

1. EXECUTIVE SUMMARY

- 1.1 Spark, One NZ (previously Vodafone) and Chorus invest significantly every year in our networks to ensure New Zealanders have access to world class digital services wherever they live, recreate, and do business. This means we have existing network in areas subject to natural hazards and the impacts of climate change events. The telecommunication industry recognises that enhancing the resilience to natural hazards and disasters (such as severe weather events, earthquakes, volcanic eruptions, wildfires and pandemics) is essential. After every natural emergency event there is a review, with learnings and actions to improve the resilience of the networks.
- 1.2 Telecommunications infrastructure is nationally, regionally, and locally critical. It is fundamental to digital transformation of private and public (both social and network) infrastructure. Telecommunication networks, including both wireless and fixed line, are a critical part of enabling New Zealand to successfully respond to climate change, monitor, and enhance the environments that New Zealander's love. These networks enable the gathering and generation of data to better understand and respond to changes, especially environmental changes which are occurring at pace.
- 1.3 Telecommunications infrastructure is further highly dynamic and - unlike other infrastructure sectors - our network requirements are changing and evolving constantly and at a fast pace. The telecommunications industry invests around \$1.62 billion per year¹ in fibre access, mobile, core and backhaul networks, and the IT systems needed to make all this work. This investment in the performance of our networks is critical to resilience.
- 1.4 In parallel, Spark and One NZ are currently rolling out new 5G mobile networks, deploying over 1,000 new mobile sites and extending network coverage to regional communities. Chorus continues to expand its fibre network in urban and small rural settlements. The continuous technology upgrades are needed to keep up with the increasing demand from consumers and businesses – exponential growth in the use of data is continuing and each year the amount of data handled by telecommunications networks roughly doubles². Chorus, Spark and One NZ, along with other telecommunication providers, invest significantly every year in our networks to ensure New Zealanders have access to world class digital services.

¹ https://comcom.govt.nz/_data/assets/pdf_file/0019/279100/2021-Annual-Telecommunications-Monitoring-Report-17-March-2022.pdf pp 25

² The New Zealand Commerce Commission, [Annual Telecommunications Monitoring Report – 2021 Key Facts](#), 17 March 2022

- 1.5 During Cyclone Gabrielle (and the other recent extreme weather events) we saw telecommunications as the most important infrastructure service on day one. Being able to get emergency assistance, to understand what was happening or who was affected, and to find out if loved ones were safe was essential for people in affected areas and for those trying to help them. By day two or three the priority was still communications: to be able to use electronic payment systems to buy food or fuel, and to coordinate restoration work.
- 1.6 The telecommunications industry relies on Resource Management Act 1991 (RMA) frameworks both nationally, via the National Environmental Standards for Telecommunications Facilities 2016 (NESTF), and Regional Planning documents such as the Regional Policy Statement and District Plans, to appropriately enable resilience via upgrading of existing networks and construction of new networks.
- 1.7 Outside of the RMA framework, Spark's, Chorus's and One NZ's networks are listed as 'lifeline utilities' under the Civil Defence Emergency Management Act 2002 (CDEMA). Under section 59 of the CDEMA 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.
- 1.8 Regulation 57 of the NESTF exempts any natural hazard rules within a District Plan from applying to regulated activities under the NESTF. Non-NESTF regulated infrastructure such as a new facility/mobile sites in an urban area are subject to District Plan rules. Spark's engineers structurally design sites through taking into account local influences such as hazards, regardless of whether or not a resource consent is required. This enables Spark to fulfil requirements under the CDEMA. Basically, the structural and design integrity of Spark's infrastructure is not changed when infrastructure must be located in a natural hazard area to service customers.
- 1.9 New Zealand is subject to natural hazards and Spark's networks have to go through these as they cannot always be avoided. No infrastructure provider, including Councils, can guarantee that their network will continue to operate during and post a natural hazard event. What Spark, Chorus and One NZ can do as a critical infrastructure and lifeline utilities is design our networks to reasonably continue to operate in an emergency and to recover fast if services are disrupted. We depend on access to up-to-date information on natural hazards and climate from central and regional/local government. Having a strong, trusted, and constructive relationship

with the infrastructure providers is going to be more effective at creating resilient networks.

- 1.10 Recognition in the RPS amendments Proposed Change 1 that the telecommunication networks are Regionally Significant Infrastructure assists the industry to build and maintain networks that have a functional or operational need to be in or pass through natural hazard or climate change areas.

2. INTRODUCTION

Graeme Ian McCarrison

- 2.1 My full name is Graeme Ian McCarrison. I am the Engagement & Planning Manager at Spark New Zealand Trading Limited ("Spark"), a position I have held since February 2015. I am authorised to give this evidence on behalf of Spark, Chorus and One NZ.
- 2.2 I hold the qualification of Bachelor of Regional Planning (Honours) from Massey University. I am a full member of the New Zealand Planning Institute ("NZPI") and have 36 years' experience in New Zealand and overseas. I have been on the board of the NZPI since April 2018. Between 2012 and April 2015 I was the chairperson of the Auckland branch of the NZPI. In 2016 I was honoured with a NZPI Distinguished Service Award, and I received a best practice award for iwi engagement from NZPI in 2015.
- 2.3 During the last 37 years I have worked in the public sector in Auckland including as Director of Regulatory Services at Papakura District Council, Planning Manager for Waitakere City Council and in the private sector as a self-employed consultant and as a consultant at Murray North Partners. I have worked the last twelve years in the telecommunications sector. Prior to Spark I held the equivalent position at Chorus NZ Limited ("Chorus") (November 2011 to January 2015), where I advised both Chorus and Spark on resource management and government matters. I am involved in the review of all regional and district plans plus any related local government documents that have the potential to enable or impact the telecommunications industry. During the review of the Christchurch District Plan process, I led and facilitated the combined approach of Spark, Chorus, Vodafone, 2Degrees and Enable during the three years of our involvement.
- 2.4 I facilitate and co-ordinate wide group of network utility organisations with interests in Auckland and nationally. The purpose of this group is to share information, identify opportunities to collaborate and engage on key documents relevant to network utilities. To ensure that the telecommunication industries interests are represented I organise a shared approach and resources that enables Spark, Chorus and One NZ to be involved at a national level in Plan reviews across New Zealand and relevant legislation which includes a submission on the Natural and Built Environments Act exposure draft. This currently comprises involvement in a significant number of plan reviews including: Dunedin, Queenstown, Porirua, Tauranga, Timaru, Selwyn, Wellington City, Waimakariri, Napier, Nelson, New Plymouth, Waikato, Far North, and Central Hawkes Bay.

- 2.5 I represented the Telecommunications Forum (TCF) on the Technical Advisory Group for the NESTF alongside my colleagues Andrew Kantor – Chorus, Colin Clune – One NZ, and Ben Blakemore – 2degrees. Since the NESTF 2016 amendments, the group made up of representatives from the Ministry of Business, Innovation and Employment (MBIE), Ministry for the Environment (MfE), and Local Government New Zealand (LGNZ) meet at least annually to discuss and review the effectiveness of the NESTF.

Scope of evidence

- 2.6 The key focus of my evidence is:
- a. Introduce the telecommunications industry;
 - b. Climate change;
 - c. Resilient communities; and
 - d. Discuss telecommunications networks in relation to natural hazards.

3. TELECOMMUNICATIONS INDUSTRY

- 3.1 Telecommunications infrastructure is critical and essential to a modern economy and connecting the ‘system of systems’ that supports New Zealand’s economy and wellbeing of people and communities.
- 3.2 The Infrastructure Commission’s discussion document on Infrastructure for a Better Future recognises the critical nature of telecommunications infrastructure. The report notes that ‘Increasing reliance on communications makes telecommunications infrastructure more critical.’³
- 3.3 Telecommunications plays a vital and important role in national resilience, demonstrated most recently through our national response to Covid-19, as recognised by the Infrastructure Commission: ‘*The Covid-19 pandemic is a reminder of the importance of a resilient, flexible and agile infrastructure system, as demonstrated, for instance, in the move to working from home, where telecommunications infrastructure has become a substitute for physical transport infrastructure.*’⁴

³ <https://www.infrastructure.govt.nz/assets/Uploads/Infrastructure-Strategy-Consultation-Document-June-2021.pdf>; p. 34

⁴ <https://www.infrastructure.govt.nz/assets/Uploads/Infrastructure-Strategy-Consultation-Document-June-2021.pdf>; p. 37

- 3.4 New Zealand has multiple layers of networks (wireless, Internet of Things and fixed line, plus satellite) and providers include:
- a. Wireless networks of Spark, One NZ, 2 degrees Rural and Connectivity Group (RCG) (a joint venture between Spark, One NZ and 2 degrees);
 - b. Fixed line Chorus, Ultrafast Fibre, Northpower and Enable – regional and national fibre networks. Note that Spark and Vodafone also have large fibre networks;
 - c. Police network;
 - d. Vital (ex TeamTalk) is the major provider of analogue and digital mobile radio in the country (used for handheld VHF communication devices);
 - e. Other fibre networks eg electricity lines companies or Transpower shared cables;
 - f. Kordia owns and manages the broadcasting network in New Zealand, which includes FM radio;
 - g. Johnston, Dick & Associates (JDA) operates a private television, radio and telecommunications network throughout New Zealand;
 - h. Private networks e.g. Kiwirail Transpower;
 - i. Wireless Internet Service Providers (WISPs) - 9 of these nationally providing local network services;
 - j. Vertical and private networks via network slicing; and
 - k. International companies e.g. Starlink (SpaceX service), Amazon, Google.
- 3.5 The wireless telecommunications networks enable the provision of Emergency Mobile Alerts by the National Emergency Management Agency. These are messages about emergencies sent by authorised emergency agencies to capable mobile phones. The alerts are designed to keep people safe and are broadcast to all capable phones from cell towers within the emergency area. The alerts have been used numerous times for local and national emergencies, including nationwide alerts for the Covid-19 pandemic, and recently flood event warnings to potentially affected people. The alerts are increasingly becoming the way by which nationally significant events and information are communicated to New Zealanders in an immediate and succinct manner.
- 3.6 Telecommunications infrastructure is a key enabler of future technologies that are expected to be one of the solutions to many of today's challenges, from climate change to lifting our productivity and innovation. It is also a key enabler of better use of other types of existing infrastructure and will support efficient deployment of new infrastructure. Telecommunications infrastructure could be considered the high-

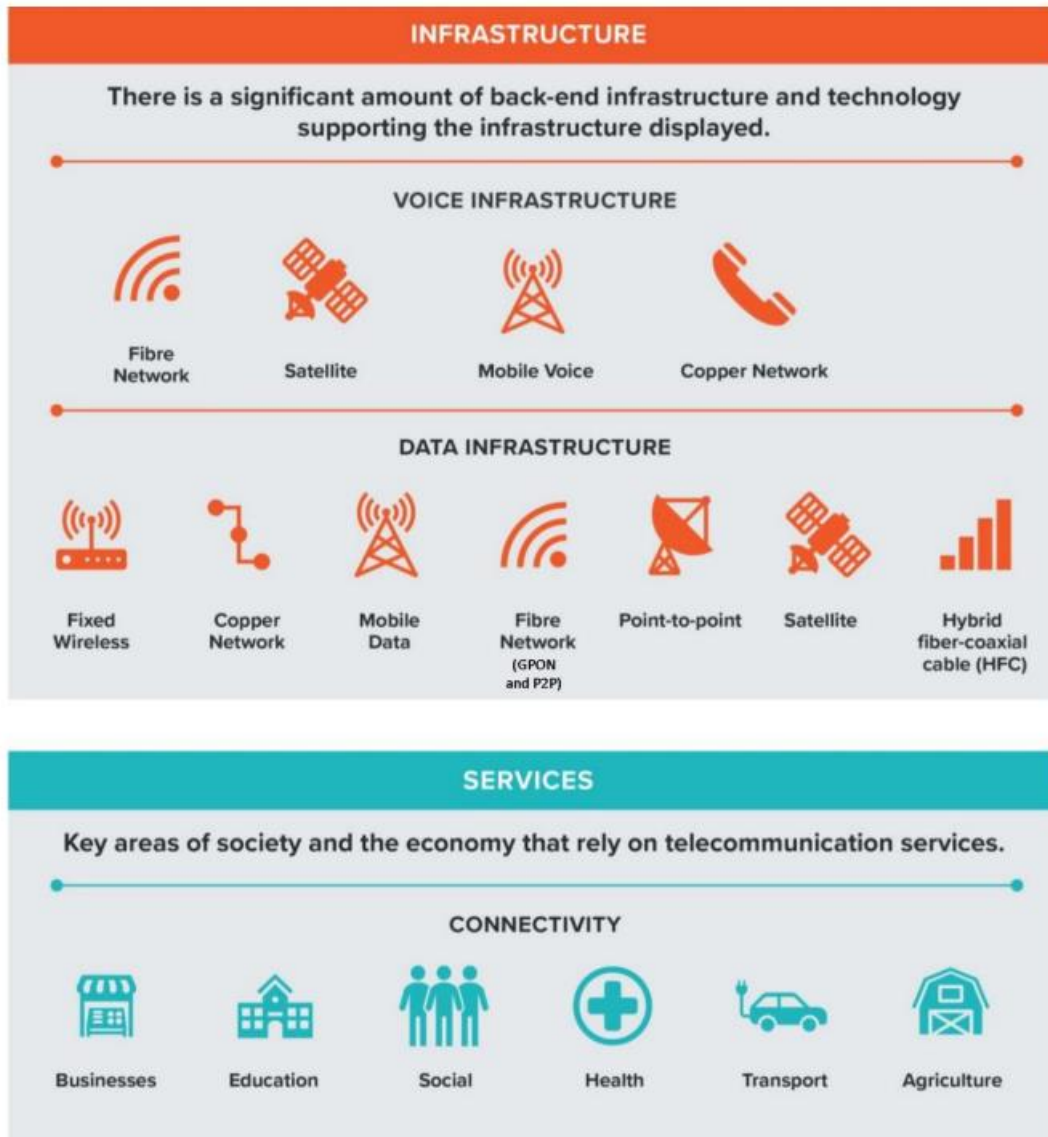
performing invisible infrastructure that underlines other sectors as the conduit to enabling connection, and the ever-increasing expansion of the Internet of Things (IoT). For example, digital infrastructure supports applications and process improvements that will assist New Zealand in meeting its climate change goals. The Climate Change Commission's final advice to the government for its emissions reduction plan notes precision agriculture as an example of the ways in which technology will help to improve efficiency and reduce environmental impacts in agriculture – it requires digital telecommunications connectivity and networks to be possible⁵.

- 3.7 The rollout of 5G and the digital technology that it enables is critical to a well-functioning urban environment as it is widely expected to transform our urban areas and the ways in which we use other types of infrastructure⁶. 5G creates new opportunities to collect and compute all sorts of vehicle data in real time, as well as exchange that information with other devices on the journey. This could soon mean we have roads that can intelligently adapt, increasing car flow during rush hour and accommodating more cyclists and pedestrians during quieter times, as well as smart traffic lights that will ease congestion. It will play an important role as an input to network demand management tools like congestion charging.
- 3.8 The telecommunications services that are relied on by many areas of society and the economy are provided via a number of different types of infrastructure and technologies, as illustrated by New Zealand Infrastructure Commission, State of Play: Telecommunications discussion document December 2020⁷ below:

⁵ <https://ccc-production-media.s3.ap-southeast-2.amazonaws.com/public/Inaia-tonu-nei-a-low-emissions-future-for-Aotearoa/Inaia-tonu-nei-a-low-emissions-future-for-Aotearoa.pdf>; p. 306

⁶ <https://www.5gradar.com/features/what-is-5g-these-use-cases-reveal-all>

⁷ <https://infracom.govt.nz/assets/Uploads/Telecommunications-State-of-Play-December-2020.pdf> Source: New Zealand Infrastructure Commission, Te Waihanga and TC



Source: New Zealand Infrastructure Commission, Te Waihanganga and TCF

- 3.9 Providing high quality connectivity and services to homes and businesses throughout New Zealand can be challenging. Rapid advances in technology are driving transformational changes as telecommunication products and services become increasingly important in the daily lives and businesses of New Zealanders. These advances have seen the telecommunications industry collectively investing \$1.6 billion each year on average to deliver new services and network technology to New Zealanders. At the same time, fierce competition is delivering more value to consumers at lower prices, meaning New Zealand is now in the enviable position of having world-class networks and services, at below OECD average prices, for both fixed and mobile communications.
- 3.10 In mobile services, Spark is the largest mobile network operator. Spark competes for customers over our network of cell sites with One NZ and 2degrees, utilising radio

spectrum licensed from the Government. Sometimes co-location of our electronic equipment on another operator's facility occurs, to save the cost of building a separate facility. Additionally, Spark, One NZ and 2degrees established and jointly own Rural Connectivity Group ("**RCG**") to share a wireless network that will provide wireless coverage under a programme to extend mobile and wireless broadband coverage to remote areas of rural New Zealand as part of the Government's Rural Broadband Initiative.

- 3.11 When it comes to fixed services provided over fibre lines, the industry structure is quite different. The local line networks are owned by wholesale companies such as Chorus, Enable and Ultra-Fast Fibre which must be separate from the retailers like Spark, and One NZ that provide services to customers. It is a bit like the network companies own and maintain the train tracks, while Spark and One NZ run trains over these tracks.
- 3.12 Chorus owns the national copper line network, and most of the fibre network being built in cities and towns, under the Government's ultra-fast broadband (UFB) programmes UFB 1 & 2. It is worth noting that it is proposed that there be a mandatory requirement for properties with copper lines to move to fibre.
- 3.13 Telecommunications is a regulated industry sector in New Zealand, with the Commerce Commission overseeing the industry. As part of this regulation, telecommunications companies are required to pay an annual Telecommunications Development Levy, which is used to improve New Zealand's telecommunications infrastructure.

4. CLIMATE CHANGE

- 4.1 The telecommunications network and digital technology is a critical pathway to reducing greenhouse gas emissions in many ways:
 - a. Avoiding transport emissions by enabling more people to work and study from home. This goes beyond connecting people virtually, to enabling secure remote access to systems and services, and monitoring physical assets. A consequential life cycle assessment was undertaken in 2022 to measure how working from home one day a week affects the size of an employee's carbon footprint. One NZ commissioned Thinkstep-anz carry out a Consequential Life Cycle Assessment (CLCA) which found that the average New Zealand office

worker who works one day a week from home will save 4.2kg in carbon emissions per day, compared to commuting into the office every day.

- b. Using smart technology to reduce energy consumption for individual households and public institutions such as schools and hospitals. This includes smart thermostats, heat pumps, and water heaters, and demand management technologies to support grid decarbonisation and reduce peak demand by controlling and coordinating energy heavy activities such as EV charging.
- c. Using smart cities technology to help tackle climate change. For example, for traffic management, optimising refuse collection, monitoring pollution, optimising street lighting, ride sharing, energy metering, and switching on devices at times to optimise energy use.

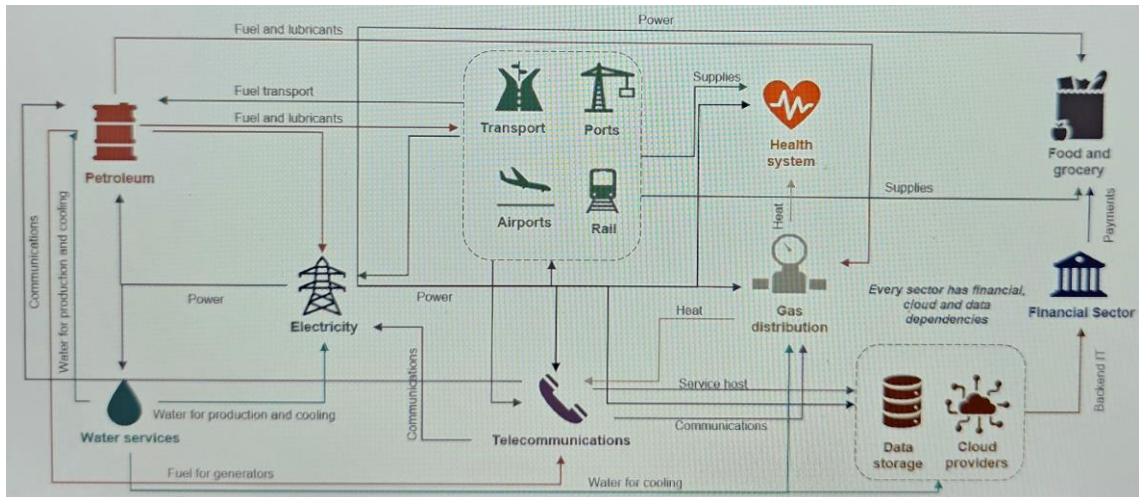
4.2 The smart technologies we mention rely on sensors and telecommunications networks to record and relay data. Research from Spark and Thinkstep-ANZ found that digital technology as an enabler of a variety of actions could collectively reduce annual emissions 7.2 Mt by 2030 - the equivalent of 42 percent of Aotearoa New Zealand's current emissions budget targets.

4.3 We support the changes to recognise that RSI is important to reducing the impact carbon emissions.

5. RESILIENT COMMUNITIES

5.1 The impact on communities that disruption to telecommunications and electricity could have during an extreme natural hazard event, such as Cyclone Gabrielle. The '*Strengthening the resilience of Aotearoa New Zealand's critical infrastructure*⁸' system discussion document outlines why a resilient critical infrastructure system matters for our country and people. The following diagram presented during a Critical Infrastructure webinar on 20 July 2023 by Te Waihanga and Department of the Prime Minister and Cabinet (DPMC) shows the interdependencies between critical infrastructure and impacts of outages in one sector can have flow on consequences for other sectors. Telecommunications and electricity are critical sectors our communities and the economy.

⁸ https://consultation.dpmc.govt.nz/national-security-group/critical-infrastructure-phase-1-public-consultation/user_uploads/discussion-document--strengthening-the-resilience-of-nzs-ci-system.pdf



5.2 It is essential that the existing and proposed growth areas have telecommunications infrastructure both wireless and fixed line integrated into the developments. The existing regulatory regimes for example District Plans subdivision and development provisions do not address interdependency requirements of infrastructure and the community.

6. NATURAL HAZARDS – TELECOMMUNICATIONS LIFELINE UTILITIES

6.1 As an industry we have also invested heavily in disaster preparedness. At the company level this is done through our business continuity planning. At the industry level we have established the Telecommunications Emergency Forum (TEF). The TEF (administered by the TCF) coordinates the telecommunications sector during an event or state of emergency. It is also the primary channel for updates on the status of telecommunications networks. The TEF communicates with NEMA, MBIE, local lifelines, councils and other infrastructure sectors (such as electricity) to help ensure support for restoration of telecommunications is organised and mobilised during an event.

6.2 Telecommunication networks are critical lifeline infrastructure. New Zealand depends on the provision of resilient telecommunication networks, especially during emergencies, as has been highlighted in the case of the Kaikoura, Canterbury earthquakes and more recent civil emergencies triggered by flooding. Telecommunications networks, along with the other critical networks such as electricity have proven to be reasonably resilient⁹. Our sites are dependent on electricity supply.

⁹ [canterbury-cdem-group-plan-updated-june-2018.pdf](#) page 29

- 6.3 Telecommunications are recognised as Essential Infrastructure networks and as a critical lifeline utility under the CDEMA. Spark, Chorus and One NZ are designated lifeline utilities both nationally and for the Wellington region. Under section 59 of the CDEMA 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.
- 6.4 Any approach force critical infrastructure to avoid areas subject to natural hazards or mitigate the effects of natural hazards must be considered and applied across all sectors or activities located in these areas. Our sector would prefer not to be natural hazard or climate change areas, but we have an obligation to provide communication and digital services to NZers wherever thy choice to be located. The telecommunication industry is taking actions that we can best able to take to control risk.
- 6.5 The recent extreme weather events such Cyclone Gaberille have highlighted the interdependence between telecommunications and other essential infrastructure providers such as electricity, roading and fuel, in the event of a natural disaster. Here are some examples of the dependencies:
- a. Electricity: the biggest issues for telecommunications network operators were caused by electricity outages. Electricity is required for fibre, copper and mobile networks to operate. With only one or two exceptions, none of our cell-sites were damaged during the recent events and were all back online as soon as power was restored.
 - a. Roothing: road and bridge collapses took out a large number of fibre optic cables. Road closures meant we had difficulty getting generators to cell-sites that lost power and stopped or delayed fuel supplies and repair crews getting through.
 - b. Fuel: we needed to refuel our generators, service stations needed electricity to pump fuel, and some service stations were unable to process payments so access to fuel was challenging.
 - c. Emergency services and other providers of essential infrastructure: depend on communications to know what has happened and who is affected. This is

needed before you can start deploying rescue efforts and fixing infrastructure.

Critical Lifeline Infrastructure

6.6 As a Lifeline Utility, the industry has developed and maintained response arrangements for the provision of service during and after an emergency event. Through the New Zealand Lifelines Council (NZLC) and 15 Regional Lifelines Groups, New Zealand's lifeline utility organisations work together on projects to understand and identify ways to mitigate impacts of hazards on lifelines infrastructure. NZLC in 2017 undertook its first infrastructure vulnerability assessment which was updated in 2020¹⁰. This report highlights the resilience of telecommunication networks and some areas for focus on improving resilience. Telecommunication network resilience comes from a variety of ways and is constantly evolving and learning from the events response assessments:

- multiple networks (different providers offering alternative networks, as described in paragraph 3.4) provide for redundancy.
- multiple technologies (fibre fixed networks available alongside mobile networks).
- robustness (design codes for strength) with specific engineering design and certification taking into account the natural hazard information available. Consultancy companies such as Aurecon and WSP provide design and engineering certification for each new site (includes guidance that influences new-site selection in regard to natural hazard risk and mitigation requirements) and upgrading existing sites.
- providers building their own networks with resilience in mind (building redundancy into their networks so that network component failures have a minimum impact).
- making arrangements to enable direct-to-satellite connectivity, which will enable mobile phone users to initially send and receive text messages, and later make calls, including to emergency services, if the mobile network is down.
- provide emergency roaming for 111 calls. This means, for example, if the Spark or One NZ networks are down, their customers can make 111 calls using the 2degrees network.

¹⁰ [nzlifelines Council-nva-2020-full-report.pdf](#)

- fleet of temporary network solutions such as Cells on Wheels (CoW) or Cell on Platform (CoP) to restore any network components damaged during an emergency while the permanent asset is being repaired.
- commercial imperative to keep customers connected.

6.7 Telecommunications are probably the most complex of the lifeline utilities given that users have access to multiple networks including the mobile networks of Spark, One NZ, 2degrees and RCG and the fixed line fibre and copper networks of Chorus and other providers. The diversity of interconnected networks has the advantage that via automatic failovers arrangements between the operator's connectivity for customers will continue. NZLC has identified that the CDEMA obligations on private operators' infrastructure such as telecommunication is difficult to measure or enforce for private companies. The Building Code does mandate standards around critical buildings housing telecommunications equipment though design standards for other components of the network, such as mobile facilities, are not prescribed. Crown Infrastructure Partners as part of Government managed initiatives such as ultra-fast (UFB 1 & 2) and rural broadband infrastructure (RBI 1 & 2) rollouts or Blackspots initiative, does have a prescribed construction standard. Although there is no network construction standard outside those contractually managed by Crown Infrastructure Partners our networks are subject review and oversight including via:

- a. Commerce Commission as the regulator, who assess and report on the industry annually looking at competition in, and the performance and development of, telecommunications in New Zealand.
- b. Commerce Commission monitoring of asset quality in areas without competition.
- c. Ministry Business Innovation and Employment (MBIE), which is responsible for maintaining a robust regulatory environment for the information and communications technology (ICT) sector. The Telecommunications Act 2001 provides for investigations and reduce incentives for regulated parties to "game" the process or proceed slowly for strategic reasons' (MBIE 2018c)
- d. The National Code of Practice for Utility Operators' Access to Transport Corridors (the Code) under the Utilities Access Act 2010, which has a process for requiring a local authority to comment and request information when a network utility is proposing to work in the road.

- e. Regional Lifeline assessments and reviews including post specific significant events reports such as Christchurch earthquakes, provide recommendations for improving network resilience.
- f. MBIE is the lead agency with Ministry for the Environment is responsible for the NESTF and the 5 yearly reviews provided for under the RMA. The 2013 review resulted in the 2008 NESTF being amended in 2016. The NESTF 2016 Regulation 57 makes it clear that natural hazard rules in district plans do not apply to a regulated activity under the NESTF 2016. This is because network resilience is already factored into industry practice, and they will either avoid hazard areas or engineer structures to be resilient to the hazard risk including flooding, instability, earthquake, and climate change¹¹. The NESTF review discussion document explored the issue of natural hazards and asked from public feedback¹². The 2015 cabinet paper comments that no information was provided that demonstrated having councils involved would improve telecommunications resilience outcomes¹³.
- g. Ministry for the Environment has provided research¹⁴ on effects-based approach of the RMA as a risk-based approach, using the risk management language of probability and impact. The RMA enables regional and district rules to be established for natural hazards. In the case of telecommunications, the Government has established under the NESTF no need for natural hazard rules to apply to regulated activities.
- h. New Zealand Infrastructure Commission, Te Waihanga (Infracom) was officially formed on 25 September 2019. Infracom will be shaping New Zealand's future through infrastructure planning and investment via the 30yr Infrastructure Strategy and performance reporting on sectors such as State of Paper; Telecommunications report released in December 2020. Reporting infrastructure investment is a way that the government via the commission will ensure that the public and private sectors are focused on investing to ensure NZ has the future infrastructure it depends for growth and to maximise the wellbeing of New Zealanders.
- i. Productivity Commission provides advice to the Government on improving productivity in a way that is directed to supporting the overall well-being of New Zealanders. Various investigations including technological

¹¹ <https://www.mbie.govt.nz/dmsdocument/1347-nestf-2016-draft-users-guide-pdf%20>

¹² Proposed amendments to the National Environmental Standards for Telecommunication Facilities: Discussion document, March 2015 page 31

¹³ https://environment.govt.nz/assets/Publications/aug2015-cabinet-paper-nestf-for-release_0.pdf

¹⁴ https://environment.govt.nz/assets/Publications/Files/NPS_Natural-Hazards-Framework_FINAL-Report-TT-June-2016.pdf

change and the future of work¹⁵ explored the dependence on digital technologies and networks.

- 6.8 The NZLC report noted that several critical components of the infrastructure such as a loss of a major exchanges such as Spark's exchanges in Porirua, Wellington, Christchurch or Mayoral Drive in Auckland could impact with resulting limitation from a nationwide network failure perspective. For this reason, the three main network operators are heavily protected with redundant links and automatic failovers. Furthermore, there is major dependence on the electricity network, with critical infrastructure buildings such as exchanges, data centres in the form of batteries and generators and most cell sites having backup electricity supply often in the form of batteries and the ability to connect to generators in an emergency. However, if electricity outages are widespread and access to fuel is restricted after a reasonable period of time would impact telecommunications services. This highlights the critical importance to have a robust electricity supply network to other infrastructure and our communities.
- 6.9 Telecommunication connectivity infrastructure continues to be fast evolving and ever changing as we integrate new technology to expand customer opportunity to connect when they want it anywhere. One of the newer frontiers is non geostationary constellations of multiple satellites that orbit earth. SpaceX Starlink service is one such global company that retail broadband services into New Zealand. Lynk Global is a satellite service provider that is expanding services into Aotearoa. Spark and One NZ have announced they will set providing satellite-to-mobile services. The first services expected in 2024 will be text to mobile phone/devices. It is worth remembering that the technology is still evolving, so the service and experience will improve and expand as the number of satellites in the sky increases. While satellite can't provide 100% coverage, as you need a clear line of sight to the sky to get connected. Satellite services adds an additional layer of resilience, particularly now, as we face increasingly severe and frequent weather events due to climate change. Once there are more satellites launched and the service is available more broadly, it will allow our mobile customers to start to use their phones in more areas that aren't reached by traditional mobile coverage.
- 6.10 Satellites are part of the integrated communications network solution and are not expected to replace the need for cell towers. A satellite has finite capacity (e.g. when a satellite service is used for making calls, connectivity is lost inside a building), hence

¹⁵ <https://www.productivity.govt.nz/inquiries/technology-and-the-future-of-work/>

the continued need for cell towers. To address this, there will continue to be an increasing number of new cell-sites constructed in the Wellington region and across Aotearoa, including in or traversing natural hazard environments or in the coastal environment.

- 6.11 The industry has focused on ensuring network preparedness and response arrangements. In response to Climate Change especially there is change toward planning and investing for risk mitigation.
- 6.12 It is experience and belief that regional and local authorities supported by the government (CDEMA, MBIE, MfE) provide and should continue to provide public information on actual and potential natural hazards. This information is essential for engineers to analyse when designing the proposed structure to meet the local conditions e.g. flood plains or geotechnical soil conditions.
- 6.13 I am not aware of any situations where telecommunication networks have been assessed by a Council as contributing to flooding or any other natural hazard situation. I have no evidence or information related to masts failing structurally during a flood event.
- 6.14 Even in extreme events such as the Cyclone Gabrielle and Kaikoura earthquake which unexpectedly snapped a fibre link, the telecommunications outage was reasonably short. Further, since the Kaikoura earthquake an additional alternative fibre link has been constructed to provide greater resilience.

7. CONCLUSIONS

- 7.1 We support the policy direction to stop development being in natural hazard areas. However, while it is our preference not to be in such areas, there can be a need for telecommunications as critical infrastructure and lifeline utilities operators to traverse or be located in areas subject to natural hazards and climate change. The NESTF 2016 under Regulation 57 precludes any natural hazard rules from applying to regulated activities under the NESTF. Council and the Government should be focused on providing up to date hazard information so that the industries engineers can use to advise on locations for new infrastructure and structural design advice on mitigating and protecting the network from the hazards so that services our communities depend on continue to operate.

Graeme McCarrison,

14 August 2023

Appendix 1

Examples of sites designed to mitigate natural hazards









Appendix 2

Examples of Temporary sites – CoW and CoP



Cell on Wheels



Cell on Platform