

Appin and Lismore High Speed Broadband 2014

Introduction

This report has been prepared by a resident volunteer group, “Appin Broadband”, which has been working with **Community Broadband Scotland** to explore the provision of future High Speed Broadband for the local community.

The UK is rolling out new High-Speed Broadband services across the country. The contract to achieve this has been awarded to BT’s Openreach, with the aim of providing the service to 95% of homes nationwide. Locally the contract was awarded to Openreach by the **Highlands and Islands Enterprise**, and the plan was published in October 2013 showing the areas which will be included. The homes, businesses and residents of Appin and Lismore are not included in the current roll-out plan.

Discussions took place with **Community Broadband Scotland** (a subsidiary organisation of **HIE**) in early December 2013 to understand the options for Appin. CBS advised Appin is unlikely to receive the service before 2020, unlike neighbouring communities and surrounding areas, which are planned to receive it between next year and 2016.

Community Broadband Scotland further advised that there are alternative means to provide High-Speed Broadband. The Government has made funding available throughout the UK for communities which have not been included in the BT Openreach plans. This funding is channelled through “**Community Broadband Scotland**”. It could be accessed, along with the necessary expertise to provide Appin with High-Speed Broadband, by setting up a community based project.

In order to establish a community based project, an initial study was required to define the scope of the community and its broadband requirements. Part way through the study, CBS asked for a similar study of Lismore to be included. This report details the findings of Appin Broadband, following a survey of the requirements.

The detailed report is divided into Part 1 - Appin, and Part 2 – Lismore.

Conclusions and Recommendations

The findings of this report were discussed at a meeting between Appin Broadband and CBS on 10 February 2014. The immediate conclusions from that meeting are summarised below.

1. There is a clear demand for High Speed Broadband in both Appin and Lismore, represented by almost 300 existing broadband subscribers and over 450 property addresses. Current service levels are below the national rural average and the Argyll average for both communities.
 - a. The livelihoods and future prosperity of both communities are becoming heavily reliant on availability of internet services.
 - b. Appin has a significant number of broadband users who are currently receiving very poor service levels – below 2Mbps download. This is due to these pockets of the community being distant from the Appin BT exchange. The satellite based services available to these users are poor, restrictive and costly. This needs to be addressed urgently.
 - c. Lismore users generally receive better service due to the majority of the population living close enough to the Lismore exchange, though still not as good as the Argyll or UK rural average.
2. It is recommended that Lismore is included in any proposals to bring High Speed Broadband to Appin. This is because any solution for Appin is most likely to be suitable for Lismore, and any joint project proposal is likely to be more commercially viable than separate projects.
3. Before moving on to evaluate any technical solutions, or making any specific project proposals, it is recommended that a short “strategic” evaluation is done to define the best direction as follows:
 - a. Work with CBS, HIE and any other available channels, to further evaluate how Appin and Lismore could be included in HIE/Openreach plans for fibre High Speed Broadband service provision on a defined and faster timescale.
 - b. Work with CBS to evaluate the benefits and scope of a joint project with further additional active communities, who are seeking similar services, to provide a wider West Coast and Islands broadband solution.
 - c. Work with CBS to develop the scope for a specific project “owned” by Appin and Lismore to provide a suitable self-sufficient solution.
4. Both the Appin and Lismore surveys indicated a high level of “no-spots” for reception of mobile phone signals. It is considered unlikely that the roll-out of 3G and 4G will deliver sufficient coverage to provide the whole communities with an alternative acceptable source of broadband.
5. The survey and associated discussions with residents indicated there is a portion of the population whose lack of understanding of IT and the internet is becoming a handicap. This should be explored with Community Council, Community Trust and potential education support services. This relates more to Appin.

PART 1

Appin Community

High Speed Broadband

2014

Appin High Speed Broadband

A report of the needs for High Speed Broadband services in the
Community of Appin

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On behalf of: - Appin Community Trust and Appin Community Council

1. Management Summary

The UK is rolling out new High-Speed Broadband services across the country. This is being done by BT's Openreach, with the aim of providing the service to 95% of homes nationwide. The plan for the roll-out in the Highlands and Islands has been published, showing the areas which will be included. This plan is shown in Appendix 1. The homes, businesses and residents of Appin and Lismore are not included. These communities are unlikely to receive the service before 2020, unlike neighbouring communities and surrounding areas, which are planned to receive it between next year and 2016.

There are alternative means to provide High-Speed Broadband. The Government has made funding available throughout the UK for communities which have not been included in the BT Openreach plans to reach the target 95% of homes. This funding is channelled through "Community Broadband Scotland". It can be accessed, along with the necessary expertise to provide Appin and Lismore with High-Speed Broadband, by setting up a community based project. (See appendices 7 & 8 for details of CBS.)

This report scopes the population and geography of the community, and sets out to define the current internet service provided to the community, along with a brief analysis of the current telecommunications infrastructure. It then goes on to define the future broadband needs of the community. Much of the data used has been collected using a community survey questionnaire which was circulated during December 2013, and January 2014.

The purpose of the report is two-fold:

1. To present a case for High Speed Broadband in Appin and either:
 - a. Achieve a commitment from HIE, Openreach and BT that the Appin exchange area will be included in the national roll-out, to provide High Speed Broadband, or,
 - b. establish with "Community Broadband Scotland" a community-based project for the secure provision of future broadband services in the Appin area
2. To inform the Appin community about local broadband affairs, and remove some of the "mystery" from the technology

The reported broadband subscriber population in Appin is 215 (as per OfCom). Current broadband download speeds vary from less than 1 Mbps up to 6 Mbps. Around a quarter of households are unable routinely to achieve broadband download speeds better than 2 Mbps. From the community survey, 93% are seeking faster broadband. This leads to an estimate that 200 of the Appin subscribers would upgrade to High Speed Broadband, followed by ongoing growth in line with society at large.

The community survey reported a high level of business use. In addition to the 35 businesses listed in the report, more than 50% of household questionnaire returns reported they used the internet for business purposes.

In the short term, internet usage will require download speeds between 8 & 10Mbps, with much improved upload speeds. Even in the foreseeable future (up to the year 2020) demand can be anticipated for speeds of 20Mbps. An absolute priority is to lift the 25% of households and businesses which are unable to achieve a service level above 2Mbps. The UK average is 14.7 Mbps.

The community survey also revealed that mobile phone services can at best be described as patchy, with unreliable service. The proportion of households with no reception at all is reported as 41%. This would need to be accounted for if the mobile phone infrastructure is used as part of any future broadband solution. These households will also be excluded from the planned upgrade of the local mobile phone services from 2G through 3G and 4G, unless improvements are made to the location of transmitter masts.

Society in general will perceive the internet much like a utility, and in some UK regions maybe it already does. Just as people expect continuous and reliable access to electricity and water, and to be supplied as much as they need, people will expect the same of internet services. That is, people expect internet infrastructure to be renewed and improved over time to ensure they can do the things they want to, when they want to do them. Appin is at risk of being left without this essential facility, not through any fault of its people, but through an unfortunate combination of geography and commercial logic. The consequences of being left out are not acceptable: business and population decline, falling property values and community wealth, and migration of valued public services.

The community of Appin must find a solution to providing satisfactory broadband services to secure its future. As today's community members we are all the custodians of the infrastructure which will determine the prosperity and well-being for current and future generations.

2. Local Area Information

Location

The Appin area lies at the northernmost boundary of Argyll and Bute Council area and is represented by Appin Community Council. The area stretches from the Highland boundary at Lurignish, in the north, south and east along the A828 trunk road to Creagan Bridge. Two local spur roads connect the settlements of Port Appin / North Shian and Fasnacloich / Glenure to the A828.

For census purposes the area falls within Datazone S01000829, but this datazone also includes the island of Lismore.

The area sits within Postcode sector PA38 4 and is defined by the following 21 unit postcodes:

- BA, BB, BD, BE, BG, BH, BJ, BL, BN, BQ, DB, DD, DE, DF, DG, DH, DL, DN, DQ, DR, DS (for the avoidance of doubt, post code PA38 4BF is in Kentallen)

Population

The 2011 Census gives a population estimate for the whole Datazone of 759. Other sources indicate a population for Lismore of around 150 so that the remainder of the area, representing Appin, would have a population of c.600.

Population estimates for the unit postcodes give a total of 477 but the methodology used to estimate this is less robust due to the small scale and it is likely that the postcode generated data is an underestimate (see Households below).

The best estimate for Appin and area is therefore approximately 600 people.

The age profile is:

- Children 16%
- Working Age 50%
- Pension Age 34%

Households

The 2001 census estimates the number of households within the datazone at 280. Assuming the same split as population this would indicate around 225 households within Appin and area.

The postcode data records a total of 206 households within the Appin area, but this may be an underestimate as evidenced by postcode PA38 4BJ which is reported as having only 15 households (and a population of 28), whereas the number of properties is actually known to be higher. Some of these properties are used as holiday homes and not all will therefore have a resident population, though there may be a growing need to have a broadband connection at the property.

There is a relatively high proportion of owned properties (69%) and private rented properties (20%) compared to both the Argyll and Bute and Scottish averages (65% / 13% and 63% /

8% respectively). The proportion of social rented housing is relatively low at 11% (Argyll and Bute 22%; Scotland 29%).

Schools / Public Buildings

There is one school within the area - Strath of Appin Primary School – providing nursery education for 3-5 year olds, primary 1-7 classes and a Gaelic Medium Unit. There is currently a school roll of 33 pupils.

Secondary education is accessed in Oban. Within the wider Datazone (ie including Lismore) there were 45 Secondary school pupils in 2012. The Argyll College, and SAMS, which provide some further education courses are within routine commuting distance.

Other public buildings comprise the two village halls, one at Appin and the other at Port Appin.

Health Services

A GP surgery with two doctors is located at Port Appin.

Post Office

There is one post office, located at Port Appin within the Community Co-operative shop.

Churches

The area has two churches: Church of Scotland at Appin; and Episcopal Church of the Holy Cross at Portnacraish, both located on the main A828.

Key Businesses

Tourism is a significant economic sector for the area and this is reflected in the type of businesses that exist, for example: accommodation, food and drink, gardens, horse riding and marina/boat hire. Other businesses of note include land based activities (estate management, farming, crofting), building contractors, local garage and taxi services, shop/general store and art/craft studios.

A list of local businesses is provided in Appendix 2. In total there are 35 businesses listed.

Not listed by name, but also known to exist within the area are a variety of other income generating activities such as farming (both agriculture and fish farming), land based services (eg timber supply) and consultancy services.

A number of the Appin businesses have their own websites and a larger number are reliant on electronic communication for their business activities.

Both Forestry Commission Scotland and SNH own and manage land within the area. Whilst these organisations do not require local access to broadband for staff purposes, the sites involved are major visitor attractions and both organisations will in future need to be able to offer GPS phone apps providing site information for visitors.

Finally, we should note the existence of a number of voluntary groups in the Appin area for whom faster and more efficient broadband could offer improved opportunities for communication and activities in the future. These include the Appin Youth Club, Art Group, Community Trust, Drama Festival, Appin Historical Society, SWRI.

Key Partner Support

The project has been jointly initiated by the Appin Community Trust, the Appin Community Council, and key interested community residents. It is led under the authority of the Appin Community Trust, which acts as its financial and corporate body for project affairs.

Other potential community support partners include: Appin Community Co-op and Post Office, Appin Youth Club, Appin Church and Appin SWRI. Several local businesses have expressed their support in survey questionnaire returns.

Terrain

For the purpose of government statistics Appin is classified as a remote rural area (6 = Areas with a population of less than 3,000 people, and with a drive time of over 30 minutes to a settlement of 10,000 or more).

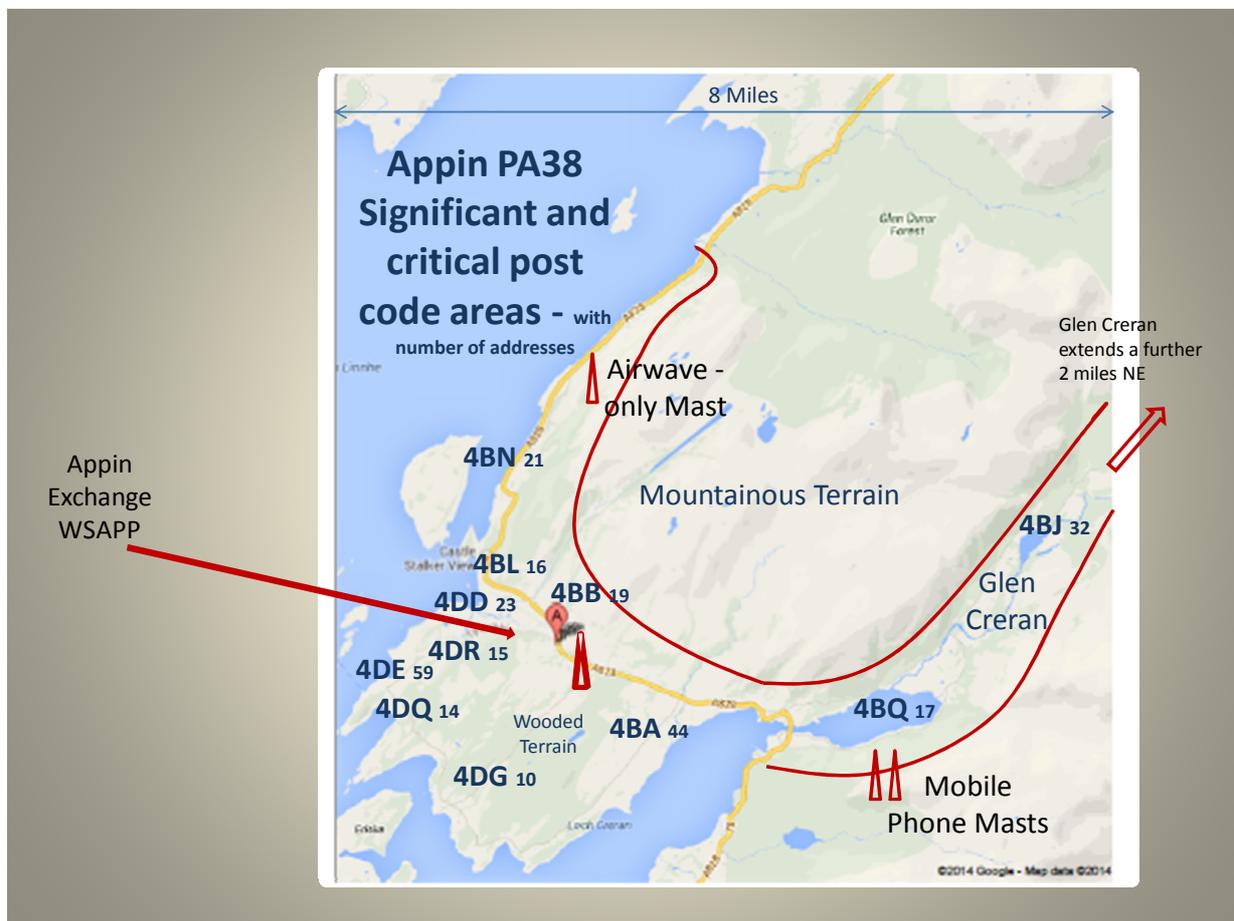
At 0.03 there is a relatively low number of dwellings per hectare within the Datazone compared to both Argyll and Bute (0.05) and Scotland as a whole (0.32). There are two main population centres – Appin and Port Appin – where the density of housing is highest.

The area is bounded on the west by Loch Linnhe and on the south by Loch Creran. Along Loch Creran-side and through the Strath of Appin the land is relatively flat and agricultural but otherwise the terrain is generally mountainous and wooded.

One island – the Isle of Shuna on Loch Linnhe – is included within the area.

3. Appin Area Post Codes and Telecoms Services

The following map describes the Appin area, with its major sub-post-codes, exchange, and mobile phone masts.



BT Exchanges and Service

There are two exchanges serving Appin and Lismore. The details of both are laid out in the table below. Both exchanges have BT Wholesale as the sole provider of broadband services.

Local BT Exchanges	Appin	Lismore
Exchange code	WSAPP	WSLIS
Post Code location	PA38 4BB	PA34 5UL
Number of premises - residential	262	83
Number of premises - other	24	10
Broadband availability	ADSL max** only	ADSL* only
LLU Operators***	none	none

*ADSL . Asymmetric Digital Subscriber Line - is a type of data communications technology that enables faster data transmission over copper telephone lines than a conventional voice-band modem can provide. It does this by utilizing frequencies that are not used by a voice telephone call. A splitter, or DSL filter, allows a single telephone connection to be used for both ADSL service and voice calls at the same time. ADSL can

generally only be distributed over short distances from the telephone exchange, typically less than 4 kilometers (2 mi),^[2] but has been known to exceed 8 kilometers (5 mi) if the originally laid wire gauge allows for further distribution. The communications are asymmetric, with speeds managed such that download is much faster than upload.

**ADSL – Max. BT Wholesale rate-adaptive services which are intended to offer the best possible speed attainable, which may vary over time. The maximum speed permitted is determined both by current line conditions and the level of noise, and also by recent history based on factors including the rate of communications errors and the best and worst DSL modem sync speeds achieved during some recent period of time. The highest speed ADSL Max services enable customers to receive up to 7.15 Mbit/s (termed 'downstream') over a standard BT telephone line on lines of sufficient quality. Various kinds of lower speed rate-limited adaptive services are also available as a reduced cost option. Customers with long lines or poor quality lines or who experience high levels of noise or interference will be limited to much slower transfer rates, and some customers whose lines are very poor or who are affected by high levels of noise may be unable to obtain service at all.

*** LLU is short for Local Loop Unbundling, a process that lets companies other than BT install equipment in local telephone exchanges. This makes it possible for them to use the pre-existing copper wires that connect homes to the exchange for the provision of broadband services.

Existing Broadband Services

The main existing Internet Service Provider (ISP) is BT. An exception is broadband users in Glen Creran (post code PA38 4BJ), who use mainly satellite based ISP's, Q-Sat and Tooway.

The following table shows the proportions of ISP use, according to the survey.

Appin Survey – ISP's	
Internet Service Provider	%
BT	80%
Q-sat and Tooway	9%
Plusnet	5%
Virgin/Sky/Talk Talk/AOL	6%

The ISP's Q-Sat and Tooway are prevalent in Glen Creran because the distance from the Appin exchange is in excess of 9Km which generally prohibits use of ADSL. These satellite system users are further penalised by generally higher monthly costs for download speeds less than 2Mbps, and limits on monthly total download volume. For example, a contract costing £40 per month is limited to 20Gb download per month.

Mobile Phone Services – Appin Area

Mobile phone services for the Appin area are provided through a mast site on the west face of Creach Bheinn, above Loch Creran, and to the South of the Creagan Bridge. There are now two base stations, transmitting for operators Orange, Vodafone, O2 and Airwave. A further mast sited above Kirkton, in the Strath of Appin, transmits for Vodafone only.

Appin Version

Reception experience is best described as patchy and intermittent. Orange has been the main operator and has suffered routine intermittent faults for long periods, with service generally non-existent over the last four months of 2013. It is understood that second base station at Creagan has been upgraded in 2014, transmitting both Vodafone and O2. Appendix 3 shows the O2 and Orange reception coverage which is typical for all three operators. Reception is generally non-existent in shadow areas of Port Appin and coastal areas, further up Glen Creran. The computer generated reception maps shown in appendix 5 would appear to be optimistic and do not reflect the results from the survey returns.

A summary of the survey returns shows post codes 4BJ, 4BN, 4DD, 4DE, and 4DR experience particularly poor mobile phone reception. (See Appendix 9)

The table below indicates mobile phone reception and strength as a proportion of properties, according to the questionnaire returns.

Appin – Survey Reported Mobile Phone Reception	
Level of mobile phone reception	% properties
Reception available indoors	40%
Reception available outdoors only	19%
No reception available at all	41%

The following table shows details of the mobile phone masts in the Appin reception area, and as shown on the map above.

	Appin - Mobile Phone Mast Details			
	Creagan-1	Creagan-2	Kirkton	A828 Appin/Duror
Operator 1	Airwave*	O2	Vodafone	Airwave*
Operator site ref	STR1800	6297	7650	STR1820
Frequency	400 Mhz	900 Mhz	900 Mhz	400 Mhz
Transmission type	TETRA	GSM	GSM	TETRA
Operator 2	Orange	Vodaphone	-	-
Operator site ref	STR0149	6297	-	-
Frequency	1800 Mhz	900 Mhz	-	-
Transmission type	GSM	GSM	-	-

* The Airwave Network is a mobile communications network dedicated for the use by the emergency services in Great Britain. Designed to be both secure and resilient it allows multiple agencies integrated communications through a nationwide network. It is a secure digital, encrypted network and can be used for voice and data transmission. The Airwave network is based on the specialist Terrestrial Trunked Radio specification.

4. Local Demand for High Speed Broadband

A survey questionnaire was circulated throughout the communities of Appin and Lismore at the end of December 2013 and early January 2014 to evaluate the current service level, demand and commitment to broadband. Further information was gathered from OfCom, and BT Wholesale to enable comparisons. The following table summarises the extent of the survey.

Appin Survey - Overview	
Survey dates	10/12/13 to 13/1/14
Number of Appin postal addresses	314
Number of Appin Exchange Subscribers	286
OfCom Number of Broadband Subscribers*	215
Number of Appin Survey subscriber returns	102
Survey returns as % of exchange subscribers	36%
Survey returns seeking High Speed Broadband	96

*based on the Ofcom reported number of subscribers by post code 2013

In Appin there is clear demand for faster broadband. Ofcom reports that in 2013 take-up rate for broadband in Argyll was 67.3%, which would lead to an estimated population of around 190 broadband installations from the Appin exchange. However, the actual number of broadband subscribers in Appin post codes is 215. This indicates the Appin community is a heavier user than average Argyll. The survey returned 96% subscribers requesting faster broadband. This leads to a potential 204 Appin subscribers seeking faster broadband today.

Current Appin broadband download speeds vary from well below 2 Mbps up to 7 Mbps. The determining factor is distance from the exchange. Appendix 5 shows a table of performance by post code, and distance from the exchange. Upload speeds are reported between 0.12 Mbps and 0.42 Mbps. This performance compares to an average download speed for Argyll of 6.4 Mbps. The average for UK rural areas was 9.9 Mbps, and for the UK as a whole was 14.7 Mbps, according to Ofcom in May 2013.

Only 31 Appin addresses are in post codes where the average reported download speed is equal to or better than the 6.4 Mbps average for Argyll. This represents less than 10% of households and businesses, so over 90% of addresses are in post codes with average speeds less than the Argyll average.

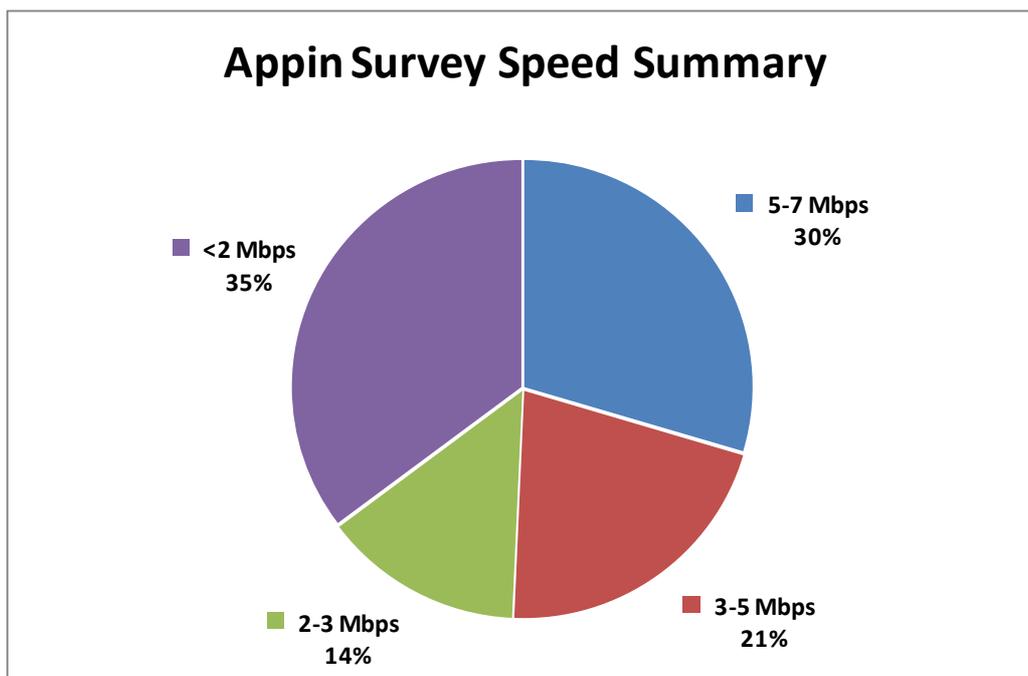
A significant proportion of addresses are in post codes with poor download performance. Of the 314 addresses in Appin, 93 (30%) are in post codes where the average download speed is less than 3 Mbps, and 72 (23%) are in post codes where the average download speed is reported below 2 Mbps. This is almost double the Ofcom 2013 reported 12.8% for Argyll as shown in Appendix 4.

The critical post codes where performance is actively reported to be poor, unreliable or below 2 Mbps are shown in the following table.

Appin Version

Appin Survey - Critical Post Codes with Poor ADSL Performance				
Post Code	PA38 4BA	PA38 4BJ	PA38 4BN	PA38 4BQ
Area	Inverfolla and North Shian	Invercreran and Fasnacloich	Lettershuna, Appin House, Station Cottages	Creagan, Druimavuic, Teraphocain
Distance from Exchange (m)	6000	10000	1800	5500
Number of Addresses	44	32	21	17
Survey reported download speed range Mbps	1.73 to 6.5	0.32 to 0.94	1.9 to 3.49	0.72 to 6.12
Comment (all speeds are download speed)	Actively reported as poor. Average speed = 3 Mbps, BT ADSL checker = 1.0 to 3.5	Actively reported as poor. Average speed = 0.43 Mbps, BT ADSL checker = 0.75 to 2.5	Actively reported as poor. Average speed = 2.45 Mbps, BT ADSL checker = 1.0 to 2.5	Actively reported as poor. Average speed = 3.4 Mbps, BT ADSL checker = 1.0 to 2.5

The following pie chart shows the survey return download speeds summarised by download speed range as a percentage of the total survey return speed tests. It shows that 35% of user returns resulted in download speed less than 2Mbps.



Fast broadband is essential for Appin business. The list of 35 businesses in Appin area is shown in Appendix 2. These are spread throughout the target area. In addition to the list, there are a significant number of home-working business people who live either temporarily or permanently in Appin and require broadband. These users tend to be more professional and sophisticated, and in addition to routine internet applications are transferring larger files to or between servers. Generally the current level of service is reported as inadequate for such work. The demand for this type of use is expected to continue to increase.

From the questionnaire returns, 54% of residential households reported that they used the internet for business purposes. Business use varied between 5 and 90% by household. For clarity these users are not included in the businesses listed in appendix 2.

Community Broadband Usage

The Appin Community is a typical user of broadband, within the limits of the performance handicap. Levels of use currently range from many whose livelihoods have come to depend on it, to a small and declining section of people who still avoid or even fear the “internet”. For completeness, the following sections describe typical internet **applications**, and their **uses**, now, and as anticipated in the future.

Examples of broadband **applications** include email, voice over IP, videoconferencing, web browsing, video streaming, and digital television services (such as standard definition TV, and high definition TV). The **uses** of these applications include such as “e-Education”, “e-Health”, and so on. These are each described in more detail later. As an example of the principle, e-Education might utilise a variety of applications, from web-browsing to access online learning materials, video streaming to view recorded lectures on a given topic, to video conferencing enabling real time interaction with remote teachers.

Depending on the particular application(s) a given “e-Education” programme is based on, the user may require different levels of customer experience from their broadband connection, which in turn may imply different underlying access technologies and delivery speeds.

Residential users

The applications households are using or are likely to be using in the future include:

- **Communication:** E-mail is probably the most common communications application being used. However, as “voice over Internet protocol” applications such as Skype and Face-time grow, more households will use their internet connections to make phone calls. A growing percentage of broadband users use the Internet for more data intensive peer to peer file transfers. Video conferencing from the home computer is also important for a number of residential home-working users. Video conferencing is growing among deaf people. The deaf community is also seeking introduction of a video relay service, which would enable them to make telephone calls to other parties using a video conferencing link. As the majority of the UK benefits from High Speed Broadband, and routinely uses these applications, the people of Appin will also be expected to respond by using the same. Younger generations in particular risk becoming alienated from their peers without easy access to such communications media.
- **Web surfing and file sharing:** Many people use the Internet to browse the world-wide-web. This includes accessing news and entertainment websites, making transactions or purchases online, and personal research including schoolwork. A large and increasing number use the Internet to access social networking sites such as Facebook and Myspace, to share photos and communicate with others. Facebook and Twitter for example are growing in importance for both home-working and business users. These social networking sites are becoming mandatory for the promotion of the services they can offer.

- **Audio visual entertainment:** As compression technologies have improved, more people are able to watch videos and television programmes online, through using applications such as YouTube, I-player, and other on-line TV and film libraries such as Netflix. Users can also listen to radio, or listen to or purchase music over the Internet (for example through iTunes).
- **Online Gaming:** An online game is a video game played over the internet or equivalent technology, and is becoming a growth area. The expansion of online gaming has reflected the overall expansion of computer networks from small local networks to the internet and the growth of internet access itself. Online games can range from simple text based environments to games incorporating complex graphics and virtual worlds populated by many players simultaneously. Many online games have associated online communities, making online games a form of social activity beyond single player games. Younger generations in particular risk alienation if they will not be able to join in.
- **Research and learning:** Many households use Internet access for personal research, for example reading news reports, and for educational purposes such as school homework, or remote school lessons.

Many studies of the social value of broadband ascribe benefit to working or learning from home. The applications involved in working or learning from home fall into three of the five categories set out above. Working from home requires the ability to communicate with other colleagues, send files and access the world-wide-web. Similarly, learning from home may require the ability to download video programs, to share files and to participate in video sessions. Without future High Speed Broadband, providing the above, the residents of Appin will be left behind.

Business users

Businesses, small and large, rely on access to the Internet for a range of core functions. In general, as businesses grow they continue to use the Internet for the same types of application, but the complexity of their systems, and associated bandwidth requirements increase:

- **Banking, payment systems:** Using internet connections to enable credit and debit cards to be used in purchases and to undertake banking
- **Account keeping:** Many small businesses use accounting packages which require connection to the internet to function effectively
- **HMRC and Taxation:** requires all employers to send PAYE information in real-time when or before payments are made to employees
- **Communication:** Using e-mail to communicate with customers and suppliers, including sending and receiving large files. Using voice and video over Internet applications to communicate with staff working from home
- **Research:** Using the world-wide-web as a low cost, accessible research tool
- **Advertising:** Advertising products and services through websites. As server technology prices have fallen, many small businesses are choosing to host their own websites
- **Flexible working arrangements:** Using internet connectivity to provide more flexible working arrangements, to improve the overall productivity of their staff. This includes access to company data from external locations (for example from home), and email over mobile phones. Businesses can provide for flexible working in various ways, including giving staff access to a virtual private network (“VPN”),

or making their files and internal systems accessible over the Internet. This is happening now (although even faster speeds may increase the value)

- **Data storage:** Backing up files and data on servers located at an alternative location. To do this effectively requires reliable and fast internet connections
- **Video conferencing:** Video conferencing is becoming an essential tool for businesses, in particular for those with multiple locations and remote locations
- **Inventory and stock control:** Supply chain management has become globally integrated, with businesses needing permanent connectivity to manage stock control and inventory processes effectively.
- **Hotels and tourism:** Hotels, B&B's and holiday let businesses are fast recognising how essential it is to offer fast and easy access to the internet as part of the guest package. Tourists are fast developing an expectation that internet services will be offered in the same way as they are used to at home.

Service sector uses: e-Education and e-Health

The terms “e-Education” and “e-Health” refer to particular uses for Internet applications. They are not in themselves applications. Rather they refer to the delivery of education and health services using a range of electronic media.

E-Education is the delivery of educational material using a variety of media, such as:

- Specialist websites for specific subjects and topics, or websites belonging to professional bodies used to work towards and gain professional and vocational qualifications, often used for adult education
- Interactive and multi cast TV used for on-line lectures and teaching
- Video downloading and viewing, and video-conferencing for one-to-one teaching and tutoring

Home learning is a fast growth use of the internet, particularly for the gaining of vocational qualifications among older students and adults. This is important in a rural community such as Appin, which finds itself remote from colleges and other traditional learning establishments.

e-Health refers to the use of electronic tools and communication to support effective healthcare. E-Health can encompass:

- Sharing of medical records between different healthcare professionals
- Online information on evidenced based medicine—that is up to date information on medical research to support diagnostic and treatment decisions
- Collaboration between healthcare professionals, using applications such as email and videoconferencing, to create “virtual” healthcare teams
- The use of electronic media for the delivery of clinical care to patients (“Telemedicine”). For example this may involve video-conferencing to conduct a real-time consultation between medical specialists in two different countries.
- The provision of remote medical procedures or examinations using two-way HD TV. Telemedicine will reduce the need for patients to travel to see a specialist, or conversely can enable specialists to cover a wider population.

As the rest of the country approaches 95% of homes able to use the internet in this way, these public services will start to assume they are used universally. It will therefore be essential that Appin and Lismore keep pace with developments, and can provide the local technological interface to participate. This local capability will be essential for the school and surgery to remain located within the community for the longer term.

5. Broadband speed requirements

Increased usage, combined with more bandwidth-hungry applications, has meant that demands on the broadband network have been increasing over a number of years. The level of typical consumption of content, measured by the amount of data downloaded per household has continued to rise dramatically since the introduction of broadband, and this can be attributed in particular to the growth in peer-to-peer traffic and video.

Users can access many of the internet services with download speeds from 2 Mbps. The exceptions are:

- For residential users: IPTV multicast services, real time video on demand, high definition TV multicast services, and high definition e-Education
- For business users: high definition multi-media applications such as high definition TV health consultations, high definition TV e-Education, high definition video conferencing, and tele-presence

To give some examples of the effect of access speed on the range of applications users can access:

- Voice and email do not consume material bandwidth
- Gaming and browsing are today mainly restricted by latency rather than speed, with content servers being the main bottleneck. Users of these applications over satellite do however experience slow and degraded performance. This is because the nature of satellite technology creates significantly high levels of latency.
- Users can start to access digital TV and similar quality video-on-demand at speeds of between 2.5 and 3.5 Mbps
- High definition TV uses up to 8 Mbps per channel.

So far the focus has been on download speeds as the main concern for accessing applications. Until recently Internet applications have generally been asymmetric in terms of their bandwidth requirements—that is users downloaded much more data than they uploaded. Examples include browsing web pages, or accessing videos and music. In this asymmetric world download speeds were the main determinant of the quality of users' experience. More recently changes in the way people use the Internet mean that users are increasingly demanding fast two-way data transmission. Examples include social networking applications, where users exchange data such as photos, or YouTube which involves exchange of video files between users.

All the above point to current service levels being inadequate, not only for the future but even today. In the near term, internet usage will require download speeds between 8 & 10Mbps for HD TV, with much improved upload speeds for business users. Even in the foreseeable future (up to the year 2020) demand can be anticipated for speeds of 20Mbps.

An absolute priority is to lift the 25% of Appin households and businesses which today are unable to achieve a service level above 2Mbps.

The average reported download speed of 3.9 Mbps is totally inadequate and needs to be lifted closer to the national average of 14.7 Mbps, as summarised in the following table.

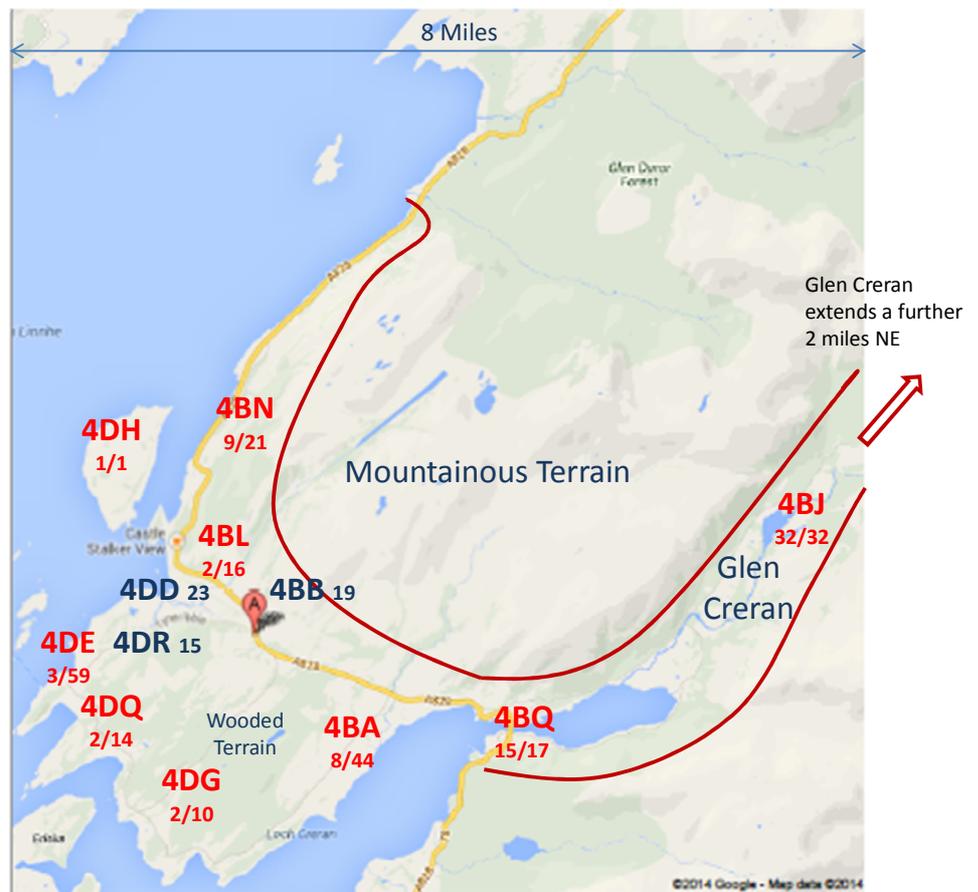
How does Speed Compare (Appin = 0.32 to 7 Mbps)	
UK national Average Speed per Ofcom	14.7
UK Rural Average Speed per Ofcom	8.8
Argyll Average Speed per Ofcom	6.4
Appin - survey reported average	3.9
Appin - survey upload average	0.32
<i>Digital TV requirement</i>	3.5
<i>HD TV requirement</i>	8.0

The following map and table show an estimate of the geographical distribution of addresses where current speeds are less than 2Mbps. These represent the early target subscribers. They have been estimated using speed test results from survey returns and by counting close proximity addresses that are also a similar distance from the exchange.

**Appin PA38
Estimated
addresses per
post code below
2Mbps**

Post Code	Number less than 2Mbps
4BJ	32
4BQ	15
4BA	9
4BN	9
4DE	3
4DQ	2
4DG	2
4BL	2
total	74

31 January, 2014



Appin Broadband

It can be seen that the majority are in the Creagan (4BQ) and Glen Creran (4BJ) area, followed by a cluster in the coastal area along the A828 from Lettershuna to the Highland boundary at Lurignish (4BN), and a cluster around the Inverfolla area of 4BA.

Appin Version

6. Future Broadband

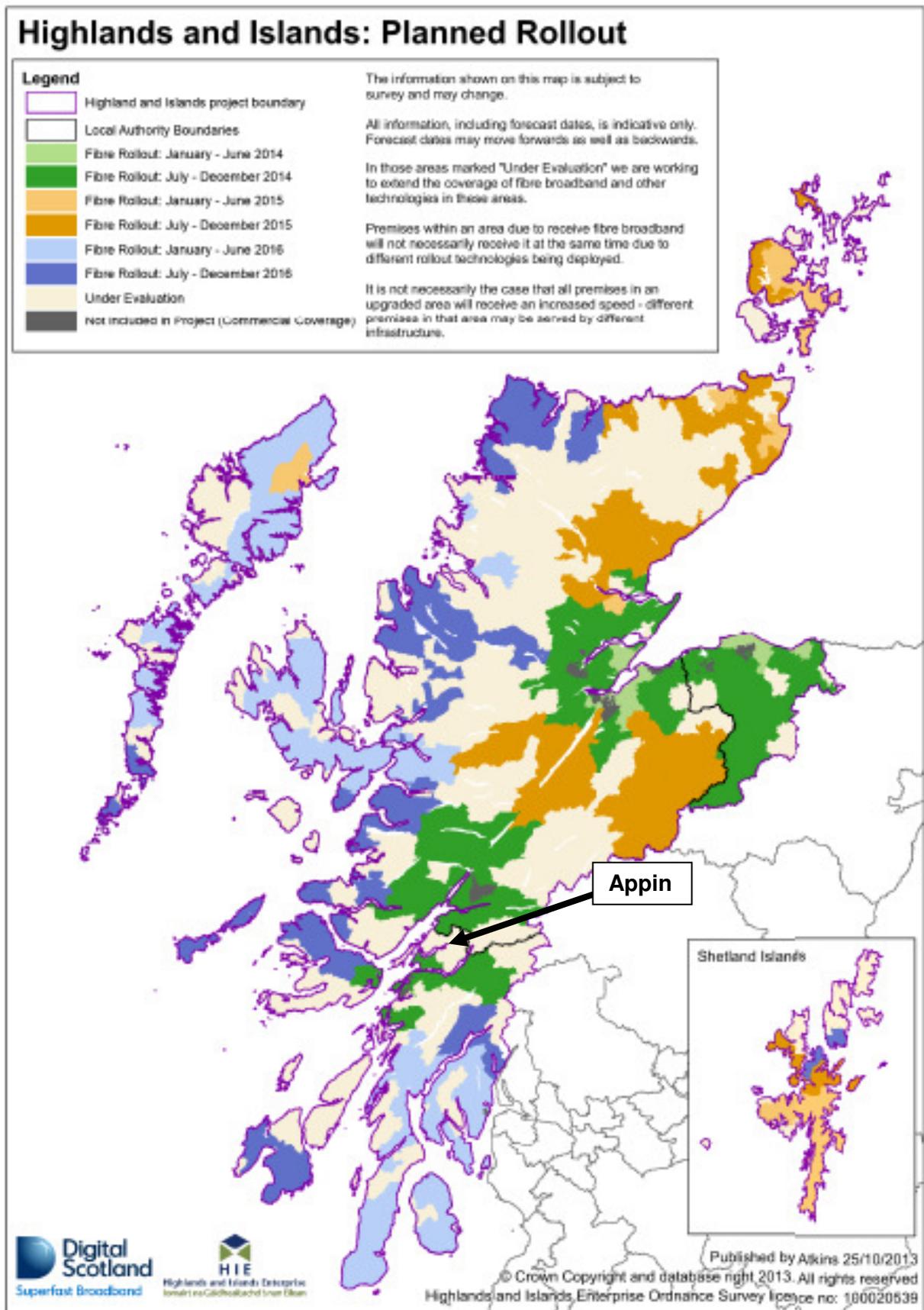
Growth in the volume of traffic, the range of available applications, and the number of users is likely to drive greater demand for high speed broadband in the future:

- Internationally, demand for internet bandwidth has grown rapidly. YouTube currently consumes as much bandwidth as the entire Internet did in the year 2000. Cisco forecasts an annual growth rate of 42 percent in global consumer traffic
- New devices will increase the load on both core and access networks. The extension of the IP standard to radios, TV sets, alarms, remotely-controlled systems (such as heating and appliances) will continue to alter the profile of use by increasing the number of devices that will simultaneously exchange symmetric information on the web. The declining cost of computer memory, monitors, and processing power will lead to continued enhancement of quality of services. Similarly, users will increasingly be able to access the Internet through a range of devices, such as gaming consoles, television sets, amplifiers and radios, and eventually through new home management systems
- Novel ways will be found to redesign and then integrate devices with broadband. Future e-Health may be revolutionised. Electronic equipment only found in hospitals today will be redesigned to operate remotely in the home, linking to central equipment in a clinic through broadband. Home-based-health observation monitors will link to hospitals and clinics over the internet, reducing the length of hospital stays.
- A whole new area of use will be created by rural activities, where applications and their use are yet to be fully defined. As internet applications grow, so then will demands from such as forestry, fish farming, land agriculture, tourism, estate-management and hydro schemes. These applications will meet needs including communications, health and safety, environmental management, feed and yield management.
- Changing demographics will shift toward younger heavier users of online services that will spend more and more time on internet-connected devices and bandwidth-hungry applications.

Society will perceive the internet much like a utility. Just as people expect continuous and reliable access to electricity and water, and to be supplied as much as they need, people will expect the same of internet services. That is, people expect internet infrastructure to be renewed and improved over time to ensure they can do the things they want to, when they want to do them. Appin is at risk of being left without this essential facility, not through any fault of its people, but through an unfortunate combination of geography and commercial logic. The consequences of being left out are not acceptable: business and population decline, falling property values and community wealth, migration of valued public services. The community of Appin must find a solution to providing satisfactory broadband services for its future.

Appendix 1

HIE Step Change Roll out Plan



Appendix 2

Appin Businesses

Accommodation

Airds Hotel - 01631 730236
Appin Holiday Homes - 01631 730387
Appin House Self Catering - 01631 730207
Cruachan B&B - 01631 730070
Drumneill House & Gardens - 01631 730228
Fairfield B&B - 01631 730384
Fasgadh B&B - 01631 730374
Kinlochlaich House Self Catering - 01631 730519
Linnhe Croft Holiday Cottages - 01631 730474
Pierhouse Hotel - 01631 730302
Strathlea B&B - 01631 730511

Restaurant/Cafes

Airds Hotel Restaurant - 01631 730236
Castle Stalker Cafe - 01631 730444
Creagan Inn - 01631 730250
Pierhouse Hotel - 01631 730302

Shops

Appin Community Co-op - 01631 730235 (Mon-Sat 9.00am to 5.30pm, Sunday 10am - 1pm)
Seahorse (Gift Shop) - 01631 730000

Office and Management Services

Computercraft Ltd, Appin Cottage, Dallens
Mary Gregory
Sea Pebble Ltd

Builders/Contractors/Property

Stuart Carmichael (Builder) - 01631 730525
D Carmichael (Builder) - 01631 730225
R.S. MacColl (Contractor) - 01631 730201
Inside & Out property maintenance – Paul Beard

Estates

Airds Estate, Factor - Bidwells, Fort William, Tel: 01397 702433
Achnacone Estate
Glencreran Estate

Farms & crofts

Gunns Garage

Tynribbie - 01631 730279

Taxis

Tina Scorgie - 01631 730398 or 07530 830

Ferry Services

Lismore Ferry

Marina & Boat Hire

Linnhe Marine - 07721 503981

Horse Riding Centre

Lettershuna Riding Centre, 01631 730227 (Trekking Centre and Livery Yard)

Bike Hire

Margaret Davidson

Fiona / Claymore Hunter – Electric Bike Hire

Gardens

Drumneill House - 01631 730228

Kinlochlaich Garden Centre - 01631 730342

Art / Craft Studios

Alex & Midge Gourlay, Port Appin

Pat Cheney, Port Appin

Appendix 3-1

Typical Mobile Phone Reception in the Appin Area – O2

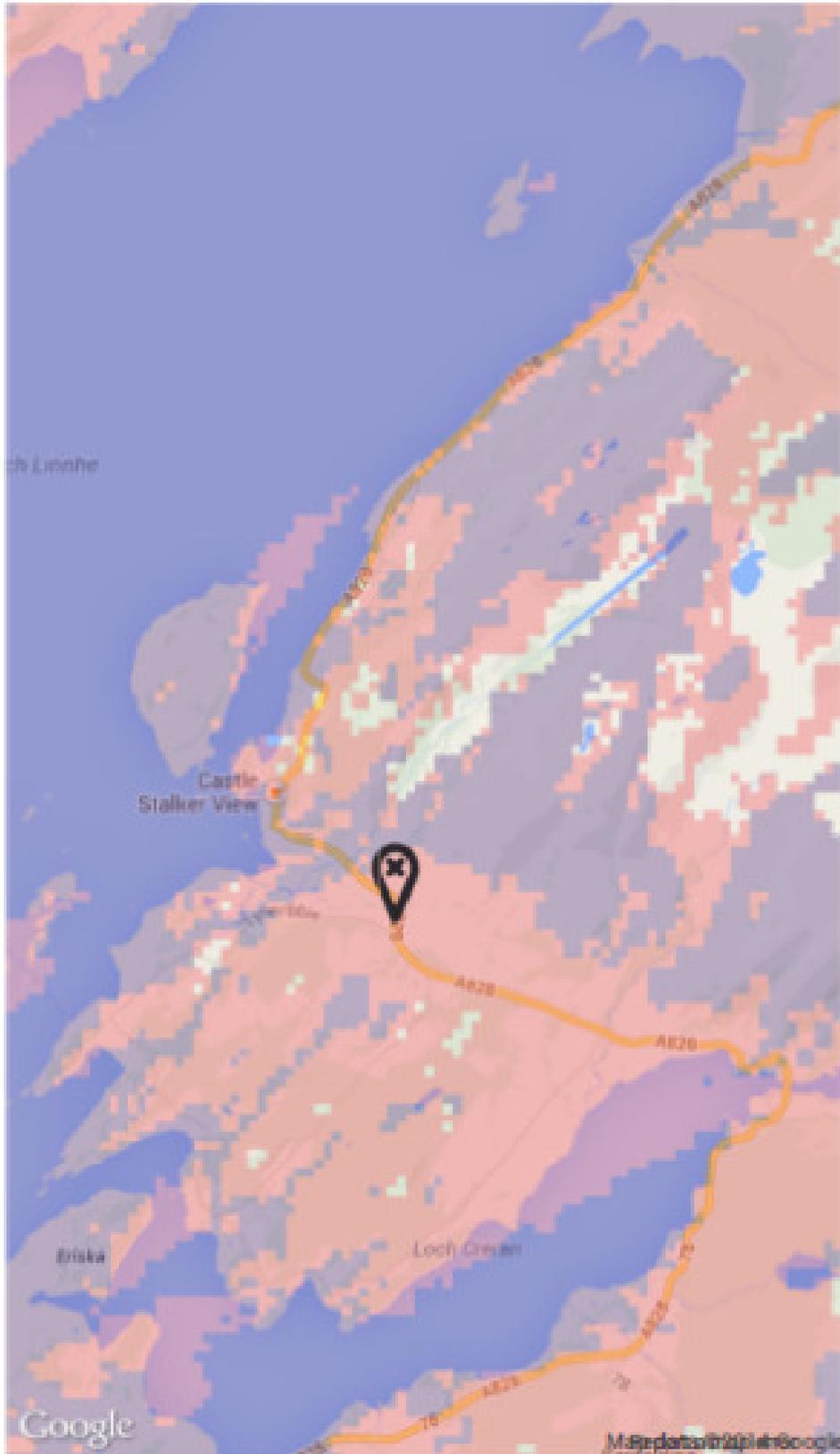
2G Reception available in Pink areas only



Appendix 3-2

Typical Mobile Phone Reception in the Appin Area - Orange

2G reception is available in pink areas only.
Many properties lie around the Appin coastline with no reception.



Appendix 4

OfCom Reported Statistics for Argyll Broadband

UK Fixed Broadband Map 2013

Map showing broadband information by administrative authority



Last updated: 24 October 2013

Appendix 5-1

Survey results - Appin Post Codes and Broadband Speeds

PA38 Postcode	Survey counter 99 Demand 93					BT ADSL Speed Checker			Questionnaire Returns			
	Appin Area	Distance from exchange - mean	distance from exchange max	No of Addresses	no of returns	Line - up to	Range min	Range max	average	average	best	worst
									download	upload	download	download
4BA	Inverfolia, Rhuagarbh, N Shian		6000	44		2.00	1.00	3.50	3.30	0.33	5.21	1.73
4BB	Kinlochlaich, Portnacloich, Achosrigan		500	19		5.50	4.50	8.00	1.97	0.22	3.31	0.84
4BD	Kinlochlaich		500	1		7.50	6.50	8.00	6.67	0.33	6.67	6.67
4BE	Achnacroich		2500	2		5.00	3.50	7.50	4.20	0.40	4.20	4.20
4BG	Blanchasgaig		300	7		7.50	6.50	8.00	6.74	3.38	6.88	6.60
4BH	Portnacroish		700	4		2.00	1.00	3.50	6.10	0.37	6.10	6.10
4BJ	Invercrean, Fasnacloich		10000	32		1.00	0.75	2.50	0.43	0.28	0.94	0.32
4BL	Pomacroish		1000	16		2.00	1.00	3.50	4.73	0.35	6.50	2.55
4BN	Lettershuna, Appin House		1800	21		1.50	1.00	2.50	2.45	0.35	3.49	1.90
4BQ	Cresagan, Drulmavulc, Taraphocain		5500	17		1.50	1.00	2.50	3.42	0.36	6.12	0.72
4DB	Appin Garage		300	1		7.50	6.50	8.00				
4DD	Tynribbie		1000	23		7.50	6.50	8.00	6.65	0.37	6.70	6.59
4DE	Port Appin		3000	59		3.00	2.00	5.50	4.90	0.38	7.96	0.77
4DF	Airds Hotel		3000	1		3.50	2.50	6.50	0.75	0.33	0.75	0.75
4DG	North Shian		4000	10		4.00	2.50	7.00				
4DL	Kirkton		1000	20		7.50	6.50	8.00	0.45	0.12	0.45	0.45
4DN	Port Appin Pier		3500	1		1.50	1.00	3.50	4.67	0.38	4.67	4.67
4DQ	Airds Farm, Drumnell		3100	14		2.00	1.00	3.50				
4DR	Bealach Na Mara		2600	15		3.00	2.00	5.50				
4DS	Tynribbie		200	7		7.50	6.50	8.00	4.64	0.30	6.40	0.30

Appendix 5-2

OfCom 2013 Post Code Data for Appin

OfCom Post Code Data							
post code	post code data status	< 2Mbps lines	average speed	median speed	msax speed		number of connections
PA384BA	OK	Y	4.2	3.4	8.1	N	28
PA384BB	OK	Y	5.1	6.8	8.1	N	14
PA384BD	Insufficient Premises	N/A	N/A	N/A	N/A	N	<3
PA384BD	No Data	N/A	N/A	N/A	N/A	N	0
PA384BE	Insufficient Premises	N/A	N/A	N/A	N/A	N	<3
PA384BE	No Data	N/A	N/A	N/A	N/A	N	0
PA384BF	OK	N	3.5	3.4	4.2	N	6
PA384BG	OK	N	6.4	6.6	8.1	N	4
PA384BH	Insufficient Data	N/A	N/A	N/A	N/A	N	1
PA384BJ	OK	Y	0.6	0.4	1.9	N	7
PA384BL	OK	Y	6.1	6.8	8.1	N	13
PA384BN	OK	Y	3.5	3.4	6.8	N	17
PA384BP	Insufficient Premises	N/A	N/A	N/A	N/A	N	<3
PA384BP	No Data	N/A	N/A	N/A	N/A	N	0
PA384BQ	OK	Y	5	5.4	8.1	N	20
PA384DB	OK	N	7.1	7.3	8.1	N	7
PA384DD	OK	Y	6.5	7.5	8.1	N	19
PA384DE	OK	Y	5.5	6.2	8.1	N	36
PA384DF	No premises	N/A	N/A	N/A	N/A	N	0
PA384DG	OK	Y	5.7	7.4	8.1	N	8
PA384DH	Insufficient Premises	N/A	N/A	N/A	N/A	N	<3
PA384DH	No Data	N/A	N/A	N/A	N/A	N	0
PA384DL	OK	Y	6.4	7.5	8.1	N	15
PA384DN	Insufficient Premises	N/A	N/A	N/A	N/A	N	<3
PA384DN	No Data	N/A	N/A	N/A	N/A	N	0
PA384DQ	OK	Y	4.6	4.5	8.1	N	13
PA384DR	OK	Y	6.1	7.4	8.1	N	11
PA384DS	Insufficient Data	N/A	N/A	N/A	N/A	N	2

Appendix 6

OfCom UK average download speeds



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Print
Tweet
Like 30

Average UK broadband speed continues to rise

August 7, 2013

The average residential UK broadband speed reached 14.7Mbps in May 2013, Ofcom research reveals.

Ofcom's latest report into fixed-line residential broadband speeds shows that the average actual UK speed has risen by 22% (2.7Mbps) in the six months to May 2013, and 64% (5.7Mbps) in the year since May 2012.

The report also shows that the average broadband speed has more than quadrupled since Ofcom first began publishing speeds data in November 2008 – an increase of 309% (or 11.1Mbps).

Take-up of 'superfast'¹ services and providers' automatically upgrading customers on to faster broadband packages continued to drive the increase in the national average speed.²

Table One: Average actual UK fixed-line residential broadband speeds since November 2008³

Measurement period	Average speed
November 2008	3.6Mbps
April 2009	4.1Mbps
May 2010	5.2Mbps
November/December 2010	6.2Mbps
May 2011	6.8Mbps
November 2011	7.5Mbps
May 2012	9.0Mbps
November 2012	12.0Mbps
May 2013	14.7Mbps

Superfast take-up and network upgrades driving speeds increase

The proportion of broadband connections classed as superfast – that is, offering headline speeds of 20Mbps or more – is increasing. By May 2013, 19% of residential broadband connections were superfast, up from 14% in November 2012 and more than doubling from 8% over the course of the last year.

By May 2013, 95% of UK fixed-line residential broadband users were on packages with advertised speeds above 'up to' 10Mbps, up from 76% six months ago and 68% in May 2012.

The move to higher speeds is partly down to Virgin Media's network upgrade to double the speeds of most of its cable broadband customers. As a result, the average speed on cable has nearly doubled over the last year from 18.0Mbps to 34.9Mbps.

Consumers are also choosing to migrate to faster fibre packages. BT reported that it had 1.3 million fibre broadband connections at the end of March 2013, up from around 550,000 a year earlier.⁴ In May 2013, the average fibre-based connection speed was 43.6Mbps, up by over a third (38%) over the year.

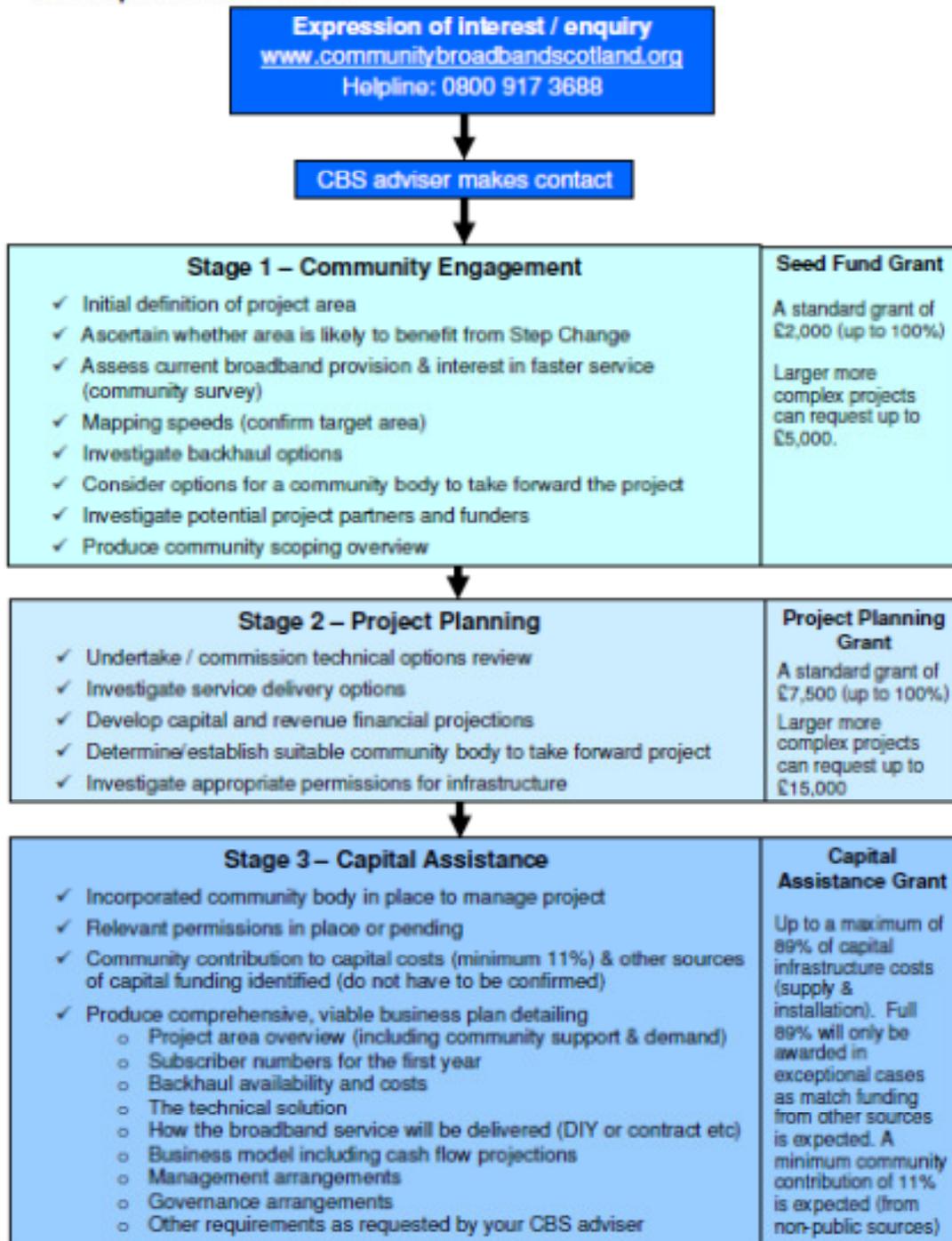
Appendix 7

Community Broadband Scotland Flow Chart

Community Broadband Scotland
For communities with limited or no broadband



Start Up Fund - Flow Chart



Appendix 8

Community Broadband Scotland – Summary of Community Support FAQ's

Support for Community and Business broadband

How can my community get funding for super-fast broadband?

Community Broadband Scotland (CBS) is a one-stop-shop service for rural community groups, providing them with the information and advice they need to find solutions for broadband delivery in their areas.

A Start-Up Fund of £5m is being made available over three years from 2012 to support the project. CBS provides a suite of support mechanisms including advice, guidance and toolkits; an online and telephone resource; and a network of staff on the ground delivering hands on advice and support locally to communities.

CBS is initially targeted at communities in the 10-15% sector of the population least likely to benefit from a next generation broadband (NGB) solution under the Scottish Government's Step Change Programme and provides an opportunity for those communities to take greater ownership, progress more quickly and trial innovative technology and business models.

CBS is a partnership between Scottish Government, Highlands & Islands Enterprise (HIE), Scottish Enterprise, COSLA and Local Government. HIE will be the key delivery agent for this programme across Scotland.

When does Community Broadband Scotland go live?

CBS went live in October 2012 with a new telephone helpline and website delivering advice and practical support. A dedicated team of staff working on the ground has been added to provide hands on assistance to groups in need.

What support is available to Community Groups?

As well as advice and practical support, communities are eligible to apply for seed funding under the initiative to enable them to obtain greater access to the internet in their area. It is not intended that CBS will provide 100% funding for community projects and an important part of Community Broadband Scotland is to provide advice and guidance on the range of financial issues and to help communities to identify and source funding.

How does my community apply for CBS funding?

Communities are able to apply for funding on a rolling basis. CBS partners selected a small number of community projects in October as part of a pioneer phase and CBS is working with these communities to help them fashion broadband solutions for their area and assist them in delivery. The learning extracted from this will inform wider roll out and refine the learning and advice offered to communities.

Funding rounds are run on an open competition basis.

What criteria will be used?

Projects will be selected by a Project Team, comprising CBS partners and key stakeholders, including the Carnegie Trust, academics and industry experts.

CBS aims to support different community models, and identify solutions to a range of issues, including:

- Both high and low capacity community organisations
- Communities with and without existing revenue streams
- Dispersed and concentrated settlement pattern
- Different local authority areas [Scotland-wide]
- Different technologies: fibre, wireless, satellite, white space, 4G, etc

- Innovative ways of utilising existing infrastructure e.g. Scottish Water, Network Rail or JANET
- Organisational structure: Co-operative, BenCom, SCIO, Company Limited by Guarantee
- Business models: capital financed via wind farm or other income, community shares, partnership/joint venture
- Service delivery: community run service or service contracted out.

Where can I find out more information?

Further information will be provided on this website and on the CBS website at <http://www.hie.co.uk/community-support/community-broadband-scotland>. Please contact 0300 244 6843 for further information.

Other sources of support

For community-level projects in rural areas, LEADER may be the most applicable scheme. LEADER is part of the Scotland Rural Development Programme (2007-2013). It aims to increase the capacity of local rural community and business networks to build knowledge and skills and encourage innovation and co-operation to tackle local development objectives. A full list of contacts for LEADER Local Action Groups is available [here](#).

The Scottish National Rural Network website has a dedicated section on [funding for rural community groups](#) outlining major funders and sources of advice and help. The [Big Society Broadband](#) resource also provides useful information about funding and other case studies from community groups.

Appendix 9

Appin Mobile Phone Reception Summary by Post Code

Appin Area - Post Code Analysis of Mobile Phone Reception

Post Code	Area	number of addresses	% Survey Returns NO	% Survey Returns YES	Calculated - NO	Calculated - YES
4BA	Inverfolla, Rhugarbh, N Shian	44	0	100	0	44
4BB	Kinlochlaich, Portnacloich, Achosrigan	19	0	100	0	19
4BD	Kinlochlaich	1	0	100	0	1
4BE	Achnacroich	2	0	100	0	2
4BG	Blarchasgaig	7	0	100	0	7
4BH	Portnacroish	4	0	100	0	4
4BJ	Invercraeran, Fasnacloich	32	45	55	14	18
4BL	Pornacroish	16	0	100	0	16
4BN	Lettershuna, Appin House, Lurignish	21	50	40	11	8
4BQ	Creagan, Druimavuic, Taraphocain	17	0	100	0	17
4DB	Appin Garage	1	100	0	1	0
4DD	Tynribbie	23	40	60	9	14
4DE	Port Appin	59	59	41	35	24
4DF	Airds Hotel	1	100	0	1	0
4DG	North Shian/Port Appin	10	100	0	10	0
4DL	Kirkton	20	0	100	0	20
4DN	Port Appin Pier	1	0	100	0	1
4DQ	Airds Farm, Drumneil	14	No survey returns			
4DR	Bealach Na Mara	15	0	100	0	15
4DS	Tynribbie	7	50	50	4	4
	TOTALS	314			84	169

Note: Mobile phone reception is defined as "yes", where a subscriber has responded "yes" to mobile phone reception either indoors, or outdoors at their property.

The calculated columns represent number of addresses in each post code factored by the % yes or no from the survey returns in the post code.