IN THE MATTER   of the Resource Management Act 1991

AND

IN THE MATTER   of the Proposed Natural Resource Plan

STATEMENT OF EVIDENCE OF GRAEME IAN MCCARRISON

FOR SPARK TRADING NEW ZEALAND LTD

IN RELATION TO THE

PROPOSED NATURAL RESOURCE PLAN

HEARING STREAM 1

May 2017

1.   QUALIFICATIONS AND EXPERIENCE

1.1   My full name is Graeme Ian McCarrison.

1.2   I am the Engagement & Planning Manager at Spark New Zealand Trading Limited (**Spark**) a position I have held since February 2015. Previously, I held the equivalent role at Chorus NZ Limited (**Chorus**) (November 2011 to January 2015), where I advised both Chorus and Spark on resource management and government matters. As part of my role I am involved in the review of all regional and district plan plus any related local government documents that have the potential to enable or impact on the telecommunications industry. I lead, provide guidance and co-ordinate the Auckland Utility Operators Group (Spark, Chorus, Vodafone, Counties Power and Vector) involvement on Auckland infrastructure matters which over the last four years has focused on the Proposed Auckland Unitary Plan (operative in part since 15 November 2016). I am currently involved in the Christchurch Replacement, Queenstown, Dunedin, Buller, Thames Coromandel proposed plan processes and in early stage engagement and review of approximately 12 draft/developing district plans in development or at the draft stage including Waitaki, McKenzie, Selwyn, New Plymouth, Timaru, Porirua, Far North and Waikato.

1.3   I hold the qualification of Bachelor of Regional Planning (Honours) from Massey University. I am a full member of the New Zealand Planning Institute and have 32 years' experience in New Zealand and overseas. Currently I am on the Technical Advisory Group for the National Environmental Standard Telecommunication Facilities amendments (NESTF amendments). Up until April 2015 I was the chairperson of the Auckland branch of the New Zealand Planning Institute and continue as member of the branch committee. In 2016 I was honoured with a Distinguished Service Award and a best practice award for iwi engagement by NZPI.

1.4   I confirm that I have read the Hearing Commissioners minute and direction on Procedures for the Hearing of Submissions and the Expert Witness Code of Conduct set out in the Environment Court's Practice Note 2014. I provide in-house technical and planning advice to Spark on the provisions of the Proposed Plan that impact on the operational requirements of the business. I am not giving evidence as independent expert. Tom Anderson is providing expert resource management evidence on behalf of Spark and Chorus. My evidence should be read in conjunction with the evidence of Mary Barton of Chorus.

2.   SCOPE OF EVIDENCE

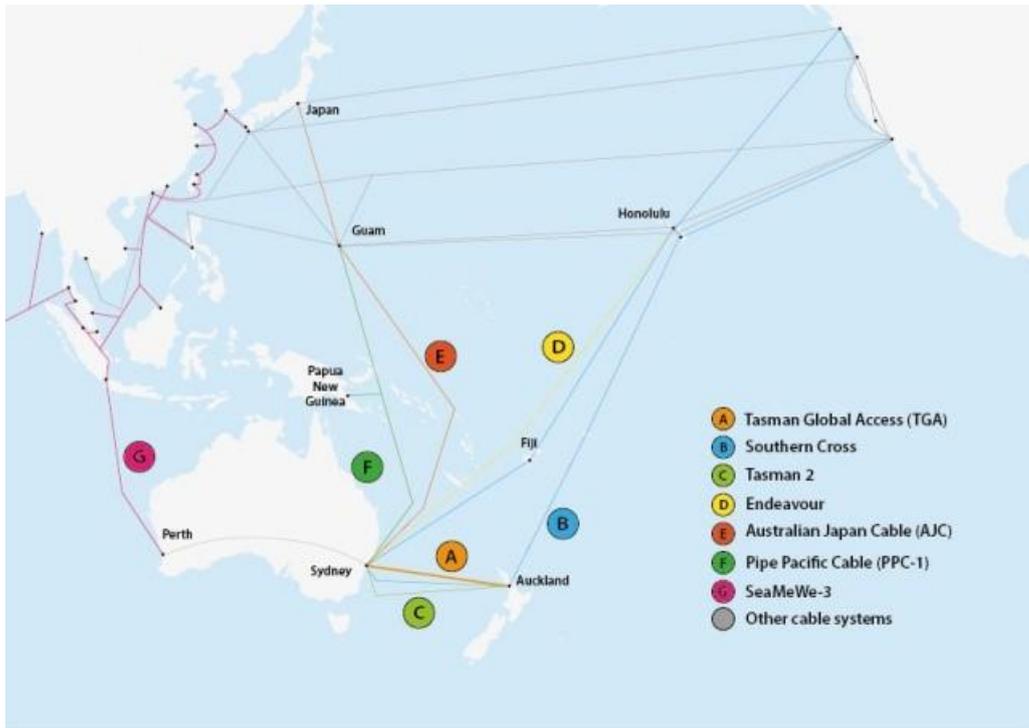The scope of this evidence is structured into general subject areas as follows:

a. Spark operations and how the growth from demand for services is driving expansion of the fixed line and mobile networks;

b. Explanation on how the mobile network operates;

c. Government initiatives;

d. Essential integrated network;

e. Regionally significant infrastructure General;

f. Lifeline activities and natural Hazards;

g. New National Environment Standards Telecommunications Facilities (NESTF 2016)

3. SPARK NEW ZEALAND TRADING LIMITED

3.1 Spark is New Zealand's largest digital services company delivering mobile, fixed and IT products and services to millions of New Zealand consumers and businesses. Our ambition is to be a winning business, inspired by customers to unleash the potential in all New Zealanders.

3.2 Spark is a multi-brand business, with principal brands Spark (supporting home, consumer mobile and small business customers) and Spark Digital (supporting government and business customers with strong Cloud services, mobility and Information and Communication Technologies (ICT) capabilities. An example is the new ICT network for the Christchurch Justice and Emergency Services Precinct designed to be fully flexible and future-proofed, with the underlying infrastructure providing a necessary base upon which services can be easily and seamlessly layered and switched out, allowing the precinct to continue innovating as technology develops into the future).

3.3 Specialist and flanking brands include Skinny (consumer mobile), Revera and Appserv (data hosting services), Lightbox (internet TV), Qrious (data analytics), and Bigpipe (consumer broadband). An in-house incubator, Spark Ventures, is developing other new business opportunities.

3.4 Fully privatised since 1990, Spark is listed on the NZX and ASX stock exchanges. Spark New Zealand contributes significantly to the community via the Spark Foundation, whose activities include ownership of Givealittle, New Zealand's first 'zero-fees' online crowdfunding platform through which generous New Zealanders donate millions of dollars annually to thousands of charities and deserving causes; and as a key partner of the Manaiakalani Education Trust,

which is transforming digital learning at schools within economically-challenged communities across New Zealand.

3.5   The New Zealand mobile market is growing at approximately 6 percent per annum, which is primarily driven by growth in mobile data and handset sales. The increase in mobile data usage has been driven by the increased uptake of smartphones. To support the "smartphone revolution" we are recently upgrading the existing mobile sites with the deployment 4G technology throughout New Zealand. More than 60 percent of mobile customers now use a smart phone, with the ability to receive and upload data. In 2015, 18 percent of data was generated by mobile devices. By 2020 this is projected to be 27 percent.

3.6   There has also been significant growth in the transfer of data between devices (Machine to Machine (M2M) communication) and this demand is expected to increase rapidly over the next few years. Aligned to this growth in the "macro" network, developing technological breakthroughs have enabled the deployment of micro cells, small cells and cel-fl units to provide improved in-building and black spot coverage.

3.7   Spark is expanding the access to broadband services through Skinny Broadband, a prepaid service, and Wireless Broadband, which since its launch in the middle of 2015 attracted more than 11,000 customers. All these wireless broadband services deliver a fast and reliable internet connection using 4G mobile technology instead of a connection using the traditional copper line ADSL network.

3.8   Spark has joined forces with Vodafone and Telstra to lay the 2,300km Tasman Global Access (TGA) submarine cable between New Zealand and Australia to service the growth in trans-Tasman data traffic.   New Zealand's international capacity requirements are growing 60 percent year-on-year (and projected to grow a whopping 11,000% in 10 years). The TGA Cable will support the future needs of consumers and the growth aspirations of New Zealand businesses. Other benefits of the new cable include strengthened links into fast-growing Asian markets, important redundancy and resiliency, and better connection with the five main international cable systems currently serving Australia.

Legend:
- A — Tasman Global Access (TGA)
- B — Southern Cross
- C — Tasman 2
- D — Endeavour
- E — Australian Japan Cable (AJC)
- F — Pipe Pacific Cable (PPC-1)
- G — SeaMeWe-3
- Other cable systems

3.9   Spark owns or depends on the following cables outside and within the Wellington region.
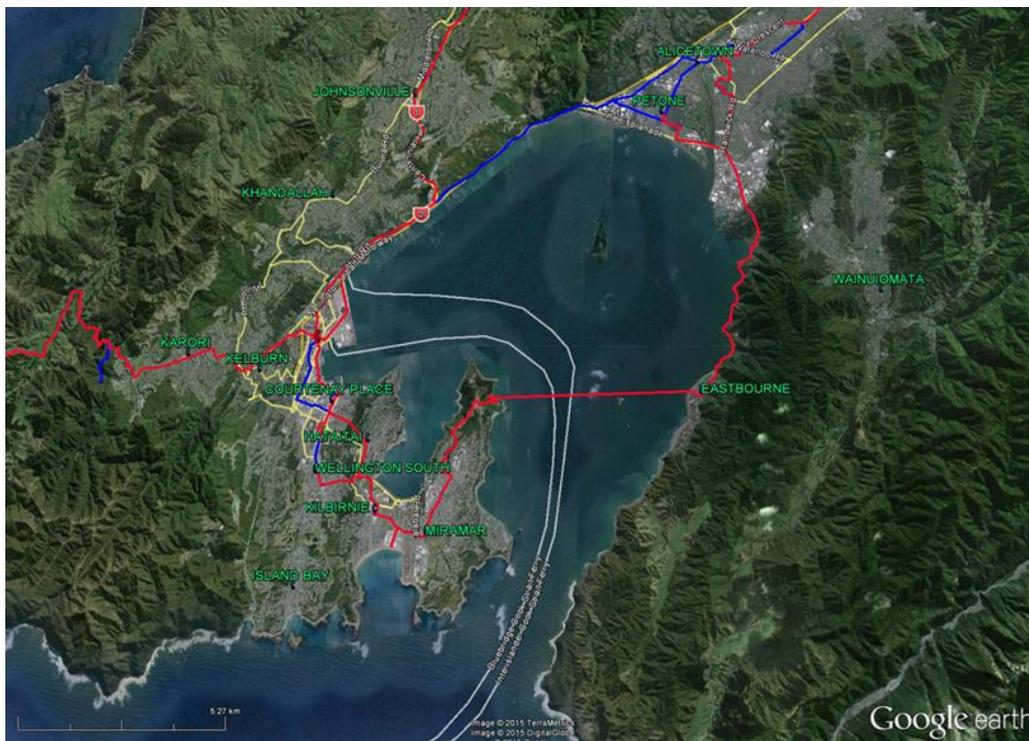

3.10   Spark shares a cable (shown above in red) with Chorus part of which is under Wellington Harbour from Miramar to Eastbourne. Spark also has leases fibres off Transpower national grid cable from Oteranga Bay to the South Island shown in blue. The cable is laid in a cable protection area, refer to the Ministry of Transport.
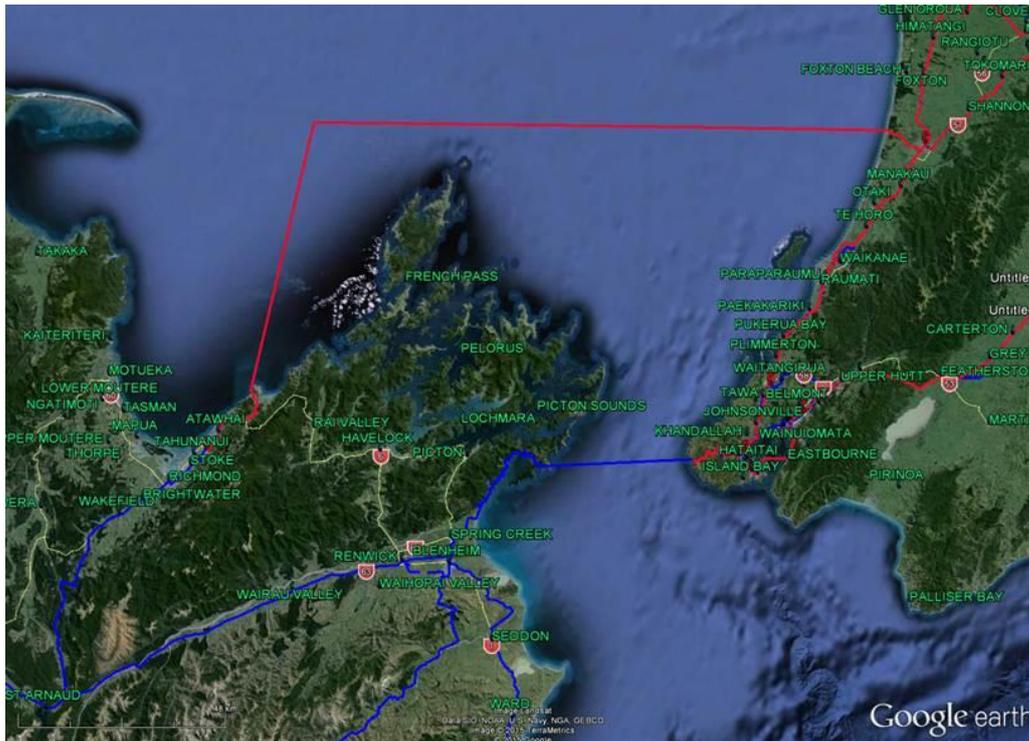
Outside of the Wellington Region is the Spark owned critical submarine Leven cable that the runs from Nelson to Foxton area, shown above in red. The cable is essential for the provision of diversity of routes and resilience within the network.

3.11   The Vodafone offshore Aqualink shown in following systemic diagram proved to be critical to the shared solution by Spark, Chorus and Vodafone to quickie restore telecommunication to Kaikoura when the fibre line broken during the 2016 earthquake. Spark and Vodafone have worked together to share capacity on their respective cables running down the east and west sides of the South Island. Spark's core fibre runs down the west side of the South Island, from Levin to Christchurch, while Vodafone's Aqualink cable runs down the east side of the South Island from Lyall Bay to Christchurch. Protecting the integrity of both the eastern and western cables remains of paramount importance.
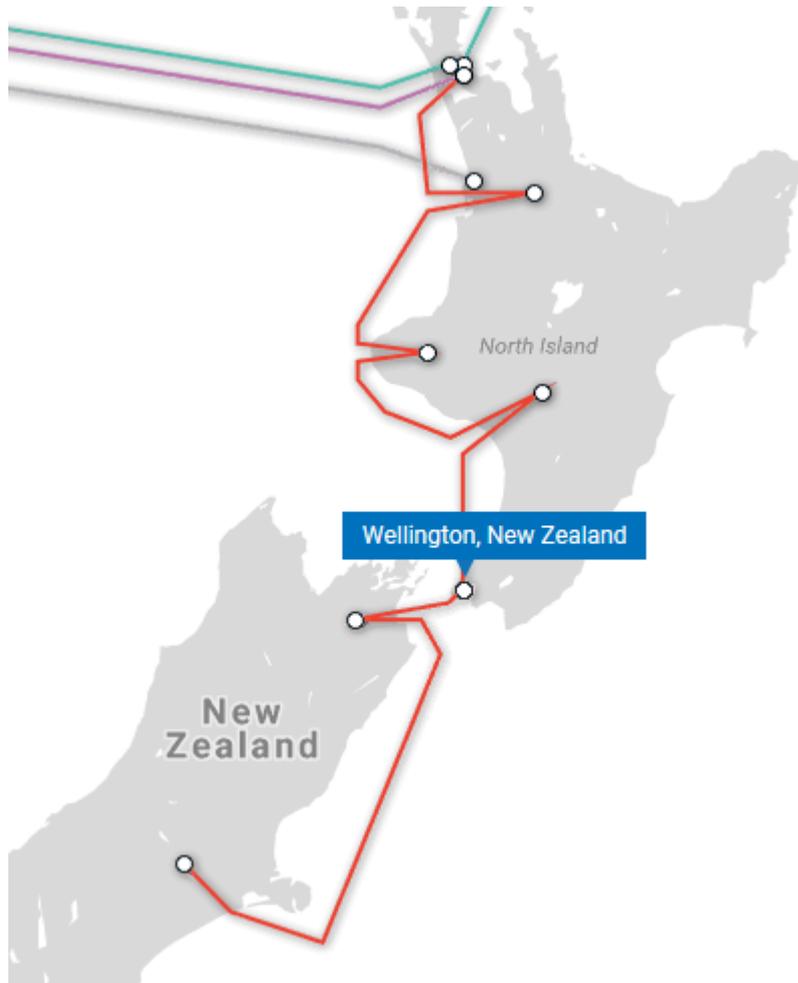
4. HOW A MOBILE NETWORK WORKS

4.1 Mobile telecommunications infrastructure is designed around the cellular concept; hence, they are often known as cellular networks. Cellular networks divide the target service area into cells and each cell is served by a central cell site. A cell site typically consists of antenna, an antenna support structure such as a mast or rooftop and a base station which contains electronic equipment. The cell site communicates with individual mobile users within its service area using dedicated radio channels, which are limited by the spectrum licence holding of the operator. These dedicated radio channels are reused in other cells for better network efficiency. One of the major advantages of the cellular technology is that extra capacity can be added by increasing the number of cells, (each with a smaller service area) in areas of high traffic demand. Modern mobile networks often comprise of a macro coverage layer providing wide-area coverage that is complemented with a micro capacity layer in high traffic areas providing extra targeted capacity.

4.2 The operation of the cell phone network is generally represented in diagram.
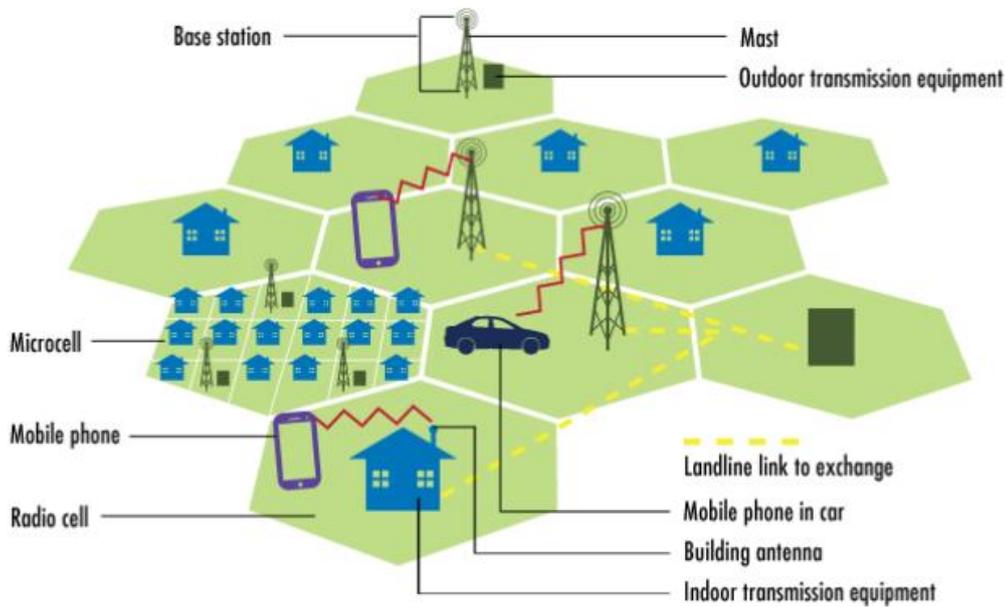
5. GOVERNMENT INITIATIVES

5.1 In June 2015, the Government announced it is investing up to $210 million to lift the Ultra-Fast Broadband (UFB) program coverage to at least 80 per cent of New Zealanders. The new funding also includes $100 million for major improvement in rural broadband and $50 million to improved mobile coverage in black spot areas along main highways and in popular tourist destinations.

5.2 In October 2015, the government announced that Crown Fibre Holdings, the government entity tasked with overseeing the taxpayer-sponsored fibre network build, will have its mandate extended to cover rural connectivity. The extension to the rural broadband initiative and the mobile black spot fund (MBSF) requires another $150 million through the Telecommunications Development Levy.

5.3 The importance of the previous RBI1 (completed) and UFB1 (completion in 2019) and new UFB2 and RBI2 programme rollouts is highlighted on the Ministry of Business, Innovation and Employment (MBIE) website. Hon Amy Adams Minister for Communications on the 27 October 2016 stated;

> "*We've set an ambitious goal of ensuring that by 2025, 99 per cent of New Zealanders will have access to broadband peak speeds of at least 50Mbps, and everyone will have at least 10Mbps. We're interested in seeing how proposals for delivering coverage under the RBI2 and MBSF programmes show an upgrade path in line with this vision*"

5.4   Spark, Vodafone and Two Degrees have jointly bid for the RBI2 and MBSF contract. The ability to deliver these services in a timely and cost effective manner is significantly influenced by the policy and rules frameworks in district plans.

5.5   RBI2 target coverage areas are those where rural end users have access to terrestrial broadband services (fixed line or wireless) of less than 20 Mbps maximum speed in any region in New Zealand (including the Chatham Islands). The MBSF is intended to cover locations where mobile service is absent, comprising segments of state highway and tourism destinations. The tenders for RBI2 and MBSF are closed on 3 April with the first contracts expected to be awarded by August 2017.

6.   ESSENTIAL INTEGRATED NETWORK

6.1   The telecommunications industry is in a unique position of comprising a group of businesses that operate private networks on a national scale. The applications and services that these networks enable are essential for businesses, tourism and residential users who expect high speed, reliable services wherever they are and whatever they are doing. Most businesses within the region and New Zealand rely on telecommunications services (whether that be fixed or mobile, voice, data or digital) for at least some part of their operation. It is vital that the regional and district plans recognise the importance of telecommunications to the wider economy.

> MBIE noted in a recent consultation document[1] that:
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> "*Digital communications technologies are impacting almost every aspect of our lives. We rely on them for business, government, education, health and in our communities. The communications sector is a critical enabler of economic growth in the twenty-first century.*"

6.2   Meeting consumer and business demands for new and improved digital services means constant investment and innovation and strong government support through nationwide policies. In 2013, total telecommunications investment reached $1.7 billion. This level of investment, compared to revenue, put New Zealand near the top of the OECD in 2013. There has been a rapid deployment of competing 4G mobile networks with the deployment of 5G networks on the horizon. Further deployment into regional areas to provide broadband to rural communities via the Government's Rural Broadband Initiative (RBI) continues and New Zealand has seen the fastest uptake of fibre in the developed world[2].

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[1] Ministry of Business, Innovation & Employment Review of the Telecommunications Act 2001, Regulating Communications For The Future, September 2015

[2] TCF 'Telecommunications – Enabling New Zealand's Future' prospectus 2016

6.3   Telecommunications infrastructure is significant, essential, safe, reliable, efficient and vital for the national, regional and local economy. Consequently, the provision and recognition of telecommunications is in the public interest both in terms of allowing people and communities to provide for their "wellbeing", and for assisting to ensure their "health and safety".

6.4   The network is utilised for a wide range of purposes that are essential to modern mobile society. Access for residents and business to quality, reliable telecommunications is a fundamental pre-requisite for the region to be a competitive, attractive and safe place to live and work. The pivotal role of modern telecommunications as a catalyst for social and economic development is now widely recognised around the world. This includes personal and commercial communications, wireless data transfer, linking financial institutions to convey critical financial transaction data, fire and burglary monitoring and control facilities, and other emergency services communications.

6.5   Critical services include access "111" service for emergency calls; receive early warning notices from Civil Defence e.g. Tsunami text or emails or other forms of electronic messaging in addition to local siren warning systems and post event information updates.


6.6   Bell Labs predict and massive growth in data consumption around the world triggered by high definition content and the Internet of Things communication.
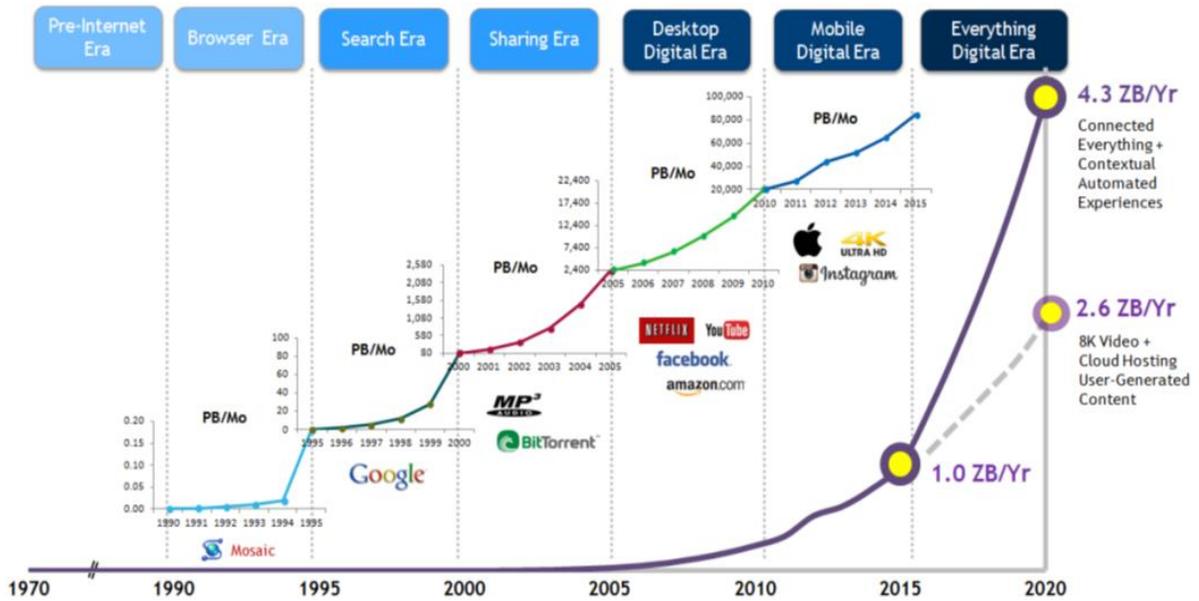
6.7   Spark continues to develop and improve the 4G network with the latest evolution being the launch of the first 4.5G sites in Christchurch and Silverdale (Auckland). This advancement is to support high quality services such as video over Mobile Broadband as we move toward 5G within the next 5 years.

6.8   5G the next evolution in mobile network technology and new network. The following summarises what 5G is expected to support and enable.
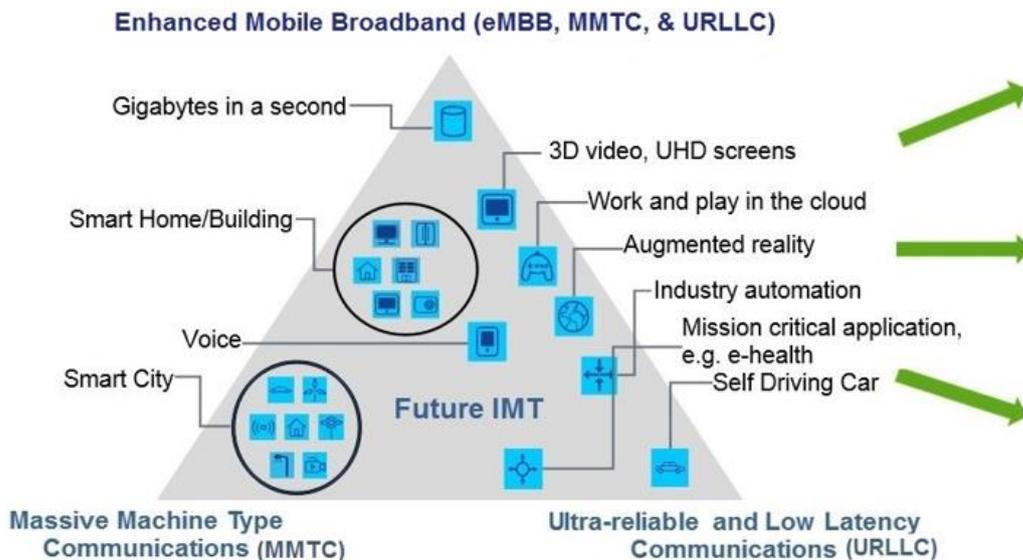
6.9   It will be essential that further investment in telecommunications infrastructure can be made efficiently and with as much certainty as possible. The updated National Environmental Standard for Telecommunication Facilities (NESTF) 2016 permits a significant range of telecommunication activities under District Plans but not regional documents. The NESTF must be recognised as providing part of the solution in the Wellington region.

7. REGIONALLY SIGNIFICANT INFRASTRUCTURE

7.1 Spark and Chorus have requested that the Great Wellington Regional Council correct the error in the definition of regionally significant infrastructure. The requested changes are:

- ~~strategic facilities to the~~ telecommunication**s** ~~network~~, as defined in section 5 of the Telecommunications Act 2001

- ~~strategic facilities to the~~ radio communications ~~network~~, as defined in section 2(1) of the Radio Communications Act 1989.

7.2 The definition is explored in detail in Tom Anderson's evidence. The error stems from the RPS. GWRC has agreed to undertake a RPS plan change at an appropriate time (expected to be mid-2018) to correct the definition of Regionally Significant Infrastructure. This agreement was not referred to in the S42a report. It would seem practical to take the opportunity to amend the definition within the Natural Resource Plan now.

8. LIFELINE UTILITIES AND NATURAL HAZARDS

8.1 The telecommunication networks are located across New Zealand. New Zealand is exposed to a wide range of natural hazards including earthworks, flooding, climate change and unstable soil conditions. Consequently, telecommunications networks are located in areas of natural hazards.

8.2 The provision of resilient telecommunication networks during emergencies is critical, as has been highlighted in the case of the Canterbury and Kaikoura earthquakes. The whole telecommunications network is recognised as essential Infrastructure and a critical lifeline utility under the Civil Defence Emergency Management Act 2002 (CDEM Act 2002). As a lifeline utility, the companies are required to plan for and manage the range of emergency impacts on the networks. Under section 59 CDEM Act 2002 a lifeline utility is required to take "all necessary steps to undertake civil defence emergency management" and be able, under section 60, to function to the fullest possible extent, even though this may be at a reduced level, during and after an emergency. Resilience comes from a variety of sources:

- multiple networks (different providers offering alternative networks);

- multiple technologies (fibre fixed networks available alongside mobile networks);

- telecommunication facilities such as cabinets and masts are exempt from the Building Act. However, the facilities are designed and certified by certified professional engineers; and

- providers building their own networks with resilience in mind (building redundancy into their networks so that network component failures have a minimum impact).

12

8.3   Council and the government provide and should continue to provide public information on actual and potential natural hazards. This information is essential for our engineers to analyse when designing the proposed structure to meet the local conditions e.g. flood plains or geotechnical soil conditions.

8.4   It is recognised that telecommunications is probably the most complex of the lifeline utilities given that users have access multiple networks including the mobile networks of Spark, Vodafone and 2 Degrees and the fixed line copper network of Chorus plus the new fibre network, still under construction. The experience of the telecommunications industry during an emergency is that it is extremely rare for customers to have no access to telecommunications when there is access to multiple networks.

9.   NES TELECOMMUNICATION FACILITIES 2016

9.1   The original Resource Management National Environmental Standards for Telecommunications Facilities Regulations 2008 came into effect on 28 October 2008. The NESTF provided for certain low impact equipment in roads (i.e. telecommunications cabinets and antennas on existing and replacement poles in roads, and radio frequency exposures in all locations reasonably accessible to the public both inside and outside of roads), as permitted activities subject to standards. In recognition of the significant role telecommunications, broadband and digital services play in New Zealand's economic performance and growth, and to support the ongoing UFB and RBI programmes, the Government in 2013 determined that it would undertake a comprehensive revision of the NESTF. The purpose was to broaden its scope and to make improvements to some of the existing regulations to bring it up to speed with ongoing rapid development in the telecommunications sector.

9.2   The NESTF 2008 was replaced by the NESTF 2016 with its significantly expanded provisions from 1 January 2017. This national environment standard provides critical guidance and direction regarding enabling the upgrading of existing and construction of new telecommunication technology and networks to be deployed both within and outside roads. These provisions override any more stringent controls in district plans. In certain circumstances where district plans include provisions for protected trees, visual amenity values, heritage values and equipment in roads adjacent to the Coastal Marine Area (CMA), more stringent district plan rules prevail.

9.3   The introductory paragraph on page 5 of the MFE discussion document dated March 2015 states:
There are significant technological developments and innovations occurring across the economy that rely on fast, reliable broadband. Many activities in New Zealand, including

13

education, health care and business, would benefit greatly from modern communications technologies. The ability for New Zealand to remain competitive internationally depends on investment in new communications infrastructure. Because of this, the Government is making significant investments in upgrading the national telecommunications network.

9.4   The objectives of the NESTF are to:

1.   *Assist in network and equipment design and equipment sourcing for national network deployment*

2.   *Reduce compliance costs and timeframes for service providers*

3.   *Reduce the timeframe and lower the costs for the availability of new services to consumers*

4.   *Contribute to a reduced council workload in processing and determining consent applications*

5.   *Set an appropriate balance between local participation in community planning and cost-effective national infrastructure investment.*

9.5   NESTF under regulation 56 provides for district and regional plans to have rules that maybe more stringent that the standards imposed by the NESTF 2016 for the purposes of sections S43B and 44A of the RMA. Currently the NESTF recognise district and regional plan rules that are more lenient as now provided for by the recent RMA amendments. An amendment to the NESTF is being considered.

9.6   Regarding natural hazards regulation 57 disapplies existing district plan natural hazard rules related to NESTF regulated telecommunication facilities. The NESTF section 32 report dated November 2016 gives the reasons for this as:

> *"Following consultation it was determined that natural hazard areas should not be included within the areas where district plan rules may prevail over the NESTF. Industry practice is already self-regulating in relation to natural hazards. The costs associated with additional strengthening and hazard mitigation generally means that telecommunication operators avoid placing infrastructure in natural hazard areas wherever possible. However, if placement in these areas is required (eg, a rural site that may be subject to flooding), then industry will engineer a solution that will ensure the facility is suitably resilient."*

Regional plans should consider if this is an appropriate approach for telecommunications. Spark submitted on the draft Wellington Region Natural Hazards Management Strategy (WRNHMS). What is important to the telecommunication industry is access to reliable information on natural hazards. This information enables us to make appropriate decisions to ensure the network and facilities meet our obligations as a lifeline infrastructure provider.

10.   CONCLUSIONS

10.1   Telecommunications infrastructure is essential for shaping and enabling the future of the Wellington region by ensuring that is residents and businesses can be connected internationally and across New Zealand. Changes in the way people access and use telecommunications and data networks is rapidly evolving. The pace of change in technology to meet demand and growth means that critical that the regulatory framework enables efficient roll out of current and future technology. The recent earthquake is a reminder that Wellington has natural hazards that have the potential to cause significant damage. Provision for diversity and resilience of infrastructure has the potential to require some new or upgraded infrastructure.

10.2   New telecommunication facilities such as cell sites or submarine cables will no doubt be required during the life on the Plan to future proof the network for future growth. The NESTF 2016 provides a new enabling regulatory framework at the local authority level that significantly provides the opportunity to support the upgrading and development of new telecommunication facilities. Regional documents such as the proposed Natural Resources Plan need to support the national direction and expectations. A practical if not symbolic action would be amending the definition of Regionally Significant Infrastructure.

Graeme Ian McCarrison
5 May 2016