K SHARP
Innovators In Human Factors

Gwraidd Cydweli

People Oriented Smart Towns: Research Phase

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Acronyms & Abbreviations

Acronym	Definition
CCC	Carmarthenshire County Council
CETMA	Community Engagement, Technology, Media & Arts
LORAWAN	LOng RAnge Wide Area Network
NCN	National Cycle Network
ONS	Office for National Statistics
RFC	(Kidwelly) Rugby Football Club
RSPB	Royal Society for the Protection of Birds
WelTAG	Welsh Government's Transport Appraisal Guidance

1   Introduction

1.1   Gwraidd Cydweli – Research Phase

K Sharp, a leading Human Factors consultancy based in Carmarthenshire, are providing support to Gwraidd Cydweli (Smart Kidwelly) group in this discovery phase to help realise the ambitions of Kidwelly Town Council in taking full advantage of Smart technologies for the benefit of the people in the town. K Sharp are providing their expertise pro bono, as part of their social impact activities to benefit local communities.

1.2   Background

Kidwelly has spent the last few years as part of the Ten Towns initiative which aimed to encourage economic growth and recovery, following the Covid-19 pandemic, of rural towns across Carmarthenshire. As part of the Kidwelly Sustainable Economic Growth Plan (2021) published as part of this work, it was identified that Kidwelly could become a Smart Town, with the ability to collect data using sensors to gain insights to support its economic development. A Kidwelly Digital Place Plan (2022) was subsequently delivered, detailing the preparation of a Digital Action Plan to support the adoption of LoRaWAN in Kidwelly (2022). Figure 1 shows an example of Kidwelly's many heritage sites, Kidwelly Castle.

Figure 1 – Kidwelly Castle

1.3   Aims of a Smart Kidwelly

The aim of this document is to define a set of requirements for stakeholders in Kidwelly to realise the value in understanding the activities of people within the town, and how they can influence them to achieve their aims. The objective of this Discovery phase is to develop a pathway to the Town Council enabling User Oriented Smart Town Engagement within Kidwelly.

K Sharp will be applying a people-first approach (see Figure 2), utilising a Human Factors based methodology to determine what knowledge about the town would be useful to stakeholders. K Sharp's people-first approach, as opposed to the traditional technology-first

approach, allows a more focussed and efficient data gathering, resulting in more useful and actionable data.

PEOPLE ORIENTED SMART TOWN (POST)
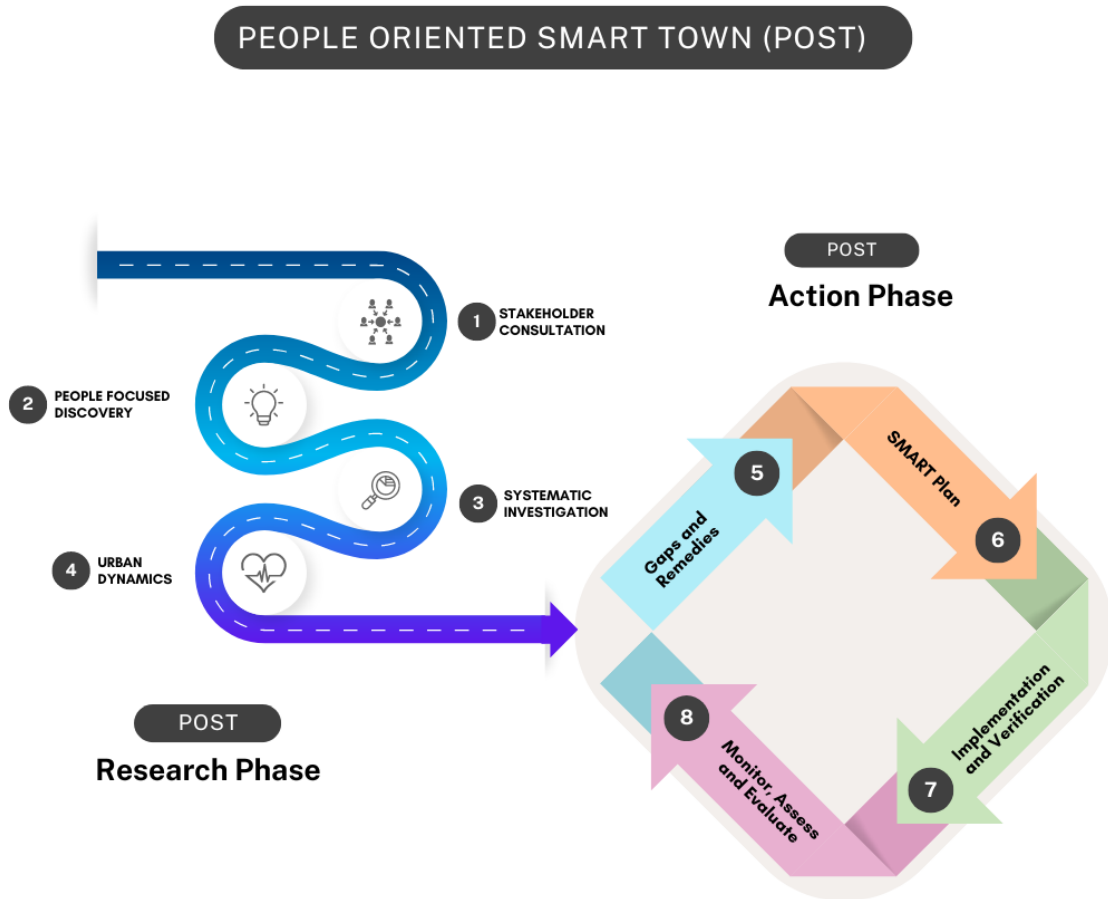
Figure 2 – K Sharp's POST Methodology Overview

The traditional technology-first approach to Smart Towns, ignores the needs of the people in the town who would benefit, instead focussing on how much data can be harvested using Smart technologies, before any attempt to identify any trends in the data.

The People Oriented Smart Towns approach provides a clear path forward to deliver the most benefit for the Kidwelly Town Council. The town's identified stakeholders will provide the human focus for the objectives of enhancing Kidwelly as a Smart Town to enable a better basis for decision making by businesses, Kidwelly Town Council and Carmarthenshire County Council (CCC), as well as supporting the needs of visitors, residents and those from the local area.

The community drivers of a Smart Kidwelly will be:

- To utilise the talents and capabilities within Kidwelly;

- To act as a catalyst to bring the community together;
- To drive social change through technology;
- To drive more money into the development of the town; and
- To develop methods that can be utilised by other towns.

1.3.1 Engagement Activity

This is the log of engagement activity that has underpinned the work within this report.

Table 1 – Gwraidd Cydweli Engagement Sessions

Date	Activity	Location
06/03/24	Initial meeting with Gwraidd Cydweli group	Kidwelly Town Council
19/03/24	Discovery Workshop 1	K Sharp
26/04/24	Wi-Fi Usability Review	Kidwelly Town centre
04/05/24	Market Engagement	Kidwelly - Glan-Yr-Afon
05/06/24	Gwraidd Cydweli group review	Kidwelly Town Council

1.4   Document Layout

The remainder of this document is comprised of the following sections:

- Discovery – defining who, why, what and where are the focus, what the goals are for this phase and how these can be achieved;
- Current Technology and Infrastructure in Kidwelly – researching existing connective technologies within Kidwelly;
- Analysis of Kidwelly's Smart Town Data – analysing the monthly Wi-Fi data report provided to the Kidwelly Town Council;
- Activities of Kidwelly's People – identifying key locations and routes for monitoring and data collection;
- Future Smart Technology for Kidwelly's People – suggestions of future steps and potential initiatives; and
- Conclusions and Recommendations – summary of findings and recommendations.

2 Discovery

2.1 Introduction

This section aims to detail the main beneficiaries of the Smart Kidwelly project and seeks to understand what success would look like from their perspective. To help with this, certain initial criteria need to be defined. Firstly, the specific location of focus needs to be defined (see Section 2.2) and the people whom this project is aiming to benefit (see Section 2.3). With location and target audience mind, it needs to be determined what this project is trying to achieve and how it will benefit the area and people (see Section 2.4), followed by how these goals can be realised through Smart Technology (see Section 2.5) and collaborations with other potential stakeholders (see Section 2.3.4).

2.2 Where?

The proposed area for this initial phase of the project is shaded in blue on the map below, and includes Kidwelly Town itself, together with the village of Mynyddygarreg and Carmarthen Bay Holiday Park. This area was defined during the initial meeting with the Gwraidd Cydweli group, detailed in Section 1.3.1.

Figure 3 – Initial Geographical Scoping

It should be noted that this geographical bounding is to enable suitable scoping of the initial project. The overall intention is that the project will grow to cover a greater geographical area over time.

2.3 Who?

The most important factor to understand with a people first approach is who are the main users of Kidwelly and are their characteristics. In order to better understand how they may be generating data, and equally what their data requirements may be, three groups have been identified: visitors (see Section 2.3.1), residents (see Section 2.3.2) and businesses (see Section 2.3.3). Understanding these groups of people leads to being able to determine what information will be of most use, to whom, and how to collect the relevant data.

2.3.1 Visitors

There were approximately 36,000 (stated by Kidwelly Town Council representatives during meetings for this Discovery phase (see Section 1.3.1)) recorded visitors to Kidwelly castle in 2023 (~30,000 in 2019 (Visit Wales 2019), ~25,000 in 2021 (Visit Wales 2021)) therefore this

can be taken as a metric for target audience number to aim for. If this is distributed across 12 months, then that is 3000 per month (or 692 per week), but these numbers will realistically be mainly during the summer months. These visitors will consist of:

- Tourists
  - Day trippers – People staying in the wider area visiting the town for a short period of time; and
  - Staying in Kidwelly for an extended period of time, e.g. at the holiday park.

- Visitors – People living in the surrounding areas coming to the town, for example:
  - Dog walkers;
  - Shoppers; and
  - Pub visitors.

- Commuters – People from outside the town regularly travelling in for work.

2.3.2 Residents

There are approx. 3700 residents within Kidwelly and Mynyddygarreg (Office of National Statistics (ONS), 2021), as shown in Figure 4. These are the people who interact with the Town the most regularly and could impact it the most. For example, if each of them makes one journey to Kidwelly per week, then this would equate to 192,400 trips per year which is around 16,000 per month, which is around five times more than the stated number of visitors to the castle.
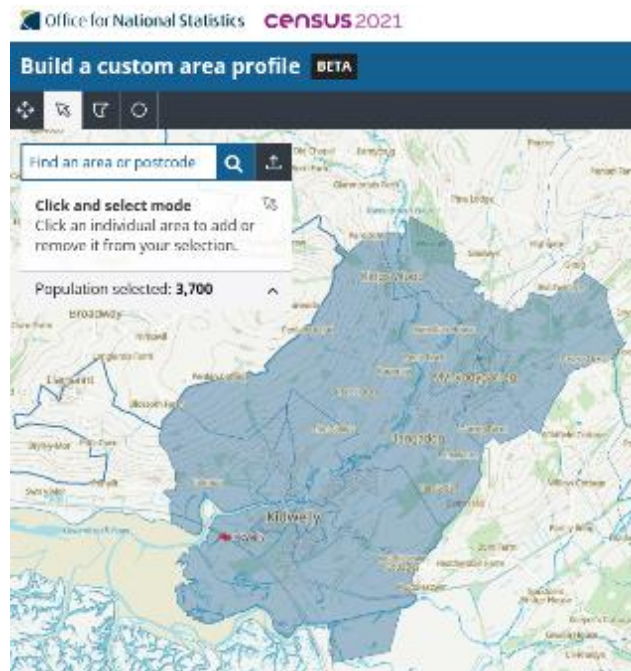
Figure 4 – Census Population for Kidwelly and Mynyddygarreg (ONS, 2021)

2.3.3 Businesses

Businesses are the economic life blood of the town. Collected Smart data will particularly benefit shop fronts and places that accept footfall and vehicular traffic, but the data can also be of use to many difference types of businesses and services, such as:

- Shop fronts;
- Larger businesses such as mechanics, car sales, builders' merchants, and manufacturing;
- Cafes, restaurants and pubs;
- 50-60 stall holders at Kidwelly market, held monthly (see Figure 6);
- Cottage industry (home based);
- Accommodation – Parkdean resorts' holiday park, B&Bs;
- Transport – train and bus route operators; and
- Cadw, managers of Kidwelly Castle.

Figure 5 - Kidwelly Monthly Market

2.3.4 Stakeholders

As well as those who live and work in Kidwelly, there are stakeholders who hold responsibility for the safety and prosperity of the Town or contribute to the draw of people to Kidwelly. Through taking the approach of identifying and prioritising the people that can benefit from this initiative, a list of potential partners and stakeholders can be generated. Building strong relationships with those listed can provide mutually beneficial results beyond individual efforts:

- **County Council** – can provide funding for development and links to other towns in the county and can benefit from Kidwelly being a strong tourist draw deep within Carmarthenshire and a pioneer for aspiring towns.
- **Town Council** – integral to bringing the community together with knowledge of and access to local services and can benefit from local engagement, enhanced tourist experience and improved municipal services.
- **Welsh Government** – Provides potential funding, collaboration and sharing for best practices.
- **Rail Services** – Great Western Rail and Transport for Wales can provide investment in terms of advertising and infrastructure to bring more tourists to Kidwelly and benefit from an increased number of passengers who could go on to further explore South and West Wales via the train lines.
- **Cadw** – arguably the biggest tourist destination in Kidwelly, a close relationship will allow the town to make the most of the draw of the castle and combine the attractions of Kidwelly to entice repeat visits and possibly encourage more Cadw Memberships.
- **Parkdean Resorts** – The owners of Carmarthen Bay Holiday Park. As the nearest town to the park, a close relationship could make Kidwelly the go to location for entertainment and amenities for people staying at the holiday park. Similarly, the park could benefit from being the recommended place for accommodation and activities around Kidwelly.
- **Burns** – This is the largest employer in Kidwelly, involving manufacturing, pet food sales, mixed farming, food market, garden shop, community and meeting/event centre, nature trails, café and restaurant.
- **CO-OP** – local supermarket with national connections. As the main supermarket for the local area, the co-op can be a draw for visitors to places like Pembrey country

park, who could be enticed further into Kidwelly. Likewise, an increase in tourists to Kidwelly could benefit the Co-op and increase its catchment range.

- **Rugby Club** – has a large area of land in the town centre that can be utilised for events and draws teams and supporters from other towns that can be encouraged to explore Kidwelly or return to visit the town. Increased engagement with the town could see more people using the club's facilities and possibly an increase interest in joining the club or investing through sponsorships.
- **Emergency service providers** – Dyfed Powys Police, Mid and West Wales Fire and Rescue Service responsible for Kidwelly Fire Station, Hywel Dda health board, HM Coastguard, lifeboat services provided by RNLI and Ferryside.
- **Businesses** (see Section 2.3.3).
- **St Mary's Church** – the church has a prominent place in the town, and there are other denominations also in the town.
- **Providers of services** – library, healthcare (Myddygfa Minafon etc.), education (Ysgol Y Castell, Ysgol Gymraeg Gwenllian, Reflect Education etc.), sanitation (Dŵr Cymru, Natural Resources Wales etc.).
- **Providers of Community services** – Princess Gwenllian community centre, Burns Community Centre, CETMA, Kidwelly Rugby club etc.

> ### Recommendation
> R1.   To create a Smart Kidwelly Stakeholder group with representations from the mentioned organisations that can meet at least every 6 months to review data, share insights and action plans.

2.4   Why?

When used correctly, Smart capabilities can provide various benefits to a town and its stakeholders. Establishing a baseline of Kidwelly Town's data and having a solid foundational infrastructure of Smart Technologies to monitor, collect and collate data will allow stakeholders to make better, more impactful decisions and track the effects more easily. This trend analysis framework will then enable a better insight into how this project's key aims, identified below, can be best achieved to deliver the most benefit for the people of Kidwelly:

- **Better connectivity for market stall holders** – allowing the businesses to take digital payments easily and update social media in real time, advertising both their business and Kidwelly town.
- **Entice visitors from Carmarthen Bay Holiday Park** – encourage holiday makers into the town and provide a good, memorable experience that will entice them to spend money in the town, recommend Kidwelly to others and visit again in the future.
- **To utilise the talents and capabilities within Kidwelly** – enable the local population to share and grow their skills and interests and enhance the town's assets such as its rich historical legacy.
- **To act as a catalyst to bring the community together** – build and re-enforce a strong feeling of community and instil a sense of pride in their town.
- **To drive social change through technology** – building an inclusive and forward-thinking environment through connectivity, for the good of the local eco-system, population and planet.

- **To drive more money into the development of the town** – identifying worthwhile causes to secure funding and build momentum through sustainable income streams, allowing the town to develop and improve the lives of its people.
- **To develop methods that can be utilised by other towns** – to become a benchmark for successful integration and utilisation of Smart Technologies and methods, providing an example for other aspiring towns and cities to emulate.

2.4.1　　　Better Decisions

The most powerful part of a well-structured Smart Town is the ability to make better decisions based on data. By utilising a stable and connected baseline infrastructure to gather useful data and understand how people interact with the town, trends and patterns can be identified to see where changes can have the most impact.

This dynamic understanding of the town will allow the council to make more informed decisions about where to invest funding most effectively, how to utilise services more efficiently and how to best cater to the community. It will also help local businesses to make important decisions like tailoring opening times, managing stock, and generating the most impact from advertising, allowing them to use their resources more efficiently to reduce costs and maximised profits.

2.4.2　　　Interactive Engagement

The robust foundations put in place to build a baseline for the town can then be used build engagement between the town and its people for the benefit of everyone. Digital activities such as interactive treasure hunts or historical trails can encourage visitors to engage with Kidwelly in a fun way and learn more about the area, and Smart community groups that inform the local population of what's happening in the town can help build a closer community and instil a sense of ownership and pride amongst residents.

2.4.3　　　Measuring Success

The other side of engaging with the people is the improved feedback for the town. With an infrastructure already set up for gathering useful data, the impact of any new initiatives can be easily measured and compared with the baseline to see the effects. This analysis will allow for a measure of success, showing if the desired outcome was achieved or, if it wasn't, what could be done differently in the future.

2.4.4　　　Building on Previous Work

There has been work already completed towards a Smart Kidwelly, and the main reference material for these works, made available by Carmarthen County Council (CCC) are listed in Table 2.

Table 2 – Reference Documentation

Title	Description
KIDWELLY TO FERRYSIDE FEASIBILITY - WelTAG Stage One: Strategic Outline Case (WSP, 2020)	CCC have commissioned WSP to undertake a Welsh Government's Transport Appraisal Guidance (WelTAG) study to identify options to improve the National Cycle Network (NCN) Route 4 between Kidwelly and Ferryside.
Kidwelly Digital Place Plan (Best, 2022)	Document that reviews and outlines the digital priorities, researches existing plans, partnerships and funding streams, assesses the current (2022) digital state of Kidwelly, and suggests some easy actions.
Town Wi-Fi Monthly Reports (Jan 23, Mar 24 inclusive) (CCC, 2023)	A single page report summarising some basic metrics recorded by the Wi-Fi network hubs each month.

2.5   What?

There are a number of aspects that should be considered when thinking about what can be done and how, both as inputs to the project and as potential outcomes. These include processes through which the goals can be achieved and tools and information that should be considered, utilised or discovered during the project.

2.5.1   Processes

Processes include methods of achieving the goals of this project. One such method is the existing Digital Place Plan (Best, 2022) which outlines the current state of Kidwelly (as of 2022) in terms of digital infrastructure and provides some generic suggestions for future improvements. This information can be built on to provide a people focused, scientific method for improvement of the town to show evidence of tangible benefits.

Another important process is securing funding. It has been noted that applications for funding will need to show some sort of environment benefit of the project and provide details on what success looks like and how it can be measured for proof in order to be successful.

2.5.2   Transport Links

Connections to outside of Kidwelly show the likely routes and methods people will use to visit the town. These are the main transport links to and from Kidwelly, the timings of which may be used to plan other activities for the Town:

- **Bus** – the main bus routes through Kidwelly are X11 (between Swansea and Carmarthen) and the 198 (between Four Roads and Carmarthen).
- **Train** – the train station between Kidwelly centre and the Quay sits on the West Wales rail line.
- **Ferry** – Carmarthen Bay Ferries run a ferry service between Ferryside and Llansteffan. There may also be potential to dredge Kidwelly Quay to allow boat access directly.
- **Road** – A484 runs alongside Kidwelly providing a route North towards Carmarthen and South towards Burry Port and Llanelli. Port Way runs West out of Kidwelly to link to Ferryside.

- **Cycle** – Kidwelly sits on the National Cycle Network Route 4 that connects London to Ferryside. The route runs through the centre of Kidwelly town, over the bridge and alone the coast road towards St Ishmael.

2.5.3 Infrastructure

Hardware will be required to underpin the data services sought by the Smart Kidwelly project. This list comprises existing and future infrastructure needed for a Smart Kidwelly:

- **Public Wi-Fi** – free Wi-Fi access is currently provided through five routers placed along Pembrey Road, Causeway Street and Bridge Street.
- **Existing Smart Devices** – local companies or residents may have connected devices such as ring doorbells, security sensors, Smart lights or cameras that they are willing to share data from.
- **Soil Sensors** – devices in flower beds or gardens that can record soil quality and moisture.
- **LoRaWAN Sensors** – there used to be sensors on the toilets in town square that counted footfall.
- **Starlink** – Provides fast internet via satellite, so is not beholden to the Open Reach network. Princess Gwenllian centre has a line of sight to the bridge carpark so could provide a base for a hub.

2.5.4 Communication

Methods of receiving or sharing information with the highlighted users and stakeholders of Kidwelly (see Section 2.3) would be very useful, and could be achieved in the following ways:

- **Newsletter** – a periodic newsletter that shares the data in a meaningful, easy to understand and contextual way.
- **Parkdean Holiday Park App** – if the Carmarthen Bay holiday park had an app, this could be used to advertise events and information.
- **Patron Data** – data collected by LoRaWAN, Wi-Fi and Point of Service devices can be shared via Smart Towns Cymru and combined with other towns' data.
- **Social Media Tags** – entice people to tag the town in any photos they take whilst visiting so they can be re-shared on official town accounts.

2.5.5 Information

Knowledge that either needs to be collected to gain a better understanding of how the town works or helpful information that can be provided for the benefit of visitors and residents.

2.5.5.1 To Be Collected

The following data could be collected through a variety of means from the users of Kidwelly and its services:

- **User demographics from EE/BT** – more granular data on the users of the town's free Wi-Fi network e.g. age, gender, nationality, are they a new user?
- **Census data on local population** – to provide better understanding of the make-up of the residents, e.g. age, family size, household income.
- **Visitors to Kidwelly Quay** – the Quay is an isolated point, about 0.7 miles from town square, so it would be useful to know how many people visit, and whether they also visit the town centre.

- **Castle visitor information** – Cadw has identified that there were approx. 36,000 visits last year, but more demographic information would be useful e.g. are they local or tourists? how many of those are repeat visitors?
- **Active Travel** – surveys are currently being formulated for people using the transport networks. Can questions be added to these surveys that would benefit this project?
- **Vocations** – Gravells and Burns are the two main employers of Kidwelly, but information on whether workers commute to/from the town could be useful to understand who uses the town during the week vs weekends for example.

2.5.5.2   To Be Provided

The following data could be provided to the users of Kidwelly to enhance their experience of the Town and encourage its use by them:

- **Transport links** – information about train and bus times, or about road traffic may be useful to visitors or to businesses, especially if it correlates with surges in footfall.
- **Parking** – directing people to available parking spaces and how much they cost.
- **Directions** – signage or guidance between key locations within Kidwelly such as the Quay and the Castle and shops, pubs or services in between.
- **Nature Data** – can information be provided for the Quay and coastal footpaths that would entice visitors, such as tide times and water levels, seasonal birds or animals that can be spotted or flowers that can be seen. Is there a possibility of RSPB funding to cultivate a good environment for wetland birds?

Figure 7 – Example of Existing Heritage Information Sign

2.6   Expanded Catchment Area

In line with the growing ambitions of Kidwelly, some areas of interest have been identified for potential future partnerships or collaborations to help expand the sphere of influence of Kidwelly town.

2.6.1   Areas of Interest

As Kidwelly's popularity grows, it may look to strengthen collaborative relationships with neighbouring communities such as:

- Towns along the railway line:
    - Carmarthen;
    - Ferryside;
    - Burry Port; and
    - Llanelli.
- Other Holiday Parks / Accommodation:
    - Kidwelly Farm Cottages;
    - Tanylan Farm;
    - Waungadog Farm; and
    - Pembrey Country Park.

2.6.2   Points of Interest

Building a relationship with other attractions in the local area could benefit both parties by increasing visitor numbers to the attractions and enticing tourists to stay in Kidwelly as a central hub with easy access to them. Some potential future points of interest are:

- Other Local Castles
    - Llansteffan;
    - Laugharne Castle;
    - Carmarthen; and
    - Loughor Castle.

- Old Tinworks Museum – Mynyddygarreg
- Pembrey Country Park
- Ffos Las Racecourse – Trimsaran
- Golf Clubs:
    - Glyn Abbey – Trimsaran;
    - Ashburnham – Burry Port; and
    - Derllys – Carmarthen.

3 Current Technology and Infrastructure in Kidwelly

3.1 Introduction

This phase aims to identify the technology, data and information that already exists, and how effective it is within Kidwelly. This will help to identify useful assets to prevent wasting time and resources on repeating previous work and help highlight any shortcomings that will need to be overcome to most effectively move forwards.

3.2 Current Kidwelly Technologies

This section describes the current digital infrastructure in and around Kidwelly.

3.2.1 LoRaWAN

The LoRaWAN Gateway is located on Kidwelly Library. Currently it is known that there are sensors on the lifesaving equipment at the Quay. These alert when the live preserver is removed. Additional sensors were on the public toilets in the main square, but they have since been demolished and therefore are not utilised at time of writing.

Figure 8 shows signal strength coverage maps for the current LoRaWAN capability.

Figure 8 – LoRaWAN Coverage (Graphic provided by CCC)

It is not clear at this point who is utilising any of the sensor data or how it is exploited.

> Recommendation
> R2.   Determine who has access to the LoRaWAN sensor data.

3.2.2 Broadband Availability

Figure 9 and Figure 10 show the availability of Gigabit and Superfast broadband in and around Kidwelly. The figures show that, while there is solid coverage for Superfast broadband, there is not currently any Gigabit supplied to Kidwelly Town centre.

Figure 9 – Map of Gigabit Broadband Availability (Graphic provided by CCC)
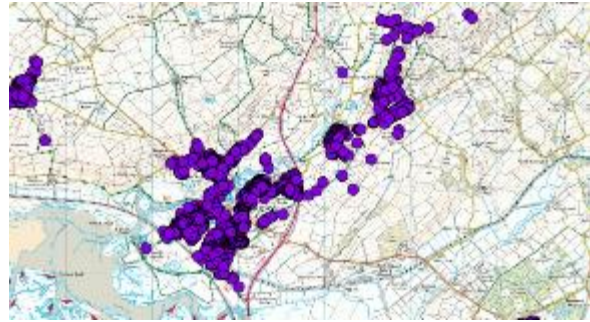
Figure 10 – Map of Superfast Availability (Graphic provided by CCC)

3.2.3 Mobile Network Connectivity

The four main providers in the area are 3 Mobile, 02, Vodafone and EE. The topographical terrain makes mobile signal reception challenging for all providers, and the standard assumption that anyone could get mobile signal within or around Kidwelly as it currently sits is not what residents and visitors experience (see Annex A - for detail).

A lot of the sites have antennae for both 1800 MHz and 800MHz frequencies. Lower frequencies have greater coverage distance whilst higher frequencies provide greater capacity for more users.

3.2.4 Mobile Signal in Town Centre

There is a difference in mobile phone/data reception depending on if you are inside or outside buildings. The website signalchecker.co.uk (as of April 26th 2024) lists the coverage provided by the four main mobile networks shown in Table 3. The table shows that mobile signal does not reliably work indoors across the area, even for voice calls.

Table 3 – Mobile Signal Coverage Comparison

Network		Voice	3G	4G	5G
Three	Indoor	X	X	X	X
	Outdoor	✔	✔	✔	X
Vodaphone	Indoor	X	X	X	X
	Outdoor	✔	✔	✔	X
EE	Indoor	X	X	X	X
	Outdoor	✔	✔	✔	X
O2	Indoor	X	X	X	X
	Outdoor	✔	✔	✔	X

3.2.5 New Mast Location

A new mast site has been given planning permission by CCC and will be a shared site meaning multiple operators can use the same mast. This new mast is shown in Figure 11 with a green cross.
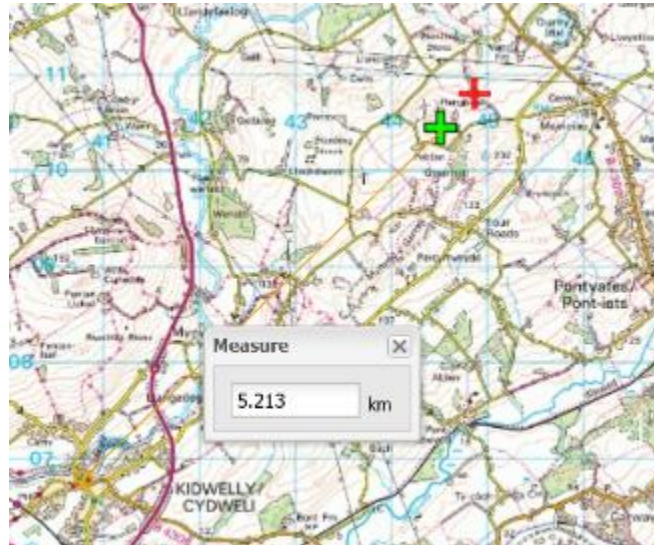
Figure 11 – Future Tower (green cross)

With low frequency antenna and the fact that this is a tall site (25-30m) the theoretical coverage is around 25 miles.

3.3 Town Wi-Fi

There is a free Wi-Fi network available in Kidwelly with five hubs placed along the town. Figure 12 shows the locations of these hubs (red dots), along with the approximate range of the signal (blue circles).

Number	Name
1	Castle News
2	Clwb Rygbi
3	Ty Gwallt
4	Serenity
5	WM Motors
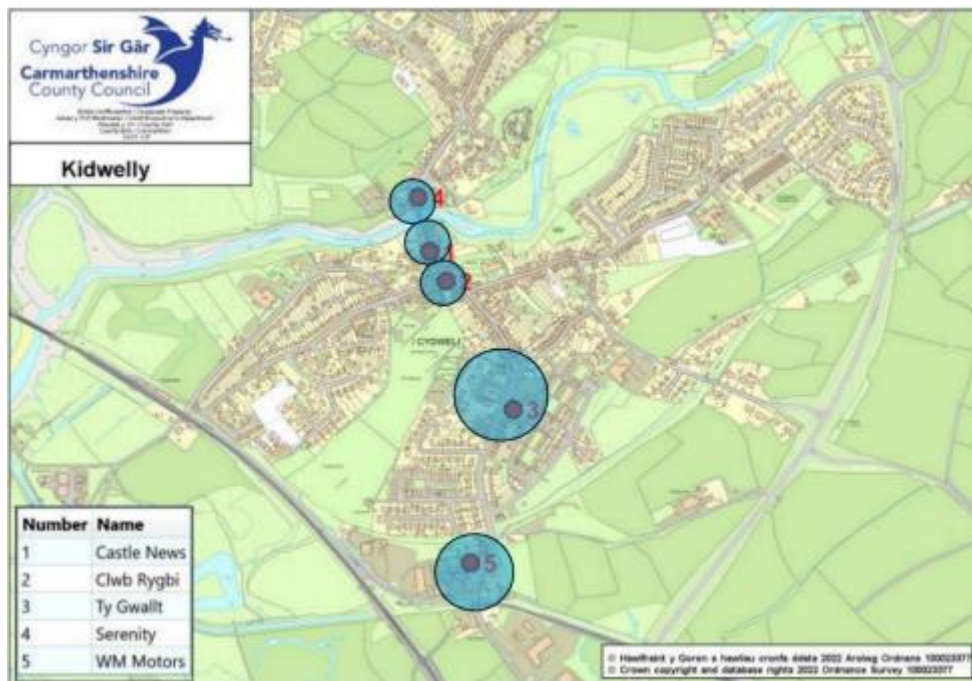
Figure 12 – Wi-Fi Provision [Source: CCC, 2023]

The approximate ranges were simply mapped on April 26th 2024, between 16:00 – 17:00, by using a Samsung Galaxy Note10 mobile phone to connect to the Wi-Fi network (Figure 15 shows a screenshot of the Wi-Fi sign in form on a mobile phone) and testing the speeds using the Ookla Speedtest (Ookla, 2024) at various distances from each labelled hub location.

3.3.1   Wi-Fi Coverage

The northernmost hub located at Serenity provided solid connection across the bridge between itself and the hub at Castle News but did not reliably reach as far as the bus stop or the war memorial on New Street, or beyond the entrance to Glan yr Afon car park (location of the monthly market in the summer).

Coverage continued along Bridge Street between Castle News and the hub at Kidwelly Rugby Club and there was signal in the town square, but it did not reach as far as the old town hall on the corner of Lady Street and stopped just before the turning into Hillfield Villas.

Figure 13 shows the three hubs along Bridge Street (red circles), their approximate range (blue circles) and points at which signal strength and speed were tested (orange dots) during the Wi-Fi Usability Review (see Section 1.3.1).

Figure 13 – Wi-Fi Hub Locations, Test Points and Ranges (Aerial Photo Source: OS Maps, 2024)

3.3.2   Wi-Fi Speeds

Using the online Ookla Speedtest to test the speed of the Wi-Fi connection at 11 locations across the 5 hubs gave an average of 2.95Mbps, with a range between 2.67 (Figure 14 shows a screenshot of this on a mobile phone) and 3.98 Mbps except for the rugby club hub,

which gave two test results of 1.45 and 0.81 Mbps. For comparison, a speed test conducted on 4G data signal (Sky Mobile) halfway between the Ty Gwallt and WM Motors hubs returned a speed of 8.78 Mbps.
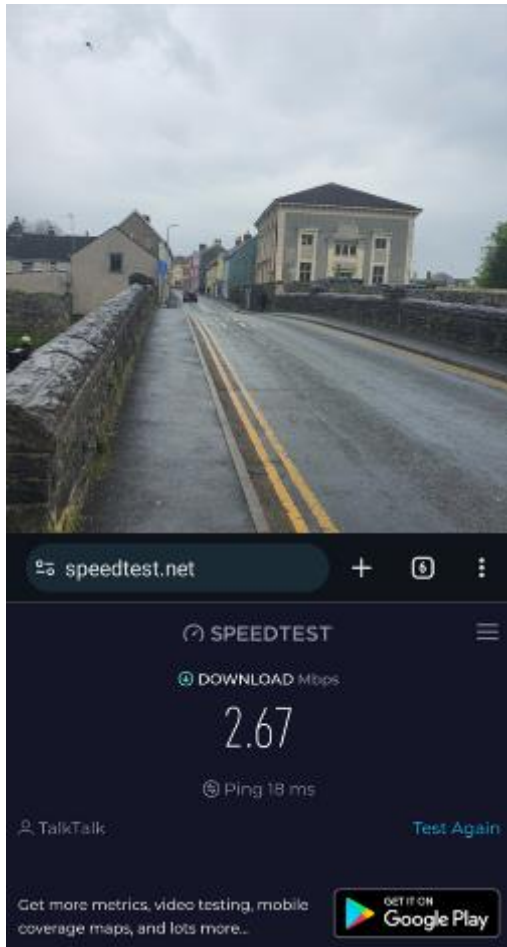
Figure 14 – Speed of Wi-Fi on North Side of Bridge

Figure 15 – Wi-Fi Sign in Form

3.4 Infrastructure Summary

The discovery research has shown that there is some basic data infrastructure within Kidwelly, but these provisions can only really be considered as starting blocks rather than fully realised ecosystems. In terms of data signal coverage, there are large gaps in the Wi-Fi network with some key sites like the north car park and the castle not catered for, the Wi-Fi speed is less than half that of a 4G mobile connection and the mobile signal is reported as unreliable for indoor use from all four main providers. The LoRaWAN gateway appears to have good signal range but there are only a handful of sensors in use, and it is unclear precisely who has access to these.

The coverage required needs high-speed Internet Connectivity that can provide a reliable infrastructure. Whilst broadband and mobile coverage is anticipated to improve, the timing of these is unknown.

3.5   Infrastructure Recommendation

To achieve a reliable and fast data network with enough coverage, Kidwelly Town will need to control its own infrastructure rather than rely on mobile networks or OpenReach to improve their existing services. One method of achieving this data independence is through a private satellite-based data network service such as can be provided through Starlink (Starlink 2024). It is recommended that this method is investigated to provide high speed internet capability. This may need one or more units that are connected in the same network to support the data needs of the town.

Recommendation

R3.   Deploy more Wi-Fi hubs to provide access, and therefore data gathering, to a wider area.

4   Analysis of Kidwelly Smart Town Data

4.1   Introduction

As part of the initial Smart Kidwelly set up, Carmarthenshire County Council provide a monthly update to Kidwelly Town Council in the form of a newsletter. This section of the report aims to understand that data and determine what can be learned from it.

4.2   Monthly Reporting

The Newsletter is delivered in both Welsh and English, an example of the English version is shown below.
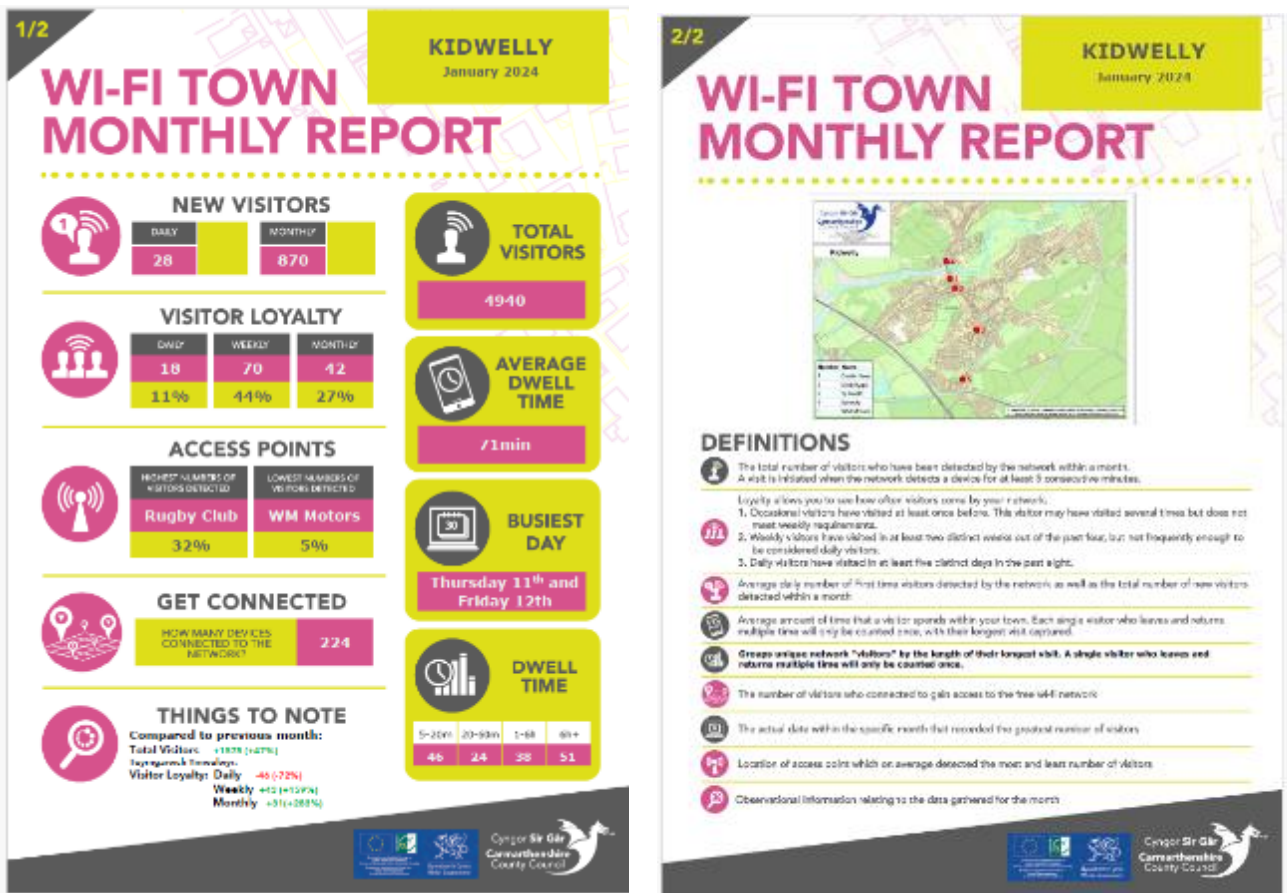

Figure 16 – Example Town Monthly Report [Source: CCC 2023]

4.3   Data Extraction

Having received 15 months' worth of Town Monthly Report (CCC, 2023) data from CCC, it has been tabulated (see Table 4) with a view to analysing it to determine what can be learned from it.

Table 4 – Collated Monthly Report Data over 15-month period

Month	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
Daily New Visitors	9	11	11	15	17	17	19	20	16	14	11	7	28	11	17
Monthly New Visitors	298	310	356	456	542	517	583	620	486	437	324	204	870	314	525
Daily Visitor Loyalty - Actual	82	80	80	84	92	90	94	89	96	90	84	64	18	93	108
Daily Visitor Loyalty - %	57	58	57	54	54	55	56	54	56	57	57	59	11	57	58
Weekly Visitor Loyalty - Actual	40	34	36	40	49	42	40	40	44	39	38	27	70	46	46
Weekly Visitor Loyalty - %	28	25	26	26	29	26	24	24	26	25	26	25	44	28	25
Monthly Visitor Loyalty - Actual	13	12	13	16	13	15	15	17	16	16	14	11	42	12	14
Monthly Visitor Loyalty - %	9	9	9	10	8	9	9	10	9	10	10	10	27	7	8
AP 1 - Castle News															
AP 2 - Clwb Rygbi	43	44	40	41	36	37	37	37	40	37	39	39	32	30	29
AP 3 - Ty Gwallt															
AP 4 - Serenity															
AP 5 - WM Motors	5	6	6	6	5	5	5	4	5	7	6	6	5	4	4
Get Connected WIFI	170	171	201	289	254	210	292	298	275	283	285	188	224	148	230
Total Visitors	4478	3853	4365	4668	5318	4920	5191	5138	5161	4964	4416	3365	4940	4723	5766
Ave Dwell Time	35	34	36	39	37	38	40	39	41	40	41	31	71	47	44
Busiest Day	19-Jan	25-Feb	23-Mar	27-Apr	02-May	30-Jun	08-Jul	11-Aug	29-Sep	02-Oct	23-Nov	04-Dec	11-Jan	07-Feb	15-Mar
Dwell 5-20m	46	44	47	50	57	55	53	53	54	51	48	32	46	44	58
Dwell 20-60m	25	25	24	25	29	29	30	29	29	28	25	18	24	28	31
Dwell 1-6h	34	31	32	39	41	36	40	41	43	36	36	27	38	39	39
Dwell 6h+	39	39	38	43	44	45	44	44	45	42	38	32	51	52	57

As presented in the Monthly Reports, there are data missing for three of the five Wi-Fi hubs due to the report only providing the most and least busy locations, which are always the Rugby Club and WM Motors respectively. .In terms of the main data, they can be averaged out over the time-period (see Table 5) to understand a baseline number in each element.

Table 5 – Data averages over 15-month period

Month	Averages
Daily New Visitors	15
Monthly New Visitors	456
Daily Visitor Loyalty - Actual	83
Daily Visitor Loyalty - %	53
Weekly Visitor Loyalty - Actual	42
Weekly Visitor Loyalty - %	27
Monthly Visitor Loyalty - Actual	16
Monthly Visitor Loyalty - %	10
AP 1 - Castle News	0
AP 2 - Clwb Rygbi	37
AP 3 - Ty Gwallt	0
AP 4 - Serenity	0
AP 5 - WM Motors	5
Get Connected WIFI	235
Total Visitors	4751
Ave Dwell Time	41
Busiest Day	-
Dwell 5-20m	49
Dwell 20-60m	27
Dwell 1-6h	37
Dwell 6h+	44

Figure 17 – Data Averages Highlights Infographic

From this data, the main averages highlights (as shown in Figure 17) are:

- There are **4751** visitors detected per month;
- **235** people utilise the free Wi-Fi;
- The **Rugby Club** is the busiest location;
- People are detected spending **41** minutes within the town; and
- There are **15** new visitors a day and **456** a month.

By visualising some of the data, in this case the monthly detected visitors, loyalty and dwell time, trends can be seen and identified. In Figure 18, it shows over the time period there is a variation, or ebb and flow to the number of visitors, with a visually significant drop in December.
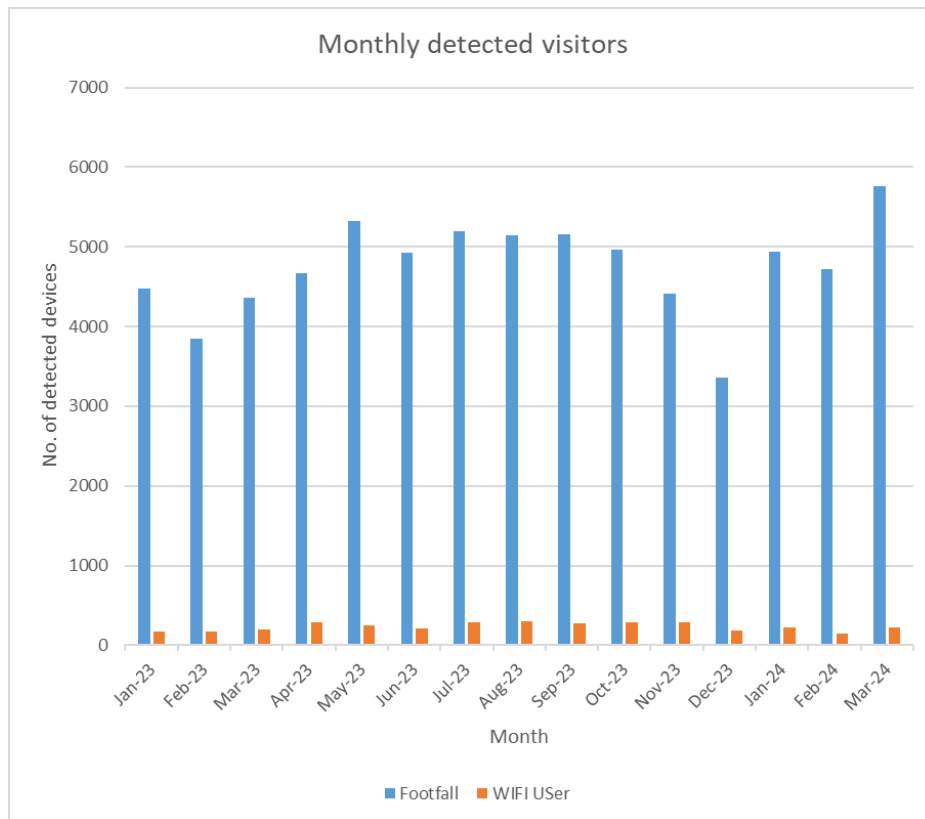

Figure 18 – Monthly Visitors Detected by Kidwelly Wi-Fi Hubs

Very few people (compared to the number of people identified within range) utilise the free Wi-Fi. It is unclear why this has such low take up and this should be investigated.

> **Recommendation**
> R5. Investigate low user take-up of Wi-Fi.

For visitor loyalty (Figure 19), each measure stays reasonably constant across the year, with little to be able to be drawn out.
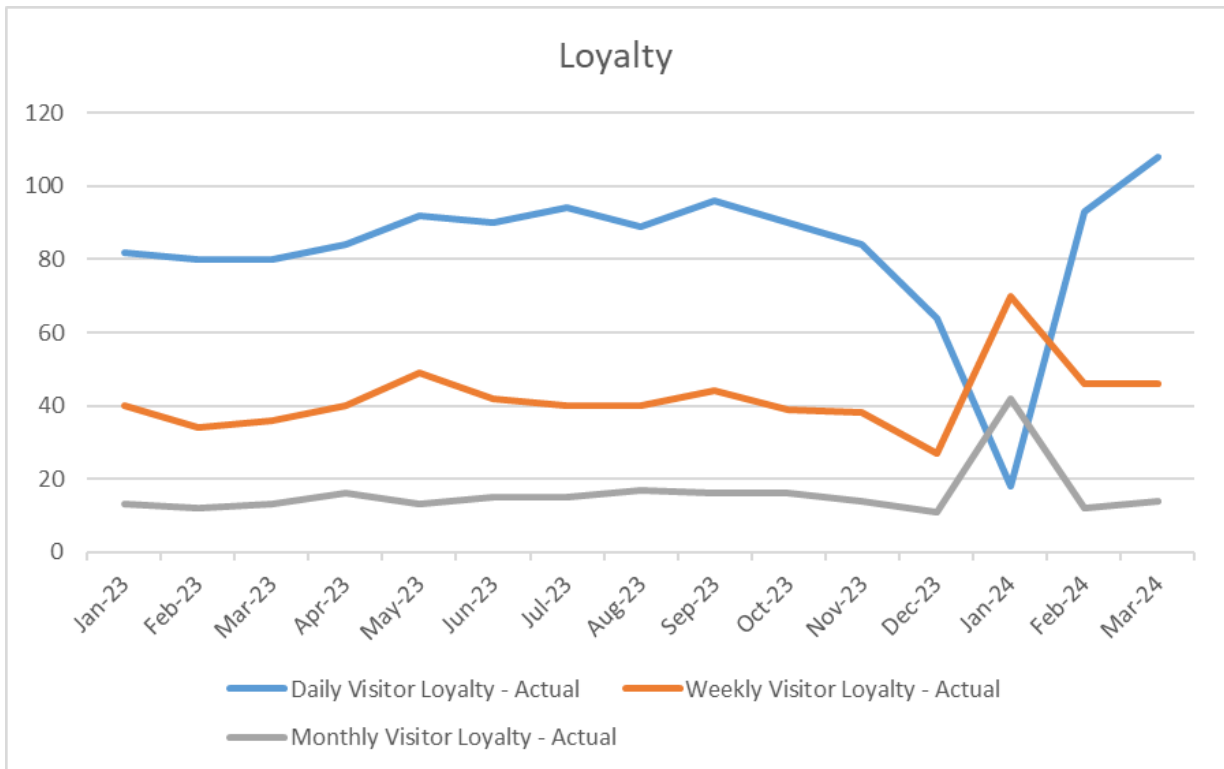
Figure 19 – Kidwelly Visitor Loyalty as Reported in Monthly Reports

There is a large loyalty variation in January 2024. This is somewhat difficult to interpret as the daily loyalty does not follow the weekly or monthly trends as it has done. With the significant spikes in the data, it seems likely that there is either been a technical error in the data collection, or there is a transcription error in the monthly report. Given the detected visitors seems nominal, then it is more likely that the Daily number is in fact the Monthly number, the weekly number is the daily number, and the monthly number is the weekly number. This data should be checked with the originators to confirm validity.

Recommendation
R6.   January 2024 delivered Wi-Fi data is checked against the raw data.

If it is proven that there is an error, then the anticipated results of correction are shown in Figure 20.
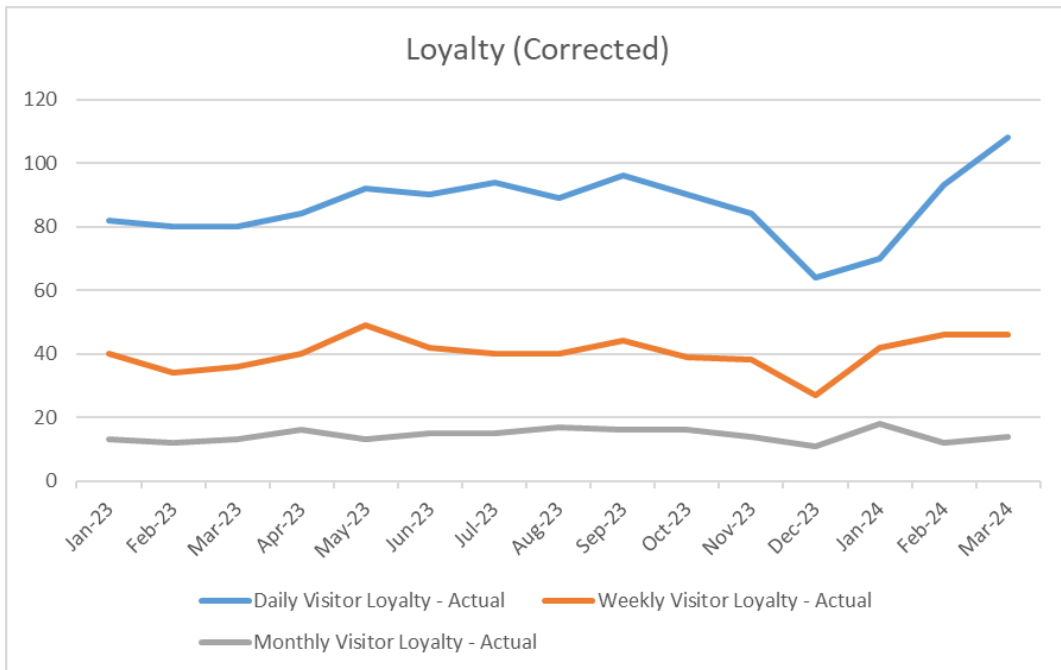

Figure 20 – Visitor Loyalty (with anticipated correction)

The dwell time, the time people stay connected in a visit, (Figure 21) shows only the longest period, not cumulative, therefore there is limited value to understand the patterns of activity. It also has a data issue for January that needs to be resolved.
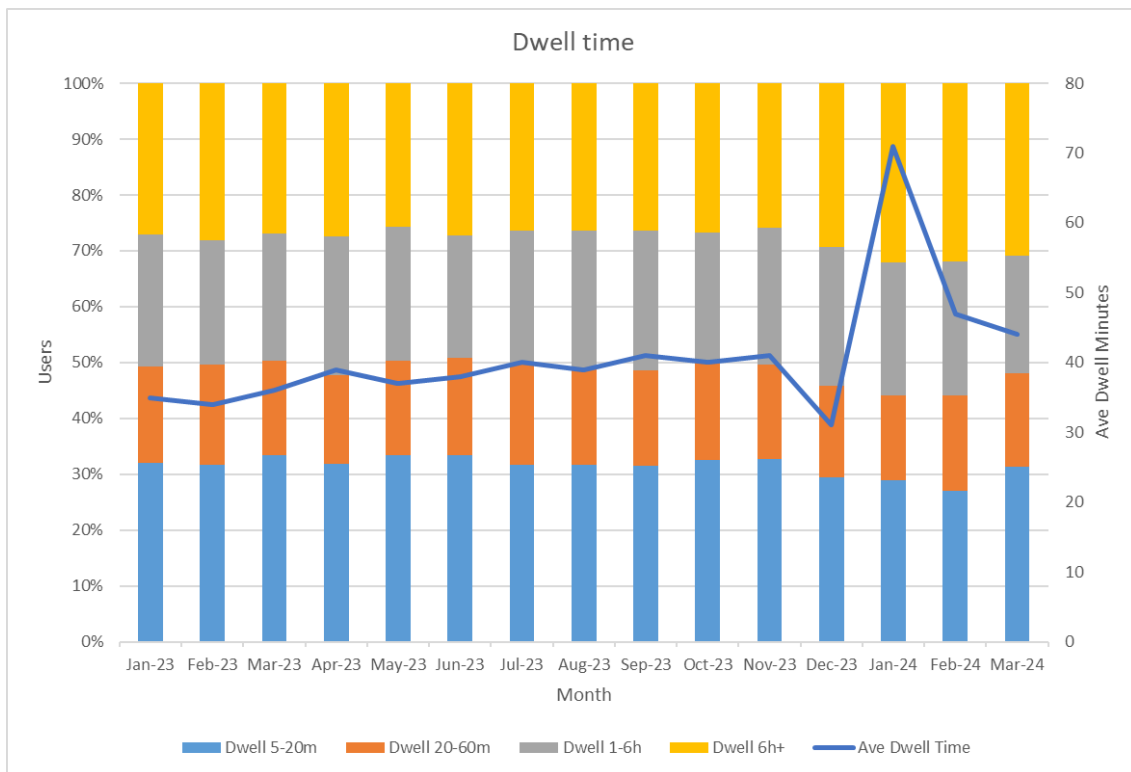

Figure 21 – Kidwelly Visitor Dwell Time

4.4   How can the data be used?

Whilst it is good that there are longitudinal aspects to this data, meaning that the trends over a significant period of time can be observed, it is not a high enough fidelity to be able to understand what is happening on a day-by-day or even a week-by-week basis and draw conclusions about what is driving visitors to visit Kidwelly.

> **Recommendation**
>
> R7.   Request Wi-Fi data at a daily fidelity as a minimum, with a view to greater granularity in the future.

This data also needs to be combined with an events log, an understanding of what activities have been held within Kidwelly and when, in order to put them alongside the visitor numbers and determine if there is any correlation.

> **Recommendation**
>
> R8.   Create and maintain an events log to accompany tracking data.

There is a need to understand where people are actually going. Currently the only location data provided is access points with highest and lowest visitor numbers, which are only two points out five and does not show enough information to determine people's movements around the town.

> **Recommendation**
>
> R9.   Request access data for all of the Wi-Fi hubs, not just the highest and lowest.

If this data is also being provided to local businesses and residents, then they should have a say in how useful they find the data, what they use it for and what changes they would like to see, either in terms of the how the data is presented or extra data that is not currently reported. Segmented email campaigns via the WIFI log in contacts is a possible next step.

> **Recommendation**
>
> R10.   Survey local businesses and residents to gauge opinion on the data reports and what changes they would like.

5   Activities of Kidwelly's People

5.1   Introduction

To ensure the best results for the intended audiences and stakeholders, it is imperative that all actions have people at the core of their focus, starting with their fundamental needs and building on these foundations to produce a robust, adaptable and useful service for many years to come.

The first step is to thoroughly understand how people are utilising the town amenities in order to then develop effective methods for increasing visitor numbers, enhancing resident experiences and supporting business growth. This section will highlight how a baseline of data measurement can be developed from which future interventions can be easily measured and assessed.

These future interventions can include developing new events, modifying current activities, optimising management of facilities to optimise the use of Kidwelly town and all it has to offer throughout the year.

5.2   Permanent Visitor Activity

There is a need to be able to encourage visitors to move between locations. The initial six permanent locations for visitors are the Town Square, the Castle, the Train station, the Quay, the rugby club and the holiday park.

These are outlined in Figure 22 and Table 6 below.

Figure 22 – Proposed Permanent Visitor Locations in Kidwelly

Table 6 – Permanent Visitor Location Descriptions

ID	Circle Colour		Location	Rationale
V1	Purple		Town Square	Focal point for the Town Centre
V2	Red		Kidwelly Castle	36k visitors per year
V3	Grey		Kidwelly RFC	Sports visitors attraction point and road junction point
V4	Blue		Train Station	Access point for Rail visitors
V5	Green		Kidwelly Quay	Attraction point for nature and walks
V6	Yellow		Carmarthen Bay Holiday Park	A large number of visitors stay during visit season.

Each of the spots is linked by a route or combination of routes as detailed below in Table 7.

Table 7 – Route Descriptions

Route Colour		Point A	Point B	Rationale
Yellow		Carmarthen Bay Holiday Park	Kidwelly Castle	A desire to encourage people from the park to Kidwelly
Red		Kidwelly Castle	Town Square	Encourage castle visitors into the town
Purple		Train Station	Town Square	Encourage visitors to utilise the Train to access the town
Blue		Rugby Club	Quay	--

The Yellow and Red Routes coincide with the National Cycle Network Route 4 (Sustrans 2024) that runs between London and Ferryside, through Kidwelly. The Yellow Route in particular has been identified (Figure 24) as an option for potential improvement in a Welsh Government's Transport Appraisal Guidance (WelTAG) (WSP 2020) commissioned by Carmarthenshire County Council in 2020. The main objectives of this study are listed as:

- **Objective 1**: Improve access to local services, employment and cultural facilities by active travel modes by improving connectivity between Kidwelly, Carmarthen Bay Holiday Park and Ferryside.
- **Objective 2**: Improve safety for all users on the Coastal Road between Kidwelly and Ferryside
- **Objective 3**: Promote and facilitate growth of the local visitor economy, with a particular focus on supporting tourism.
- **Objective 4**: Promote and facilitate more active and healthy lifestyles.
- **Objective 5**: Protect and mitigate any impacts on the natural and built environment.

The study also recommends multi-modal counts, including pedestrian and cycles on the route, analysis of recorded personal injury collision data and surveying residents and visitors as methods of measuring the success of potential route improvements.

Figure 23 – National Cycle Network Route 4 [Source: Sustrans 2024]
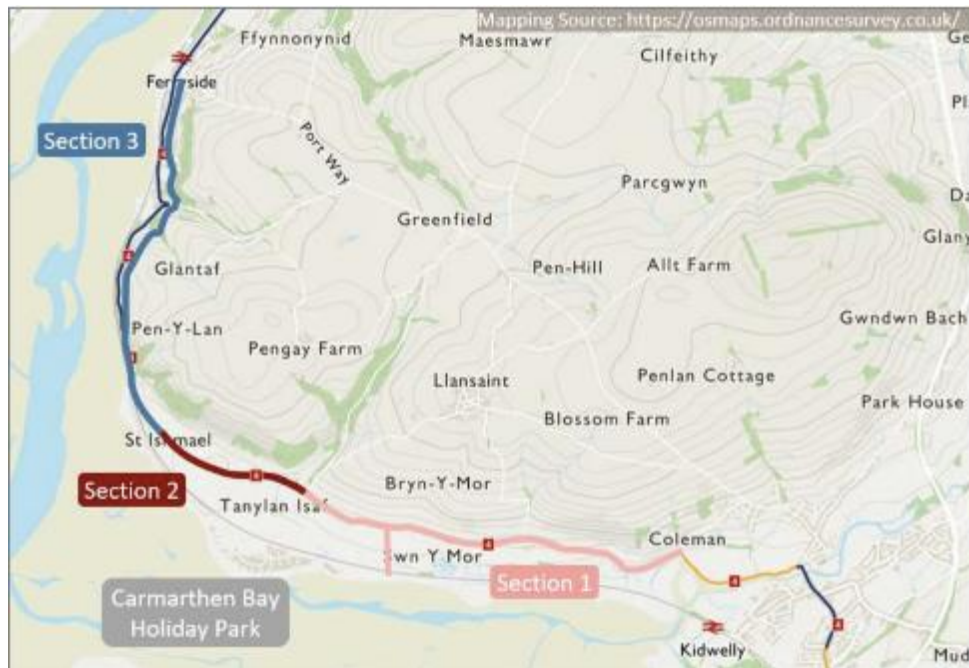
Figure 24 – Sections of NCN Route 4 Identified by WelTAG Document [Source: WSP 2020]

5.2.1 Red Route

The red route is between the castle and the town centre. Leg 1 consists of Castle Street, a narrow, mostly residential one-way street between the Castle car park and the entrance to the Glan yr Afon car park. Leg 2 consists of Bridge Street, a mostly commercial road between the Methodist Church and the rugby club.

The anticipated traffic for these this route is pedestrians, cars, busses along leg 2 stopping at the bus stops by the war memorial on New Street. Leg 2 also forms a section of the National Cycle Network Route 4 between London and Ferryside, running along Bridge Street and through Glan yr Afon car park, which leads to a footpath that runs alongside the river and meets up with the Yellow Route identified below (see Section 5.2.4).

The data in this route would be well supplemented by developing a strong relationship with Cadw and share visitor data with them to gain a richer understanding of their visitor experiences.

> Recommendation
> R11. Engage with Cadw about sharing more detailed visitor data.
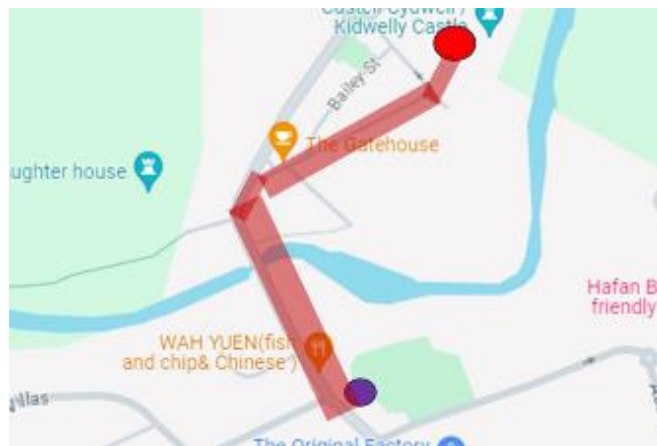
Figure 25 – Red Route

Table 8 – Red Route Breakdown Analysis

Red Route Legs	Red Route Interest Points:	Red Route Businesses:
• Red 1 – Castle Street • Red 2 – Bridge Street	• Castle • The Gate House • Glan yr Afon • Bridge • Capul Sul • Shops • Town Square	• The Old Moathouse • The Gatehouse • Serenity • Kidwelly Pharmacy • Castle News • Mario's Pizza • Taj Mahal • Time for Tea • Wah Yuen Take Away • The Fishermans Arms

5.2.2 Blue Route

The blue route is between the Rugby Club and Kidwelly Quay. Leg 1 is Hillfield Villas, a mostly residential street between the park and railway crossing that includes many local services, such as the library and Princess Gwenllian Community Centre. Leg 2 is Quay Road, an unlined, single track country road between the railway crossing and Kidwelly Quay.

On this route, people can walk or use personal vehicles. Additionally, there will be Fire Brigade Vehicles that are centralised within the fire station.
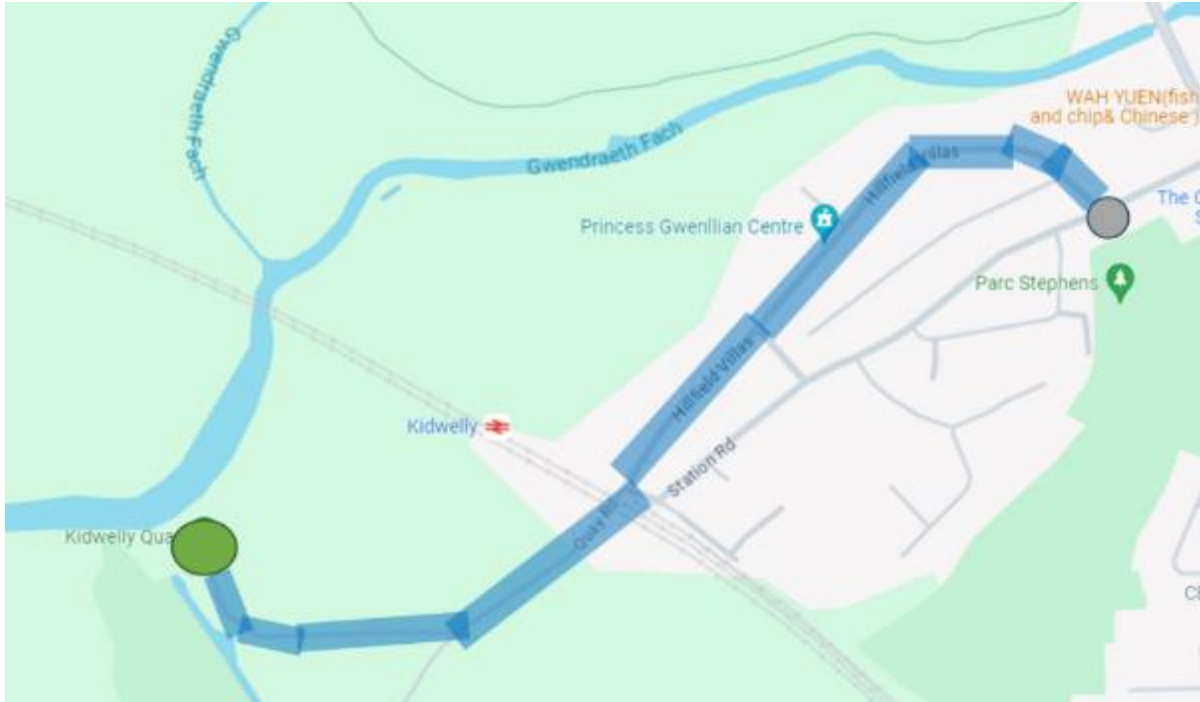
Figure 26 – Blue Route

Table 9 – Blue Route Breakdown Analysis

Blue Route Legs	Blue Route Interest Points	Blue Route Businesses
• Leg 1 – Hillfield Villas (Rugby Club to Railway Crossing) • Leg 2 – Quay Road (Railway Crossing to Quay)	• Rugby Club • Kidwelly Surgery • Fire Brigade Station • Princess Gwenllian Centre • Kidwelly Quay	• Gwenllian Education Centre • Anthony's Hotel

5.2.3 Purple Route

The purple route runs between town square and the train station. Leg 1 runs along Station Road, a residential street with street parking that goes between the rugby club and the railway crossing. Leg 2 consists of the short road section between the station platform and the intersection of Hillfield Road, Quay Road and Station Road.

This is a mostly residential route so the majority of traffic will likely be residents walking or driving along it. It is likely that there will be an increase in traffic around the school during drop off and pick up times and around the rugby club at match times. It may be interesting to combine, compare and contrast with the adjoining blue route data to see which gets more traffic.
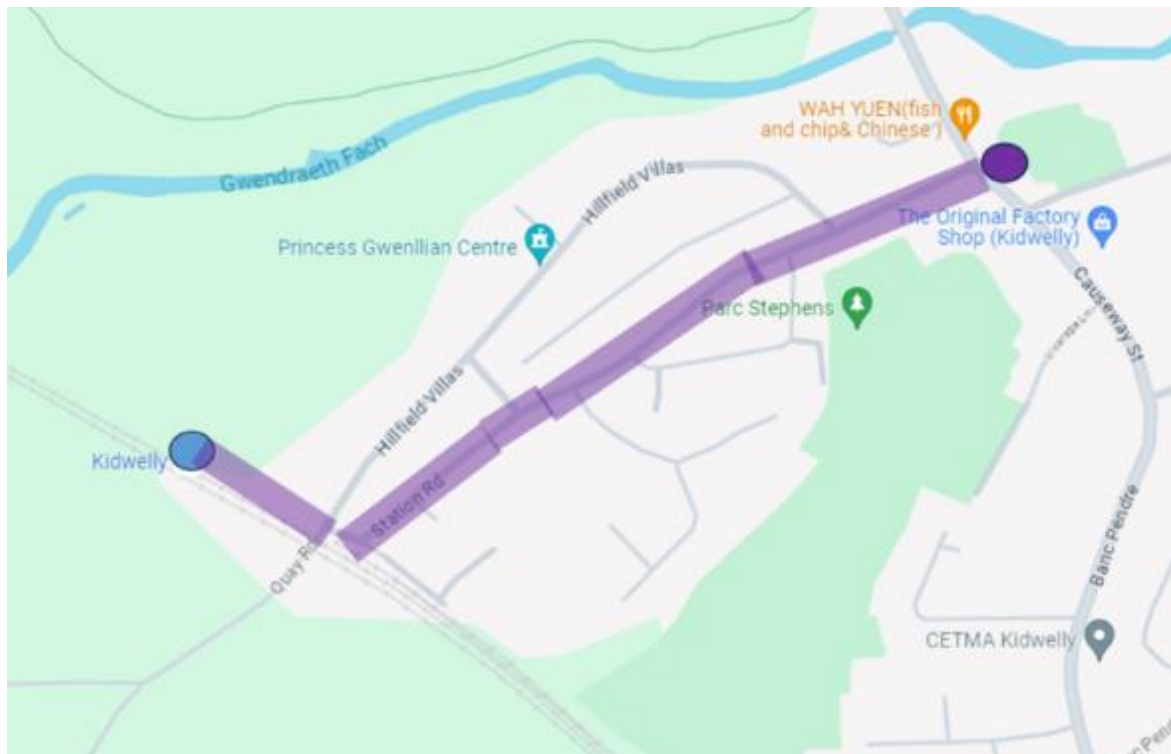
Figure 27 – Purple Route

Table 10 – Purple Route Breakdown Analysis

Purple Route Legs	Purple Route Interest Points	Purple Route Businesses
• Leg 1 – Station Road (Rugby Club to Railway Crossing) • Leg 2 – Station (Railway Crossing to Station Platform)	• Rugby Club • Ysgol Gymraeg Gwenllian • Train Station	• Kidwelly Rugby Club • Post Office • Ysgol Gymraeg Gwenllian • Glanmorfa Care Home

5.2.4 Yellow Route

The yellow route runs between the Carmarthen Bay Holiday Park and Kidwelly Castle. Leg 1 runs along Ferry Road, which is a mostly residential road with pavement on one side allowing pedestrians to walk along it. Ferry Road leads into Port Way, the main road to neighbouring Ferryside, and forms part of the 198 bus route.

Leg 2 consists of two miles of country road, that runs between the Carmarthen Bay Holiday Park and Ferry Road. This is a long, single track road with no pavements, so it is unlikely to have much foot traffic, but is the main driving road for the holiday park. Leg 2 is also a section of the National Cycle Network Route 4 between London and Ferryside.

Figure 28 – Yellow Route

Table 11 – Yellow Route Breakdown Analysis

Yellow Route Legs	Yellow Route Interest Points	Yellow Route Businesses
• Leg 1 – Ferry Road (Londis store to turn off for Holiday park) • Leg 2 – Single Track Road (Ferry road to Carmarthen Bay Holiday Park)	• Kidwelly Town Cemetery	• Londis • Burns Pet Nutrition • V Evans Dairy Farm

5.2.5 All Routes

Figure 29 – All Permanent Visitor Location Routes

5.3   Permanent Resident Activity

There is also a need to consider the permanent residents of Kidwelly. If the number of visitors to the castle per year is used as a metric, approximately 36,000 (see Section 2.3.1), and compare this to the number of visits by residents to the town centre just once a month, approximately 3,500 x 12 = 42,000 visits per year, it is clear that the local population is very important to the town.

With this in mind, improvements and provisions of Kidwelly should also provide befits to the residents and include key locations of importance to them. Initial resident locations are outlined in Figure 30 and Table 12 below.
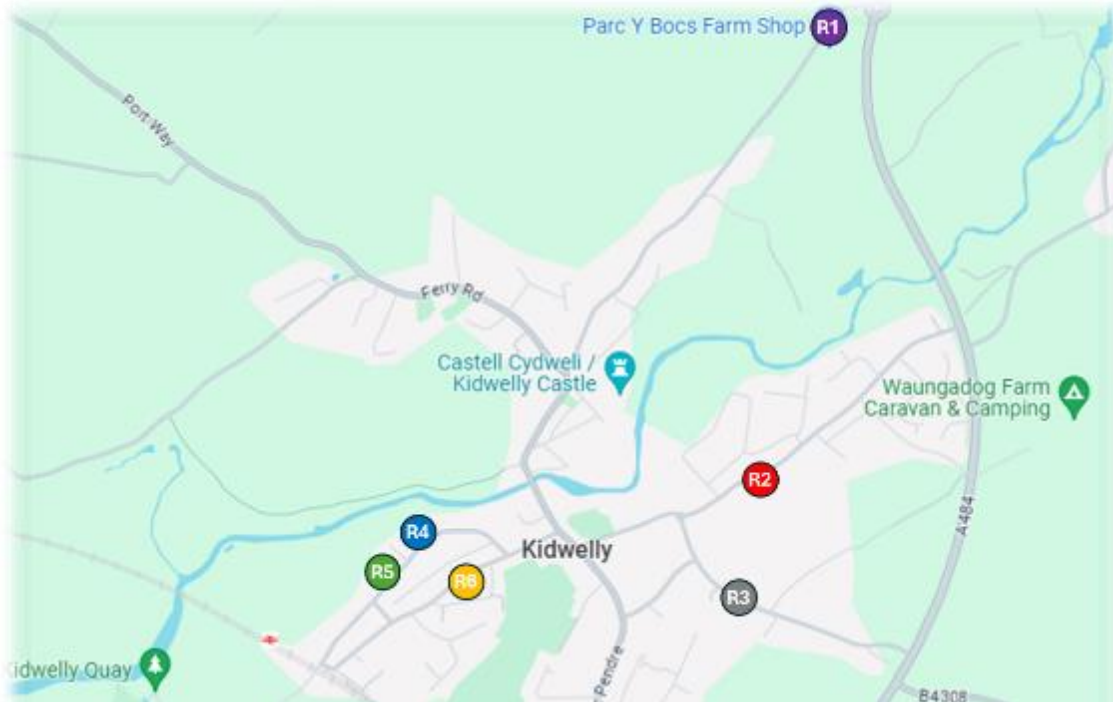
Figure 30 – Proposed Permanent Resident Locations in Kidwelly

Table 12 – Permanent Resident Location Descriptions

ID	Circle Colour		Location	Rationale
R1	Purple	🟣	Parc Y Bocs Farm Shop	Farm Shop and Café selling local produce
R2	Red	🔴	Ysgol Y Castell	Local Primary School
R3	Grey	⚪	Co-op	Supermarket for the town
R4	Blue	🔵	Kidwelly Surgery	Medical Centre
R5	Green	🟢	Library	Local Library
R6	Yellow	🟡	Ysgol Gymraeg Gwenllian	Welsh Medium School

Set routes between these hub spots have not been identified as it is anticipated that they will mostly be frequented by residents who will travel from their own, individual homes. Data should still be collected at the identified hubs, however, to help gain a fuller understanding of engagement within Kidwelly.

5.4 Periodic Activity

There needs to be consideration for events that are not permanent fixtures in the town but happen periodically, either with a regular cadence such as the monthly market, or more sporadic but still predictable events like rugby matches or bank holiday offerings from the castle. The market needs the ability for merchants to make card-based transactions using mobile card payment machines and the town may be able to prepare for increase in footfall.

Some examples of these periodic activities are:

- Carnival;
- Markets;
- Food and Drink Festival;
- Castle events:
  - Carmarthenshire Falconry;
    - Easter bank holiday, August bank holiday
  - HMS Wales Reenactment;
    - May bank holiday
  - Minstrel Tom, Juggling Jim, Time Travelling Medicine Man;
    - July 30-31, Aug 3-4, Aug 20-21
  - Outdoor Theatre and Cinema.
- Rugby matches (September – May); and
- Capel Sul (Figure 31) – Future music event.

Figure 31 – Capel Sul [Source: Capel Sul 2024]

6 Smart Technology for Kidwelly's People

6.1 The Future of a Smart Kidwelly

Whilst this document describes an initial scoping of Smart Technologies, this should only be seen as an initial stage, that can have increased granularity within the scoped area, but also grown out with the initial scoped area to include a wider catchment.

Section 5 identifies the human centric information that is needed to form the baseline data for Kidwelly and foundations for future work moving forwards to achieve the goals set out in Section 2. Section 3 has investigated the current state of technology and data handling and identified the areas that require some more work, infrastructure or investment for them to be fully useful and provide actionable guidance.

This section and Figure 32 describe what is needed to establish a robust infrastructure that is capable of collecting useful data for a baseline and identifying the effects of future initiatives as the goals of Kidwelly as a Smart Town are worked towards.
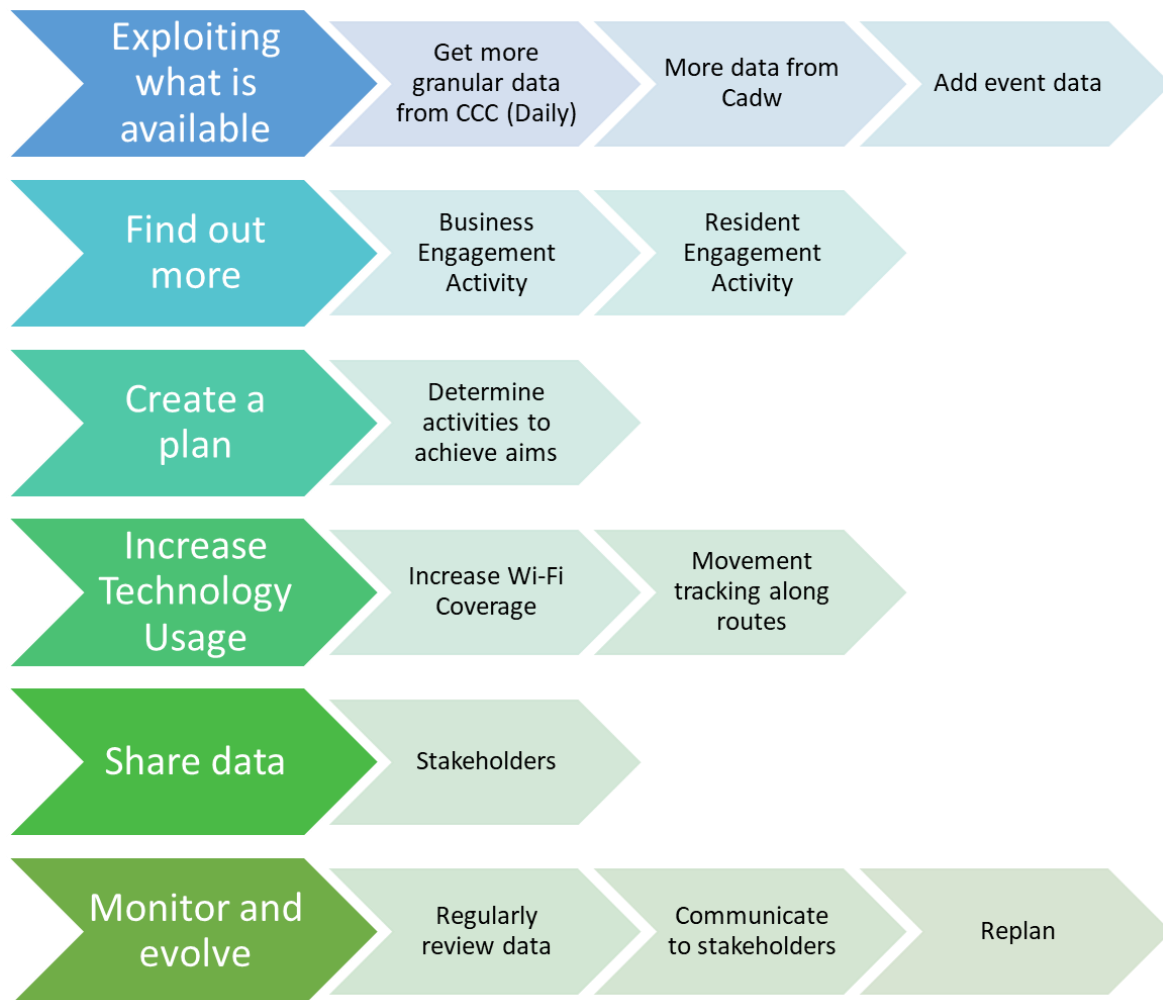

Figure 32 – Future Steps Action Plan

> ## Recommendation
> R12.   To put the future steps into an action plan and get signoff from stakeholders.

6.2   Maximising current infrastructure

The current Smart infrastructure is providing a certain amount of limited data. With an increase of the granularity of the reported data, and supplemented by local knowledge, then the current infrastructure can provide a much greater amount of information from which better decisions could be made.

- The data provided by CCC needs to be provided at a Daily level to be able to understand the daily activity and the success of individual events. (see Section 4.4)
- The addition of the central events log will enable the correlation of people movement and event activity. (see Section 4.4)

6.3   Improving Baseline Infrastructure / Sensor Capability

Hubs, points of interest and key routes within Kidwelly have been identified, as well as the gaps in the current ability to gather data in these areas. It is key to this project that some infrastructure is put in place to fill or link these gaps so that traffic, both footfall and vehicle, can be quantified.

6.3.1   Wi-Fi

Expanding the Wi-Fi access to cover the identified routes and hubs would provide the follow benefits:

- Enables more data to be gathered on visitors (with permission);
- Enable greater footfall tracking, giving a better picture of how people move around Kidwelly;
- Give data in the same format as the existing reports; and
- Other Smart sensors can be connected to the Wi-Fi network to provide additional data for various locations.

However, as has already been mentioned, the visitor data will need to be reported in a much more useful way or as raw data that can be analysed and interrogated locally. Wi-Fi also has the limitation of tracking devices, so may not be so useful for vehicle tracking.

6.3.2   LoRaWAN

Increase the LoRaWAN capability across the whole area. This will allow for:

- Secure data collection that can be stored and analysed locally;
- Specific data collection – sensors that are designed to collect a specific type of information can be placed in targeted locations; and
- Wider range data collection – the LoRaWAN network has a longer range signal than Wi-Fi, which allows for sensors to be placed in more isolated locations without an extra dedicated connection setup.

6.4   Future Aspirations

With the Baseline infrastructure and data in place, this can be built on by introducing new features and functionality to the town. The strong foundation will allow for easy data collection, analysis and direct comparison to show the effects, both good and bad, and provide direction for further refinement and improvements.

6.4.1 Kidwelly Web App

A free web app that will be a portal to the insights provided, and can be updated to provide new information, be compatible with newer devices and to reflect the evolving identity or branding of the town. This app can be used to advertise events in the town, direct people to underutilised areas of interest, promote sales or offer discounts during slower days to increase business, and encourage interaction with the town itself through trivia and fact finding/treasure hunts.

6.4.2 Digital Signage

Signs posted along the identified routes that direct people to the points of interest, e.g. to the town centre, castle and quay from the train station, or town centre from the castle.

Smart signs that can display dynamic information, such as direct people to open parking spaces, provide public transport times, or show details of upcoming local events.

6.4.3 The Kidwelly Trail

A trail that has QR codes displayed at prominent points like the war memorial (Figure 33) that link through to more information or interactive activities for that particular area. Using the data gathered from the routes identified in Section 5.2, points of interest can be placed along the most prominent footfall routes, but also located in less frequented areas in order to encourage people to explore more of the town.

Figure 33 – Kidwelly War Memorial

6.4.4 Active tracking

Dynamic graphics that show how busy or not different areas of the town are. This can be combined with historical data over time to show trends in footfall, showing which areas are more popular at certain times of day/week/month/year.

6.4.5 New Events

Using the baseline footfall data, new events that encourage residents and visitors into Kidwelly can be timed to either capitalise on the most popular times or strategically held during identified lulls in visitor activity to improve business during quieter periods. Events can also be strategically located to either capitalise on the most popular locations in the town or to encourage people to go to less used areas.

6.4.6 Building Management

Measurement of air conditioning, heating schedule, air quality, and energy and water usage are all possible and can help business owners and building managers to make more efficient use of their energy.

6.4.7 Community Safety

Using combinations of these data can help to improve safety in town for residents and visitors, for example making women feel safer when walking on their own. Data such as light

levels, people movement and noise levels along with activity like bus times and business opening times can be collated and provided for people to choose routes where they feel safe, and to identify and improve potential trouble spots.

6.4.8   Smart Lighting

Data can be used to employ Smart lighting across the town. For example, sensor-controlled lighting can be used to identify and deter antisocial behaviour or timed lighting can be used to minimise light pollution in nature areas when there are no visitors.

6.4.9   Waste Management

Sensors monitoring the bins can be utilised to ensure they are emptied when necessary. This can reduce littering, allow for efficient waste service management and maintain a positive image of a clean town. An interactive messaging system can also be available for people to easily report any issues such as fly tipping or damage around town.

6.4.10   Smart Parking

Monitoring and displaying the capacity of the local car parks can show which are being over or under used, can help direct visitors to control crowd distribution around town and make it easy for people to locate parking, making them more likely to stay and less likely to inappropriately park on the street.

6.4.11   Environmental Monitoring

Weather, river levels, and air and soil monitoring can help track the effects of the town on the environment and the effects of the environment on the town. For example, if a reduction in air or soil quality is detected then steps can be taken to reduce traffic in the area and river levels can be monitored to ensure there is no risk of future flooding of the riverside paths.

6.5   Testbed Technologies

The town could benefit from funding or technology partnerships where new technologies are being developed and the suppliers are looking for areas to test them out on. If Kidwelly were to have a good baseline infrastructure, then it would be an attractive proposition for the future.

7   Conclusions & Recommendations

7.1   Introduction

This section summarises the main findings of the report, followed by a summary of the main recommendations.

7.2   Conclusions

There is some infrastructure for Smart Town capabilities within Kidwelly that are currently either underutilised or underpowered but is a good start on which to build. There is a monthly data report, that provides a level of confidence that the technology works and provides data, but that data now needs to be put to work, by having greater granularity and deriving how the council can utilise it for decision making and town growth.

While there is currently a free Wi-Fi provision that covers the length of bridge street, it is not clear who is directly benefitting from this or how. It also does not cover many of the identified points of interest within Kidwelly including the car park just north of the bridge, where there would be a benefit for the 50-60 stall holders that attend the monthly markets in the summer. The monthly Wi-Fi reports show that there is some potentially useful data being collected, but it is not being analysed or presented in a particularly helpful way that would allow someone to identify trends or how to make best use of the information.

Kidwelly has many positive assets available, such as sites of historical and architectural interest, areas of natural beauty, good transport links and a thriving market community, that can be developed and better utilised to grow and improve the town for its residents, businesses and visitors.

To best facilitate changes, improvements and enhancements, it first needs to be fully understood how the town is currently used by the people who interact with it in order to uncover how they can be best served by the town. This can be achieved by making better use of the existing data available and by improving the base infrastructure around the town, which could also provide immediate benefits to important members of the community like the market stall holders who operate in the Glan yr Afon car park.

When a baseline has been established, the data can be analysed to show where actions will have the most impact and the provide the biggest benefits. Any actions can then be monitored, data recorded, and effects interrogated to show if they had the desired results.

7.3   Recommendations

As a starting point, a robust, foundational infrastructure should be built that will enable useful data to be collected, analysed and monitored over time. This data infrastructure should cover at least the routes identified in Section 5.2.

A summary of the recommendations made throughout this report:

Table 13 – Recommendations

ID	Recommendation
R1	To create a Smart Kidwelly Stakeholder group with representations from the mentioned organisations that can meet at least every 6 months to review data, share insights and action plans.
R2	Determine who has access to the LoRaWAN sensor data.
R3	Deploy more Wi-Fi hubs to provide access, and therefore data gathering, to a wider area.
R4	Investigate Starlink as a method to provide good internet access.
R5	Investigate low user take-up of Wi-Fi.
R6	January 2024 delivered Wi-Fi data is checked against the raw data.
R7	Request Wi-Fi data at a daily fidelity as a minimum, with a view to greater granularity in the future.
R8	Create and maintain an events log to accompany tracking data.
R9	Request access data for all of the Wi-Fi hubs, not just the highest and lowest.
R10	Survey local businesses and residents to gauge opinion on the data reports and what changes they would like.
R11	Engage with Cadw about sharing more detailed visitor data
R12	To put the future steps into an action plan and get signoff from stakeholders.

7.4   Next Steps

A meeting was held with stakeholders on 5th June 2024 at Kidwelly Town Council offices, to review the work to date and look at the next steps.

It was agreed that engagement with business and residents is needed, the following are suggested focus areas that can act as a catalyst in the immediate future.

Town Council:
- Want to be able to target businesses suitable to fill empty commercial buildings
- Understand why people are travelling to Kidwelly, and what they are buying, visiting or using while there
- To understand why people may be leaving Kidwelly, in order to buy, visit or use something not available in Kidwelly

- Connectivity – mobile and broadband to support market traders with electronic payments – which could be via Starlink (Grant applications through Carmarthenshire County Council or Dyfed Telecom may be available)
- More sensors on LORAWAN network
- Make use of existing data

County Councillors:
- Who are receiving the monthly data reports, and are they using the data? If so, what for?
- Does the data match what they want to know?
- There is a need to communicate data findings to businesses
- Investigate data quality of footfall visiting Castle and if they can be pushed through to the Town
- There may be possibility of redistribution of sensors and Wi-Fi hubs as other Ten Towns funding ceases this year.

Caru Kidwelly:
- Want to create surveys to provide data for Kidwelly-based events to understand what is bringing people into the Town and keeping them there
- What businesses work in Kidwelly, and how can we support them

Carmarthenshire County Council representatives:
- Happy to assist with Town's Smart Kidwelly plans, but want Town to decide what they want and need
- They want to engage all businesses to understand what they want in terms of sensors and data, how are they going to use it?

An initial identification of priority areas to focus on, concluded that the following three themes and underpinning activities should form part of the immediate plan:
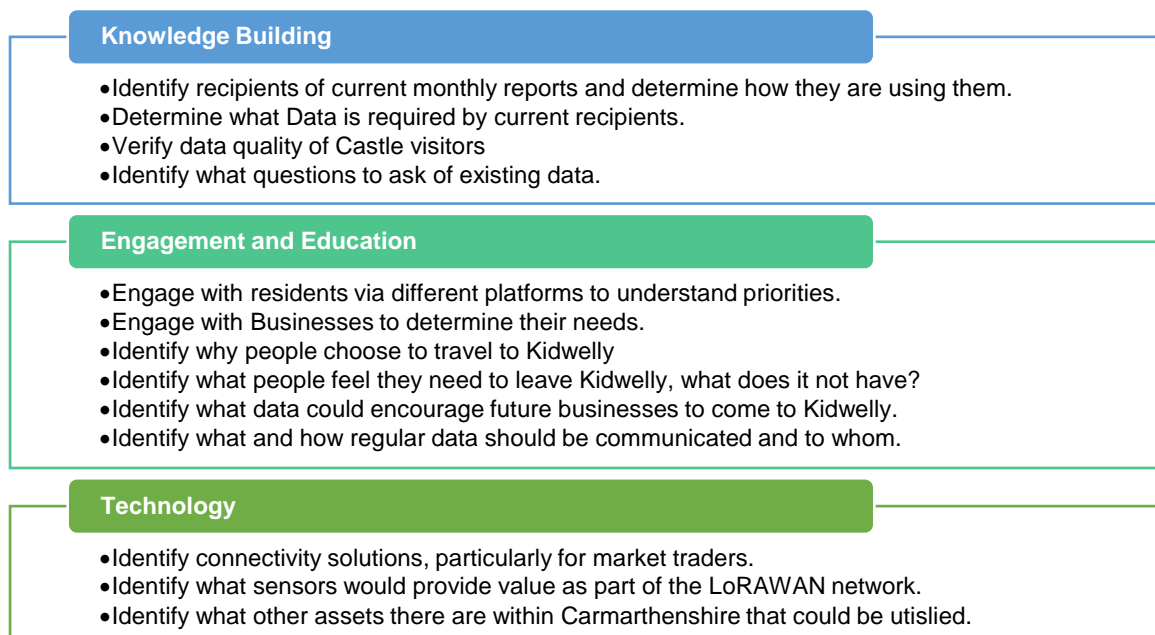
Knowledge Building
- Identify recipients of current monthly reports and determine how they are using them.
- Determine what Data is required by current recipients.
- Verify data quality of Castle visitors
- Identify what questions to ask of existing data.

Engagement and Education
- Engage with residents via different platforms to understand priorities.
- Engage with Businesses to determine their needs.
- Identify why people choose to travel to Kidwelly
- Identify what people feel they need to leave Kidwelly, what does it not have?
- Identify what data could encourage future businesses to come to Kidwelly.
- Identify what and how regular data should be communicated and to whom.

Technology
- Identify connectivity solutions, particularly for market traders.
- Identify what sensors would provide value as part of the LoRAWAN network.
- Identify what other assets there are within Carmarthenshire that could be utislied.

Figure 34 - Next Step Focus Areas

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Annex A - Mobile Coverage

A.1   Introduction

This Annex details the coverage each mobile network in the Kidwelly area.

A.2   3 Network

Figure 35 – 3 Towers

Figure 36 – 3 Coverage

A.3   Vodafone Network

Figure 37 – Vodafone Towers

Figure 38 – Vodafone Coverage

A.4   EE Network

Figure 39 – EE Towers

Figure 40 – EE Coverage

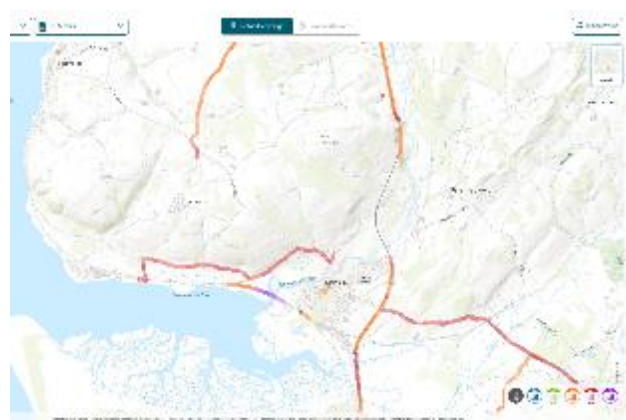## A.5 O2 Network

Figure 41 – O2 Towers

Figure 42 – O2 Coverage