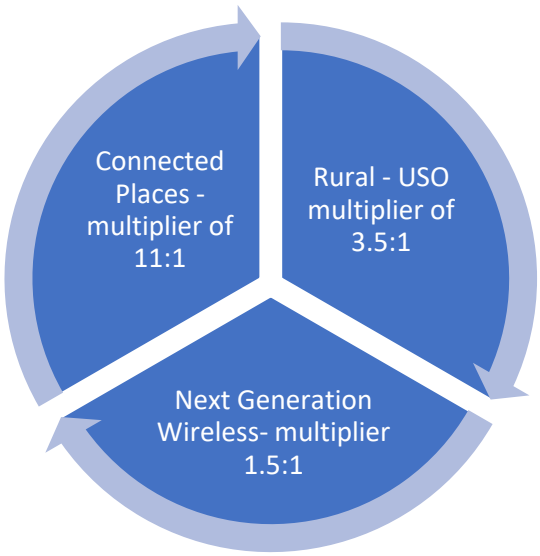
Note: All the benefits in the Strategic Case and Economic Case must be accounted for within the Benefits Register - this includes the Economic Appraisal for the Preferred Option.

This Register should cover all benefits - Financial, Non-Financial and Qualitative identified during the Implementation and Operational Phases of the project.

Benefit No:	Benefit Description	Benefit Target	Targeted End Achievement Date	Year Time Value			Data Sources	Activities Required/Critical Dates	Responsible Officer/Who will deliver it	How will it be evidenced	Reporting
(unique no. in this register)	*(including enabling project or activity)*	*Measurable Target - Expected level of change*	*Specific date when will the benefit be realised*	*(what benefits will be delivered over the 5yr, 10yr, 15yr period)*			*(what aspect of the project will give rise to the benefit - to facilitate monitoring)*	*(to secure the benefit)*			
OPERATIONAL PHASE				**5yrs**	**10 yrs**	**15yrs**					
QUALITATIVE INDICATORS											
OP1	*Digital transformation is accelerated in the Public Sector*	*Acceleration in transformation beyond current planning*	*15 years*				*Authority annual reports. Authority strategy documents*	*Ongoing from 2020*	*Authority ICT lead*	*Monitoring progress in transformation and interviews with digital leads*	*Authority reporting*
OP2	*Access to Public Services via digital services increases and improves*	*More access is made to wider services through digital channels*	*15 years*				*Authority annual reports. Authority strategy documents*	*Ongoing from 2021*	*Authority ICT lead*	*Monitoring progress in transformation and interviews with digital leads*	*Authority reporting*
OP3	*Access by rural populations to Public Services increases and improves*	*More access is made to wider services through digital channels*	*15 years*				*Authority annual reports. Authority strategy documents*	*Ongoing from 2021*	*Authority ICT lead*	*Monitoring progress in transformation and interviews with digital leads*	*Authority reporting*
OP4	*Loneliness and isolation reduces through digital access to services and information*	*General reporting of condition is reduced*	*15 years*				*Authority annual reports. Authority strategy documents*	*Ongoing from 2021*	*Authority ICT lead*	*Monitoring progress through Social Services*	*Authority reporting*
OP5	*Better integration across digital platforms*	*Single versions of digital truths that is mapped across many digital platforms*	*15 years*				*Authority annual reports. Authority strategy documents. Industry led integration of information sources and integrated applications*	*Ongoing from 2021*	*Industry players and Local Authority service providers*	*Ease of use across digital platforms and applications*	*Authority reporting*
OP6	*Access to remote health services*	*Telemedicine*	*5 years*				*Health Service reports and analysis of patient access*	*Ongoing from 2021*	*Health Trusts & GPs*	*More acceptance and use of digitally enabled remote health services*	*Authority reporting*
OP7	*Time savings in accessing goods and service for the public and SMEs*	*More access is made to wider services through digital channels*	*5 years*				*Authority reports and business reports*	*Ongoing from 2021*	*Industry players and Local Authority service providers*	*Monitoring progress in transformation and interviews with digital leads*	*Authority reporting*
OP8	*Access to educational material through digital infrastructure*	*More access is made to wider services through digital channels*	*5 years*				*Authority annual reports. Authority strategy documents*	*Ongoing from 2021*	*Education authorities*	*Monitoring progress in transformation and interviews with digital leads*	*Authority reporting*

Annex 4

Economic Impacts



Research into the benefit/cost ratios that apply to the three main headings vary for different interventions across different deployments of digital infrastructure, but all are positive in their impact. Considering the three main headings and applying a conservative aggregation interpretation of current figures to make them directly appropriate, the following applies;

Connected Places 11:1 multiplier – extrapolation from Regeneris Report – The Economic Impact of Full Fibre Infrastructure in 100 Towns and Cities.

Rural 3.5:1 multiplier – UK Govt case for USO intervention & Superfast Cymru assessment report.

Next Generation Wireless 1.5:1 multiplier – EC report on 5G impacts and TeliaSonera Inst, benefits of 4G Sweden and Estonia.

It should be noted that all three Digital Infrastructure deployment types above are complimentary and importantly amplify each other. Strong and widespread fibre deployments is a precursor for 4G-Adv and 5G, while many Use Cases are enhanced by the fact that they are able to deliver through both fixed and mobile applications and services.

It should be noted that there is so far a small body of evidence around the impact of 4G[55] and none related to 5G, simply because in the case of 4G it is a relatively new technology[56] and only **adds mobility** to the services available through fixed and WiFi services. For 5G, despite the hype, there is no concrete evidence as yet and it will be several years before research is available on this topic. For this reason, a very conservative multiplier has been adopted for

[55] Research in Australia gave a significant impact to 3G/4G availability, although not measured as a direct economic impact. The figures indicate a 10% uplift in productivity for businesses due to mobile broadband. https://www.acma.gov.au/~/media/Numbering%20and%20Projects/Report/pdf/Economic%20impacts%20of%20mobile%20broadband_Final%20pdf.pdf

[56] EE Provided a report estimating 0.7% uplift in GDP over the life of 4G mobile broadband. https://ee.co.uk/content/dam/everything-everywhere/Newsroom/PDFs%20for%20newsroom/Capital%20Economics%20Report_ImprovingConnectivityNov2014.pdf

the Next Generation Wireless. If the hopes for 5G[57] do come to fruition, then the multiplier here is understated[58] by a factor of ten.

In all cases, the digital infrastructure deployment supported by SBCD will be of 'production standard', that is, it will be deployed as a long-term investment and service provider. It will deliver digital infrastructure that is fully integrated into the commercial base of connectivity in the region and not on the basis of short-term usage and impacts. In delivering this, it will be imperative to work with the private sector service providers for both fixed line and mobile operators and to integrate the Digital Infrastructure interventions with their networks and commercial operation.

Connected Places Case:

In the Urban /Economic Development Zones segment the Regeneris[59] analysis model has assessed the direct and indirect economic impacts of full fibre infrastructure over 100 UK cities. Specifically, in the Swansea Bay region, the modelled impacts of the direct benefits are >£200m against a projected investment for the region of £17m, a multiplier of 11. In fact, Swansea City itself has a multiplier of 20. These benefits are broken down as follows;

- Productivity improvements to businesses - 8%
- Start-ups – 9%
- Innovation - 8%
- Network build – 19%
- Enhanced teleworking and worker flexibility – 11%
- Household benefits – 45%

This assumes a build up as follows;

- services enabled: 1 year after the start of network build
- 35% adoption rate reached: after 5 years
- productivity benefits achieved: 1 year after adoption
- innovation benefits realised: 4 years after adoption.

Next Generation Wireless

There is little evidence available for the direct impact for better 4G coverage and as yet none for 5G, as it has not been deployed at this time in more than testbeds. Despite this, the general opinion of the industry is that 4G and 5G coverage is essential for both their general

[57] Deloitte report to UK Govt.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/714112/The_impacts_of_mobile_broadband_and_5G.pdf

[58] General support given in European Commission Report: Identification and quantification of key socio-economic data to support strategic planning for the introduction of 5G in Europe.

https://connectcentre.ie/wp-content/uploads/2016/10/EC-Study_5G-in-Europe.pdf

[59] Regeneris report on the Economic impact of Full Fibre

https://www.cityfibre.com/wp-content/uploads/2018/03/The-Economic-Impact-of-Full-Fibre-Infrastructure-in-100-UK-Towns-and-Cities-12.03.18.pdf

customer base and also industry and the service sector as a whole. Work undertaken for the EU in relation to 4G services being made widely available in Sweden and Estonia, has estimated a benefit ratio of 1.5:1. Bearing in mind the very large impacts of deploying full fibre, it must be remembered that 4G in particular is only enhancing benefits further due only to its mobility, not by adding new services. In contrast, 5G opens significant opportunities for new services and innovation.

Rural

A direct comparator in this case is the work undertaken by Ofcom to determine the business case for the introduction of a Universal Service Obligation[60] so that every premise in the UK has connectivity at 10Mbs or above. This directly compares with the rural areas of the region. In their economic assessment, a benefit multiplier of 3.4-3.6:1 is set out. Independent research[61] for BT undertaken to assess the impact of investment in rural connectivity for Northern Ireland gave the following;

Benefit Category	Absolute Benefit	Benefit Multiple (relative to cost)
Productivity Growth	£50m – £410m	0.3 – 2.7
Employment Benefits	£290m - £890m	1.9 – 5.9
Teleworking	£40m	0.3

Table 47 - Rural Connectivity Investment Impacts in NI

In effect this gives a range of benefit multiplier of between 2.5 and 8.9. However, as the economic impact undertaken for the USO is very recent and is more conservative, the 3.5:1 figure is preferred for the rural Digital Infrastructure.

Taking all three of the headings, it should be noted that all of the above are additive, that is, they offer integrated connectivity solutions that will enable wider services and innovation.

[60] https://www.ofcom.org.uk/phones-telecoms-and-internet/advice-for-consumers/broadband-uso-need-to-know

A limit of £3,400 has been placed on any single connection, if the cost of connectivity is in excess of this, then a contribution will be required. It is also limited to customers who will NOT benefit from another publicly funded programme.

[61] The analysis was the delivery of 30Mbs services across rural areas in NI, DotEcon report for BT

Annex 5

Success Factor Analysis Framework – Update to headings and review

The tables reflect the inputs from workshops held with SBCD working groups during workshops. The assessment is identified by the normal Red/Amber/Green arrangement, with the best choice represented by having the most green boxes.

Rural Options	Aligned to Strategy	Economic Impact	Achievability	Affordability	Attraction to Supply Chain	Programme Compatibility	Risk
Do Nothing	Does not meet any strategic plans from WG, Authorities or SBCD	Has No impact	Cannot be delivered as other intervention programmes cross over	Good as No Costs involved	Will drive supply chain to other regions and negatively impact other full fibre and 5G ambitions	Good as it would not interfere	Highest risk is terms of achieving the digital infrastructure goals
Supply Side Engagement	Corresponds to previous and current efforts	Historically not provided strong or measurable impacts	Corresponds to previous and current efforts	Low Cost - Small team	Suppliers respond to contact and sharing of data, but not a strong influencer of their objectives	Allows lobbying on both programme teams and supplier to create harmonised outputs	Low risk as based on influencing, not delivering
Demand Stimulation	Works through multiple streams for training and innovation support	Targeted stimulation gives higher success rates and allows broad brush sectorial improvements as well	Requires the use of existing skills, supported by supplier innovation actions, strong likilehood of success	Low Cost - Small team	Supply Chain investment cases are driven by revenue forecasts, improving the market size is positive for all	Will allow added leverage to interaces with other funding programmes and evidence to improve investment	Low risk as based on influencing, not delivering
SBCD Procurement	Will meet strategic goals	Investment will drive additional investment from the private sector, generally improves GVA	No guarantee of private sector take-up or additional investment	Large scale investments required	Reduces deployment costs, but does not solve the equation on low revenues for large investments	Other programmes are intervention funds to encourage the supply chain to action, not to support authority builds	Constant risk suppliers will not utilise any infrastructure offered
Community Programmes	Corresponds to previous and current efforts	Fragmented approach with limited take-up, localising any impact	Historically, very problematic as skills to execute do not exist in small communities	Fragmented approach removes any economies of scale	Fragmented approach removes any economies of scale for suppliers	Could be used to support other intervention programmes, but linkages not in place	Low numbers of successful deployments probable so high risk of limited success

Table 48 - Rural Options Assessment. Preferred choice, 'Demand Stimulation'

Connected Places	Aligned to Strategy	Economic Impact	Achievability	Affordability	Attraction to Supply Chain	Programme Compatibility	Risk
Do Nothing	Does not meet any strategic plans from WG, Authorities or SBCD	Has No impact	Cannot be delivered as other intervention programmes cross over	Good as No Costs involved	Will drive supply chain to other regions and negatively impact other full fibre and 5G ambitions	Good as it would not interfere	Highest risk is terms of achieving the digital infrastructure goals
Supply Side Engagement	Corresponds to previous and current efforts	Historically not provided strong or measurable impacts	Corresponds to previous and current efforts	Low Cost - Small team	Suppliers respond to contact and sharing of data, but not a strong influencer of their objectives	Allows lobbying on both programme teams and supplier to create harmonised outputs	Low risk as based on influencing, not delivering
SBCD Asset Investment	Aligns with UK, WG and SBCD. LFFN funding is directly equivalent	Investment will drive additional investment from the private sector, generally improves GVA	Private sector partnerships and investment are pre-requisite, success more likely	Leveraged investment with private sector. Costs also amortised over longer term (15y)	Supply Chain investment cases are more favourable due to anchor tenant model	Will allow added leverage to interaces with other funding programmes and evidence to improve investment	Timescales and level of invstment lead to higher risks, although many risks are shared with the supply chain
SBCD Procurement	Will meet strategic goals	Investment will drive additional investment from the private sector, generally improves GVA	No guarantee of private sector take-up or additional investment	Large scale investments required, but revenue opportunities from rental of assets	Builders of the assets would be positive, but they do not share any ongoing commercial usage risks	Would be seen as an in-fill to other programme funding rather than a competitor	Constant risk service providers will not utilise any infrastructure offered

Table 49 - Connected Places Assessment. Preferred Option, 'Supply Side Engagement'

Next Generation Wireless	Aligned to Strategy	Economic Impact	Achievability	Affordability	Attraction to Supply Chain	Programme Compatibility	Risk
Do Nothing	Does not meet any strategic plans from WG, Authorities or SBCD	Has No impact	Suppliers will deploy 5G in Dense Urban anyway	Good as No Costs involved	Will drive supply chain to other regions and negatively impact other full fibre ambitions	Good as it would not interfere	Highest risk is terms of achieving the digital infrastructure goals
Supply Side Engagement	Meets some of the strategic intents of UK, WG and SBCD	Unlikely to secure a wide deployment of services outside city centres over 5 years	Suppliers are in engagement mode as they try to build their own business case for 5G deployment	Low Cost - Small team	Suppliers respond to contact and sharing of data, but not a strong influencer of their objectives	DCMS 5G programmes likely to be aligned to SBCD strategy	Low risk as based on influencing, not delivering
Udertake 'Future Telecom Infrastructure Review guidance	Would support all UK, WG, SBCD strategic intents around broadband and mobile broadband	Would offer a broad set of opportunities to stimulate uptake and innovation	Local Authorities highly recommended to implement, some central support available	Low Cost - Small team	Supply Chain investment cases are driven by revenue forecasts, reducing their costs of deployment is positive	Would not guarantee the delivery of 5G or IoT services within SBCD, but would be directly aligned to DCMS 5G funding	Low risk as based on influencing and cost reductions for the suppliers, no real delivery risks
Funded Extension of 4G Coverage	Will meet Ofcom, DCMS and WG strategic goals	Coverage extensions only needed in more rural environments. Better this was left to fixed broadband to achieve	Direct funding would be problematic under State Aid as there are four MNOs	Depending on intervention model, a site can cost up to £200k to build and operate	Reduces deployment costs, but does not solve the equation on low revenues for large investments	There are no programmes currently in place	Constant risk suppliers will not utilise any infrastructure offered
Funded Intervention for 5G and IoT deployment	Ealry adoption of 5G and IoT is a fundamental strategic aim for UK, WG and SBCD	Limited impact as deployments will be PoC rather than industrail scale role-outs	Supply side would do all deployment, therefore low risk of failure to deliver the services. Uptake is a different issue	Joint funding with private sector and time-limited exposure	Supply side is seking attractive Use Cases so is willing to engage and jointly innovate	Future programmes for 5G are imminent and these are likely to be closely aligned	Low numbers of successful deployments probable so medium level of success likely

Table 50 - Next Generation Wireless Assessment. Preferred Option, 'Undertake FTIR Guidance'

Annex 6

Summary of Financial Analysis – Assumptions and Sources

Financial Overview

Figure 1 presents a summary of the proposed budget for Digital Infrastructure Stream, segmented between Capital and Revenue Expenditure (Opex)

Stream	Proposed Budget	Capital	Revenue over 5 years
Rural	£25.5m	£20m	£5.5m
Connected Places	£20.0m	£19.5m	£0.5m
Next Generation Wireless	£9.5m	£7.5m	£2.0m
TOTAL	£55.0m	£47.0m	£8.0m

Numbers were derived from detailed bottom up cost modelling of addressing the requirements and needs of each of the respective streams. In the case of the rural stream the focus was to enhance broadband service provision in those areas where there is an absence of broadband provision or at a speed beneath a 30Mbps download. In the Connected Places the programme seeks to prioritise full fibre provision into the key urban centres and economic development zones across the region. The proposed budgets address these requirements. However, there is flexibility and the reach and depth of both programmes could be increased. This gives the programme flexibility to accommodate new funding sources. In contrast the Next Generation Wireless programme is targeted at the partial funding of key next generation wireless technology projects, which can also be scaled.

The key assumptions are as follows:

i) Rural

In the rural programme we have the following activities selected from the long list of options:

- Option 2; Supplier Engagement; £0.5m revenue budget (See Economic Case Option 2 – Table 23. and description in Option 2 table). The £0.5m is comprised of £100k/annum over a five-year period. Tasks to be undertaken include;
    - Briefing industry on regional plans and requirements
    - Lobby for inward investment
    - Promotion of region as test bed for new technologies and services
    - Arranging site visits, events etc
    - Providing single interface between industry and the regional public sector bodies and a point of contact for issues such as planning, way leaves etc
    - Co-ordination of programmes with UK Govt and Welsh Government
- Option 3; Demand Stimulation; £5m revenue budget (See Economic Case Option 3 – Table 23 and description in Option 3 table) . SBCD establish a local programme to increase user awareness and adoption of digital services across the entire population of SMEs and households. Activities would include:
    - PR and promotion
    - Establishment of case studies of benefits and usage
    - Engagement with local stakeholders such as business groups, community organisations etc
    - Events
    - Promotion of connection voucher schemes of UK and regional Govt
    - Engagement with suppliers
    - Engagement with local businesses and residents
    - Support and training programmes
    - Use of social media
    - Web based support
    - Provision of technical, commercial and legal support to community groups
- Option 4; In-fill procurement; The estimated gap in coverage in the SBCD following the interventions from Superfast Cymru and the Universal Obligation Fund is estimated at up to 3-5000 premises (see Economic Case; Option 4 SBCD In-Fill Procurement). As these are the most outlying rural sites, we have a cost per line of £5000 based on the remaining unserved premises in BDUK. If we take a mid-range figure of the estimated gap i.e. 4000 lines, we have a capital requirement of £5000 x 4000 = £20m.

ii) Connected Places

Detailed bottom up modelling was undertaken to derive the Total Capital Cost to link the public sector sites in the key development zones. As stated in page 88 a blend of Options 3- an investment in public sector owned duct infrastructure and Option 4, a procurement of commercial owned full fibre infrastructure should be undertaken. The blend of these two options will depend on supplier appetite to be defined in market testing with a total budget

of ceiling of £20m; £19.5m for network build and £0.5m to cover procurement and management costs.

In order to derive the costs a bottom up cost model was commissioned from their consultancy FarrPoint. Public sector site data was input to the model. The following approach was then taken. This model has been used by DCMS on a range of LFFN projects. Key assumptions are;

- The WAN requirements of the authorities will result in the build of a new duct and fibre infrastructure to serve all the sites centrally located Points-of-Presence (PoPs).;
- For the purpose of modelling, the PoPs are taken to be existing BT exchanges currently used to deliver the Council WAN connectivity
- A GIS tool was used to model an example network footprint, establish the routes over the UK road network, and capture route distances.
- The cost of the modelled network was estimated using standard industry benchmarks for civil and fibre infrastructure including: the cost of dig on roads, footpaths and soft verge including reinstatement, sourcing and installation of chambers, subduct, fibre cables, fibre joints, and including fusion splicing.
- For all sites, standard assumptions have been used to estimate a cost for work on the curtilage of each site including provision and installation of a small chamber and small splicing enclosure, a 20m soft dig outdoor with installation of a duct and sub-duct between the chamber and the building entry point, 10m internal cabling installation in existing containment, installation of a 4 fibre cable from external chamber to fibre termination point, termination of fibre on an existing rack and fibre patch panel or on a wall box.
- The cost model assumes a typical breakdown of work on road, footpath and grass verge.

iii) Next Generation Wireless

In the Next Generation Wireless stream, we have the following activities selected from the long list of options:

- Option 3 ; Will be executed under central SBCD mandate and management with a cost cap of £2.0m (see Economic Case Option 3 page 75) The thrust of the Telecoms Review and the Welsh Mobile Action Plan is to make it easier and cheaper for mobile operators to expand coverage and introduce new services such as 5G and IoT. Fundamentally, this requires SBCD, along with support from local authorities in allowing their asset usage and in addition streamlining the planning and implementation processes.
- Option 5: Do Something: Support for Specific 5G/IoT Projects (See Economic Case Page 79): Note the cost of the team to manage these projects is taken to be covered under Option 3. There is a requirement to for 5G/4G+ augmentation to SBCD projects and the scope of these and this will be undertaken via the procurement process. The public funding will be constitutes R&D, training, knowledge transfer, network support for projects. Private funding will be in form of R&D, infrastructure and network management.

Summary of Investment Sources and Benefits

The table below summarises the budget spend and investment sources along with associated benefits

Stream	Total Budget Spend (Revenue and Capital over 5 year)	Direct SBCD Capital Contribution	Direct SBCD Revenue Contribution	Other Public Sector Contribution	Direct Commercial Contribution	Additional Commercial Sector Pull through Investment	GVA Uplift over 15 years from Budget Investment
Rural							
Option 2; Supplier Engagement	0.5 (Note 1)	0.0	0.5	0.0	0.0	0.0	
Option 3: Demand Stimulation	5.0 (Note 2)	0.0	1.5	3.5	0.0	28.9	17.5
Option 4: In-fill Procurement	20.0 (Note 3)	6.0	0.0	10.0	4.0	20.0	70.0
Connected Places							
Options 3/4 Duct Investment /Procurement	20.0 (Note 4)	12.0	0.5	0.0	7.5	70.0	220.0

Next Generation Wireless							
Option 3; Infrastructure Review	2.0 (Note 5)	0.0	2.0	0.0	0.0		
Option 5: Support for Specific Projects	7.5 (Note 6)	2.5	0.0	0.0	5.0	3.0	11.3
TOTAL	**55.0**	**20.5**	**4.5**	**13.5**	**16.5**	**121.9**	**318.8**

Costs contributions

The key budgetary cost assumptions made are as follows:

Rural

- Note 1: All supplier engagement costs are borne by SBCD. See Option 2; Supplier Engagement; £0.5 revenue Budget (See Economic Case Option 2 – Table 23. and description in Option 2 table) The £0.5m is comprised of £100k/annum over a five-year period.
- Note 2: Demand stimulation costs are split between central SBCD and other public sector contributions. It should be noted that some of the local authorities already have their own staff and resources to undertake this task. In addition, some central demand stimulation activities will be borne by DCMS as part of its Rural Connectivity programme
- Note 3: Based on other projects rural infill investment is split as follows:
- A 20% contribution from commercial operators based on BDUK experience in rural programmes such as Digital Scotland. This will be verified with Superfast Cymru
- A 50% contribution for central and regional govt schemes, notably Rural Gigabit Connectivity Fund and Superfast Cymru. This is based on the region capturing £10m out of the allocated national budget of £200m from DCMS
- 30% from SBCD. This is the balance of costs to address the requirements.

In addition, it should be noted that that it is central Govt policy that every premise will have a legal right to access broadband speeds of at least 10 Mbps

https://www.gov.uk/government/news/high-speed-broadband-to-become-a-legal-right

At the time of writing the operation of this funding it not known but it is likely that the region will benefit from further inward investment under this scheme. In addition, SBCD will be well placed to enhance the efficiency of this scheme in the region through its central co-ordination and demand stimulation activities

Connected Places

- Note 4: The split in costs between the commercial sector and SBCD will be determined during procurement. It is likely that the initial of direct commercial investment will be greatest in central Swansea. In other areas it will require greater public sector contribution.

The split of costs in LFFN projects of this nature have shown that that the public sector bears much of the cost of the initial project (typically 60%). This is because the initial project is solely to connect public sector sites due to state aid constraints. However, the commercial sector does acknowledge a contribution to the cost as it is able to commercial the assets. In subsequent pull through investment, the commercial sector bears the full cost as it is based on build out to homes and business premises.

If the SBCD is directly procuring its own duct infrastructure to own and use it will bear all costs. If it is procuring a right to use over commercially owned infrastructure the commercial sector will bear some of the initial investment costs as it is able to commercialise these assets.

Based on this experience in other national programmes of this nature we forecast that SBCD invests £12m of capital plus an additional £0.5m to cover procurement and management overheads.

Next Generation Wireless

- Note 5: SBCD bears costs of compliance to infrastructure review
- Note 6: SBCD makes a 33% capital contribution to specific projects; In order for the effectiveness of the envisaged SBCD projects to be optimized there is a requirement to augment their access to wireless infrastructure and the scope of this and this will be undertaken via the procurement process. In addition, the programme will also work with the mobile industry to identify other key projects of benefit to the region. The public funding contribution will consist of R&D, training, knowledge transfer, network support for projects. Private funding will be in form of R&D, infrastructure and network management.

Pull Through Commercial Investment

Rural

- Demand stimulation activities increase NGA adoption by 17000 lines. This will be across the region, an industry benchmark cost per line of £1700 has been made. This is the benchmarked from Digital Scotland. These investment costs will be borne by the commercial sector.
- In the in-fill procurement Openreach is likely to make an initial contribution of up to 20% of project costs. A subsequent second wave of commercial investment will arise as unserved premises are connected in the areas and SBCD demand stimulation activities increase take up and demand. There are currently 23,000 white premises. If the SBCD and DCMS programmes establish FFIB in most of these locations and there is a 30% adoption rate, we can expect around 7000 new FTTP customers. At £3500/line the pull through investment will be >£20m.

A good example of the benefits of a programme is superfast Cornwall

https://www.superfastcornwall.org/wp-content/uploads/2018/07/Superfast-Evaluation-Report-June-2018-Final-Issued-190618.pdf

Up to March 2018the Superfast programme delivered an estimated 3,490new FTE jobs and a GVA uplift of £136,900,000. It also safeguarded 4,190FTE jobs and £166,800,000 of GVA.

Connected Places

In Connected Cities experience in cities such as Aberdeen has shown a pull though multiplier. For example, in Aberdeen an initial £6m anchor tenancy project by Aberdeen City Council leveraged a further £40m of investment by City Fibre and Vodafone (https://investaberdeen.co.uk/index.cfm?topNav=success-stories&subNav=case-studies&subsubNav=cityfibre-building-aberdeen%E2%80%99s-full-fibre-future).

A similar benchmark is the recently announced programme of investment by City Fibre. City Fibre has core metro networks in 42 UK towns and cities, which will be extended to

customer premises in order to deliver consumer FTTP services. CityFibre estimates that the total capex costs of this deployment will be in the region of £500-£700m.

Based on £12m of SBCD investment, a long term pull though investment contribution of >£70m can be expected.

Next Generation Wireless

In June 2015 the UK Govt published its definitive report on the impact of Mobile Broadband and 5G;

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/714112/The_impacts_of_mobile_broadband_and_5G.pdf

'There is a clear consensus that mobile broadband technologies have brought significant benefits for consumers, businesses and the wider economy Studies show that mobile broadband is associated with positive impacts for the economy, such as higher GDP and employment. Underlying this effect are the investments made by mobile network operators and the impacts these investments have had throughout the supply chain, as well as productivity improvements from employees having access to more advanced mobile connectivity. Additional impacts on consumers include benefits from access to a range of innovative apps and services powered by mobile broadband.'