Connectivity Literacy
- you don't know what you don't know -
(and there's no map or guide)

Regional Telecommunications Review 2021

Better Internet for Rural Regional and Remote Australia

Kylie Stretton, Julie Stott, John Kitchener, Adam Broadbent, Josh Schiller, Sam Hicks, Rachel Hay

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2021 RTIRC Submission

TABLE OF CONTENTS

1. Introduction

We are conscious that the committee will have been inundated with issues and case studies, therefore the BIRRR 2021 RTIRC submission will be solutions focused. This submission will first recommend eight priorities BIRRR sees for the committee to consider. Next, it will give some background to the BIRRR group, then it will introduce Connectivity Literacy and Illiteracy, as the BIRRR Team feel this is a previously unidentified area of importance. The remainder of the submission will supply supporting evidence to the recommendations. BIRRR appreciates the opportunity to submit to the 2021 Regional Telecommunications Independent Review Committee (RTIRC).

2. Recommendations

The roll out of the nbn, investment from Telcos and existing Government programs have made a significant positive impact on the improvement of telecommunications infrastructure in regional areas. However, each individual program is very 'siloed' and no one is working collaboratively to plan well into the future, or to solve existing problems and capacity issues and maximise regional telecommunications investment. The below recommendations need engagement and participation from all levels of government (Federal, State and Local) and government agencies, Telco's, regional telecommunications stakeholders, regional industry groups, regulatory bodies, retail service providers and mobile carriers. The recommendations address issues such as reliability, redundancy, connectivity literacy and consumer guarantees, affordability, and adequacy. Extensions of these recommendations can be found in Section 11 on page 60.

RECOMMENDATION 1 – WORK TOGETHER TO DEVELOP A REGIONAL CONNECTIVITY PLAN OR ROADMAP

There is a need for the different levels of government (Federal, state, local) to work together with the Telcos, regional telecommunications stakeholders, and industry to develop a regional connectivity plan or roadmap that is forward-thinking and encompasses future needs and growth of regional communities.

Recommendation 2 – Improve the Quality and Distribution of Information

Improve the quality and distribution of information to regional consumers to help educate consumers on how to get connected, how to stay connected and how to use their connection (connectivity literacy).

Recommendation 3 – Improve Consumer Guarantees & Telco Accountability

It is imperative that there are clear standards, targets, and accountability in regard to connection and repair times, performance levels, reliability and safety nets for RRR consumers for both voice and broadband. An urgent improvement to regional telecommunications fault reporting, fault rectification and consumer guarantees, is needed to ensure that Telcos are held accountable and RRR consumers understand how to get problems resolved and are aware of their rights.

Recommendation 4 – Greater priority to identification of Mis and Dis Information

Greater priority given by government regulatory bodies to identify misinformation and disinformation that exists in the regional telecommunications space.

Recommendation 5 – improving the resiliency of regional telecommunication networks

Improving the resiliency of regional telecommunication networks

Recommendation 6 – Improve Capacity and Coverage of Regional Telecommunications

Improving the capacity and coverage of regional telecommunication networks.

Recommendation 7 – Improve Affordability of Telecommunications in Regional Areas

Improving affordability of telecommunications services in regional areas.

Recommendation 8 – NBN & RSP's to Continue to Engage with Regional Stakeholders

NBN, mobile carriers and regional Retail Service Providers to continue to engage with regional stakeholders and RSP's.

3. Background and Overview

The Better Internet for Rural, Regional & Remote Australia (BIRRR) group was founded in 2014 due to a lack of information, advocacy, and support for bush broadband consumers. There are now over 13,500 active and engaged BIRRR members from every state and territory of Australia. In particular, the BIRRR group includes those that are requiring equitable telecommunications for their businesses and the education of their children.

BIRRR is a volunteer- based advocacy group with extensive lived experience in regional telecommunications and a community of engaged regional users and support volunteers. Rural, Regional & Remote (RRR) consumers are extremely reliant on effective communications, due to the nature of their geography and vulnerability, and this also heightens the need for effective representation. Even after the roll-out of the nbn and a significant amount of funding directed to the Mobile Blackspot Program (MBSP) and Regional Connectivity Program (RCP), there remains a regional dimension to the digital divide. The impact of COVID-19, closure of banks, amalgamation of local government offices and a push to have all government services online, have ignited further concerns amongst those in regional Australia about being left behind in the new globalised and Internet-connected world. With this has come an anxiety that uneven distribution in access to reliable, affordable, and accessible voice and broadband services may further separate the country from the city.

The BIRRR team has undertaken extensive large-scale research on regional telecommunication needs. Previously there have been few studies and limited research into this specific consumer group. BIRRR has also successfully lobbied for:

- a one-stop shop for RRR connectivity support and education that has resulted in the Regional Tech Hub (RTH), operated by the National Farmers Federation (NFF)
- funding for place-based solutions which delivered the Federally funded Regional Connectivity Program.
- enhancements to the nbn Sky Muster platform, which saw the delivery of nbn Sky Muster Plus, offering a speed burst and unlimited data for everything except VPN & video streaming. These new plans have been game changing for regional satellite users.
- Telstra to deliver SMS over Wi-Fi, and a team of mobile network advisory specialists, which both have been very welcomed in RRR areas.

- More engagement with government and Telcos in regional telecommunications issues with those on the ground with regional telecommunications experience.

To ensure RRR productivity and growth and to keep people living in RRR areas, voice and broadband services must be accessible, affordable, reliable, and adequate. Essential services such as health in RRR areas are already lacking. Mental and physical health, education, business productivity, increased local tourism (due to Covid-19 and the "Holiday Here this Year" campaign https://www.australia.com/en/travel-inspiration/holiday-here-this-year.html), economic growth and innovation would all benefit from improved telecommunications in our regions.

"Every Australian, irrespective of where they live or work, should be confident they can access quality, reliable, accessible, and affordable voice, and broadband services with customer support guarantees"

Numerous enquiries, reference groups and research have previously been undertaken, which have highlighted that RRR users need a reliable connection that they can use freely, without restriction and limitations, that is accessible and affordable and that meets their needs for education, health, business, and social purposes, with appropriate consumer safeguards.

BIRRR urges RTIRC to acknowledge that now it is the time to be proactive and solve the telecommunications issues raised in these reports, with a serious commitment of policy, funding, and action.

While we acknowledge that the 2018 RTIRC report delivered on several of BIRRR's recommendations, regional telecommunications change rapidly, as do regional connectivity needs and demands. Future-proofing connectivity in RRR areas by adopting and funding solutions that plan for future growth and investment in our regions, will ensure that they are not disadvantaged due to their population and postcode. BIRRR encourages RTIRC to look at our previous submissions on telecommunications (https://birrraus.com/submissionssurveys/birrr-submissions/).

BIRRR is a founding member of the Rural, Regional, Remote Communications Coalition (RRRCC) and in principal support the submission made by the RRRCC.

4. Connectivity Literacy

Connectivity literacy was first termed by BIRRR Admin, Kristy Sparrow, who has extensive grassroots experience and knowledge in regional telecommunications.

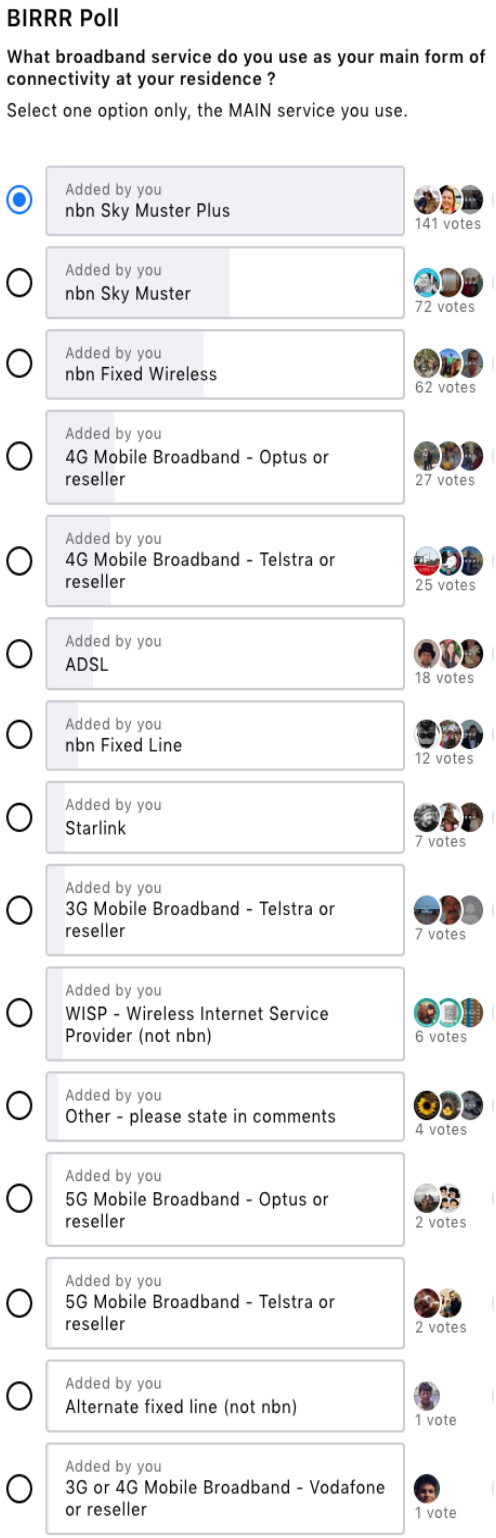
"Connectivity literacy is all of the skills and knowledge needed by a consumer to get connected and stay connected, to both voice and broadband services"

It is separate from digital literacy as the skills required to navigate through a choice of providers and technologies, understand terminologies, plans and equipment are different skills than what are needed to physically use a broadband service. BIRRR research demonstrates that connectivity literacy does not have any demographic barriers such as age, gender, location, or education level.

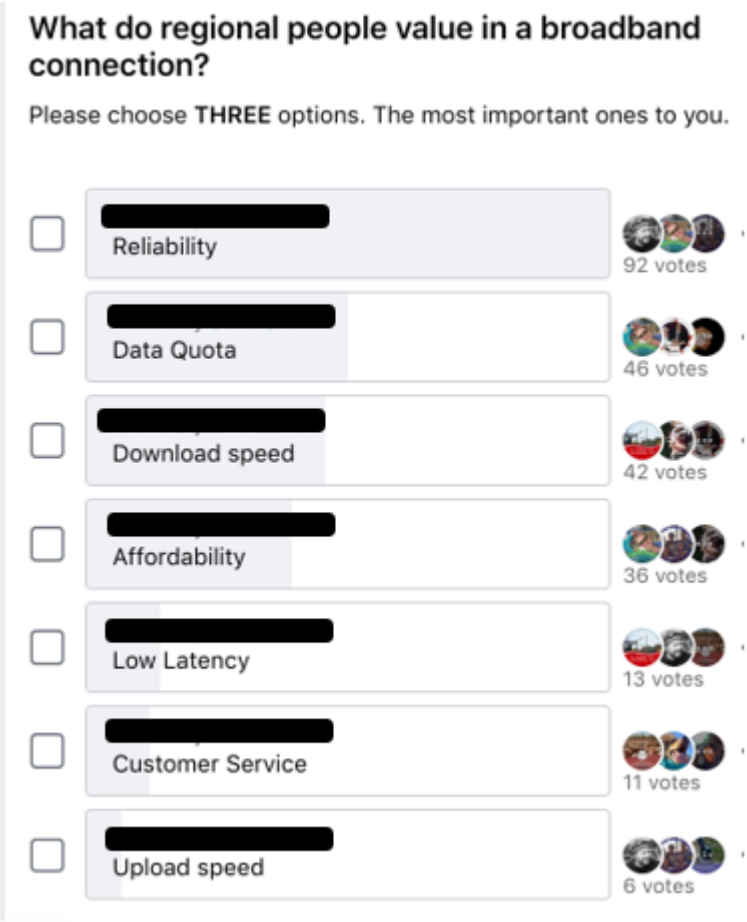
Connectivity illiteracy issues have developed in RRR areas due to misinformation/disinformation, a lack of support and education and poor consumer guarantees as regional Australia has moved from a monopoly provider with a limited choice of technologies and plans, to a patchwork quilt of connectivity, plans, speeds, providers, and technologies. Regional connectivity illiteracy is spawned by the vast differences between urban and regional connectivity solutions. Urban customers enjoy secure high-speed mobile connectivity (multiple providers) and connections to secure unlimited fixed line nbn internet. A secure landline service is available via nbn fixed line services. Nbn fixed line internet is uncontended, well supported and largely trouble free.

By contrast regional customers use an entirely different connectivity sub-set. They may or may not have mobile connectivity. Mobile connectivity is more often available from only one provider that may only support voice and very limited internet. Broadband is provided by nbn Fixed Wireless or nbn Sky Muster and for some select areas a Wireless Internet Service Provider (WISP). By any measure these very different and highly contended technologies are no match for a fixed line connection.

They are inherently less reliable, more expensive, and poorly supported. These technologies are poorly understood and anecdotally mis-represented, creating ongoing customer confusion. A fixed line voice service is increasingly difficult to obtain, often unreliable and downtime is a feature. The frustration of not being able to get a fault fixed or resolve a network issue and the poor support and misinformation from providers in this space, has exacerbated the connectivity illiteracy problem in regional areas. Connectivity illiteracy creates barriers for people to get connected and stay connected, which in turn creates negative experiences with technology that are difficult to overcome. Some researchers, media and regional stakeholder groups also suffer from their own level of connectivity illiteracy, further ingraining this widespread problem into a now common and groundless perception that 'bush broadband is bad'. Whilst BIRRR acknowledge that connectivity illiteracy exists on a smaller scale in metropolitan areas, for RRR areas connectivity improvements over the last few years have created many challenges surrounding education and upskilling of consumers, who previously had limited choice in terms of their connectivity. To overcome this, government and industry need to address connectivity literacy as it is an issue that will not disappear and will only become more ingrained by the arrival of new technologies and a larger 'patchwork quilt' of connectivity solutions.



The perceptions and beliefs of consumers in peri-urban, regional, rural, and remote areas also need to be considered as factors affecting connectivity literacy. These four areas offer different challenges and perspectives and should be treated as such by Government funded programs and the telecommunications industry. For instance, BIRRR research has shown that rural and remote users greatly value reliability over other factors such as cost, when compared to more regional and peri-urban consumers who have highlighted a desire for 'equal' services to metropolitan consumers.



BIRRR spends a lot of time on connectivity literacy support and education, creating resources to help educate and publicly debunking myths. However, there is only so much we can do as a volunteer group and often our experience and knowledge is undervalued.

4.1. Misinformation & Disinformation

One of the largest challenges to getting connected and staying connected is directly related to misinformation (false, inaccurate, or misleading information) and disinformation (information that is covertly spread deliberately to deceive or influence). Misinformation and disinformation in the telecommunications industry in Australia is widespread and ingrained in the very organisations that traditionally consumers would turn to for connectivity advice. This misinformation creates confusion and makes it incredibly difficult to educate and engage consumers in understanding how to get connected and stay connected.

CASE STUDY 1: Bob, NSW: Ten years ago, Bob had a landline connected to his rural property. It was connected to a shed as he was told that was the cheapest option, it cost him $800 to get connected. A few years ago, Bob disconnected his landline phone as he thought his mobile service was pretty reliable. Now his mobile service regularly doesn't work, is prone to outages and power failures and Bob decided to get his landline reconnected this year. Bob lives in a bushfire prone area and wanted two forms of communication for emergencies. He went to a shonky salesman that sold him an Optus booster for $2000, that he said would boost his data speeds, however Bob only gets Telstra coverage where he lives. Bob was told by Telstra there "are no ports available" and his landline can't be reconnected. Bob also has a nbn Satellite connection with Activ8me, his neighbour told him about a new plan called 'plus' which gave more data. However, Activ8me told Bob he can't get a plus plan. Misinformation provided to Bob by providers has greatly affected his ability to get connected and created potholes along the road to Bob's connectivity literacy journey.

4.1.1. Government & Industry Groups

Industry groups and politicians often share information for their constituents and members, sometimes the information they share regarding RRR telecommunications contains misinformation or misleading info. For example, a NSW Member of Parliament recently shared a post that hinted that nbn satellite connections, when used for home schooling, were restricted by data limits. If the original poster had been on a nbn Sky Muster Plus plan, most education needs would have been unlimited.

Figure 1: Facebook post example of misinformation

Another example is NSW Farmers who conducted a survey and research about their members' connectivity.

> *EXAMPLE: "A sensor could save that time, but dreadful mobile phone coverage makes that impossible. Even the simplest of tasks can be difficult. All of our banking is online now. You get a new payee and when you enter them in, you have to get a code sent to your mobile phone, but on the farm, we can't actually get the code – you've got to drive 15km up the road to get phone service and by the time you've got the code and driven back, it's expired" (NSW Farmers)*

By sharing stories like those above, industry groups and politicians are adding to the negativity and misinformation, when they could be helping educate these consumers. For example, there are a number of sensors that don't require mobile connectivity, and SMS over wi-fi works with in-home wi-fi to access banking codes in areas with no mobile coverage. There are also nbn Sky Muster Plus plans available for regional students to access unmetered data for education,

however awareness of these plans is low. To address issues surrounding connectivity literacy it will be important to engage all stakeholders to ensure that information is not misleading and incorrect and positive stories are shared that help combat the misinformation.

4.1.2. Researchers

Often researchers (who often themselves lack skills in connectivity literacy), construct surveys and research that lack the use of consistent and relevant terminology and technical understanding of RRR connectivity. This further entrenches the misinformation when research is produced containing data that can be misunderstood. For example, a recent study on the performance of the nbn Sky Muster Plus product as a suitable telehealth video conferencing platform, spoke about upload error being an issue with the nbn satellite product, when any number of factors could have prevented the data uploading including equipment issues, poor wi-fi or anti-virus software. One question asked in the survey associated with the research asked if the respondent could rate their speed and their ability to use video conferencing on landlines and UHF (St Clair & Murtagh, 2021, see Appendix 2). Other research documents talk about the RRR connectivity failing in power outages. However, it is not the connectivity that is failing, but rather the power, and often if an in-home backup power source was supplied the broadband service would work. Recent research discusses 'poor regional internet' without indicating what technologies or areas it relates to. A recent report by Australian Broadband Advisory Council (ABAC) stated there was "*a general perception that the satellite service is inferior*" (Koch et al., 2021, p. 5). However, no positive case studies were used, and the research was limited in scope for areas referred to as 'rangelands' with ABAC stating "*the connectivity issues in remote areas (the rangelands) are likely to be of a different character and magnitude. An examination of these areas was not feasible within the scope and timing of this report" (Koch et al., 2021, p. 11).* The report used negative case studies that demonstrate examples of families struggling to school children and conduct business online, without referring to what technologies they were using or acknowledging the role connectivity literacy plays in ensuring these families were connected to a technology that could meet those needs (see Figure 2).

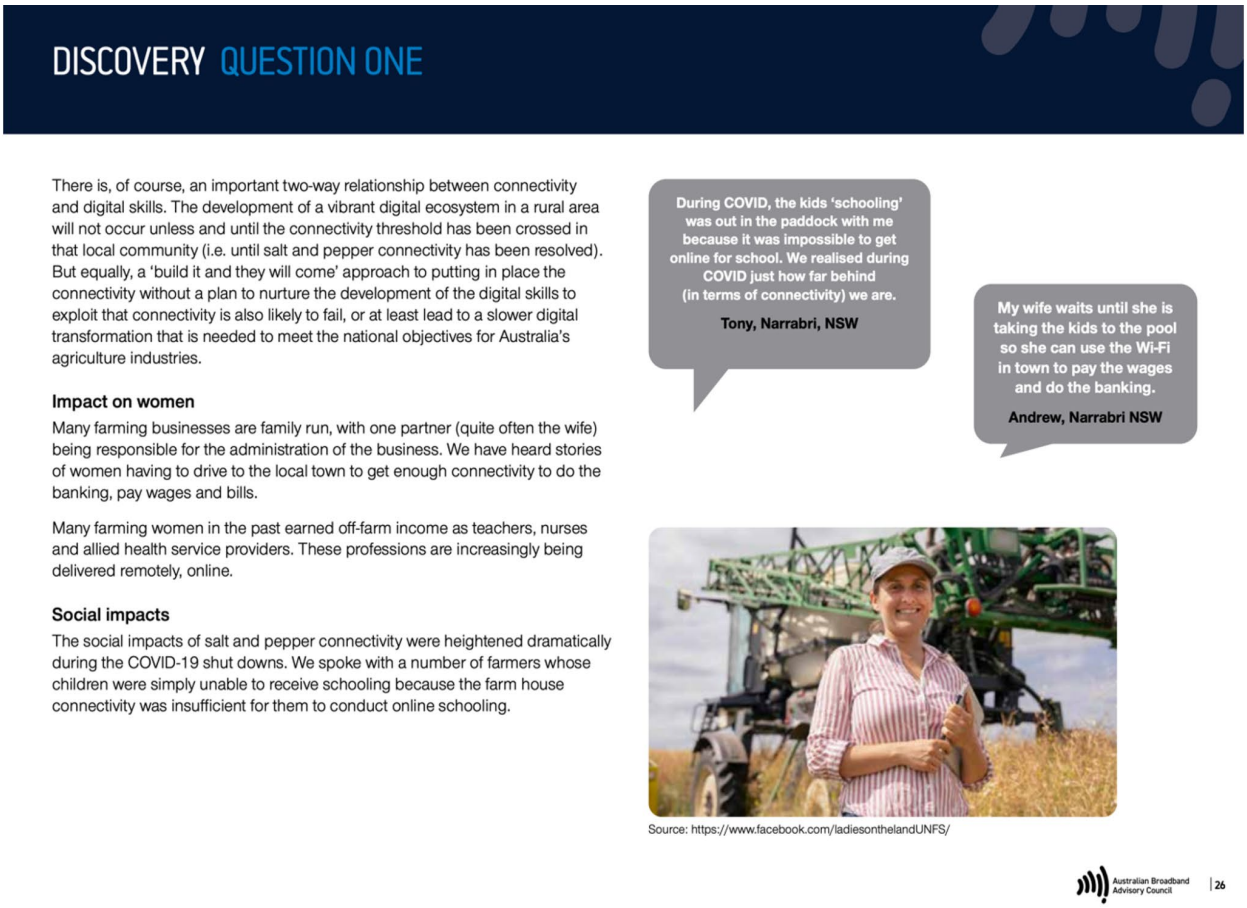


Figure 2: Example of families struggling to school children, Source: Koch et al., 2021

4.1.3. Media

The media, many who also struggle with their own understanding of connectivity literacy and distinguishing factual information from misinformation, often further perpetuate the spread of misinformation. A Current Affair recently reported that Cedar Creek, Queensland residents were "*…forced to drive up a hill and set up an office on the side of the road as a last resort just to get a phone or internet connection*"(A Current Affair, 2021).

Figure 3: Example of misinformation via the media (A Current Affair, 2021)

ABC have also published numerous stories with inaccurate information, for example *"With the family farm in an internet black spot, technology has been a major barrier to home schooling"* (Webster, 2021) and *"But the rural location comes with some disadvantages – namely, no NBN"* (Coulter & Robb, 2021). Analysis of the comments that followed from consumers on the social media sites of these stories, demonstrated the level of misinformation and the impact this has on getting connected (see Appendix 1: Case Study 2: Misinformation from Facebook, September 14 at 7:18pm).

The continual negative talk around bush broadband in the media has created barriers to people being able to get connected, stay connected and use their connection. For example, a metro-based specialist stated that a remote patient couldn't use telehealth as she "read in the media

that bush broadband is bad". During lockdown schools have used social media to show students sitting in cars and paddocks with the perception given they "can't get nbn" or they live in "internet blackspots". The constant negativity creates a barrier that fails to acknowledge connectivity improvements and the lengthy advocacy conducted by groups such as BIRRR and Isolated Children's Parents' Association (ICPA), so that RRR consumers can access equitable connectivity for telehealth, education, business, and social needs.

4.1.4. Scammers

The increase of frequent spam/scam calls and messages adds to the misinformation. For example, BIRRR has frequent reports that consumers are contacted by 'Nicole from nbn', telling them they "must switch to nbn now or they will lose their landline". Other scammers pretend to be Telstra, stating there is something wrong with your connection and press 2 to have it fixed, when a consumer responds that they don't have a Telstra internet service they are told *"Telstra is the mother internet provider in all of Australia"*. Consumers also must be aware of illegal repeaters and 'cowboy' installers who sell illegal equipment. Illegal repeaters have a significant negative impact on mobile networks, and it is difficult for a consumer to report them. It has become increasingly difficult for consumers to establish what is factual and what is not, which contributes to the spread of misinformation and creates digital apathy among regional consumers.

4.1.5. Retail Service Providers

Telecommunications providers in Australia are commercially driven, they do not offer independent advice on connectivity to individuals, businesses or at a community level. Previously one provider held the monopoly of broadband services across RRR areas, however, in the last 5 years with the roll out of the nbn and an increase in 'last mile' Wireless Internet Service providers (WISPs), RRR consumers now have more choice. However, RRR consumers are not skilled in knowing how to choose a provider, how to choose a technology (if they have more than one available) and how to troubleshoot to stay connected. For instance, nbn Sky Muster satellite is offered by 11 providers, who are not well-known brands in the

telecommunications industry and therefore viewed as not 'trusted providers'. Furthermore, larger providers such as Telstra and Optus do not sell nbn's satellite product and their marketing campaigns often contain misinformation that create a barrier for consumers attempting to connect to these technologies. Terminology and plan specifics such as speed tiers, latency, data limits, plug and play routers and PPPOE are confusing for regional consumers who have traditionally only been able to access one speed, one plan type and restricted data. The dot points below show examples of the misinformation given by larger providers who don't sell all nbn technologies.

- You "have to move to nbn"
- The 'old copper network is being discontinued'
- The "Australian Government expects everyone to move to nbn"
- The "Australian Government plans to turn off the old network….you'll need to take action soon"
- "nbn not available to all premises or areas" (Telstra Advertisement in the Adelaide News)
- Telstra lists the nbn technologies available on their website "connecting to the nbn", but excludes nbn satellite

Source: https://www.telstra.com.au/connected/move-to-nbn-what-you-need-to-know
This misinformation is widely available from Telstra advertising, mapping, call centre staff, staff in stores and the Telstra website. If a consumer is mapped for nbn satellite and enters their address into the Telstra nbn mapping system, they are pushed to a mobile broadband connection (if they have mobile coverage) or a satellite phone (if they have no mobile coverage). This creates confusion for consumers who have often been Telstra customers for many years.
Likewise, misinformation is equally available from other larger providers who don't sell nbn satellite or nbn fixed wireless products. On the Optus website when typing in an address that is mapped for nbn Fixed Wireless it states, '*unfortunately fixed line internet is not available at your address, but don't worry you can still get connected to an Optus Mobile Broadband plan'* (Source: https://www.optus.com.au/broadband-nbn) the website then redirects to Optus 5G and 4G Home Broadband, both which display messages of 'not available at your address'… and

then on to Optus Mobile Broadband that allows the consumer to sign up to an Optus mobile product with no coverage check of the address.

Another example of misinformation amongst providers is highlighted by RSPs who only sell certain nbn satellite plans. BIRRR has had considerable consumer feedback that iiNet has told customers that *'no more data is available on nbn satellite and 60GB peak data is as much as you can get'* when this is untrue. Nbn Sky Muster Plus plans offer unlimited data for everything except VPN and streaming. However, these plans are not offered by iiNet, Westnet or Bordernet. Nbn Sky Muster providers seem to be lacking support from nbn in resourcing their own websites and call centre staff with misinformation commonly spread by the very providers selling the product. *"Sky Muster™ Plus™ Satellites, the latter of which offers special traffic shaping policies which gives you access to Un-metered content for commonly used applications such as email and social networking (excluding videos)"* is an example of incorrect information listed on the ANT website *(Source:* https://ant.com.au/nbn-satellite.html).

4.1.6. Telecommunication industry

Providers are not the only spreaders of misinformation. Whistleout (https://www.whistleout.com.au/) is a broadband comparison website that assists consumers in shopping for broadband plans, although it only covers pricing, speed and data and information that is tailored to fixed line products. Some examples of misinformation include:

- "Your existing home phone and internet services will be disconnected 18 months after your home is connected to the NBN. If you want to maintain a phone or internet service at your house, you'll need to change to an NBN plan before the cut-off date" (Dent, 2020).
- "Unlike your old landline, which was delivered over a copper connection, your new home phone will make and receive calls using the internet via the NBN" (Dent, 2020).

Technicians, antenna suppliers and other connectivity professionals can also, at times, contribute to the spread of misinformation. Many are not independent. Therefore, their advice is vendor driven and provided in order to sell a certain product or plan, this is disinformation (information that is covertly spread deliberately to deceive or influence).

One example of this is a telecommunications business in Central Queensland that advertised the following untrue statements, with the view to influence consumers to buy their product instead of a competitor's:

- Forget nbn satellite – it is already too crowded and slow and unreliable
- Forget nbn Fixed Wireless – it is limited to within 10km of the nearest tower
- Forget cell boosters and repeaters – they are old tech and have limited success
- Forget Telstra Go – it works a little bit for phone reception if you are lucky
- Forget ADSL2 – Telstra is abandoning copper lines as fast as they can.
- Forget pansy little Netgear Nighthawks & Telstra's other portable rubbish

Figure 4: Kerr Solutions Brochure

Apart from misinformation and disinformation other factors within the telecommunications industry in RRR areas have also contributed to the connectivity illiteracy problem, making it

difficult for consumers to shift through the information needed to get connected and stay connected. These other factors are identified below.

4.2. Equipment & Software Vendors

Misinformation and disinformation also create barriers for uptake of innovative technologies across a variety of industries. Software and tech companies are very vendor driven, designing products to be used with mobile connectivity, without understanding the connectivity realities and needs of their customers. There is also very little independent support that helps consumers compare digital technology equipment such as best EFTPOS machines, health monitoring equipment, ag-tech and business software. There is a lack of understanding surrounding the design of solutions for RRR industries, with many vendors blaming poor RRR connectivity rather than the equipment or software solution. This is preventing take up of products, solutions, and innovation such as ag-tech. Although there are already many ag-tech products available that can be used in areas without mobile coverage, there is a groundless perception in the industry that you need mobile coverage to be able to use ag-tech.

> *CASE STUDY 3: Angie uses Phoenix Live software as a cloud accounting program for her grazing business in Central Queensland, she has no mobile coverage and uses nbn Sky Muster satellite. The program was prone to dropouts and required Angie to log back in and reconnect to the platform numerous times in a session. This was not only frustrating but also wasted Angie's valuable time. Angie approached the software company (AgData) for support and was told to change nbn Sky Muster provider. Frustrated with this response, Angie contacted BIRRR for assistance. During Beef Week 2021 BIRRR were able to connect Angie's accountant, Angie, AgData and a nbn satellite specialist to discuss these issues. AgData didn't realise that nbn Sky Muster Plus has no Static IP address and were able to make changes to the backend of the program that accounted for this and thus fix the dropout and reconnect problem. Angie now reports that the software is not dropping out as often.*

Also, equipment such as EFTPOS machines or ag-tech devices that require reliable mobile coverage are being sold in non-mobile areas. Then the equipment vendor blames 'bad bush internet' when in reality, the vendor has sold their customer a solution that only works on a connectivity technology that the customer can't access regularly or at all. Suppliers need to

understand the connectivity realities of their customers, so that consumers are not 'putting up with problems', thinking it's their connection, when it's actually the product design.

4.3. Patchwork Quilt of Technologies

Regional connectivity infrastructure has become like a 'patchwork quilt' of technologies. With 5G, 4G, 3G, nbn fixed line, nbn fixed wireless, nbn satellite, alternate fibre providers, ADSL, WISP's and the newly emerging Low Earth Orbit Satellites (LEO's). Consumers lack the resources to compare and match their available technologies to their broadband and voice needs. BIRRR has previously created several resources to assist regional consumers. However, these require updating and enhancing and need to be shared and distributed throughout regional areas on a much wider scale.

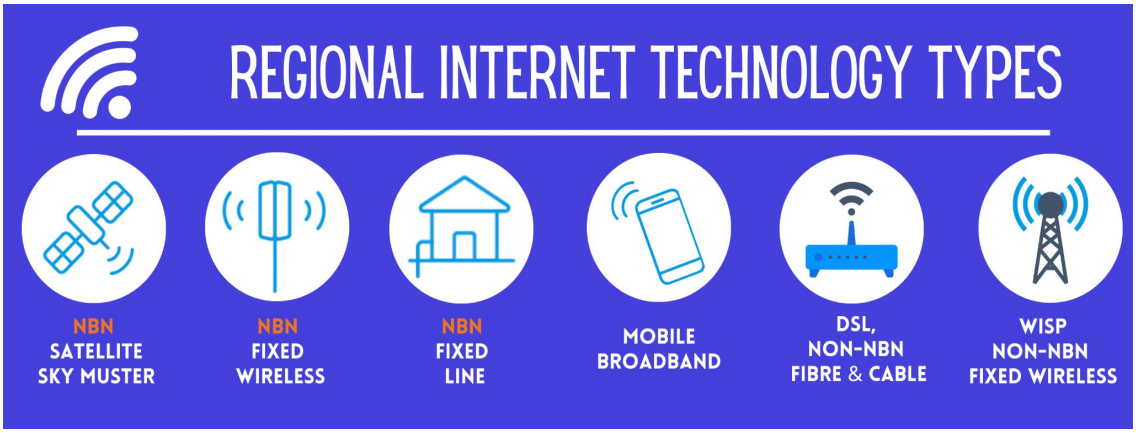
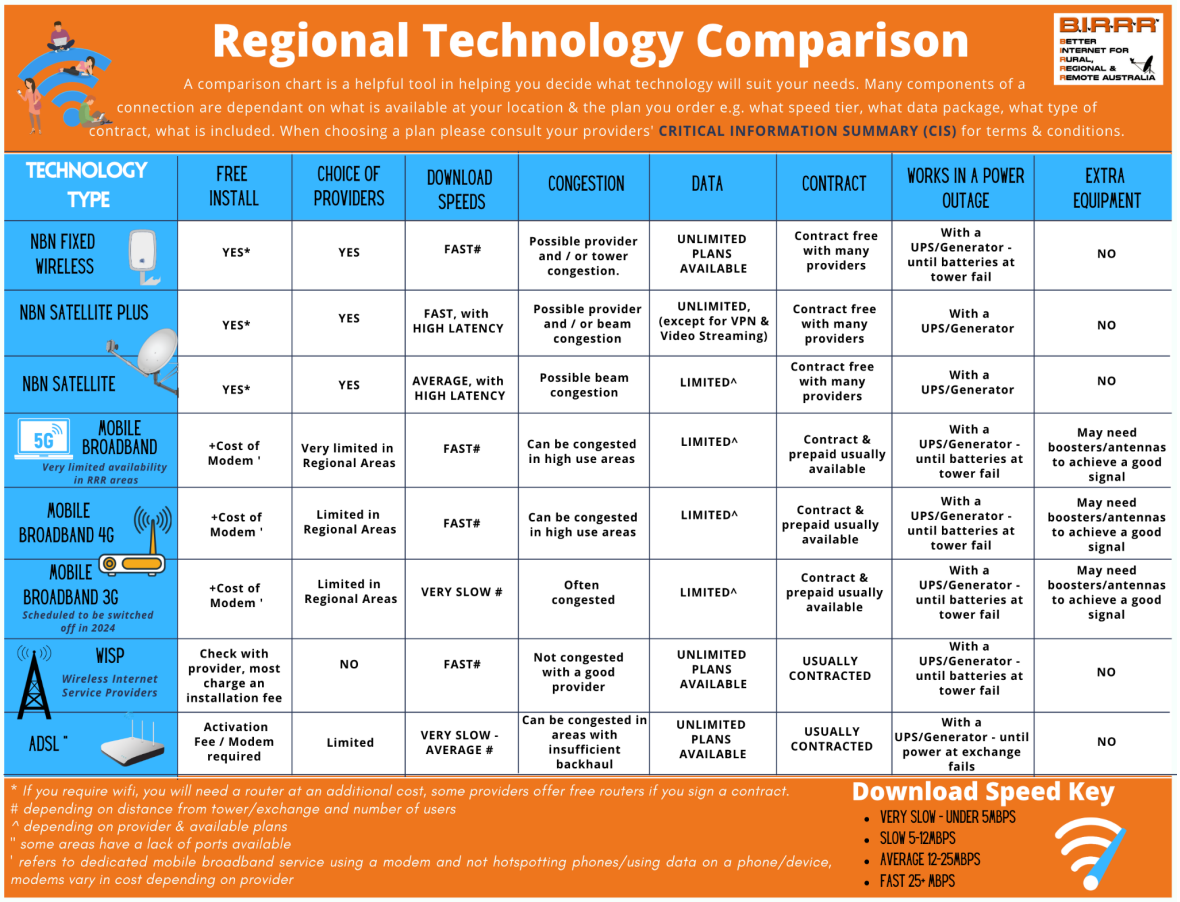


Figure 5: Examples of available "Patchwork Quilt" technologies



Regional Technology Comparison

BIRRR BETTER INTERNET FOR RURAL, REGIONAL & REMOTE AUSTRALIA

A comparison chart is a helpful tool in helping you decide what technology will suit your needs. Many components of a connection are dependant on what is available at your location & the plan you order e.g. what speed tier, what data package, what type of contract, what is included. When choosing a plan please consult your providers' **CRITICAL INFORMATION SUMMARY (CIS)** for terms & conditions.

TECHNOLOGY TYPE	FREE INSTALL	CHOICE OF PROVIDERS	DOWNLOAD SPEEDS	CONGESTION	DATA	CONTRACT	WORKS IN A POWER OUTAGE	EXTRA EQUIPMENT
NBN FIXED WIRELESS	YES*	YES	FAST#	Possible provider and / or tower congestion.	UNLIMITED PLANS AVAILABLE	Contract free with many providers	With a UPS/Generator - until batteries at tower fail	NO
NBN SATELLITE PLUS	YES*	YES	FAST, with HIGH LATENCY	Possible provider and / or beam congestion	UNLIMITED, (except for VPN & Video Streaming)	Contract free with many providers	With a UPS/Generator	NO
NBN SATELLITE	YES*	YES	AVERAGE, with HIGH LATENCY	Possible beam congestion	LIMITED^	Contract free with many providers	With a UPS/Generator	NO
5G MOBILE BROADBAND *Very limited availability in RRR areas*	+Cost of Modem '	Very limited in Regional Areas	FAST#	Can be congested in high use areas	LIMITED^	Contract & prepaid usually available	With a UPS/Generator - until batteries at tower fail	May need boosters/antennas to achieve a good signal
MOBILE BROADBAND 4G	+Cost of Modem '	Limited in Regional Areas	FAST#	Can be congested in high use areas	LIMITED^	Contract & prepaid usually available	With a UPS/Generator - until batteries at tower fail	May need boosters/antennas to achieve a good signal
MOBILE BROADBAND 3G *Scheduled to be switched off in 2024*	+Cost of Modem '	Limited in Regional Areas	VERY SLOW #	Often congested	LIMITED^	Contract & prepaid usually available	With a UPS/Generator - until batteries at tower fail	May need boosters/antennas to achieve a good signal
WISP *Wireless Internet Service Providers*	Check with provider, most charge an installation fee	NO	FAST#	Not congested with a good provider	UNLIMITED PLANS AVAILABLE	USUALLY CONTRACTED	With a UPS/Generator - until batteries at tower fail	NO
ADSL "	Activation Fee / Modem required	Limited	VERY SLOW - AVERAGE #	Can be congested in areas with insufficient backhaul	UNLIMITED PLANS AVAILABLE	USUALLY CONTRACTED	With a UPS/Generator - until power at exchange fails	NO

** If you require wifi, you will need a router at an additional cost, some providers offer free routers if you sign a contract.*
 # depending on distance from tower/exchange and number of users
^ depending on provider & available plans
" some areas have a lack of ports available
' refers to dedicated mobile broadband service using a modem and not hotspotting phones/using data on a phone/device, modems vary in cost depending on provider

Download Speed Key

- VERY SLOW - UNDER 5MBPS
- SLOW 5-12MBPS
- AVERAGE 12-25MBPS
- FAST 25+ MBPS

Figure 6: Example of BIRRR resource showing the 'Patchwork Quilt' of technologies.

The quilt of connectivity options continues to grow and expand. However, the education of consumers in how to access these technologies has attracted little Government or industry investment. Although the Regional Tech Hub (RTH) has recently been funded to provide help to regional users in getting connected it is not widely known about and doesn't solve the issues of specific connectivity support for sectors such as agriculture, small business, tourism, education, health, or local government. The RTH is focused on solving individual connectivity issues and is currently not well situated to address connectivity literacy education on a wider scale across the regions. With a Federal Government move to more place-based connectivity funding, via the Regional Connectivity Program (Australian Government, 2021), independent advice and support needs to be made available to local government and communities to ensure they can fully utilise and participate in such programs. Support for the need for independent connectivity advice is growing rapidly in regional communities with the ABAC Agri-tech working group recently reporting that their *"...consultations also indicated the need for local*

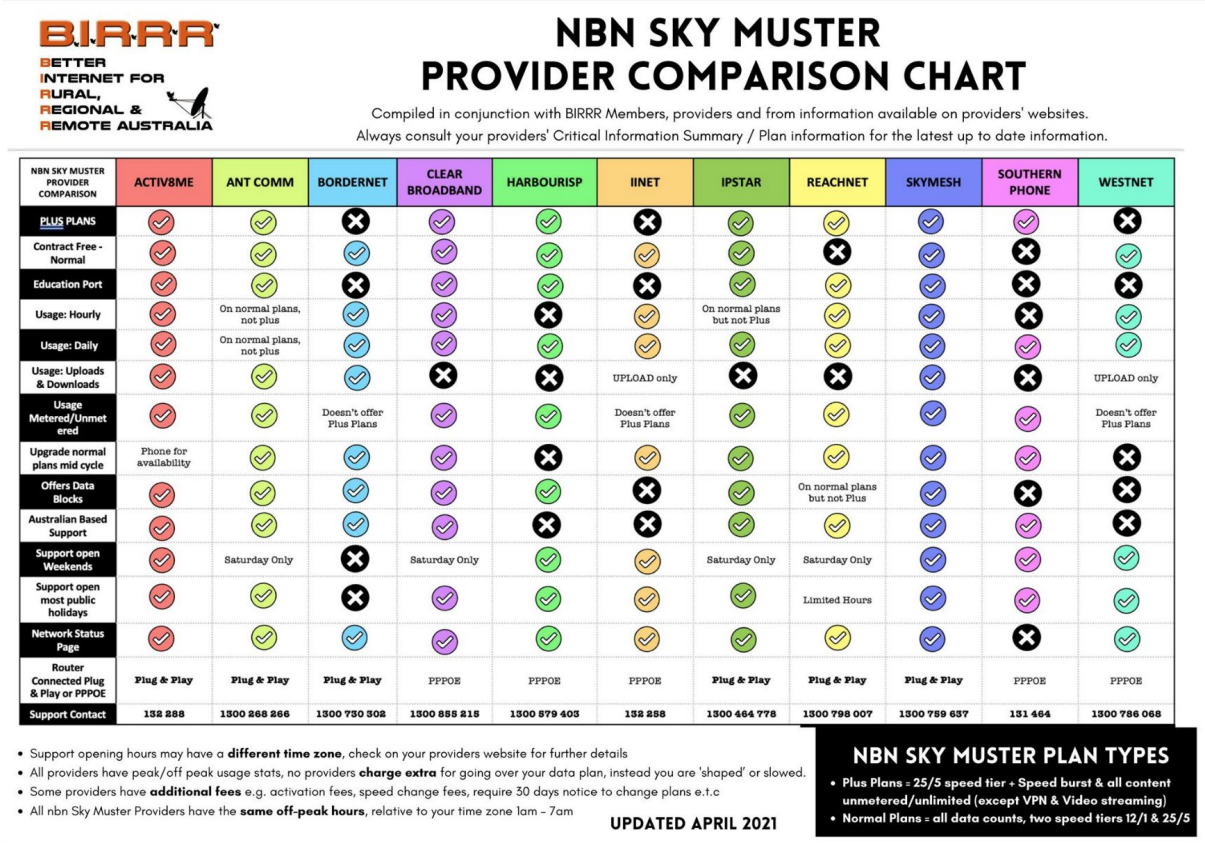
ecosystems of digital skills across a stack of technical capabilities, including: advice on connectivity options: while a farmer will be well aware of the lack of mobile coverage, they may not have knowledge of, nor a way of, finding out about other viable connectivity alternatives" (Koch et al., 2021, p. 6).

There is no existing map or wizard of RRR connectivity infrastructure and technologies, nor a comparison tool that explains each technology and the benefits or limitations. RRR connectivity illiteracy will not be solved until accessibility issues are resolved and comparison of technologies and plans are made easier for consumers (see Appendix 5 and Appendix 6 for scoping brief and examples of a connectivity wizard).

4.4. Staying Connected & Consumer Support

Troubleshooting a bush broadband connection is like navigating through a broadband maze or jungle. The telecommunications industry on a whole offers very poor support to consumers who are faced with connectivity issues, regardless of the technology they use. Extensive research by BIRRR has highlighted extended outages and faults, network issues and continual 'blame game' behaviour from the industry, leaving consumers frustrated and fatigued (*see Section 7:* Consumer Guarantees).

There is very little independent help for RRR consumers to get connected, understanding an internet plan, speed, data needs and how to choose a provider is a complex web that lacks a clear framework that could be used to support consumers in getting connected. There are also no provider comparisons that factor in important considerations such as provider support hours, outage notifications, usage example the BIRRR Satellite Comparison Chart, see Figure 7.



BIRRR
BETTER INTERNET FOR RURAL, REGIONAL & REMOTE AUSTRALIA

NBN SKY MUSTER PROVIDER COMPARISON CHART

Compiled in conjunction with BIRRR Members, providers and from information available on providers' websites.
Always consult your providers' Critical Information Summary / Plan information for the latest up to date information.

NBN SKY MUSTER PROVIDER COMPARISON	ACTIV8ME	ANT COMM	BORDERNET	CLEAR BROADBAND	HARBOURISP	IINET	IPSTAR	REACHNET	SKYMESH	SOUTHERN PHONE	WESTNET
PLUS PLANS	✓	✓	✗	✓	✓	✗	✓	✓	✓	✓	✗
Contract Free - Normal	✓	✓	✓	✓	✓	✓	✓	✗	✓	✗	✓
Education Port	✓	✓	✗	✓	✓	✗	✓	✓	✓	✗	✗
Usage: Hourly	✓	On normal plans, not plus	✓	✓	✗	✓	On normal plans but not Plus	✓	✓	✗	✓
Usage: Daily	✓	On normal plans, not plus	✓	✓	✓	✓	✓	✓	✓	✓	✓
Usage: Uploads & Downloads	✓	✓	✓	✗	✗	UPLOAD only	✗	✗	✓	✗	UPLOAD only
Usage Metered/Unmetered	✓	✓	Doesn't offer Plus Plans	✓	✓	Doesn't offer Plus Plans	✓	✓	✓	✓	Doesn't offer Plus Plans
Upgrade normal plans mid cycle	Phone for availability	✓	✓	✓	✗	✓	✓	✓	✓	✓	✗
Offers Data Blocks	✓	✓	✓	✓	✓	✗	✓	On normal plans but not Plus	✓	✗	✗
Australian Based Support	✓	✓	✓	✓	✗	✗	✓	✓	✓	✓	✗
Support open Weekends	✓	Saturday Only	✗	Saturday Only	✓	✓	Saturday Only	Saturday Only	✓	✓	✓
Support open most public holidays	✓	✓	✗	✓	✓	✓	✓	Limited Hours	✓	✓	✓
Network Status Page	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓
Router Connected Plug & Play or PPPOE	Plug & Play	Plug & Play	Plug & Play	PPPOE	PPPOE	PPPOE	Plug & Play	Plug & Play	Plug & Play	PPPOE	PPPOE
Support Contact	132 288	1300 268 266	1300 730 302	1300 855 215	1300 579 403	132 258	1300 464 778	1300 798 007	1300 759 637	131 464	1300 786 068

- Support opening hours may have a **different time zone**, check on your providers website for further details
- All providers have peak/off peak usage stats, no providers **charge extra** for going over your data plan, instead you are 'shaped' or slowed.
- Some providers have **additional fees** e.g. activation fees, speed change fees, require 30 days notice to change plans e.t.c
- All nbn Sky Muster Providers have the **same off-peak hours**, relative to your time zone 1am - 7am

UPDATED APRIL 2021

NBN SKY MUSTER PLAN TYPES

- **Plus Plans = 25/5 speed tier + Speed burst & all content unmetered/unlimited (except VPN & Video streaming)**
- **Normal Plans = all data counts, two speed tiers 12/1 & 25/5**

Figure 7: BIRRR Satellite Comparison Chart

BIRRR has spent a significant amount of time and research developing resources such as Figure 7. However, with the transfer of content to the Regional Tech Hub and no dedicated resource there is no clear pathway of who is responsible for continuing resource development and education surrounding connectivity literacy.

Whilst programs like the ACCC's Measuring Broadband Australia program (2021), cover some technologies for speed comparisons, they do not report on all technologies and in particular neglect nbn satellite services. The 'train of blame' (Sparrow et al., 2017a) contributes further to this complexity, as when issues arise consumers are handballed from providers, to wholesalers, to delivery partners, with no real support in being able to get their issues addressed. When they have an issue, consumers are often unsure which 'carriage' the issue exists in i.e., is it their own equipment, or their provider's equipment, is it network congestion or a network fault, is it their provider's congestion or a provider issue, are they on the right plan or product? For a RRR consumer getting connected and staying connected is hard work!

Poor consumer support and a lack of comparative tools contributes further to the connectivity illiteracy problem in RRR areas.

4.5. Lack of Transparent Information

The lack of transparent information from Telcos also contributes to connectivity illiteracy. For example, information on how to proceed with a nbn Fixed Wireless Non-Standard install is not readily available on the nbn website and Retail Service Providers (RSP's) do not appear to have the required information to assist consumers. New solar non-standard fixed wireless installs have recently been trialled by nbn. However, there is no information available that helps consumers know how to access a non-standard install using solar, putting them at risk of receiving incorrect advice from vendor driven "cowboys".

The nbn addressing system further contributes to connectivity illiteracy, by not helping consumers when an addressing issue arises and relying on RSP's to be able to fix nbn's own addressing problems. When a consumer puts their address into the nbn roll out map and their address is unrecognised, the consumer is sent to a list of all nbn providers, who may or may not sell the nbn technology the consumer is mapped for (see Figure 8), BIRRR is aware that addressing issues create a significant barrier to consumers in getting connected to nbn. A simple solution would be for consumers to be able to 'fix their address' with nbn, as it is nbn data, nbn mapping and nbn addressing, sending consumers to a provider to fix the issue is adding another carriage to an already long train.

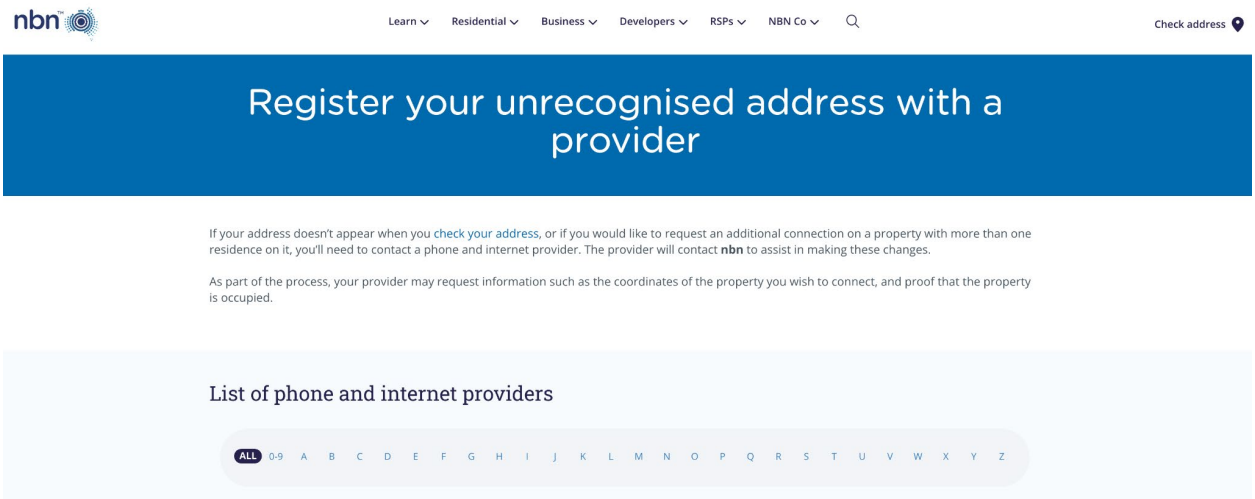


Figure 8: Register your unrecognised address with a provider

Nbn marketing is also not clear, for example the 'made for more' campaign could have educated consumers on nbn availability to the majority of residences, Australia wide, to debunk the myth that regional consumers 'can't get nbn'.

Mobile coverage maps across all major carriers are not consistent or accurate and fail to provide transparent information to consumers that allows them to make informed decisions about connectivity. Additionally, outage pages for both mobile carriers and nbn RSP's are not always accurate and often leave consumers frustrated with where the issue with their connection lies. Not all providers have outage pages or send notifications to their customers when services are affected by maintenance or damage. Therefore, prior planning for equipment such as water sensors and personal response alarms cannot be undertaken, as consumers are not made aware of an outage to begin with.

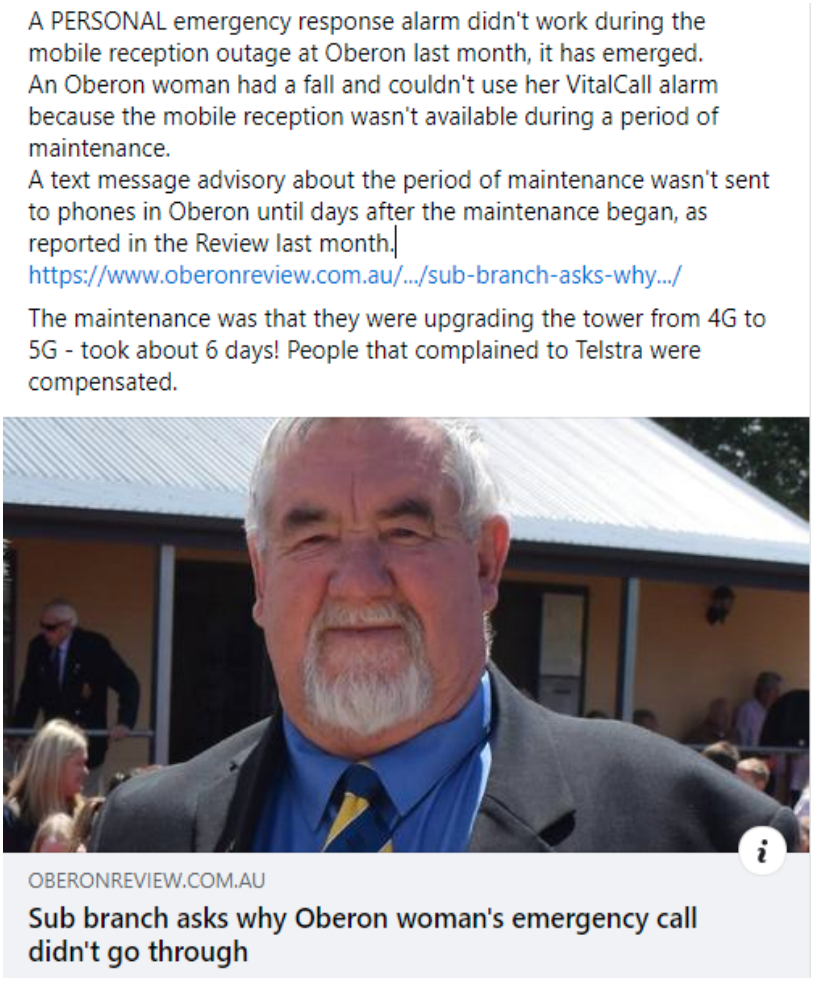


Figure 9: Example of emergency call that did not go through
(Source: www.oberonreview.com.au/story/7348435/sub-branch-asks-why-oberon-womans-emergency-call-didnt-go-through/)

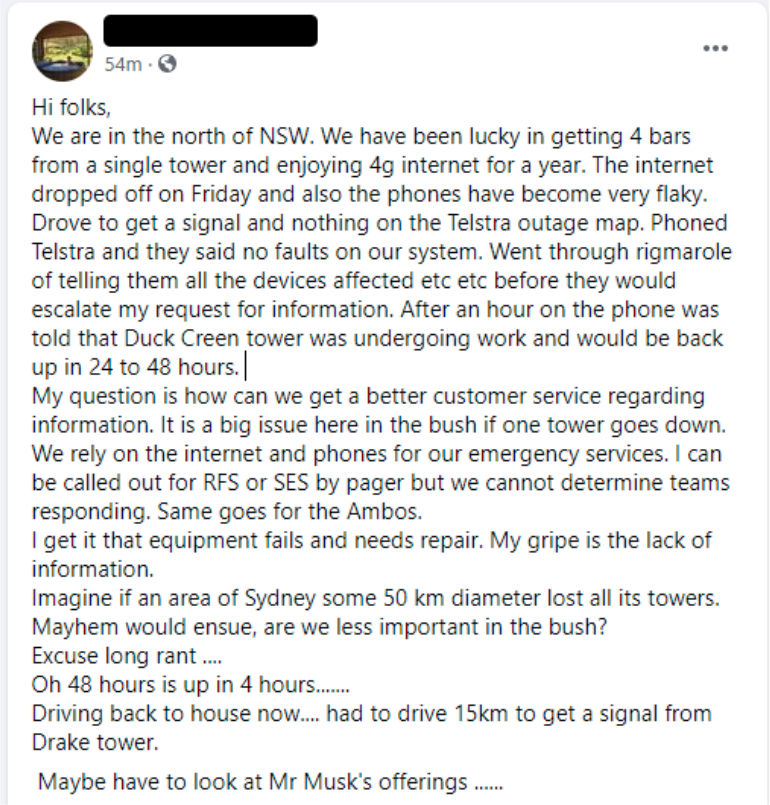


Figure 10: Example of limited coverage and poor customer service

Even with an improvement in infrastructure and technology upgrades across regional areas, if the connectivity literacy piece of the patchwork quilt is not resolved, RRR users will still struggle to get connected, stay connected and use their connections. An example of this is the recent Regional Connectivity Program funded projects for nbn tech flips from satellite to FTTP for the towns of Alpha, Surat, Morven and Augathella in Queensland. An upgrade in infrastructure is very welcomed in these communities, however there is no dedicated education or assistance provided in these grant programs, helping these consumers change technologies and connect to nbn. There is a widespread lack of transparent consumer information on what is needed to get connected and if an issue arises how to get this resolved in a timely manner and this has compounded the connectivity illiteracy problem.

4.6. Fatigue

RRR consumers have connectivity fatigue. Connectivity fatigue can be caused by various factors including fear of the unknown, a lack of exposure or experience with technology, lack of time or a reluctance to change or try new things. It can also be caused by people trying their best to solve their connectivity problems and 'giving up' as it gets too hard and takes too much time. One Queensland couple had to rely on a politician to escalate their case after 63 days with no landline, stating "I get the impression that Telstra, unfortunately, couldn't care less about the bush," and "Whether that's true or not I don't know but I certainly think that with the lack of service and the lack of help that we got until a politician had words with them" (Robinson, 2021). Another talks about the time it takes to keep up with policy and how it "affects access, delivery, quality and reliability of our essential services such as roads, education, telecommunications, postal services, and health (including mental health) services… And it takes its toll. So, while you sometimes have a win and affect positive change, it can often be soul-destroying, especially when you need to take on big organisations like any level of government and their departments, or big corporations like some telecommunication organisations that shall remain nameless" (Stretton, 2021).

Telecommunications has now become an essential service, yet unlike other utilities (e.g., water, power) a consumer is expected to be intricately involved in the delivery and success of that service. A consumer needs to drive the car, fix the potholes, navigate the signs and negotiate roadblocks, all without a map on how to get and stay connected. The telecommunications industry continues to add more complexity to receiving the service (i.e., more potholes and roadblocks), resulting in consumer fatigue and frustration, causing people to give up, ultimately putting up with substandard connections and ongoing faults. This is not only a significant safety concern but also creates lost productivity, affects education and mental health, and exacerbates social isolation for remote consumers.

4.7. Terminology

The terminology used in connectivity literacy is confusing. Many consumers that engage with BIRRR still answer with 'Wi-Fi' when asked what sort of internet connection they have.

Additionally, the telecommunications industry does not use consistent terminology for equipment. An example is with an nbn modem being called a Network Termination Device (NTD), a modem, and a router, depending on the nbn technology you are connected to.
The names of telecommunication companies are also confusing for example Sky Muster satellites are two geostationary communications satellites operated by NBN Co Limited, they deliver nbn to homes and businesses in RRR areas. Skybridge delivers high volume field installation and maintenance on behalf of corporate and government clients and Skymesh is a RSP that provides NBN, wireless and satellite services. Sky Muster, Skybridge and SkyMesh are often confused with each other, and BIRRR has seen instances of Starlink being called SkyNet, further adding to the confusion in terminology. In addition, the names of technologies are also confusing for example fixed line, fixed wire, fixed wireless, mobile wireless, mobile broadband, independent wireless, and satellite. Industry, government and independent agency acronyms (ACMA, ACCC, RTH, RRRCC, TIO etc.) are also confusing and hard to find using a google search, without understanding what they do.
Nbn Sky Muster plans have speed tiers that are called different things by each provider, for example there is sonic, fast, standard, 25/5, 12/1, basic and one provider who doesn't offer plus plans calls a speed tier 'plus'. No wonder consumers are confused!
Government, industry and telecommunications suppliers need to provide clear information about the difference between providers, plans and equipment and use consistent terminology to help overcome connectivity illiteracy.

4.8. Connectivity Literacy Summary

Misinformation and disinformation, combined with a lack of consumer support and information, a lack of transparency, inconsistencies with connectivity terminologies and consumer fatigue have all played a part in creating and compounding RRR connectivity illiteracy. It is becoming harder for RRR consumers to get connected and stay connected. The telecommunications industry needs to change their thinking and investment strategies from a *'if we build it and they will come'* approach to *a 'support RRR consumers in getting and staying connected'*. BIRRR acknowledges that whilst connectivity literacy plays a huge role in the success of getting connected and staying connected, other factors such as adequacy,

affordability, consumer guarantees, redundancy and reliability also need to be analysed to solve the problems in regional telecommunications.

5. Reliability

Regional telecommunications services, in particular mobile and landline technologies, have progressively become very unreliable, to the point that regional users are now required to have multiple types of connectivity to stay connected. Reliability of regional connectivity is not only placed under pressure during emergencies and extreme weather events, but also everyday due to ageing networks with little investment in repairs and upgrades by major Telcos. For those unable to afford multiple connection types, reliability becomes a huge concern during emergencies and is also affecting productivity, business, education and health in regional areas. It must be noted that in many regional circumstances only one service technology may be adopted by a user or only one service technology is available. When this technology fails the customer has no other connectivity option (*see Section 6 Redundancy).*

Thirty eight percent of RRR nbn™ Sky Muster users have no alternative broadband service when there is an outage or a fault. Of those that do have an alternative service, reliability becomes an issue, see anecdotal comments from the BIRRR Sky Muster Review (Hay & Sparrow, 2021) results below:

- *The copper landline is reasonably reliable but fails after heavy rain periods.*
- *Very dodgy Telstra mobile signal.*
- *Sometimes our mobiles work if put in certain spots around the house*
- *Sometimes we get 4G depending on the weather; 4G is only [reliable] because of Yagi Antenna; 4G Mobile service is limited/weak signal; 4G Optus home broadband.*
- *We do get a tiny bit of 4G but I use Cel-fi to get any mobile coverage so have it set in 3G as it's more stable and reliable*
- *We get occasional patchy 4G on mobile service too. If Sky Muster is down, it is AWFUL as the whole district then uses the minimal tower signal.*

Unreliable telecommunications services can occur due to one or several reasons:

- Power outage at tower or exchange
- Damage or fault to backhaul, a network or individual equipment - caused by extreme weather, fire, other factors such as rodent or bird damage
- Lack of consumer awareness of how to support home power outages (and associated affordability)
- A backhaul deficit that does not meet the capacity needs of the technology / equipment (*See Adequacy*)
- A lack of technicians in remote areas, resulting in extended repair times and lengthy waits to get voice or broadband services back online
- A lack of available parts for ageing systems such as High Capacity Radio Concentrator services (HCRC)
- A lack of investment in repairing ageing infrastructure such as the copper network and HCRC landlines.
- Weather conditions that can often prevent access to the communication services, such as rain fade on satellite services, high winds and smoke affecting nbn fixed wireless and mobile signals.
- Poor fault management by Retail Service Providers (RSP's) / nbn or other service providers (mobile carriers, WISP's etc). The fault lodgement process is convoluted and may rely on the customer proving a fault before it is accepted. This may involve complex testing that is beyond the customer's capability or it may simply fail the rigid call centre procedures resulting in no fault lodgement or subsequent rejection by nbn. (*See Consumer Guarantees)*

When these issues occur, it is increasingly difficult for consumers to contact their provider to get accurate information and to organise repairs. In addition, geographic location often means repairs can take several weeks and the more remote locations often do not have redundancy (other forms of communication), leaving consumers feeling frustrated and at risk.

6. Redundancy

Due to unreliable telecommunications services, regional users are encouraged to have redundancy in connectivity. As no technology is 100% reliable, not having all your "communication eggs in one basket" is terminology BIRRR has begun using to highlight the importance of ensuring regional consumers understand redundancy. Affordability, capacity, and lack of awareness remain the biggest barriers to achieving redundancy in regional communications.

Redundancy could be provided by a RSP selling a product for an extra cost but not enough to discourage the option, i.e., if a customer has a NBN Fixed Wireless connection they could have either a 4g failover (with external antenna connection) to allow the voice phone or internet at lower speeds, whilst a fault exists. Some providers have begun offering nbn Sky Muster routers with this capability, see ANT Communications - https://ant.com.au/nbn-satellite/nbn-skymusterplus.html However, for those on a low-income achieving redundancy in connectivity the cost is a significant barrier.

7. Consumer Guarantees

Regional connectivity over the past five years has improved in regard to available technologies, plans and providers. As regional consumers move from connectivity provided by a monopoly provider with limited choice of technologies and plans, to a 'patchwork quilt' (a large and varied choice of connectivity, plans, speeds, providers) of technologies, consumer guarantees for telecommunication services become critical in ensuring that services are adequate and repaired promptly. There needs to be a more robust, consumer focused framework as well as solid strategies applied by the Government and the telecommunications industry as a whole to address the ongoing issues faced by regional users. People are fatigued with the constant troubleshooting and work required to get services repaired.

Issues surrounding consumer guarantees fall into the following categories:

- Fault Identification: It has become incredibly difficult for regional users to get providers to acknowledge faults, often the finger pointing blame game results in consumers becoming incredibly frustrated at the first step of reporting a fault or issue. Regional

service providers have long call centre queues and larger providers have no specialist regional help or an understanding of the technology's consumers are experiencing issues with. The current Telstra routing system for fault lodgement is not available to small business customers and BIRRR has received continual feedback that Telstra are pushing people to an app for support, with it being near impossible to reach an Australian call centre operator that understands the technology you are using and the issues you are having.

- Getting a fault identified is problematic across a range of technologies and is not limited to nbn connections alone, however the very nature of nbn as a wholesaler with numerous delivery partners, increases the number of stakeholders who need to be involved in identifying a fault. As noted in our 2017 submission to the joint standing committee on the National Broadband Network, there are too many train carriages to go through (see Figure 1 below; Sparrow et al., 2017b) to be able to get assistance. This is exacerbated for nbn Sky Muster and nbn Fixed Wireless consumers as nbn provides very limited network monitoring tools to consumers and RSP's, resulting in consumers having to jump through every carriage on the train to get a fault identified.

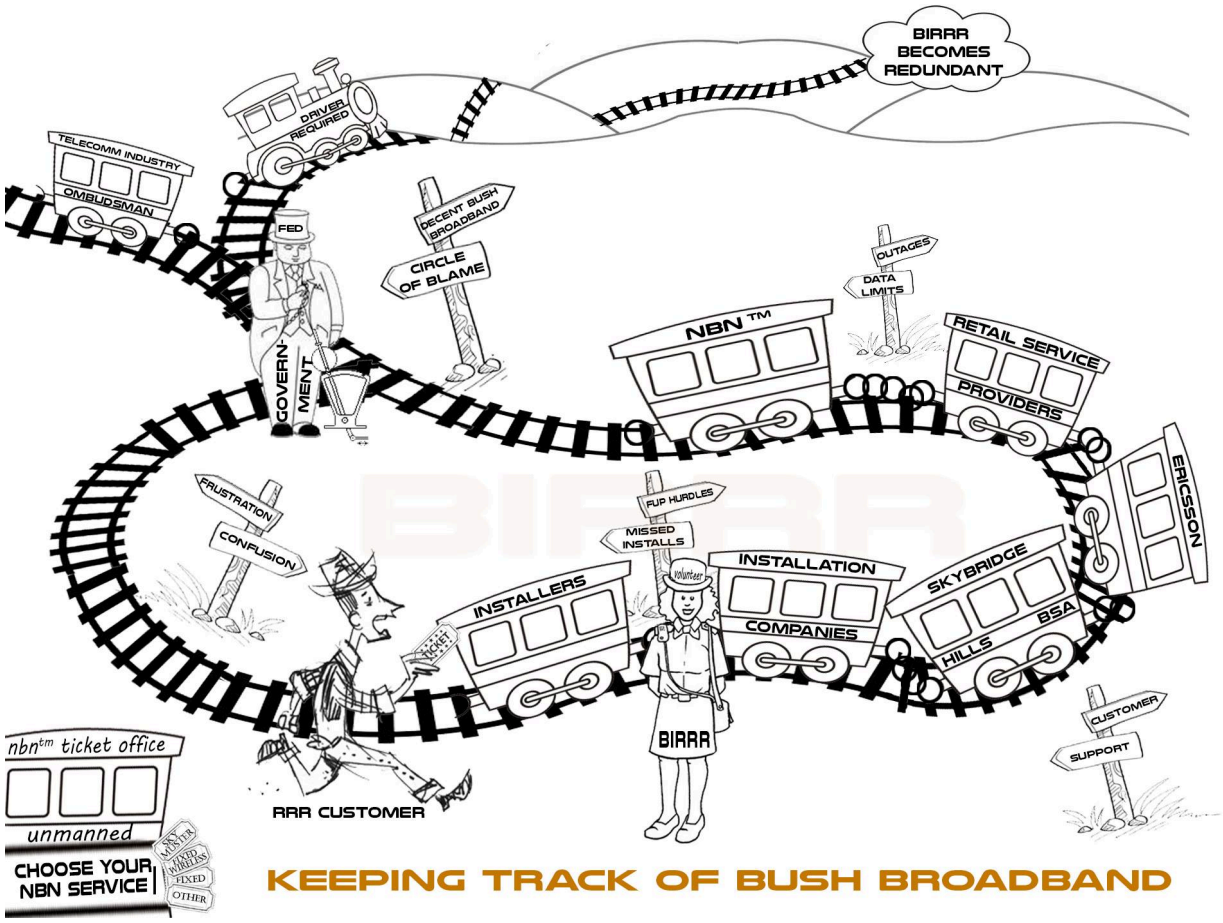


Figure 11: Submission to the Joint Standing Committee on the National Broadband Network, Parliament of Australia (2017)

- Fault Resolution: Regional faults (once identified) have extended repair times, or ongoing issues resulting in several tech visits and often the fault repeating itself again several weeks later. Cancelled repair appointments or faults that require several tech visits add to consumer frustration. Fault resolution is problematic across all regional communication networks, however BIRRR receives the most complaints about landline services.

ANECDOTAL COMMENTS FROM BIRRR LANDLINE SURVEY, 2018
Respondent comments show that participants are frustrated with the time it takes to fix their service when they lose it. Many of the responses identify simple fixes once their call has been answered, however, some comments also reflect rescheduled appointments and frustration about offshore call centres and a lack of local knowledge. In some cases, survey participants are waiting weeks and months for their service to be repaired. The comments

highlight in many cases the danger of not having access to a landline in case of accident, illness or in the fire season.
SERVICE: "Our landline phone goes out with the SAME fault about every second month with extremely limited mobile service in our area we are left without a phone for several days. When we ring to report the SAME fault we have to go through the same 20 minute 'testing the fault' rubbish to establish the same issue as 40 days previous"
MOBILE: "Sometimes weeks without phone working; appointments for technicians to visit/repair are broken without notice or apology; fault often recurs within days or weeks. Despite my multiple advice to the contrary, Telstra leaves messages (re landline faults etc.) on my mobile phone which I cannot access at home...."

Often the fault repeats over and over throughout a year, with consumers paying for a service they do not regularly receive. BIRRR has concerns that this has resulted in an increasing number of consumers cancelling landline services, leaving them with no redundancy if their broadband service is not working (for example results from the BIRRR Sky Muster Survey (Hay, 2017) identified that 11% of users identified as having no back up communications, not even a landline). It has also impacted the number of people who have 'tried' nbn satellite and turned it off as it's simply too difficult to get issues resolved.

- Network Issues: Network issues also affect all types of technologies. However, seem to be more prevalent on the nbn satellite platform. Over the past 12 months there have been several network issues with the nbn Sky Muster platform that have caused issues with users' connections.

CASE STUDY 4: In July 2021, an issue with Microsoft products was identified by nbn which required a user to contact their provider and ask them to get nbn to apply a fix to their individual NTD. BIRRR members reported this was not always successful as some providers' call centre staff seemed unaware of the issue or didn't get nbn to apply the fix. Some users were told to engage their own tech at their own expense and time to fix the problem. At the time of writing this submission the issue is ongoing and BIRRR is concerned about the negative impact this will have on consumers who are unsure of how to get their problem resolved.

CASE STUDY 5: In October - December 2020 nbn experienced user degradation on the nbn satellite platform, this was only resolved after BIRRR

member involvement and assistance to help nbn engineers find and fix the problem.

We are unclear how many consumers may have simply turned off their nbn satellite after experiencing the issues above.

- Lack of regional technicians across all technologies leading to extended repair times, cancelled appointments and current consumer guarantees not being met.
- Consumers' lack of awareness of their rights under the Universal Service Guarantee (USG), not being informed by their provider of their rights and misinformation/disinformation (see Section 4 *Connectivity Literacy*) regarding their rights as telecommunication consumers.
- Lengthy wait times at the Telecommunications Industry Ombudsman (TIO), with consumers often being told the solution is to 'move to another provider' or a credit being applied to the account, with the issue only to re-occur 2 months later and the whole escalation process having to start again.
- On the nbn satellite and fixed wireless platforms and with mobile broadband and WISP connections, consumers have no information that can help them make a decision on a provider and the ability of that provider to offer a congestion free service and consumer support.
- Wireless Independent Service Providers (WISP's) remain relatively unregulated and although they are meeting a need as last mile providers in regional areas, consumers have little protection. Currently there is little regulation around who becomes a WISP. This allows rogue WISPs to randomly enter and exit the market often leaving behind consumers with an internet connection that does not work accompanied by the expense of setting it up and the cost of installing a new technology or moving to a new provider. Often those who are genuine and have good business models are overwhelmed by their industry and not responsive to consumer calls for technical assistance, negatively affecting the experience of consumers and the reputation of other WISPs. Some form of governance or regulation is required to ensure that WISPs entering the market meet a select criteria that provides a surety to consumers, other WISP providers (whose reputations are damaged by short term suppliers) and funding providers, that they will

both exist in the long run and provide a reasonable consumer service. BIRRR understands that WISP's need a carrier license to operate or operate under a carrier declaration, however for a consumer to access this information it is quite complex.

- Landline phones: Until voice services such as copper landlines, HCRC and USO Sat can be replaced with services that provide the same or exceed existing voice service quality and reliability they need to be supported by government guarantees that recognise the importance of voices services to regional consumers.
- Coverage maps for mobile carriers are often not accurate, which makes it difficult for consumers to access current information regarding mobile availability at their residence or across their agricultural property.

8. Affordability

It is increasingly evident in BIRRR research and discussion that RRR consumers pay more for broadband and voice services than those in metropolitan areas (see Figure 12).

Rural, regional and remote internet users, unlike city dwellers, often need to **use extra hardware to access a connection to their network**. The survey asked respondents about the type and price of extra equipment that was required to access their mobile broadband service.

Thirty three percent of respondents had purchased **a Yagi Antenna** to assist with connectivity and **26%** of respondents **purchased some other type of on-roof antenna**. Fifteen percent purchased a Telstra branded Smart Antenna and 14% purchased a Cel-Fi Booster. Around 12% purchased another type of in house booster that was not named in the survey, see Figure 10.

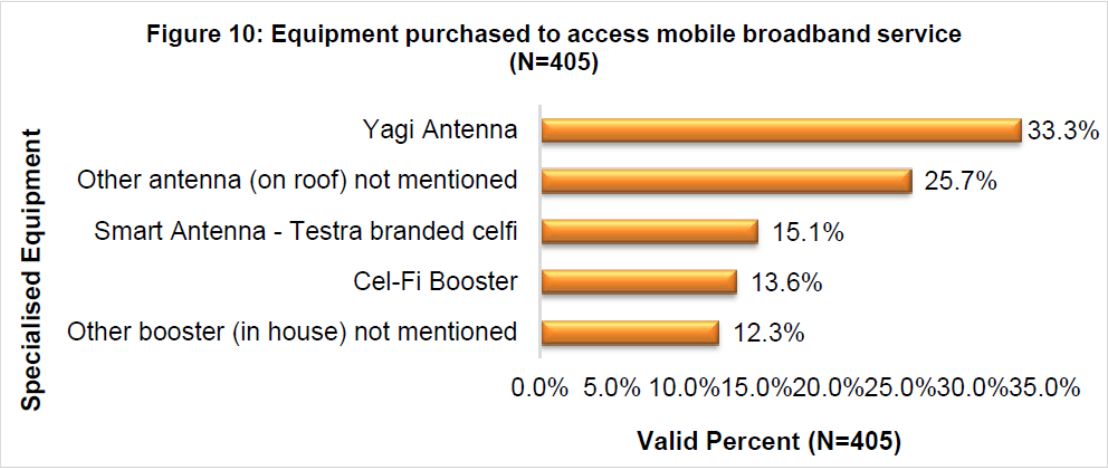


Figure 12: Graph and text showing extra equipment purchased for connectivity from the BIRRR Regional Access Survey (Hay, 2016)

Furthermore, if a RRR consumer has a low income or is indigenous the affordability gap is much wider. The impact of COVID19 has exacerbated connectivity affordability for RRR consumers, as more Government services have now moved online. During this time there has been a need during lockdowns for people to work from home and educate from home, an increase in telehealth and mental health services offered online and a greater need for telecommunications in RRR areas to be affordable. Whilst we acknowledge that RSP's did offer COVID initiatives, these were short lived and lacked knowledge and understanding of the perception these would give RRR users when they were removed. For example, extra CVC provided by nbn to retailers resulted in extra data to nbn satellite users, many who were already working and educating from home and running small businesses in satellite mapped areas. The removal of this extra data created a perception amongst RRR users that nbn had 'turned off the tap', and although the data could be provided during COVID, RRR users were not important enough to have this applied all of the time, even though it was everyday practice for these consumers to need the data for schooling and running businesses/working from home.

CASE STUDY 6: Jodie and her husband operate a cattle grazing property in central Queensland, they have two residences (a homestead and a staff quarters). Broadband is delivered via nbn Sky Muster satellite at a cost of $280 a month for both connections. Jodie's business values paying for connectivity for staff as it is now viewed as an essential service and helps retain staff. Additionally, the business pays for a landline phone (which works over the mobile network), $85 a month and three mobile phones at $50 a month each = $150. However, these are generally only usable at the homestead or when travelling away from the property. Jodie spent $1500 on an antenna and booster to try to alleviate this and has three cel-fi go's and antennas installed in the family car, truck and ute ($1200 each + installation). The business also maintains UHF radios at the homestead and staff quarters and in every vehicle. To ensure these methods of communications work in a power outage (which happens regularly) Jodie invested in a large generator, at considerable cost. Jodie and her family use their connections for their grazing business, staff use, telehealth, tertiary education as a son is studying agribusiness online from home, education when two other sons return to the property in school holidays from boarding school and personal use. Jodie is unable to access a specific plan for her business needs and her metered content is quickly used up with VPN and YouTube (for business and education) and streaming services (for personal use). Despite investing in redundancy there are still times when Jodie has no access to communications and she is concerned that Government initiatives for new alternatives are focused on putting voice and broadband via

the one technology, which she says is a considerable safety risk for her family and business.
Monthly spend: $515 plus equipment
Number of Technologies: 4 (satellite, landline (NGWL), 3G and UHF)

Having redundancy in connectivity is not affordable for some, who often choose mobile connectivity only, due to convenience, cost and the prepaid availability of mobile connections. Those who use pre-paid sim cards pay more for data. If a consumer is contracted the plan contracts are often lengthy, and if mobile service declines the contracts are often difficult to break. The cost to RRR consumers for equipment to enable them to access mobile broadband services e.g., boosters and antennas or non-standard nbn fixed wireless connections, is significant, particularly when the cost of travel and installation by a technician is added to hardware expenses.

8.1. Indigenous Communities

There is a need in Indigenous communities for a community Wi-Fi solution, however who pays for this and an example of a solution that is working well requires further research and investment and may differ from community to community. Indigenous focus groups should be consulted to ensure services that are offered meet the needs of communities and are affordable. BIRRR encourages the Telcos and Government to offer these communities place-based solutions, through programs such as the regional Connectivity Program.

8.2. Lack of affordable business plans

Whilst some regional areas can access business plans, generally speaking rural and remote areas have a lack of access to business plans which increases costs. Nbn Sky Muster business plans are designed for larger scale businesses and are confusing, with little support to micro, small, medium and large businesses on how they can access plans that suit their needs. There are no business plans available on the nbn fixed wireless network.

SMALL BUSINESSES - In Victoria alone there are currently more than 644,000 small businesses across the state, comprising more than 97 per cent of all Victorian businesses (Source: https://www.premier.vic.gov.au/new-small-

business-commissioner-appointed). Small businesses now make up 98 percent of all businesses in Victoria with 26 percent of businesses located in regional Victoria (Source: https://www.premier.vic.gov.au/new-small-business-commissioner-appointed). So, doing the updated maths 167,440 small regional businesses that all depend on non-metro communications solutions.

8.3. Limitations of fixed broadband plans affordability

RRR consumers are less likely to be able to 'bundle' plans and often have separate bills from multiple providers for broadband, mobile and voice services. RRR connections are also more likely to be limited and based on a 'user-pays' model than metro connections. For example, nbn sky muster connections, once shaped, require the consumer to purchase data blocks to meet their required data needs. This applies not only for normal nbn Sky Muster plans but also for the new nbn Sky Muster Plus plans, for those requiring extra data for VPN and streaming use. Whilst the addition of nbn Sky Muster Plus plans has been a game changing experience for many regional users, plans are higher in cost and restricted to off peak/peak time periods. When compared to metro connections RRR consumers using nbn satellite are restricted, not able to use their connection freely, for whatever they like, whenever they need to. Fixed broadband plans also usually require a credit check and the purchase of extra equipment such as routers, which adds to the cost of telecommunications services, making fixed services often unaffordable for renters, students, transient workers and those with concessions or low income.

9. Adequacy

The COVID-19 pandemic has plunged regional areas into a rapid need for adequate internet connectivity. A move to remote learning, work from home, telehealth and online support has exacerbated network issues on some technologies that were already stretched to capacity. Often some connections in regional areas lack adequacy and are not designed as place-based solutions for the communities they serve. This is particularly the case in the large number of towns across regional Australia that are mapped for nbn Sky Muster but currently use ADSL services. There is also a lack of recognition within the telecommunications industry that often RRR connections are 'multi use' with one connection being used for home schooling, business,

staff, health, and social needs. Additionally, the average nbn user is downloading approximately 355GB per user per month, with this being an upward trend year on year (Australian Competition and Consumer Commission, 2020, p. 4). The issues surrounding adequacy are highlighted below.

9.1. Nbn Sky Muster

The adequacy of the NBN Sky Muster satellite service for use in some industries and across some platforms, does have limitations.

- The high latency of the nbn satellite service means that it is an inadequate technology for some platforms. VPN use over nbn Sky Muster is often problematic, and slow. It is also metered. Therefore, data limits often restrict important work from home tasks. The nbn Sky Muster latency also affects user experience in some cases such as gaming, mapping, cloud services, remote desktop programs and wi-fi calling. Software providers often do not cater for high latency when designing programs, resulting in dropouts and issues connecting to these platforms when using nbn Sky Muster. This often restricts a consumer's ability to participate in work requirements. As more people move to a work from home situation, the high latency will continue to impact those who can only access nbn satellite for a broadband service, and a much lower latency will be needed into the future.
- BIRRR acknowledge and thank nbn for the launch of the nbn Sky Muster Plus product, which has been game-changing for many nbn Sky Muster users and encourage nbn to continue working with RRR stakeholders to understand current and future connectivity needs.

> *CASE STUDY 7: Marcelle, QLD - I am one very satisfied SkyMesh Pty Ltd customer on a plus plan. Located central west Qld. We were previously connected with Telstra on a 25GB (@$160/mth) plan (Max available) that was slow and frustrating and expensive and regularly slowed with usage. We switched to Sky Muster a few years ago and have never been so satisfied with the Internet ever. We were about 18 months on a normal plan and then upon advice published on the Better Internet For Rural, Regional And Remote Australia (BIRRR) by Kristy Sparrow we changed to a Plus Plan in March 2020 prior to our first home schooling /lockdown. I had one high school child on teams/zoom from 8-3.30 each day as well as online tutoring some afternoons/nights as*

well as a Uni student who was also on teams/zoom meetings most days. I also carried out my normal farm/business online duties simultaneously without any problems. Because most of the usage on the plus plan is not metered we have never gone over our data usage and are now able to also stream Netflix /Stan. Because of the lower meterage our usage is now relevant to a much lower gig /cheaper plan (@$70/mth) . I highly recommend checking out all the info/ research already done for you by the BIRRR group and switch to Sky Muster Plus. It really is a game changer.

- Off peak / peak hours and data limits, regional consumers want to use their connection in the same way that people in metro areas do. However, nbn Sky Muster plans are not only confusing they are also limited with restricted hours and data limits. The need and want to stream content is creating a 'data divide' for users of satellite, who cannot use their connection freely, without constraint. There is also a growing use of YouTube and VPN for education and work purposes, as YouTube and VPN's are metered sites, continual use is restricted to the metered data allowance of the consumers plan. As data needs grow, a restricted, high latency service, like nbn Sky Muster, will become more of an issue and will need to be addressed for future planning.
- The nbn COVID-19 CVC initiative (extra CVC provided by nbn = extra data provided by RSP's), which was initially given during the pandemic to support those working and educating from home, was well received by nbn Sky Muster users. However, when it was removed, it left RRR consumers concerned that there was no acknowledgement that working from home and educating from home is everyday practise for many regional Australians. The perception this gave regional users was they didn't matter.
- BIRRR understands the need to restrict certain users 'hogging' the bandwidth available on nbn satellite, however we encourage RTIRC to be aware that nbn Sky Muster services are usually restricted to only one 'port' or 'plan', and that this needs to be multi-use for home schooling, business, staff, health and social needs, with limited accessibility in being able to access other plans or more data when needed. Furthermore, staff are unable to use their own mobile plans in areas with no mobile coverage and need to be supplied with an internet service.

- The nbn Sky Muster business, normal and plus products are very confusing and information to compare them is difficult to research and source.
- Whilst many regional consumers maintain a mobile service (when available) and access WIFI calling (VoWIFI) via their SkyMuster service, not all phones/ providers support reliable SMS. However, SMS access is assumed to be universally available Australia wide. Two factor authorisations of financial services via SMS are common. If an SMS message cannot be delivered in real time, then that transaction will fail (there is also inconsistency, as in some days it works and other days it does not). Yet there remains a poor understanding from Government, health services and banks, that not everyone can access SMS messages.
- The use of nbn satellite to service rural and remote towns who were on existing ADSL services, this is a backwards step in connectivity for these towns, who feel underserved by nbn.

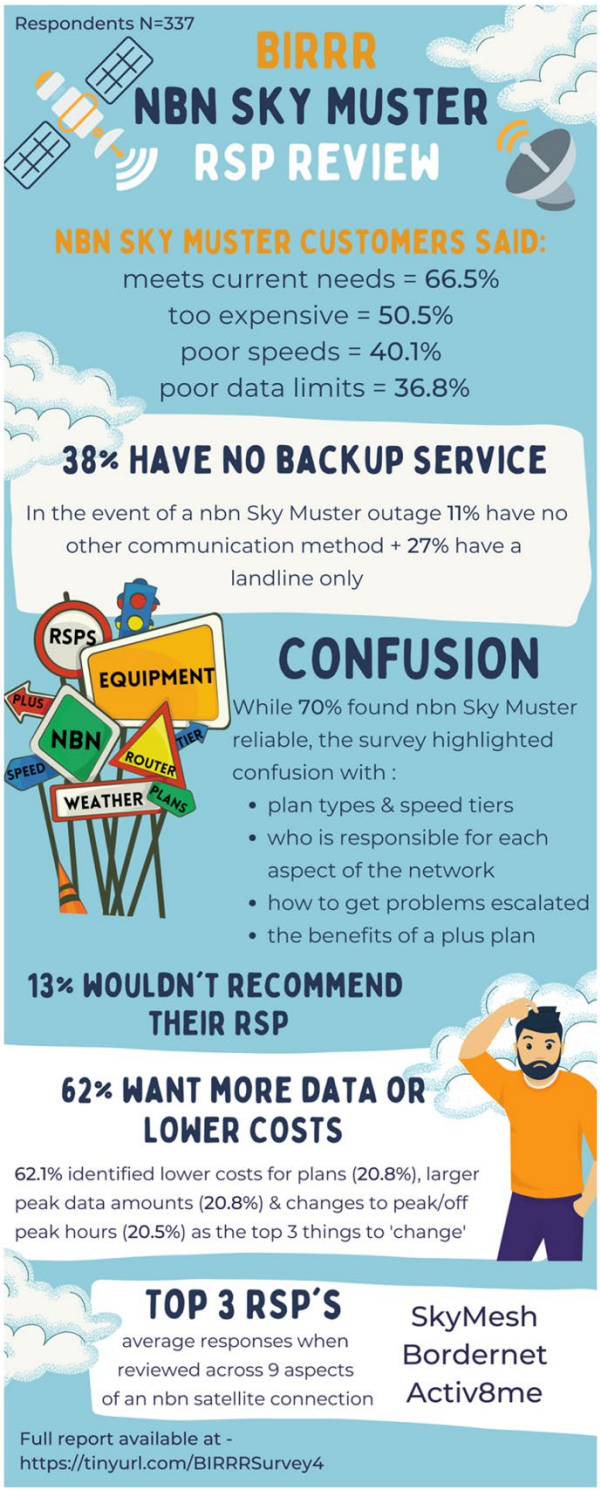


Figure 13: ***BIRRR Review of nbn™ Sky Muster Retail Service Providers (RSPs)*** *Report can be downloaded here*

- As free to air TV becomes more costly to access in remote areas, consumers are turning to streaming services for news and current affairs, however streaming services are metered on nbn Sky Muster plans.
- Nbn needs to clearly describe the meteorological events that may cause service disruption. In our experience for Sky Muster it is 'thunderstorms' i.e., very heavy and localised rainfall in the satellite path. Wind does not cause a connectivity problem for Sky Muster (unless a tree branch is blowing across the satellite path). However, many report winds as a problem. This is likely due to an insecurely installed dish or a faulty installation of equipment.

9.2. Mobility Products

Although trials have started, with an nbn Sky Muster 'fly away' kits the lack of a scalable, affordable mobility product is preventing access to broadband for those in remote stock camps and work sites, tourists and those who are itinerant workers.

9.3. Nbn Fixed Wireless

The adequacy of Nbn Fixed Wireless services, particularly for businesses, is an area for concern for regional consumers using this technology:

- Upload speeds are increasingly important as we adapt to the new Covid-19 normal while we learn, work and connect with others (Anders, 2021). This is problematic for nbn Fixed Wireless users as upload speed was sacrificed during recent network changes, for higher download speeds. With upload speeds now capped at 10mbps on the nbn fixed wireless platform, this has significant repercussions for many users, in particular businesses.
- There are no business plans available on the nbn Fixed Wireless network.
- Extended outages for repairs and maintenance are affecting business, those working and educating from home, with few RSP's keeping consumers updated on outage times and resolution.

- Congestion remains an issue for some nbn Fixed Wireless users, which results in poor speed and poor customer experience.

9.4. Nbn Roll Out

The nbn roll out in fixed line areas has created extra demand on mobile technologies, this is particularly evident in areas that have delayed nbn roll out such as Yarramalong and Kenthurst NSW.

> *CASE STUDY 8: Belinda lives in Kensthurst NSW, a Peri-urban area. The nbn roll out for her address has been delayed numerous times and is currently pushed back to 2022. The mobile network in Belinda's area is capacity constrained and suffering from severe congestion due to large numbers of people working and educating from home due to COVID lockdowns. The delay to the nbn roll out has affected Belinda's ability to work from home and impacted her secondary aged children's education. It has also left the family at risk during an emergency. Although Belinda has a landline phone, the copper was damaged by a storm in March 2020 and took 3 months to repair, there are no ports available to get an ADSL service. To make matters worse the information from nbn has not been transparent and the community has not been kept informed about the delayed roll out or offered any other interim solution. Belinda has no choice but to drive to a sports oval and sit under a tower so she can work, and her kids can study, she is fatigued with constantly checking the roll out map for updates and frustrated with the lack of response from nbn.*

9.5. Procurement Processes

The procurement processes used by many state departments and some local governments are restricting the use of place-based solutions and placing barriers on installations such as small schools and health centres being able to access the best technology for their needs.
State education and health systems are generally contracted to one provider which is preventing place-based solutions for schools & health centres. Government procurement processes favour large carriers/Telcos and result in schools/health centres not having access to place based adequate connectivity solutions, as the ability to purchase a more suitable product is limited at a local level.

> *CASE STUDY 9: Distance Education Families in NSW having to use the department Optus contracted satellite for all schooling purposes, when other (more adequate) technologies and connections are available. Mistake Creek*

School, QLD trying to troubleshoot a nbn Sky Muster Public Interest Premise (PIP) Connection and being told by the Education QLD IT department to contact Telstra (who do not sell nbn Sky Muster), the IT department then moved the school's connectivity requirements onto a 4G Telstra satellite small cell, which cannot support the school's connectivity needs. Other examples of procurement processes affecting Government services include Doomadgee Rural Hospital and Forsayth and Kindon State Schools, QLD using congested mobile services, with no redundancy or recognition from the Queensland Government that connectivity may be more adequate if supplied by a different technology that is not offered by their contractual supplier.

9.6. Backhaul

Backhaul refers to the high capacity, dedicated datalinks that carry large volumes of data traffic between two locations. Backhaul can be provided using different types of technology: fibre optic cable, fixed wireless radio and microwave technologies and satellite. Backhaul is supplied by telecommunications network owners to other service providers (Infrastructure Australia, 2021). The lack of backhaul, of adequate capacity and the cost of backhaul supplied by telecommunications network owners is affecting the connectivity of regional users. Backhaul in regional areas is the single most challenging and expensive component for last mile providers, such as WISP's and is preventing innovation and competition in regional connectivity. Retail service providers (RSP's) cannot compete and solve connectivity issues without access to affordable and adequate fibre.

These challenges include:

- Some regional communities do not have any fibre optic cable backhaul at all, which makes them challenging to service for connectivity.
- If fibre optic connectivity exists, in many instances (such as between Normanton and Cairns in QLD) there is only one carrier (Telstra).
- Many of the fibre links in regional Australia, lack capacity and do not run at the speeds they are capable of (i.e., running 1gb/s services through fibre that is capable of 10gb/s plus) and are unlikely to be upgraded due to the high cost to do so and the limited commercial return. In addition, in areas where Telstra is the only provider, if they were

to upgrade these links, they may choose to charge higher prices and limit investment in new services (Infrastructure Australia, 2021, p. 438). Upgrading may also enable other providers to enter the market or to compete against them.

- Legacy regulatory issues that regulate the pricing of access to some backhaul services, such as the Regional Backbone Blackspots Program (RBBP) (an Australian Government initiative with the specific objective of providing competitive wholesale backbone services to underserved regional markets (Vocus, 2021)).
- In some instances, the backhaul providers have little incentive to provide connectivity as the cost of providing and maintaining services in remote areas outweighs the money they can recoup from a service.
- In some instances, Government funding to repair and maintain fibre optic cable backhaul, covers the cost of doing so, and as such there is little incentive for fibre optic providers to offer innovative RSP's with access to the fibre optic backhaul.
- Backhaul services are a lot more expensive in regional areas, even where there is competition. Fibre is priced by zones, i.e., the CBD of Brisbane then various regional zones. Pricing is generally commercial in confidence but pricing in the CBD of a capital city is significantly cheaper (e.g., $1000 for 1GB/s) than in regional areas. Remote areas are significantly more expensive again, for example a quote from Telstra for 100mb/s in Normanton was quoted in the vicinity of $10K per month. Telstra has since reduced their pricing, but it remains expensive and inaccessible.
- It is quite expensive to gain access to the fibre optic backhaul in part due to the construction that is needed and accessing people with the skills to (actually) do the connection.

The challenges associated with regional backhaul affects the adequacy of mobile broadband, WISP's and nbn fixed wireless, often resulting in consumers experiencing congested services. This problem is exacerbated in areas with only one fibre provider. Additionally, BIRRR are aware of the lack of fibre in areas such as Northern Queensland and regional Western Australia, however this is difficult to quantify due to the lack of any mapping of existing fibre in regional Australia.

9.7. Spectrum

Spectrum is a continuous range of electromagnetic radiation waves. It extends from the longest radio waves to the shortest X-rays and gamma rays. The radiofrequency spectrum sits in the lower part of the spectrum (Source: https://www.acma.gov.au/what-spectrum). Spectrum is the raw material used for mobile communications. It is a natural and finite resource that is in high demand, hence there is a lack of access to affordable spectrum, which is also a challenge for WISPs in regional Australia. Challenges include:

- Many of the common frequencies and bands that are used for services such as LTE and fixed wireless broadband (in particular the lower bands that are more suitable for rural areas) have been purchased by the major carriers for millions of dollars and are therefore out of reach of smaller carriers. The ACCC has acknowledged that these high prices are anticompetitive (Infrastructure Australia, 2021. pp. 497) and that high spectrum costs affect financial sustainability and lead to lower network investment and poor-quality services that deliver substandard user experience (Infrastructure Australia, 2021. pp. 497).
- In some cases, these bands are purchased by larger providers to lock out other competitors, and there are no existing Government mandates for larger Telcos to use all or even share some of the spectrum they purchase.
- There is no long-term certainty for smaller carriers in regards to spectrum use.
- There is a mismatch between Australian regulations and other countries in regard to spectrum distribution. Specifically, to the 3.6GHZ band in Australia (Referred to as Citizens Broadband Radio Service (CBRS) in the USA)). This band (known as the 'goldilocks spectrum' because it's just right for 5G) is very commonly used for Point to Multipoint services by WISPs but due to recent changes by ACMA (https://www.acma.gov.au/) the band was auctioned off to major carriers (Telstra, Optus, Mobile JV (a joint venture between TPG and Vodafone Hutchison Australia) and Dense Air) using the band for 5G, raising nearly $853m (Australian Government, 2018). This band is critical to telecommunications companies because "once these 5G networks deployed on this mid-band spectrum are rolled out, the performance

jump is going to be so dramatic, that if carriers [including WISPs and smaller carriers] are not in that game they're going to get left behind" (Leswing, 2021).

- It is now difficult to use the band to provide fixed wireless services and current users are being transitioned off over a 7 year period (ZDNet, 2018).
- This spectrum was "one of the few left where small businesses can obtain affordable internationally-harmonised spectrum for apparatus licenses for wireless broadband" (iT News, 2017).
- This results in less suitable equipment available for use in regional Australia and limits the ability to cover large distances with radio links.

Australia is one of the largest countries in the world with the lowest population density to maximise the potential solutions for rural and remote connectivity, existing spectrum allocation and use needs to be managed more effectively.

9.8. Mobile Broadband

The adequacy of mobile broadband for regional users who have coverage has been noticeably declining over the past few years. As the demand for mobile networks increases, user experience is affected. In particular, many small communities have noticed a degradation in mobile capacity due to an influx of tourists, work camps and itinerant workers in the regions which places an increasing demand on mobile networks. BIRRR commonly hears of issues with declining coverage which we believe is due to 'cell breathing'. For consumer's this means they may have full bars on their phones or devices but can't load pages, send emails or open apps needed for business use.

The introduction of SMS over Wi-Fi by all major carriers has been a welcome development in regional areas. However, consumer awareness of wi-fi calling and SMS over Wi-Fi remains low, and it is not reliable all of the time. Other limitations are that not all retailers offer it, and you have to have a compatible device.

The introduction of the Telstra Regional Advisory Network (Source: https://www.telstra.com.au/coverage-networks/telstra-regional-australia/regional-advisory-network) to provide advice on mobile connectivity and equipment, has also been welcomed . However, boosting an already congested mobile service often leads to frustrated consumers,

who have spent large amounts of money on recommended equipment, with little improvement in their ability to use the data. Common complaints made to BIRRR are that even after purchasing the recommended equipment consumers still have capacity issues and are unable to use their devices in peak times. BIRRR are also concerned with technicians and providers who recommend expensive equipment, without providing information that whilst it may improve voice connectivity it often does not improve the experience for data.

9.9. New Developments

New development builds should be the best technology available, not the easiest or cheapest to deliver. BIRRR has seen several cases where densely populated new housing developments are mapped for nbn Sky Muster. Regional developers must be held accountable for ensuring that telecommunications infrastructure is rolled out with each new development, and that the required paperwork is completed to prevent delays in consumers getting connected once builds are complete.

9.10. Current Programs & Policies

There are currently a range of federal and state funding programs that offer investment in regional telecommunications infrastructure and improvements. Whilst some of these programs have been very successful in filling the gaps and delivering place-based solutions, there is a lack of coordination between programs and between governments at local, state and federal levels and regional infrastructure projects. The 'patchwork quilt of connectivity' in regional areas also lacks appropriate backhaul and capacity to meet the current demands, this is more evident in some areas than others, such as Far North Queensland and regional Western Australia. A lack of planning or a framework which prioritises connectivity infrastructure and no mapping that identifies where the gaps are located and where networks are at their weakest, makes it difficult for communities to gather knowledge about connectivity solutions. A lack of mapping of funded projects also has the potential to create an overbuild of infrastructure, as funded programs are not working together with local governments, businesses, and the Telcos. BIRRR has mapped the RCP projects and the National recovery and resiliency communication funded

projects for northern QLD and identified that this has occurred, where Wi-Sky QLD and Telstra infrastructure builds are located only several kilometres apart.

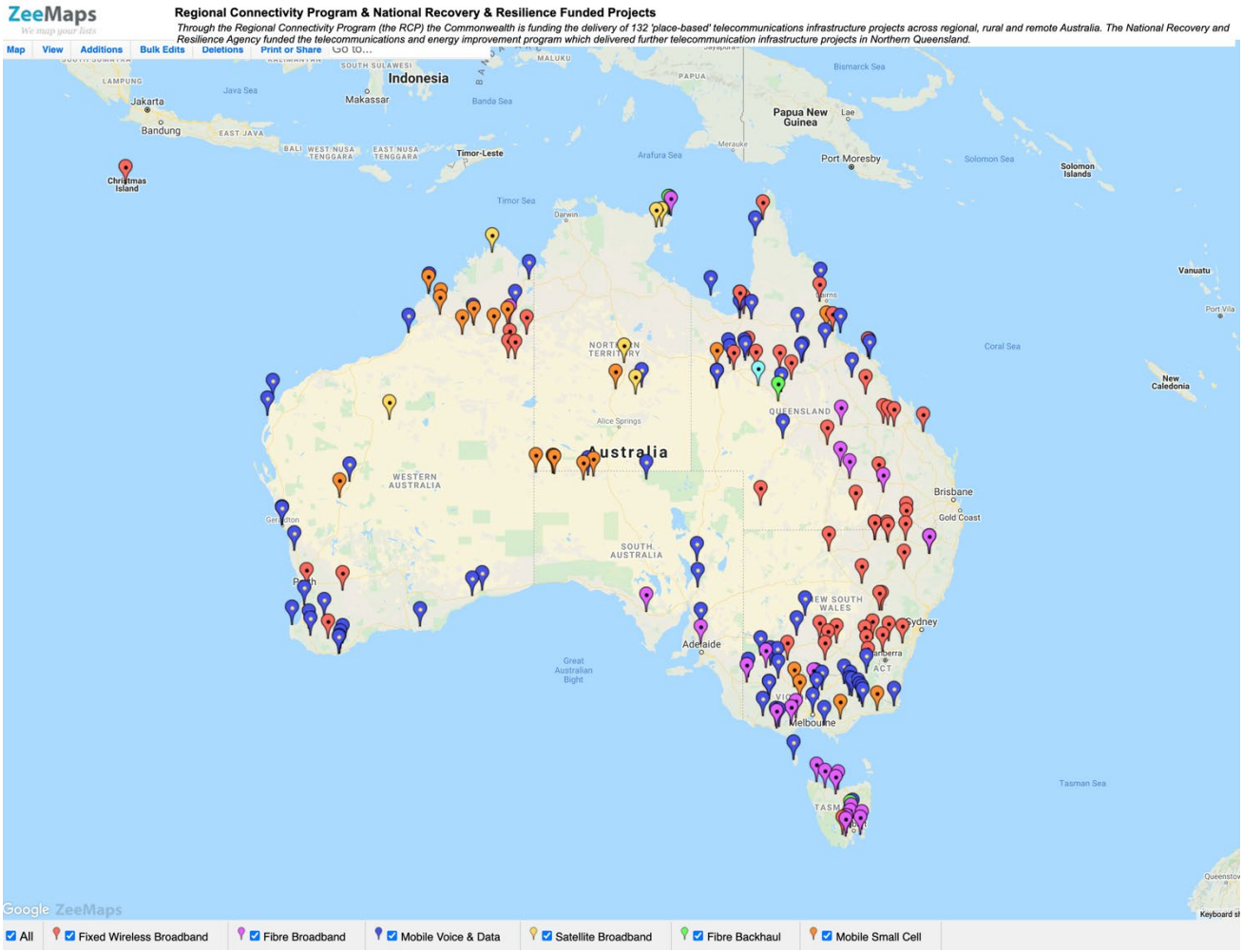


Figure 14:: [BIRRR Mapped RCP Projects]

It is imperative that capacity gaps are identified and prioritised. Current funding models will only continue to put patches on the quilt, without a strong thread to hold the patches together, if backhaul and capacity issues are not addressed.

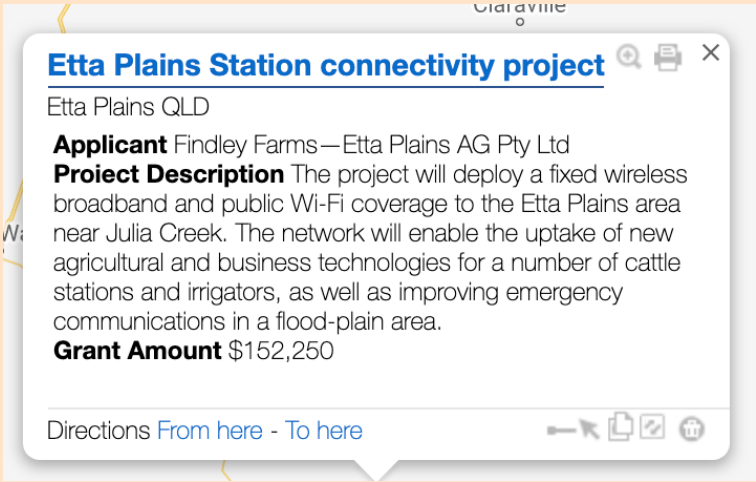
9.10.1. Regional Connectivity Program

BIRRR advocated strongly for place-based funding for telecommunications services during the 2018 RTIRC review and were very pleased to see the announcement of the Regional Connectivity program. The Regional Connectivity Program (RCP) will deliver place-based

solutions to regional communities outside of the nbn fixed-line footprint. BIRRR believes the program was very successful at delivering improvements to telecommunications in regional communities with a demonstrated economic and social need. To date these projects have not been rolled out, so it is difficult to comment on the effectiveness of this program at this point in time. However, BIRRR has identified a lack of independent advice and support available to communities and local governments as a major factor in being able to fully utilise and participate in such programs, with Telcos being very commercially driven and communities struggling to understand or find the knowledge needed to plan and roll out telecommunication solutions.

CASE STUDY 10: Findley Farms / Wi-Sky QLD Regional Connectivity Program Funded Project

Lucas Findley operates a large-scale cotton growing operation, north of Julia Creek in Northern Queensland. A multi-million-dollar earthworks project has commenced that will involve a 7 year roll out. Partnering with Wi-Sky QLD, Findley Farms applied and were successful in securing RCP funding to build a whole farm wi-fi network. Lucas' dream is to stand in his paddock with VR Goggles with a piece of cotton in his hand and talk to his agronomist. The joint application to build a connection from Julia Creek to Etta Plains (100klm) will provide connectivity to anyone on Etta Plains Station. To date the project has been delayed by the local Government which has frustrated the stakeholders involved in the project.



(Source: https://www.northqueenslandregister.com.au/story/7216464/field-of-dreams-at-etta-plains/)

9.10.2. Alternate Voice Services Trial

The Alternate Voice Services Trial (AVST) has been disappointing for those in regional areas who were hoping for an innovative solution to voice delivery. BIRRR acknowledges that the program was limited by the grantees that applied, however we are concerned about the large number of trials that use existing nbn Sky Muster services. We have previously spent much of our advocacy time detailing why regional consumers should not have their communication 'eggs in one basket' and why voice and broadband need to be delivered via separate technologies. It is therefore disappointing that many of the AVST trials ignore this advice. Additionally, VOIP via nbn Sky Muster was already available to regional consumers if they wished to access it. Our members involved in the AVST trial using nbn Sky Muster have been plagued with issues and problems, adding further to frustrations over future voice delivery in remote areas.

CASE STUDY 11: Louise: My experience with the AVST trial, using nbn Sky Muster and Telstra as a provider has been incredibly frustrating. Every time nbn Sky Muster drops out all of the equipment needs to be power cycled to get the voice service back online. If we have a light shower of rain, we need to power cycle. If the power flickers, we need to power cycle. If there's a nbn Sky Muster drop out, we need to power cycle. Sometimes this needs to be done twice. I put our name down on

the department list as an AVST triallist and was contacted by 6 different providers, which was confusing. None of them could adequately explain the technologies they were trialling, what my downtime would be and what type of voice quality to expect. One grantee wasn't even installing trial equipment in QLD, so I felt contacting me was just wasting my valuable time. It was difficult to sign up to the trial with Telstra and it resulted in a mess with our billing that I'm still trying to resolve, and there was no troubleshooting documentation supplied, with contact for help via an email only. Our number was not provided to us and we had to 'guess' that some digits written in texta on the box was the number we would be using for the trial. Our trial service would be of no use in an emergency as it needs to be power cycled every time, we need to use it.

BIRRR is concerned that the AVST trials included a very limited number of people on HCRC systems. We also have concerns with the Telstra 4G Home Voice being trialled in areas that already had several voice options and believe this is mainly due to Telstra billing requirements that prevented small businesses from being part of this trial. This excluded anyone utilising an existing HCRC as almost all of them are small business consumers.

9.10.3. Universal Service Guarantee

BIRRR has extensive survey data that provides evidence of the difficulty in ordering a landline phone, lengthy repair times and recurring faults. The BIRRR Landline Survey (2018) demonstrated that over 13 % of respondents had had trouble ordering a landline service and over 41% of respondents said their voice service stops working more than three times per year. Over 34 % of respondents stated their landline service was worse or much worse than ten years ago. Notably over 69% of respondents used a landline phone that did not require power to work, which highlights the frustrations that would be felt by consumers who move to newer voice technologies that do require power. The 2018 BIRRR Landline survey highlighted that consumers are unaware of their rights under the Universal Service Obligation, are fatigued with reliability issues, constant outages and ongoing faults and concerned about the future of regional voice services. This research has been distributed to Telstra and the Department. The results from the BIRRR 2018 Landline Survey (2403 respondents) can be found on our website: https://birrraus.com/submissionssurveys/birrr-surveys/

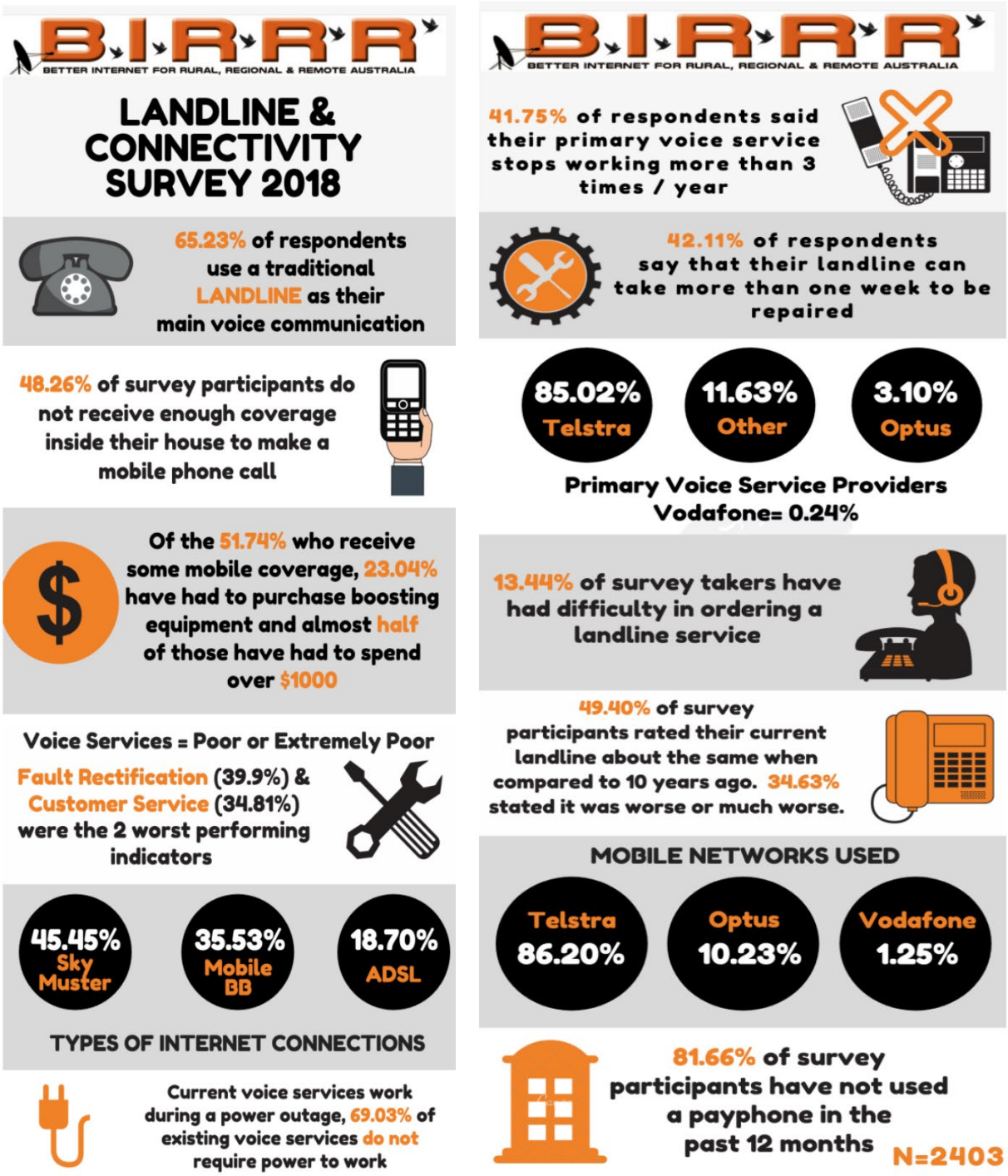


Figure 15: Quick Stats from the BIRRR 2018 Landline Survey

9.10.4. Strengthening Telecommunications Against Natural Disasters (STAND) & the Mobile Network Hardening Program.

The above programs were designed to improve the resiliency of communications networks after the 2019/2020 bushfires. The programs will:

- Improves the resilience of regional and remote mobile phone base stations - upgrading power such as batteries and generators for towers built under Rounds 1 & 2 of the MBSP
- Portable communications facilities to allow quicker service restoration
- Deliver improved communications - to improve the information provided about access to telecommunications in emergencies.

Enhanced telecommunications for rural fire authorities and evacuation centres - $7 million will fund the deployment of approximately 2,000 NBN Co satellite services across the country, to rural and country fire services and designated evacuation centres, to provide additional redundancy when fixed line connections are experiencing outages. Programs that encourage telecommunications network hardening, extended power back up and resiliency should be encouraged.

9.10.5. nbn - roll out, co-investment & nbn local

For those areas still yet to receive nbn, the lack of information and transparency around connection dates is an ongoing frustration. When delays of this magnitude occur nbn should be placing residences on alternate technologies, such as satellite and fixed wireless (where available), until the fixed line footprint can be rolled out. In peri-urban areas, substantially affected by COVID lockdowns, delays to the nbn rollout and a capacity constrained mobile network, has significantly impacted education, work from home and placed residences at risk in emergencies. nbn co-investment should be focused now on upgrading underserved ADSL towns mapped for nbn Satellite, delivering place-based solutions to large regional towns where the fringes of towns are mapped for satellite, upgrading regional areas located in satellite 'busy beams' and upgrading areas where nbn FTTN or nbn Fixed Wireless is underperforming. Nbn

network monitoring should be able to map and identify areas of high demand and nbn local teams are well placed to engage local communities and empower them with information that can help them improve telecommunication infrastructure and services. The introduction of nbn segment roles across a variety of industries such as education, tourism, health and indigenous, along with a nbn local 'boots on ground' approach has been well received and valued in regional areas and credit should be given to nbn for developing their taskforce and engaging with regional stakeholders.

10. Emerging Technologies

With emerging new telecommunications technologies on the Australian landscape, BIRRR believes that future planning is key to maximising the benefit of these technologies. Future planning needs to be done on a much larger scale than three years ahead and should involve consultation with regional stakeholders to ensure that technologies used in regional delivery are needs based. Whilst nbn Sky Muster satellite is meeting the needs now for two thirds of users (see Figure 15), heading into the future as data needs grow, symmetrical speeds are required and innovative digital technologies are adopted, the latency of geostationary satellites need to be considered.

Two thirds of respondents agreed that their nbn™ Sky Muster service met their current internet needs. We also asked for anecdotal comments to support their answers, see Section 7.1.

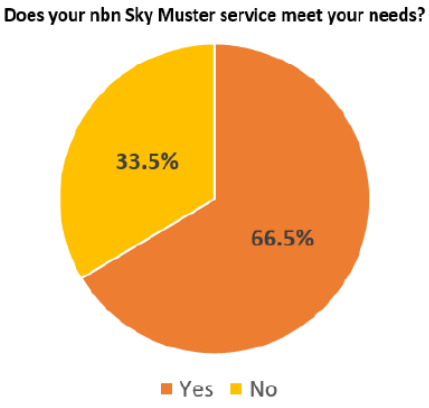


Figure 5: Does your nbn™ Sky Muster service meet your current internet needs?

Figure 16: BIRRR Sky Muster Review Survey Results

A patchwork quilt of technologies in regional areas, must come with consumer education and support, with the arrival of new emerging technologies this will remain a critical need.

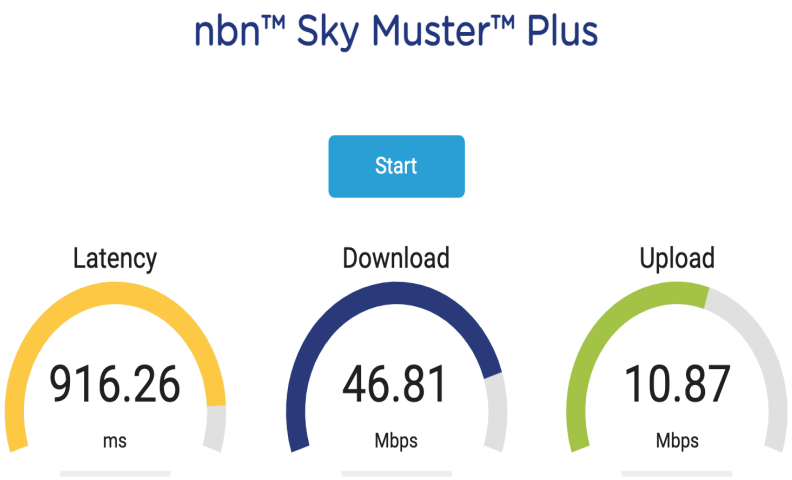


Figure 17: Speed test on nbn Sky Muster demonstrating latency

10.1. Adequacy of Emerging Technologies

Emerging technologies such as Low Earth Orbit Satellites (LEO's) offer promising opportunities for regional users. However, also have some restrictions in regard to adequacy. For example, BIRRR has identified the following limitations of the SpaceX Starlink service:

- No static IP addresses
- High cost for equipment and plans
- No support with installation
- Not tried and tested in Australian weather conditions
- Only in Beta phase, with a slow roll out and production issues with equipment supply to meet demand
- Not available for a commercial premise, no business plans
- Limited consumer support, only available via the app, support is based in the United States (US) and the app needs some type of internet connection to work. So, in areas with no mobile coverage, and for those with no redundancy, it is difficult to contact Starlink for support as they do not accept voice calls.
- Equipment has a short life cycle; a limited warranty of 12 months and replacement equipment needs to be shipped from the United States (US)

10.2. Changes in Demand

The following changes in demand have all impacted data needs and regional telecommunications networks and greatly affected the capacity of these networks to keep up with demand.

Governments requiring more online interactions	An increase year on year of data use growth
More people working from home	Increasing trend towards a cashless society
An increase in people moving to the regions	The need for symmetrical services - upload speeds becoming just as important as download speeds
An increase in remote learning	An expectation that everyone can access SMS messages (used for banking, health, appointments, government services + more)
A move from tertiary institutions towards less face to face and more online study modes	The increased use of video conferencing via platforms such as Teams and Zoom
The development of telehealth	Increased data needs and network capacity due to COVID-19
An increase in mobile devices and an expectation that consumers can use devices, wherever they may be.	A move away from face – to face services such as banking, health, government agencies etc. With the expectations that everyone has the skills and connectivity to be able to now access these services online.

An increase in the use of streaming services, 'as free to air services' become more expensive to access for those in remote areas.	An increased uptake in cloud accounting, cloud storage and collaborative cloud programs such as Canva, Google Drive and One Drive

11. Recommendations

RECOMMENDATION 1 – WORK TOGETHER TO DEVELOP A REGIONAL CONNECTIVITY PLAN OR ROADMAP

Existing Government programs have made a significant positive impact on the improvement of telecommunications infrastructure in regional areas. However, each individual program is very 'siloed' and no one is working collaboratively to plan for the future, solve existing problems and capacity issues and maximise regional telecommunications investment. **There is a need for the different levels of government (Federal, state, local) to work together with the Telcos, regional telecommunications stakeholders and industry to develop a regional connectivity plan or roadmap that is forward-thinking and encompasses future needs and growth of regional communities.** Working together collaboratively could deliver improved capacity, redundancy, adequacy and reliability of regional communications using strategies such as:

- Develop a framework for funding programs that has a set of key criteria that prioritises funding, although this was covered in some aspects of the Regional Connectivity Program, it needs to be more widely applied across all telecommunications project funding and factor in things such as remoteness, population, social and economic benefit, risk of natural disasters, redundancy already available, health, education, tourism and business benefits.
- Any future planning or technology roll out should support the growing need for faster speeds and symmetrical services, with unlimited data and low latency for all rural, regional and remote residences and businesses. Long term planning should consider future proofing connectivity so that future growth in connectivity capacity is factored in.
- It is essential that any decisions on future roll outs of technologies are backed by appropriate and adequate research into the needs and wants of regional users and come with appropriate consumer protection when faults and issues arise. For example, if rain

fade is identified as an issue that affects satellite reliability in the tropics, then other technologies need to be investigated that could overcome this issue. If latency affects the use of certain platforms that are essential for education, working from home and business use, then lower latency technologies should be investigated and trialled.

- Mapping existing backhaul and identifying gaps in capacity and where networks are at their weakest.
- Future planning for new technology rollouts and funded programs that are much further ahead than 3 years, with the ability to ensure network capacity into the future via a framework that can prioritise investment and a quantum of funds that relates to the need for regional telecommunications to be resilient, adequate, reliable and offer redundancy and affordability.
- Future rounds of place-based connectivity funding via the Regional Connectivity Program – with LGA's, large business and industry groups support in understanding how to apply and what to apply for to solve their connectivity problems in RRR areas.
- Offer incentives and grants to providers that are willing to service 'hard to reach' and 'difficult to install' areas, award innovative thinking in solving the barriers to delivering telecommunications infrastructure to underserved areas.
- A Round 2 AVST that has very clear criteria to trial new innovative technologies that meet or exceed existing voice services, with a particular focus on HCRC and USO SAT voice service. There also needs to be a greater awareness of the adequacy of trial technologies so that voice services are reliable and robust. Any emerging technology that is used for voice delivery cannot be the same service that is used for broadband. Emerging technologies used for voice communication services must meet or exceed existing service guarantees for voice - see BIRRR Submission into the USO enquiry (Sparrow & Gowen, 2017).
- Explore options and engage with stakeholders to provide free community wi-fi to indigenous communities via the Regional Connectivity Program.
- Consider each government grant program has a quarantined small component for connectivity literacy support.

RECOMMENDATION 2 – IMPROVE THE QUALITY AND DISTRIBUTION OF INFORMATION

Improve the quality and distribution of information to regional consumers to help educate consumers on how to get connected, how to stay connected and how to use their connection (connectivity literacy). This could be achieved via a variety of strategies including:

- The Regional Tech Hub (RTH) to be overseen by an advisory/consultancy body that develops a clear framework of what is needed, future direction and solid strategies to deliver connectivity literacy education to the regions across the following levels:
    - Individual consumers
    - Small Businesses
    - Local Governments - independent community advisors for local government, business and community groups that can assist in developing a plan for connectivity and how to maximise grants and funding opportunities. This advice needs to be able to be upscaled so that local government, state government, business and local communities can all be empowered to make sound telecommunication decisions, not only on connectivity but also on products that they can use to adopt technical solutions within their communities.
    - Regional Sectors - segmented into the main regional sectors of local government, community groups, business, tourism and the arts, education, health, agriculture, and indigenous communities.
- RTH to develop a pool of consultants and advisors that community groups, organisations, local Government could use to get connectivity advice.
- Industry advice for consumers on equipment, software and products that use connectivity. For example, within the agriculture industry, a product review type wizard that allows a grazier to compare walk over weighing equipment or a farmer to compare drones with weed identification ability. In business, a comparison of point-of-sale devices and which ones will work on the connectivity options specific to that business (e.g., Square payments system, EFTPOS etc). Currently consumers must do all the research and decipher the solutions themselves. Industry advice should encompass existing advice channels such as Agtech finder. This could be industry led and funded by each specific sector, tapping into

resources that already exist such as drought hubs, chamber of commerce and other industry groups.

- Creation of a connectivity / wizard tool that helps the RTH & individuals establish their connectivity options. A tool, app or wizard that scrapes information from the following:
    - Nbn roll out map
    - The three mobile carriers coverage maps: Telstra , Optus , Vodafone (TPG)
    - A map identifying all of the available WISP's (with carrier licenses)
    - ADSL Address Checker
    - Grant Project map - A map that is continually updated to indicate new funded projects across all levels of government and industry.
- The RTH needs to be established as a one stop shop for accurate and current connectivity advice for regional consumers. MP's, LGA's and industry groups should be encouraged to send their constituents and members to the RTH, rather than attempting to give their own advice which is quite often wrong. To achieve this the RTH needs to be more closely engaged with regional stakeholders and regional telecommunication providers and their website content needs to be overhauled and adapted to address the needs of regional users. Additional funding and resourcing will be required to grow and maximise the potential of the RTH.
- Further roll out and Government funding for inDigiMOB connectivity & digital literacy (currently funded by Telstra) for Indigenous communities
- Consistent and accurate terminology needs to be developed within the industry, with Government, nbn, telecommunications providers and researchers all using the same terminology. nbn should ensure that information supplied by their clients (the RSP's) is accurate and consistently uses the same terminology.
- Development of an online tool to help regional users review broadband plans & choose a connection based on their needs for reliability, data, speed and customer service. For example, the Canstar Tool for electricity consumers (Canstar Blue 2018), Whistle Out broadband comparisons. This tool needs to specifically encompass regional connections in particular nbn satellite, as there are no independent comparison sites that currently do this.

RECOMMENDATION 3 – IMPROVE CONSUMER GUARANTEES & TELCO ACCOUNTABILITY

It is imperative that there are clear standards, targets and accountability in regard to connection and repair times, performance levels, reliability and safety nets for RRR consumers for both voice and broadband. An urgent improvement to regional telecommunications fault reporting, fault rectification and consumer guarantees, is needed to ensure that Telcos are held accountable and RRR consumers understand how to get problems resolved and are aware of their rights.

- The Universal Service Guarantee (USG) should continue to ensure that RRR Australian consumers and businesses have baseline voice services that are at least equivalent to the standard offered under the Universal Service Obligation (USO). Standard telephone services must be maintained until such a time that baseline service needs are exceeded using alternate Broadband technology. There should be no degradation in the current voice service that users receive. The USO should be technology neutral and updatable to ensure ongoing needs are met.
- The USG should be fully monitored to ensure that providers are meeting the requirements of the guarantee, with clear consequences for when these guarantees are not met. Government Regulatory Bodies to investigate the use of additional industry fines to RSP's (above the current standard fines) when a fault continues to occur. For example, when the same fault is reported more than three times within a 12-month period, or if the fault takes longer than 6 weeks to repair. Money raised from industry fines should then be used to expand and improve the quality of connectivity literacy resources.
- Extend ACCC Measuring Broadband Australia (MBA) monitoring to satellite connections. This service delivers powerful monitoring tools and information to the customer. This service tool has been instrumental in resolving complex nbn Sky Muster faults that nbn could not 'see' or replicate.
- Telstra to provide a regional call centre with a dedicated number, not via a routing service, specifically to help regional users with landline and mobile fault reporting and repairs.

- Telcos to provide clearer pathways for escalation of faults, improved network and connection monitoring and to be made accountable when things go wrong, such as extended fault repair times and recurring faults.
- Regulatory bodies to mandate network monitoring on all technologies to ensure consumers are receiving quality and reliable service. All telecommunication providers to provide network monitoring and diagnostics to ensure consumers are receiving quality and reliable services and that fault reporting does not become such an onerous task for a consumer on any network.
- Develop human capacity through upskilling local technicians, training more RRR technicians to increase the availability of skilled technicians in RRR areas and increase fault response time.
- A commitment from Telcos to increase 'boots on ground' technicians and advisors, particularly those skilled in infrastructure repairs and fault diagnostics, in RRR areas.
- The telecommunications industry should support the RTH to develop consistent, transparent information that can be distributed through regional networks so that consumers understand their rights and how to escalate issues when things go wrong.
- The **Telecommunications Industry Ombudsman (TIO)** to collect data on regional connectivity issues (in particular landline faults that are ongoing or where there are multiple faults on a landline service in one calendar year) and length of time taken to resolve issues in regional areas.

RECOMMENDATION 4 – GREATER PRIORITY TO IDENTIFICATION OF MIS AND DIS INFORMATION

Greater priority given by government regulatory bodies to identify misinformation and disinformation that exists in the regional telecommunications space. This could include opportunity strategies such as:

- Consumers being able to 'dob in' misleading information via a website, this could include information, advertisements and sale of misleading or illegal equipment (such as illegal repeaters)

- Regulatory bodies fining those who are actively misleading consumers.
- Improving the quality of information available to consumers
- Ensuring consumer protections are in place regarding misleading and deceptive information.
- Regulation of Wireless Internet Service Providers (WISPs)

RECOMMENDATION 5 – IMPROVING THE RESILIENCY OF REGIONAL TELECOMMUNICATION NETWORKS

Improving the resiliency of regional telecommunication networks by a range of suggestions such as:

- Continuation of the STAND program & network hardening programs, that helps build resiliency in telecommunications networks
- Ability for local SES, council, trained local personnel etc to be able to refuel generators at RRR towers during extreme weather events, when safe to do so.
- Legislating power backup requirements so that future upgrades or government funded telecommunications infrastructure, including nbn fixed wireless and mobile towers, include power resiliency of at least 12 hours.
- Supporting research and roll out of power extenders for towers and other telecommunications infrastructure, in particular for areas prone to natural disasters.
- Supporting research and roll out of cost-effective backup power devices for residences.
- Improving the quality and distribution of resources regarding the importance and availability of back-up devices for communication and power. Educating consumers in the importance of keeping a traditional landline in nbn Sky Muster and nbn Fixed Wireless mapped areas. RSP's should also highlight this when connecting regional consumers.
- Small business grants could offer incentives for consumers to access rebates that enabled the purchase of back-up power devices.
- Improving education resources for consumers, businesses, and local government about the importance of redundancy in connectivity. RSP's to ensure that misinformation/disinformation isn't creating barriers to consumers achieving redundancy

RECOMMENDATION 6 – IMPROVE CAPACITY AND COVERAGE OF REGIONAL TELECOMMUNICATIONS

Improving the capacity and coverage of regional telecommunication networks by a range of suggestions such as:

- A high-level map of all available fibre & communications infrastructure, so gaps can be identified & stakeholders can use this to plan future backhaul investment. The maps should identify if the existing backhaul is capacity constrained, and other barriers which are preventing access to technologies that could be used by last mile providers to solve connectivity issues in more remote areas.
- Acknowledging regional Australia, just like metro areas, need redundancy in connectivity and continue to roll out new fibre pathways so this can be achieved by incentivising new backhaul and fibre builds in areas where gaps are identified, to maximise the potential economic benefits that regional Australia can deliver.
- Establishing a clear plan and framework to increase affordable backhaul in regional areas by prioritising areas that currently have no backhaul or only a single backhaul source or those areas with capacity constrained backhaul.
- Major infrastructure projects such as railways, roads, and big business builds to include telecommunications infrastructure build mandates to allow for community upgrade pathways. These need to be delivered at the design phase and not as an afterthought.
- A review of spectrum licensing policies and an investigation into a “use it, share it or lose it” policy. To ensure that alternate fixed wireless service providers continue to bring competition to regional broadband markets.
- An investigation into the Mobile Black Spot Program and how funding can be used to increase mobile coverage in areas that are not profitable and hard to reach for Telcos.
- Investigate the ability of ‘roaming’ for emergency SMS messages to aid in evacuations during natural disasters and extreme weather events.

Recommendation 7 – Improve Affordability of Telecommunications in Regional Areas

Improving affordability of telecommunications services in regional areas, which could be achieved through a range of measures such as:

- Un-metering of data used on government websites for mobile connections, in particular Centrelink, MyGov etc.
- Government to investigate a concessional allowance, similar to the current telephone allowance (Australian Government, 2021) (which is currently up to $46.40, a quarter), attached to social security payments, which could be used for any broadband connection and adequately reflects the cost of broadband.
- NBN to continue to work on concessional plans across all technologies.
- Education and consumer awareness surrounding mobile reseller availability (particularly in Indigenous communities).
- Encouragement of state-based programs that give accessible rebates for mobile broadband boosting equipment for small businesses, such as the NSW SafeWork Rebates (NSW Safe Work, 2021) for small businesses. Small business rebates for mobile boosting antennas and celfi's would help towards the increasing costs of purchasing and installing such equipment.
- Make telecommunications redundancy affordable, by ensuring RSP's offer concessional plans and subsidies are created for low income & concessional users.
- Ensure that access to backhaul and spectrum is affordable for last mile providers.

Recommendation 8 – NBN, Mobile Carriers & RSP's to Continue to Engage with Regional Stakeholders

NBN, mobile carriers and regional Retail Service Providers to continue to engage with regional stakeholders and RSP's.

Active and respectful engagement with regional stakeholders, results in positive change and improvements in regional connectivity. In just 7 years BIRRR has been a very effective advocate in the regional connectivity space, to achieve this we have been engaged with not only the Telco industry but also other regional stakeholders. This level of engagement needs to continue, across the board, if the needs and wants of regional consumers are to be understood and recognised and

connectivity literacy and infrastructure is to be improved throughout the regions. Suggestions include

- Mobile carriers to set up or continue regular roundtables / consultation with key regional advocates, acknowledging that Telstra actively contribute on a regular basis to the RRRCC.
- Mobile carriers and RSP's to have consultation pathways with national regional advocacy groups. Whilst we acknowledge the positive impact of the Telstra Regional Advisory Councils (RAC) these are state based and there is limited opportunity for national regional stakeholder organisations to share their grassroots experience and gain knowledge on regional connectivity.
- Other suggestions have been made above regarding how mobile carriers could better support regional consumers.
- WISP's and nbn Sky Muster RSP's should continue to engage with regional stakeholders

To ensure nbn maximise consumer experience in getting connected, staying connected and using the nbn network:

- NBN and RSP's to make getting connected easier by making plans less confusing (in particular nbn satellite business plans, and nbn Sky Muster Plus/Standard Plans) and issues easier to escalate and troubleshoot.
- NBN to investigate increasing the upload speed of the nbn Fixed Wireless (FW) platform, to reflect the need more adequately for symmetrical services and to introduce business plans on the nbn FW network.
- NBN Regional co-investment should be focused on the following areas:
    1. ADSL towns mapped for nbn Sky Muster
    2. Areas located in nbn satellite busy beams
    3. Fringe areas of large regional towns, with dense populations, yet mapped for nbn satellite
    4. Upgrading areas where nbn FTTN and nbn Fixed Wireless is underperforming and not keeping up with demand

- NBN to investigate the use of an additional port on nbn Sky Muster connections to allow for a dedicated connection for small business use, acknowledging that in many instances, connections are used for remote schooling, business, work from home, telehealth and personal use. For example, a small business may use an SM+ connection, whilst the family may utilise a standard plan for telehealth, emails, streaming and social media use.
- NBN to ensure residences in high rainfall areas have appropriate equipment and use adequate technologies, to counteract the effect of rain.
- NBN to work closely with regional stakeholders, equipment vendors and software providers/ designers to ensure the solutions created work on all platforms
- NBN to adapt their 'check your address' & roll out map to enable consumers with addressing issues to be able to move a pin and send a request to nbn to create a new LOCID or fix their address/service class, rather than be sent to a long list of providers who often do not solve the issue or don't sell the technology the consumer is mapped for. Nbn can then email the consumer with their nbn address and a list of providers who offer that specific technology.
- NBN to provide monitoring tools for NTD's to both end users and RSP's on the nbn satellite and nbn FW networks, so that individual connection issues can be monitored, and faults are easier to report. A relevant comparison is the Beta Starlink service where the customer has powerful service diagnosis tools and information at their fingertips or a mobile service where the relative signal level is easily observed. Aussie Broadband also has a terrific app for nbn fixed line consumers, however consumer diagnostic tools and information for nbn satellites is very poor.
- NBN & nbn Sky Muster RSP's to develop tools and resources to improve customer experience such as a monitoring/usage/troubleshooting app, troubleshooting fact sheets, how to choose a plan/provider etc
- NBN to continue to work with regional stakeholders to enhance the nbn Sky Muster network to ensure the needs of regional satellite users are met. For example, reviewing metered sites (in particular YouTube & VPN), reviewing peak / off peak hours, ensuring a mobility product is accessible and affordable, keeping wholesale pricing affordable for regional users and ensuring that RSP's pass on pricing benefits,

- Improved **marketing** with a specific focus on better-targeted regional marketing, that ensures getting connected is accessible for RRR consumers.
- Clearer guidelines and open communication and transparency around nbn Fixed Wireless Non -Standard installs, ensuring these are accessible for regional consumers.

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Appendix 1: Case Study 2: Misinformation from Facebook, September 14 at 7:18pm

CASE STUDY 2: Misinformation from Facebook, September 14 at 7:18pm
There were 19 replies to this post and a further 10 replies to another related post. A transcript demonstrating how misinformation from the media can impact on connectivity from the conversation follows. Ultimately, there were two clear solutions for BIRRR Member (1), namely to follow up with their local council or nbn to make sure they were on the next round of RCP funding or two book an appointment with nbn for a non-standard install. However, BIRRR Member (1) followed the misinformation provided to remain unsatisfied.

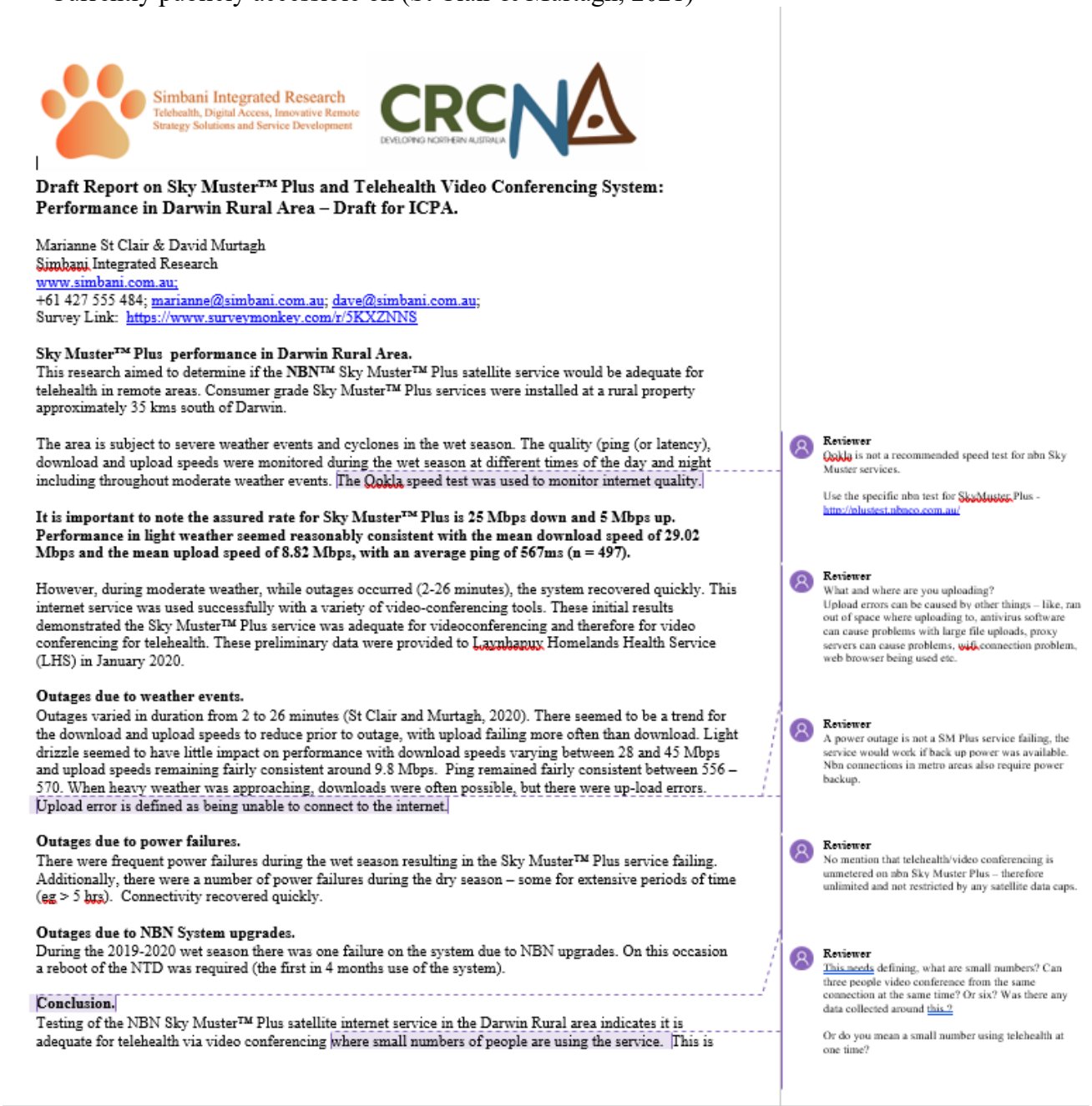
BIRRR Member (2): BIRRR Member (1) no line of site for satellite... way too many trees?? And a hill?
BIRRR Member (1): BIRRR Member (2) surrounded by ridges and State forest and National Heritage Goldfields Park.
BIRRR Member (2): BIRRR Member (1) what solution are you looking at as being acceptable to you in your chosen location? It certainly sounds like you have a landline phone service if you have a adsl service ... which is definitely vital telecommunications in rural areas
BIRRR Member (2): BIRRR Member (1) most people I know that are in isolated or rural areas are happy to invest to improve their chosen location... but yes you are going to be limited for options due to where you have chosen to live.
BIRRR Member (1): BIRRR Member (2) we have rotting, copper landline in soggy pits and ADSL1. We need fast, reliable, affordable, Government provided telecommunications. If we had all been provided with optical fibre to our homes, there would no issues.
BIRRR Member (1): BIRRR Member (2) most people I know, do not have access to $$$ to fund something that should be a funded public utility service.
BIRRR Admin (1): BIRRR Member (1) people on fibre still have issues. There are government programs in place to upgrade technologies, we highly recommend you checking in with your local council to make sure they are aware of these. Optic fibre will never be delivered to every residence in Australia, under any government.
BIRRR Member (2): BIRRR Member (1) but it's not a public utility. Are you saying at your location someone was going to run fibre ... to an area that can't even get a satellite signal I strongly doubt it would suit? Your best option is to contact your adsl provider and get them to run a line test to confirm its with limits... that will certainly help

BIRRR Member (1): BIRRR Admin (1) it was going to be provided to 93% by Julia Gillard's government (the other 7% to fixed wireless and satellite) until the LNP scuttled that for a nightmare of confusion, complications and sub-standard options.
BIRRR Member (1): BIRRR Member (2) it WAS a public utility and should be. It's vital. And yes we WOULD have optic fibre if Gillard's plan had come to fruition. It was to be installed utilising the copper network.
BIRRR Member (2): BIRRR Member (1) I think this discussion is going off track as it's against the group rules to be making political commentary... Like I said check on the line conditions with your service provider to see if you have any fault conditions.
BIRRR Member (2): BIRRR Member (1) I'm not sure your correct in your assumptions... it sounds like your location would have always been allocated the satellite service regardless of politicians That's the biggest issue I face as a telecommunications engineer, most people just believed the politicians they were going to run fibre everywhere... including rural and remote... wasn't going to happen. But bringing it back to a positive these guys here [BIRRR] can help... but in the short term a 4g solution maybe your best route for faster internet traffic. Good luck
BIRRR Member (1): BIRRR Member (2) if you read my post, we are in a mobile black spot.
BIRRR Member (2): BIRRR Member (1) I read it clearly... that's why I'm assisting... if you don't get signal on your phone inside... there really aren't many places in Australia that you can't get suitable signal with the correct mast (height/location) and the correct specification of antenna pointed at the correct cellular tower. Potentially the real issue here is you don't feel you should and/or want to pay for that. I'll let someone else assist.. cheers
BIRRR Member (1): BIRRR Member (2) we cannot afford it. The infrastructure for connection to vital public services, should never be out of reach for any Australian.
BIRRR Member (2): BIRRR Member (1) as a matter of interest now, what is your current internet speed test result?
BIRRR Member (2): BIRRR Member (1) thank you, that's great info. That speed is rather fantastic in a adsl1 setting.(8,192kbps/384kbps speed: this is the fastest speed you can get on an ADSL1 connection) When was the last contact made with your provider? Did they say it was okay?
BIRRR Member (1): BIRRR Member (2) it's irrelevant how good this is for ADSL1, the issue is that this is all we can get.
BIRRR Member (3): BIRRR Member (1) what town please. More than curious.
BIRRR Admin (2): When NBN came out to see whether you could get satellite, did they suggest putting it on a pole near your house? Or is your whole block completely treed in? I think we did a desk check a few years ago, and there were a LOT of trees.
BIRRR Member (1): **BIRRR Admin (2)** yes. There they did - at our expense. Yes, there are on the ridges that surround us.
BIRRR Admin (1): BIRRR Member (1) last time we checked your address nbn said you hadn't placed an order for nbn satellite? Have you tried to order since then? If nbn need to do a pole mount, then they pay for it, so not sure who gave you the info that you need to pay.
BIRRR Member (1): **BIRRR Admin (2)** we've had two technicians out. Both said line of view no satellite was no good didn't mention poles. The Telstra techs who come out here, often, have told us that we need to pay for poles.
BIRRR Admin (1): BIRRR Member (1) Telstra techs are not nbn techs, we've assisted with several pole mounts for nbn satellite, at no cost to the customer. Which RSP did you order through?
BIRRR Member (2): BIRRR Admin (1) that's very interesting information, as I've definitely been advised the opposite from NBN... regarding a 'non standard' installation extra costs are passed to the service provider and generally to the customer. The following is from the nbn documentation "How much will the installation cost? nbn does not currently charge for a standard installation. Wiring and cabling changes, or the installation of additional wall outlets, may incur a fee. Ask your provider what fees and charges will apply to you. Some installations may not be standard – for example, if your nbn™ approved technician needs to take special measures to protect heritage items or your property requires use of specialised mounting equipment. In such cases, nbn may quote your phone and internet provider a charge for the non-standard installation, which may be passed on to you."
BIRRR Admin (1): BIRRR Member (2) a nbn sky muster pole mount is not a non-standard installation.
BIRRR Member (2): BIRRR Admin (1) wow, that's quite interesting. Can you let us know of any references to that, or say the cable limit before it does become non-standard? Am I just being confused with Fixed Wireless

information? Surely the home-owner would pay for trenching works to connect to the home to the base of the pole?
BIRRR Admin (1): BIRRR Member (2) no pole mounts are classed as standard installs by nbn for satellite due to factors such as inability to install on tiles etc. Not sure on allowed cable length, however we have assisted with many of these now and they are definitely installed by nbn techs and paid for by nbn. There's even some photos in this group somewhere. They won't install if you do the work yourself. A pole mount nbn non-standard fixed wireless antenna has an 80 metre limit for trenching. Again the work is done by the nbn tech and paid for by nbn. In both cases the NTD is installed in the home and nbn are responsible for the equipment and installation up to the NTD. BIRRR Member (3) BIRRR Member (4) care to comment?
BIRRR Member (3): **BIRRR Admin (1)** thank you
BIRRR Member (3): **BIRRR Admin (1)** I'll do up some photos of my work for everyone soon. I personally only install satellite, as I can guarantee every client I see will definitely get NBN.

Appendix 2: Example of misinformation/disinformation from funded research

*** Currently publicly accessible on (St Clair & Murtagh, 2021)



Simbani Integrated Research
Telehealth, Digital Access, Innovative Remote Strategy Solutions and Service Development

CRCNA
DEVELOPING NORTHERN AUSTRALIA

Draft Report on Sky Muster™ Plus and Telehealth Video Conferencing System: Performance in Darwin Rural Area – Draft for ICPA.

Marianne St Clair & David Murtagh
Simbani Integrated Research
www.simbani.com.au;
+61 427 555 484; marianne@simbani.com.au; dave@simbani.com.au;
Survey Link: https://www.surveymonkey.com/r/5KXZNNS

Sky Muster™ Plus performance in Darwin Rural Area.
This research aimed to determine if the **NBN™** Sky Muster™ Plus satellite service would be adequate for telehealth in remote areas. Consumer grade Sky Muster™ Plus services were installed at a rural property approximately 35 kms south of Darwin.

The area is subject to severe weather events and cyclones in the wet season. The quality (ping (or latency), download and upload speeds were monitored during the wet season at different times of the day and night including throughout moderate weather events. The Ookla speed test was used to monitor internet quality.

It is important to note the assured rate for Sky Muster™ Plus is 25 Mbps down and 5 Mbps up. Performance in light weather seemed reasonably consistent with the mean download speed of 29.02 Mbps and the mean upload speed of 8.82 Mbps, with an average ping of 567ms (n = 497).

However, during moderate weather, while outages occurred (2-26 minutes), the system recovered quickly. This internet service was used successfully with a variety of video-conferencing tools. These initial results demonstrated the Sky Muster™ Plus service was adequate for videoconferencing and therefore for video conferencing for telehealth. These preliminary data were provided to Laynhapuy Homelands Health Service (LHS) in January 2020.

Outages due to weather events.
Outages varied in duration from 2 to 26 minutes (St Clair and Murtagh, 2020). There seemed to be a trend for the download and upload speeds to reduce prior to outage, with upload failing more often than download. Light drizzle seemed to have little impact on performance with download speeds varying between 28 and 45 Mbps and upload speeds remaining fairly consistent around 9.8 Mbps. Ping remained fairly consistent between 556 – 570. When heavy weather was approaching, downloads were often possible, but there were up-load errors. Upload error is defined as being unable to connect to the internet.

Outages due to power failures.
There were frequent power failures during the wet season resulting in the Sky Muster™ Plus service failing. Additionally, there were a number of power failures during the dry season – some for extensive periods of time (eg > 5 hrs). Connectivity recovered quickly.

Outages due to NBN System upgrades.
During the 2019-2020 wet season there was one failure on the system due to NBN upgrades. On this occasion a reboot of the NTD was required (the first in 4 months use of the system).

Conclusion.
Testing of the NBN Sky Muster™ Plus satellite internet service in the Darwin Rural area indicates it is adequate for telehealth via video conferencing where small numbers of people are using the service. This is

Reviewer
Ookla is not a recommended speed test for nbn Sky Muster services.

Use the specific nbn test for SkyMuster Plus - http://nbnstest.nbnco.com.au/

Reviewer
What and where are you uploading?
Upload errors can be caused by other things – like, ran out of space where uploading to, antivirus software can cause problems with large file uploads, proxy servers can cause problems, wifi connection problem, web browser being used etc.

Reviewer
A power outage is not a SM Plus service failing, the service would work if back up power was available. Nbn connections in metro areas also require power backup.

Reviewer
No mention that telehealth/video conferencing is unmetered on nbn Sky Muster Plus – therefore unlimited and not restricted by any satellite data caps.

Reviewer
This needs defining, what are small numbers? Can three people video conference from the same connection at the same time? Or six? Was there any data collected around this.?

Or do you mean a small number using telehealth at one time?

further supported by the feedback from Laynhapuy Health Services who have been successfully using NBN Sky Muster™ Plus satellite internet for telehealth and community wifi.

Telehealth Video System Update.
A range of equipment and software was tested with a number of devices and software purchased for testing in the Darwin Rural area on the Sky Muster™ Plus service.

Technology requirements for Telehealth
As a general set of principles, the Australian College of Rural and Remote Medicine (ACRRM) have developed a guide to Telehealth in clinical practice with the following recommendations:-

- Where appropriate and available, use technology that is recommended by, or available from your Primary Health Network or health organisation.
- Use technology accessible to, and usable by, the general public and other health organisations.
- Have available adequate network capacity for the technology supplied by your organisation or an internet service provider to operate reliably.
- Have timely access to technical support for detecting, diagnosing and fixing technology problems.
- Take measures to protect the identity of patients when using commercial service providers or social media networks, for instance by only using a dedicated account owned by your practice.
- When using commercial service providers or social media networks to communicate by phone or video with patients, ensure no health information such as chat interactions, documents, images are retained by the commercial service provider or social media network.
- Understand the Office of the Australian Information Commissioner Privacy policies for GPs as they may apply to information and communications technology used for telehealth services.

Reviewer
How is one meant to do this?

Zoom
Zoom as a company has seen huge expansion since the start of the pandemic. The software and underlying infrastructure were able to expand with the demand placed upon it. Since significant scrutiny was placed on the program, security features have been increased. A high level former Yahoo security expert was contracted and the purchase of an existing security firm has led to a more secure environment for videoconferencing.

Zoom's call quality has been reported to be better than similar market products. This is a very difficult value to measure but from personal observation over NBN Sky Muster™ Plus - Zoom is the most reliable performer.

Cross-platform integration in Zoom means it can be installed in all mainstream computing environments including IOS, Android, Mac, Linux and Windows.

Zoom has introduced custom backgrounds to create a more private or decorative environment for videoconferencing. If the user has a nice picture they wish to share with patients or the clinic room is not very attractive, a background can be enabled.

Zoom also has created filters to adjust facial blemishes, etc.

Meeting recording and transcripts (not recommended for clinical interactions as video files can be very large and the requirement to retain medical data will soon present issues with storage) is also available. Large video files may also slow down the operation of the database, depending on the clinical record system in use.

Zoom for Healthcare
Zoom has customised a paid version which is specifically designed for telehealth and is compliant with health international standards (e.g. Health Insurance Portability and Accountability Act (HIPAA)), which is the American healthcare standard for technology and devices). It has high-quality video, even in low-bandwidth

environments, on-screen annotations to allow clinicians to explain health issues and can provide a consultation recording (not recommended for long consults as described above).
https://www.cnet.com/news/zoom-security-issues-zoom-buys-security-company-aims-for-end-to-end-encryption/
https://www.businessinsider.com.au/zoom-video-everywhere-google-hangouts-skype-2020-3?r=US&IR=T

Facetime
Facetime is built into the Apple iPhone, iPad and MAC computers and is only usable between these devices. This system is secure but is also immediately eliminating just over half smartphone users. It could represent an option in the situation where the practice believes it will be an alternate connectivity solution, but this would require a practice mobile number. If using personal phones, patients would possibly have unscheduled access to the owner of the phone.

As Apple shares a dominant position in the smart phone industry, Facetime video calls are now an easy way to transition from a traditional phone call to video. The downsides are the screen is only small and the service is iPhone/iPad/Mac only. There have been a number of Telehealth papers mentioning the use of smart phones to allow remote-end doctors to direct patients to allow closeup views of wounds, skin conditions and other visible problems requiring remote diagnosis. Although these examples have clear benefit, the lack of an Android version of Facetime will always restrict use of this service.

Conclusions/Key Recommendations
From a technical perspective, there are a number of key choices remote health service providers should consider before establishing significant Telehealth infrastructure in software, hardware and Internet Services. The following list outlines key considerations and recommendations in the Australian video conferencing market for Remote Telehealth at the end of 2020. These recommendations will change as new vendors and functionalities are introduced to software, hardware and Internet services.

Beneficial features and functionality of healthcare focused videoconferencing.
Easy scheduling and initiation
Zoom has benefitted greatly from being an easy to use videoconferencing product. Primarily from the fact that the service allows users to setup and start a video conference quickly without too many questions, clicks or technical failures. Zoom also quickly responded to concerns about security maintaining trust as a new organisation to most technology users.

The two Microsoft products: Skype and Teams were both more complex and were not clearly targeted to their market segments (i.e. home and business users). There are a number of Telehealth specific videoconferencing tools that have gained market share by integrating closely into the work practice activities of the clinical environment. Products like Covju (now part of the Health Direct government supported solution) may not be as easy to use as Zoom.

Easy transition from phone to video.
Facetime phone to video conference transition shows an easy way to change a patient consultation from a phone conversation to a video call. This has been demonstrated to be valuable in gaining a differential diagnosis in the Laynhapuy Homelands of East Arnhem Land in the NT (St Clair and Murtagh, 2020). Clinicians have been able to more accurately assess the severity of injuries, skin conditions and other key diagnostic indicators to help inform on-going treatment and/or the decisions to evacuate the patient. This feature/functionality may be enabled through the generation of an SMS with a link to a video conference so the phone call could become the video call. This would require doctors to understand a new skill/capability/competency from the perspective of both the use of the software and changes to the consultation method.

3

Reviewer
What about WhatsApp?
https://www.whatsapp.com/?lang=en

WhatsApp Messenger, or simply WhatsApp, is an American freeware, cross-platform centralized messaging and voice-over-IP service owned by Facebook, Inc. It allows users to send text messages and voice messages, make voice and video calls, and share images, documents, user locations, and other content.

High quality video rendering over low bandwidth connections.
Zoom also won the videoconference battle by providing more reliable and better-quality video images using a variety of internet services. Remote health services tend to rely on inferior internet services. So, the choice of videoconference software in remote settings must place priority on low bandwidth performance.

Multiple camera/video stream input.
Telehealth is not just videoconferencing. It can take the form of remote monitoring. Video conference software can display multiple video inputs. For example, a dental camera can be added to the videoconference so patients, doctors and the output of the remote monitoring device used to assess a particular condition can be viewed at the same time. As an education process as well as a way to ensure the patient understands the problem and the information being provided to them, this functionality allows better communication between the remote clinician and the local patient.

Remote End Camera Control
There are now a number of remote-control video conferencing cameras. For example, Zoom allows users to grant access to remote doctors to control camera direction and zoom into specific features of a wound or skin condition. The Logitech PTZ Pro camera for example can plug into the computer's USB port and be controlled both locally and remotely. This would allow a remote clinic with limited staffing to be guided by a more experienced and qualified clinician. Here is a You Tube video to explain remote camera control: https://www.youtube.com/watch?v=8DujozD1fSs It is worth noting that both users, the user requesting and the user giving control, need to have the far end camera control option turned on in Zoom's advanced settings.

Connectivity
In respect to Internet connectivity, new Internet services are being established and will change the remote connectivity environment in the coming years but the NBN Sky Muster™ Plus service is a viable videoconference platform and therefore all Australian mainland based health services can do Telehealth from the perspective of external connectivity.

The testing done by the project team indicates the Sky Muster™ Plus service is adequate for video-conferencing and telehealth with up to two connections operating concurrently. This is further supported by Laynhapuy Health Service's positive experience with the product and their purchasing of an additional four Sky Muster™ Plus services for their stores and community wifi.

Initial development of a simple, robust and reliable Telehealth Video Conferencing System (TVS).
A range of equipment and software were tested in the first phases of this project. A list of components of the current TVS system which has been tested extensively in the Darwin Rural area is outlined below.

Fundamental TVS principals:

1. Must be very easy to use from the clinician and patient's perspectives.
2. Best case scenario requires alternate internet connectivity for reliable telehealth clinical services.
3. Need enough concurrent bandwidth to access a) Video conferencing session, b) Patient data (ie medical record and My Health Record Data) and c) Other internet resources required by the clinician.
4. It is better to have 2 screens - one for patient data/resources, one for video conferencing.
5. A high quality video camera capable of remote control via remote clinician is required. Camera needs high quality pan tilt and zoom ability so clinician can clearly see specific patient conditions to inform diagnosis.
6. High quality microphone and speaker preferably integrated to eliminate feedback.
7. Video software (Zoom is the current recommended product for small services) but there is a clear use of multiple VC software when interactions with Specialist, other healthcare providers and State and Territory Departments of Health.
8. Network setup should employ multiple routers to isolate any untrusted devices such as security cameras, guest Wi-Fi access, smart medical devices, ECG's, smart door locks, remote blood testing equipment,

4

Reviewer
Also need to include nbn satellite business grade services for remote health centres as these will have greater reliability and be able to have more devices concurrently video conferencing at once.

Reviewer
Why can't island communities also use nbn Sky Muster?

Reviewer
Be clearer here on differences between patient and clinician requirements.

etc. This setup is commonly known as the three router system and deploys a Border Router connected to the internet and two internal network routers, one for secure devices and the other for unsecure and untrusted devices (see figure below).

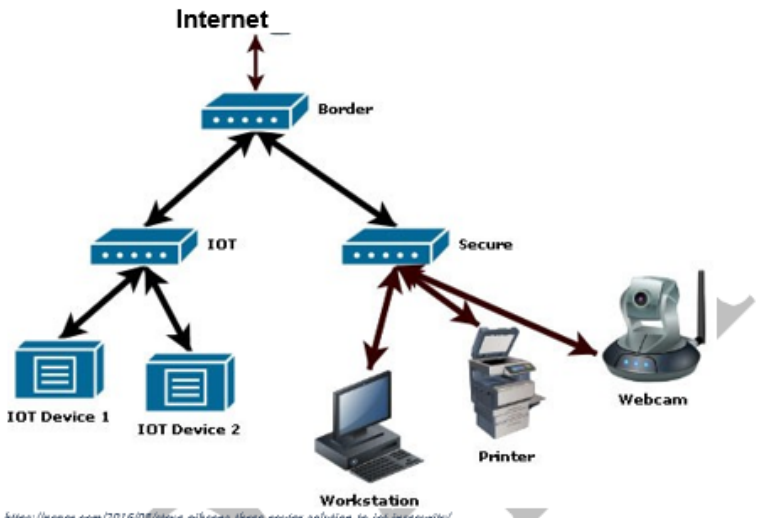


Figure 1 https://peger.com/2016/08/steve-gibsons-three-router-solution-to-iot-insecurity/

Current Telehealth Video Conferencing System (TVS) and indicative costs (please see table below):

Establishment costs: Estimated establishment costs for the current TVS is approximately $4,400 but when costed out as a per annum cost would be in the range of $2,500. A number of devices tend to fail in the harsh conditions of remote communities, so a conservative (prophylactic) approach includes replacing some components more frequently than required in an urban setting.

Annual subscription costs: Annual subscription costs are in the order of $2,530 which includes the costs of the Sky Muster™ Plus Service and Zoom annual subscription.

Access to My Health Record is free for both clinicians and patients. Costs for clinic specific patient data bases have not been included in these costs.

Reviewer
Be clearer here on differences between patient and clinician requirements/ costs.

Reviewer
Not if they are set up correctly and have surge protection etc.

Reviewer
This needs reviewing

Reviewer
Wouldn't this cost be covered by the Dr? Clinic or health centre? Or State department of health?

Current TVS and connectivity systems and costs:

#	Item	Indicative cost ($)		Estimated life	Expected
		pa	Establish-ment	Expectancy ***	cost pa
1	Zoom Video Conferencing Software	130			
2	Computer – either Mac or PC with integrated camera*		1000	2 years	500
3	Camera – Logitech PTZ Pro		1200	2 years	600
4	Jabra 710 integrated conference microphone and speaker		300	2 years	150
5	NBN Sky Muster™ Plus Plus service (including Satellite Dish and NTD)**	2,400			
6	NighthawkWiFi Access Point		100	1 year	100
7	2 x Router Ubiquity Unifi Security Gateway @ approximately $500 each		1000	2 years	500
8	Netgear Prosafe Switch		500	1 year	500
9	Uninterruptible Power Supply (UPS) – eg Power Shield Defender 1600		300	2 years	150
10	Remote access to patient's clinical record (highly recommended) ****	0	0		0
	Totals	**2530**	**4400**		**2500**

NB: Links to devices and software have been included as examples, however, the researchers are not advocating or recommending any particular provider. However, the researchers strongly recommend "shopping around" to get the best deal and shop to support local business if possible. The researchers often negotiate with vendors to get better deals for equipment.

*Devices tested: Mac Book Pro, Mac Book Air, Mac Mini, HP Envy Laptop and HP all in one, ACER Spin Laptop
Range in costs $400 - $4,000, a figure of $1,000 is used as an example with
Minimum specifications: • Storage space: 250 GB • CPU: i5 or above • RAM: 8GB minimum • Graphics: Onboard is OK
**The establishment and maintenance costs are borne by NBN Co and not the consumer
NBN Sky Muster™ Plus Service is approximately $200 per month
*** Estimated life expectancy relates to the anticipated life expectancy in the bush
which can be subject to severe weather events, lightning strikes, etc.
This figure is based on the researchers' personal experiences in regional and remote areas
as well as ICT support staff in a number of roles over the last 20 years.
**** Patient's records may include My Health Record and/or the clinical database
used by that practice. My Health Record is free, other database access costs
vary significantly and have not been included in the costs

A number of Telehealth consultations and demonstrations have been done in Darwin Rural successfully using the current TVS and Sky Muster™ Plus service.

It is important to note, the Sky Muster™ Plus service can fail in storms and power failures but recovers quickly when the storm has passed or the power returns. It is recommended to switch power off to all unprotected equipment as the storm approaches to prevent damage to equipment. It is also recommended all networking equipment is connected to the Uninterrupted Power Supply (UPS). Telehealth consults can continue if power and internet are still available on power protected devices (UPSs).

6

Reviewer
Could these be tax deductible?

Reviewer
This isn't correct, nbn Sky Muster installation including dish and NTD is free. Plans are available from $600 p.a the quoted figure of $2400) would be for the maximum plan costs on the largest plus plan. However video conferencing is unmetered/unlimited so the largest plan would not be necessary.

Reviewer
Is this costs for patients ? Or costs for health centres ?

Reviewer
Incorrect & misleading see comment above

Reviewer
This seem to be very low life expectancies for equipment.

Reviewer
The service isn't failing, the power is failing. If a back-up power source is supplied the service continues to work without issues.

6. For each of your internet services, how would you rate its speed? (eg to download video, do video conferencing, play games) would you rate the ability to do video conferencing?

	Very Poor	Poor	OK	Good	Very Good
Fixed phone (i.e. landline)	○	○	○	○	○
Phone - Voice over IP	○	○	○	○	○
Mobile - smart phone	○	○	○	○	○
Mobile - basic	○	○	○	○	○
Satellite phone	○	○	○	○	○
Radio phone	○	○	○	○	○
UHF Radio	○	○	○	○	○
Data/ Voice Services	○	○	○	○	○
Fixed internet service – ADSL	○	○	○	○	○
Fixed internet service – dial up	○	○	○	○	○
Fixed line internet service - where internet access is received via a physical line or cable connecting to the Internet	○	○	○	○	○
Fixed wireless internet service - where internet access is received via an antenna on your home	○	○	○	○	○
Fixed satellite internet service – where internet access is received via a satellite dish on or nearby your home	○	○	○	○	○
Mobile internet service using mobile phone data	○	○	○	○	○
Mobile internet					

Reviewer
Nbn have a video conferencing guide for telehea that is not mentioned in this draft. The nbn interactive videoconferencing troubleshooting g aims to provide support on common videoconfe issues. There is also a specific guide for healthca providers and/or their patients, to help take advantage of the added benefits a video call cou bring to a consultation.
https://www.nbnco.com.au/content/dam/nbn/ ments/support/nbn-co-telehealth-video-conferencing-guide-2021.pdf?fbclid=IwAR3X5UEFda1WLDU49N_4S_ Ae2-0YQTSp4xE5ZxVvNXqhUfs4-r3e8YQ

Reviewer
This is terrible ! The questions doesn't make sen the technologies listed are not all 'internet servic How do I rate speed or video conferencing of a U radio or landline phone ? The survey is poorly designed and misinformed.

Reviewer
With a nbn Sky Muster Plus plan all video conferencing is unmetered / unlimited, this is al mentioned in this draft. Plan costs start from ap $50 per month (not the $200 mentioned above)

Appendix 3: Connectivity Wizard: We need a recipe

Designer: Jo-Ann Resing

Aim: to commission a design brief that defines the 'scope of work' required to build an interactive digital assistant able to assist agribusiness source foundational connectivity solutions that will support their digital transformation.

A design brief is a document that provides designers with guidance. The document focuses on the results and outcomes of a design by providing insight on important considerations and constraints likely to be experienced. These are prepared in consultation with the client and will both define the deliverables

Define the project

- **Define the business problem:** describe the issues and challenges to current methods and the function
- **Define the target audience:** typical client, geographies, their needs for this service; audience segmentation. Industry members: focus group to ensure design is meeting their needs.
- **Define the project team:** subject matter experts engage how: workshops, meetings, polling and ensure buy-in with levels of review and approvals
- **Define what success looks like** and you we measure it (SMART metrics); What is the message you are trying to convey

Itemise the tasks

- **Outline the strategy**: team, timeline, key milestones
- **Source the data:** product/service audit (current/anticipated) from project experts and external sources: sourcing, qualified in, vetting, sorting, compiling and presentation framework
- **Web content author:** web text on all pages and to describe specific products; is imagery required?
- **Legal**: any legal requirements? Data security, privacy, accessibility, third party API integration, hosting
- **Information architecture**

    - Are there known or existing online processes and services
    - Website scope and features
    - Formatting data, presentation as a ‘product’
    - decision tree, logic, systems setup, website structure
    - Obtaining/maintaining data through APIs, automated bots and data scraping, plugins
    - Content curation: results winnowing and solution presentation
    - Future commercialisation: member only features, billing
    - Maintenance standardisation
    - Build environment: serving environment and DNS setup
- **Identify negative scope:** what is not going to be in the build to eliminate feature creep.
- **Prioritise the build plan:** staged build, iterative upgrades
- **Service level Agreements;** hosting, commercialisation; ongoing operational requirements and costs
- **Operational future**: training, maintenance, costs

Costing: Figure the times and costs per task

Appendix 4: Connectivity Wizard Budgetary Proposal

Table of Contents

Queensland Government

Department of Agriculture and Fisheries

gwi
Inspiring discovery. Empowering action.

Our Understanding

Rural Connectivity Analysis and Roadmap Generator

Background: The Department of Agriculture and Fisheries has identified that agribusinesses in remote locations need support to understand and create tailored connectivity solutions for their businesses. It has been observed that in some instances, owners of these agribusinesses are unsure what questions to ask, where to source information, what options are available and how to develop and choose a tailored connectivity solution based on their unique needs and requirements.

One way to solve this problem is to develop a Rural Connectivity Analysis and Roadmap Generator or "Connectivity Wizard". The Connectivity Wizard would help agribusiness achieve business-grade internet, voice and data connectivity by providing them with an online tool that analyses their current and future connectivity needs and, then suggests suitable connectivity solutions and an achievable adoption roadmap.

The Project phases are expected to be as follows:

- Scoping Study
- Solution Design
- Build Minimum Viable Product
- Trial, test and improve MVP
- Produce and release

This Budgetary Proposal is for the first two phases of the Project; Scoping study and Solution Design

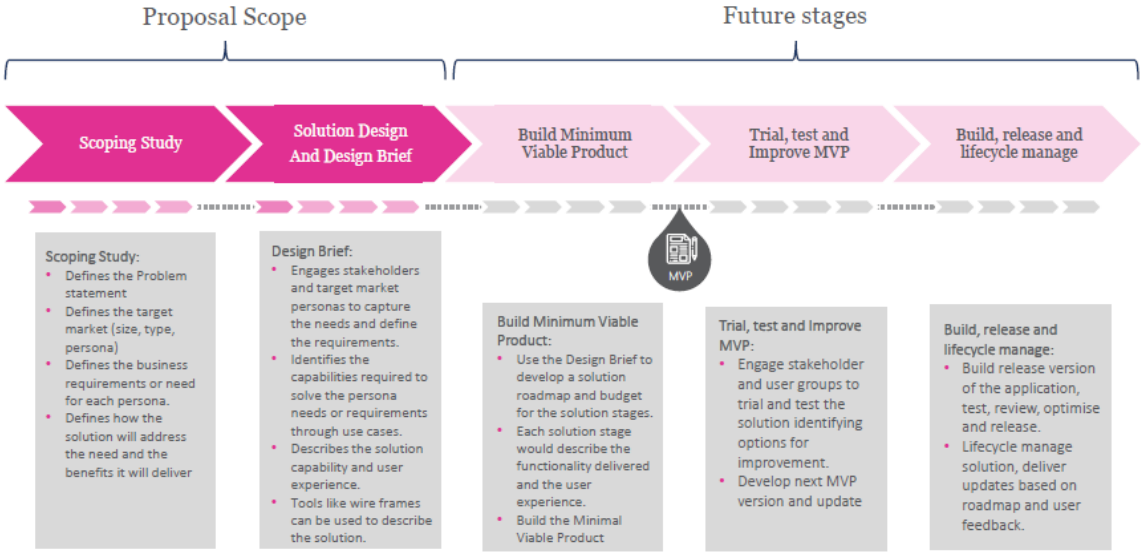
3

Our approach

Developing a Design Brief

4

Project phases



5

GWI's proposed approach

Proposal Scope — Future stages

	Scoping Study	Solution Design and Design Brief	Build Minimum Viable Product	Trial, test and Improve MVP	Build, release and lifecycle manage
Focus	Identify the key drivers, problem statement, target market, requirements, how the solution will address the requirements and benefits	Target market persona user engagement to develop solution requirements, functionality and solution design.	Develop roadmap and build Minimal Viable Product	Improve MVP	Build release version
Activities	• Workshops (1-3) with key stakeholders to define the scope, drivers, problem statement, target market (and key personas), requirements and initial scope of the solution. • Workshops (1-3) with target market personas to confirm problem statement, requirements, options and benefits of solving the problem statement and addressing the requirements. • Conduct market scan to identify solution options. • Develop draft of Scoping Study document, seek feedback and finalise	• User design workshops (up to 3) to determine user requirements and workflows • Develop initial persona use cases and solution over view. • Design UX workflows and concepts, including wireframes • Test UX workflows and wire frames with user persona stakeholders. • Identify solution data and interface requirements. • Develop initial solution architecture. • Develop draft Solution design and Design Brief, gain feedback and finalise.	Build Minimum Viable Product: • Use the Design Brief to develop a solution roadmap and budget for the solution stages. • Each solution stage would describe the functionality delivered and the user experience. • Build the Minimal Viable Product using agile sprint methodology	Trial, test and Improve MVP: • Engage stakeholder and user groups to trial and test the solution identifying options for improvement. • Develop next MVP	Build, release and lifecycle manage: • Build release version of the application, test, review, optimise and release. • Lifecycle manage solution, deliver updates based on roadmap and user feedback.
Artefacts	• Scoping Study	• Solution design and Design Brief (which will include use case, UX workflows, wire frames and solution design)	• Solution roadmap • Minimal Viable Product Design • Sprint documentation • MVP as built documentation	• Test Plan • User feedback and improvement documentation • Updated version of the MVP	• Release version of the solution • Solution documentation • Solution roadmap and lifecycle management plan • Support plan and documentation
Driver (Why do it?)	Understand scope of the problem statement, size of the target market and options to solve the problem	The solution Design and Design Brief documents the proposed solution and can be used to develop and build the solution.	Develop a minimal viable solution to determine if it will deliver the intended benefits	Improve the solution before release	Release version of the solution

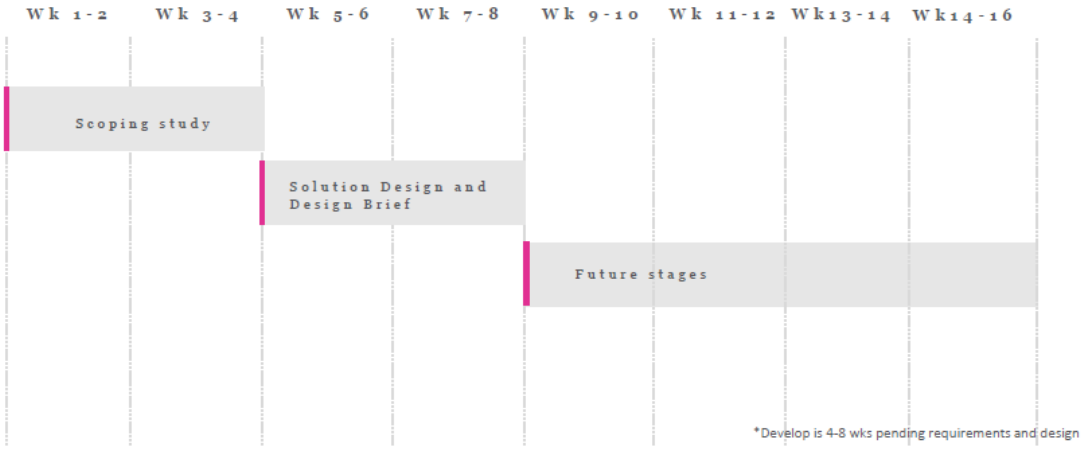
*activities are subject to change pending design approval

Our Budgetary Proposal

7

Delivery Schedule

How it will be delivered



*Develop is 4-8 wks pending requirements and design

8

The Proposal

Delivery Schedule

A team of specialists from GWI will work with Project stakeholders to produce the following deliverables over an expected 8-week period.

Project Phase	Activities for each Project Phase	Deliverables	Engagement model	Investment* (including GST)
Scoping Study	• Workshops (1-2) with key stakeholders to define the scope, drivers, problem statement, target market (and key personas), requirements and initial scope of the solution. • Workshops (1-3) with target market personas to confirm problem statement, requirements, options and benefits of solving the problem statement and addressing the requirements. • Conduct market scan to identify solution options. • Develop draft of Scoping Study document, seek feedback and finalise	• Scoping Study	• Senior Consultant 100% • Manager 100% • Associate Director 40% • Director 15% • Partner 5%	$65,000
Solution Design and Design Brief	• User design workshops (up to 3) to determine user requirements and workflows • Develop initial persona use cases and solution over view. • Design UX workflows and concepts, including wireframes • Test UX workflows and wire frames with user persona stakeholders. • Identify solution data and interface requirements. • Develop initial solution architecture. • Develop draft Solution design and Design Brief, gain feedback and finalise.	• Solution design and Design Brief (which will include use case, UX workflows, wire frames and solution design)	• Senior Consultant 100% • Manager 100% • Associate Director 40% • Director • Partner 5%	$85,000
			Budget total	$150,000

*Budgetary estimates to be confirmed based on the final scope of work

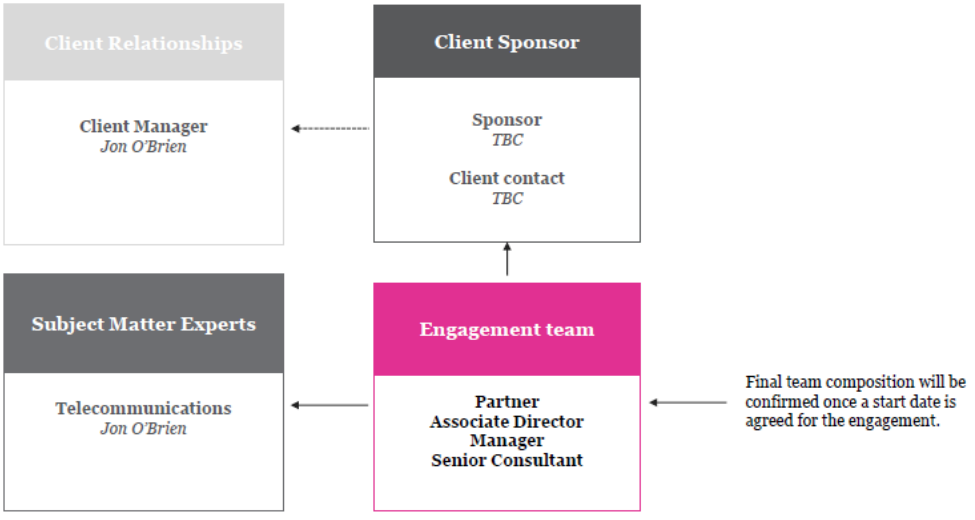
Assumptions

GWI's response has been predicated on several assumptions that, if proved wrong, may have an impact on the delivery time and/or quoted price.

Category	Assumptions
Client Support	• The Project lead will provide operational support including the arrangement of stakeholder introductions and interviews as needed.
Documentation	• The Project lead will provide documentation and briefings to GWI within the first two weeks of the engagement commencing. • The Project lead will provide all relevant documentation within five business days of commencement, including access to any existing material related to the project. • Any relevant pre-existing work (e.g. stakeholder engagement) completed by the Project team will be shared with GWI to prevent duplication and ensure identification of a timely solution.
Stakeholders	• Key stakeholders will be available for consultation during the contracted period and at the times identified. Any significant impacts to the availability of stakeholders will impact delivery timeframes and cost. • The Project lead will arrange for stakeholder introductions and assist with scheduling of stakeholder interviews within the first week of the engagement start • Planned stakeholder engagements are limited to 5 – 8
Onsite/offsite	• Where required GWI consultants can be embedded on-site as needed with appropriate internal system access provisioned. • We anticipate workshops to be run remotely using technology such as Microsoft Teams. If travel is required, this will be an additional expense above the Budgetary Proposal.
Feedback response times	• GWI assumes a 24-hours response time for Project team feedback on draft deliverables.
Technology	• Technology cost have not been included in these estimates, however, GWI will aim to leverage existing technology licenses were appropriate.

10

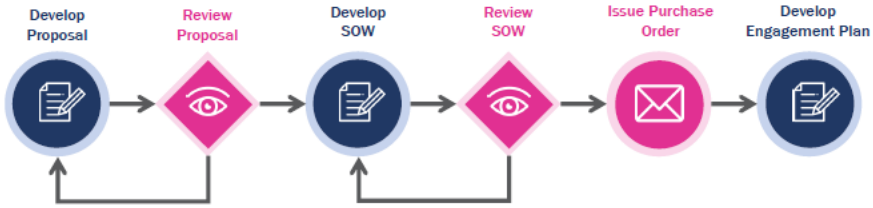
Proposed Team Structure



11

Next Steps

Over two stages, GWI will deliver data ethics framework over a 6 to 8 week period. This will incorporate the following commercial activities:



GWI follows a simple process to work with clients through scoping, estimating and costing engagements.
This process moves from Proposal to Statement of Work (SOW) through a Purchase Order to the Engagement Plan.
As we progress through this process, each of these documents provides further detail discovered through reviews with the client. This document is the Proposal that is now being provided for review. We will then be in contact to receive any further information to develop the SOW.

Proposal
The Proposal provides a high-level view of the challenge faced by the client, the approach GWI would take to reach the desired outcome and the initial estimated schedule and level of investment.

Statement of Work
The Statement of Work goes down to the next level of detail relating to the scope, schedule, resourcing, success criteria, price and payment schedule. GWI's terms and conditions form part of the SOW.

Engagement Plan
Once commercial terms are agreed based on the SOW, an Engagement Plan is developed to confirm scope, schedule, governance, stakeholders, deliverables, risks and the communication plan.

12

Our Team

It's our people that make us unique.

Our track record

gwi

Giving our clients the confidence they need

We've equipped clients across a range of sectors with the bandwidth to deliver.

- Government – Local, State and Federal
- Public safety and justice
- Finance, superannuation and insurance
- Not-for-profit
- Tourism, transport and logistics
- Utilities and energy
- Healthcare and social services
- Higher education
- Gaming and entertainment

30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Appendix 5: Wizard Examples

Connectivity Wizard

an interactive tech audit and deployment map

Improve business connectivity

- Internet --- Voice --- Data/IoT

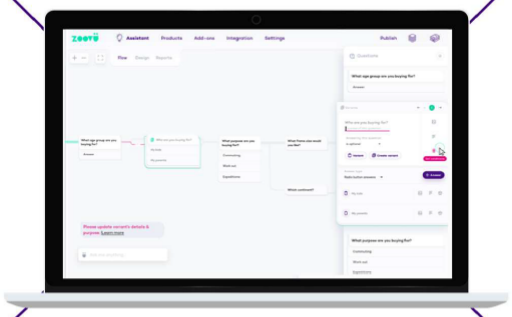
Digital assistant

- **Interactive** --- easy, browser-based tool
- **Audit** --- connectivity needs analysis (business operations, staff and assets)
- **Advice** --- Decision support guidance to source products
- **Now ---** suggests products to improve functionality
- **Future** --- outputs a deployment roadmap
- **Self-perpetuating** --- in sourcing data

Zoovu

AI powered digital assistants

https://zoovu.com/



Dynamic Conversations

Supports dynamic engagement and conversations with AI-driven optimizations

Omnichannel

Seamless integration and compatibility with your tech stack: PIM, CRM, CMS, MDM

Intelligent taxonomy

Transforms technical product specifications into needs-based language for a user-friendly experience

Data & Analysis

Uncover and leverage insights into buying behavior, preferences, and buying motivators of your personas

Online • Mobile • In-Store • Kiosks

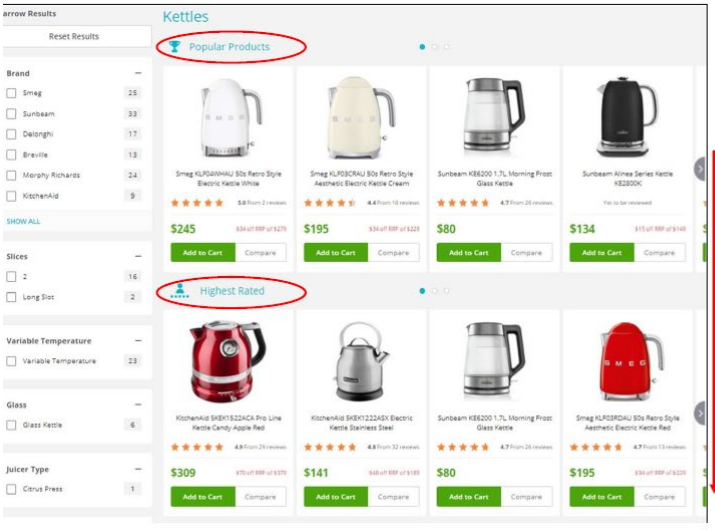
Chatbots • Voice Assistants

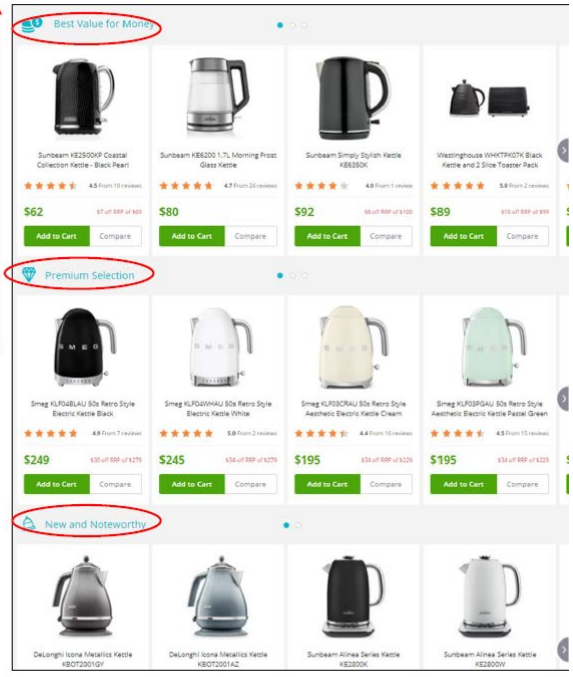
AgriHive

drop and drag wealth projector tool
www.agrihive.com

Appliances online

Excellent layout to source and select
www.appliancesonline.com.au





WHO
Getting the Right People Involved

Team	People	Roles
Proponent	FNQ Growers (Mareeba) • Leanne Kruss, Agriculture Workforce Manager • Membership	Project oversight Project lead Product testers/focus group
Critical friends	• JCU – Rachel Hay (Townsville) • Sarah Nolet and/or Matthew Pryor (Sydney)	Governance Board
Subject matter experts	• BIRRR – Kristy Sparrow and team • DAF – JoAnn Resing • JCU – Carrie Wilson (Scenic Rim)	Technical Advisory board
	Others • JCU – Will Harrington (Richmond) • *QUT – Amber Marshall (Brisbane) – yet to reach out* • *NGulf NRM – Reg Huston (Georgetown)*	Data Collation Workshop
Solution design experts	• Agrihive – James Walker(Longreach) platform developer • Zoovu – platform and contract developers • GWI - Jon O-Brien (Brisbane) data science • BlackBook - James Payne (Brisbane) – data automation/AI	Production team

Appendix 6: Connectivity Literacy: You don't know what you don't know – and there's no map or guide. (Bloomfield, 2021)