

Section 9A Backhaul services study

Our findings

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Associated documents

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Glossary

AoB	All of Business. AoB is often used to describe a contract for the supply of a customised bundle of services (eg, all of the backhaul required by a cellular network operation throughout the country).
CAGR	Compound Annual Growth Rate. A measure of growth over multiple time periods.
DSL	Digital Subscriber Line. A technology that allows high speed data to be carried over copper pairs. Asymmetric Digital Subscriber Line (ADSL) and Very high Speed Digital Subscriber Line (VDSL) are known as DSL technologies (sometimes referred to as xDSL).
FFLAS	Fibre Fixed Line Access Services as defined in the Telecommunications Act 2001. This means a telecommunications service that enables access to, and interconnection with, a regulated fibre service provider's fibre network.
IP	Internet Protocol, the main protocol used for transporting data across network boundaries. This protocol is necessary for the internet to operate.
Layer 1	Layer 1 refers to the physical layer of the Open Systems Interconnection 7-layer model. The physical layer consists of the optical fibre and the light spectrum that passes through it.
LFCs	Local Fibre Companies are the Government's partners in the Ultra-Fast Broadband (UFB) initiative to deliver wholesale fibre services in certain areas. These are made up of Chorus and the other LFCs— Enable Networks, Northpower and Ultrafast Fibre. We use the term 'other LFCs' to collectively refer to Enable Networks, Northpower and Ultrafast Fibre.
POI	Point Of Interconnection. A point of interconnection refers to the point at which one network connects to another (eg, where a Retail Service Provider's network connects to an LFC's network).
RBI	Rural Broadband Initiative means the New Zealand Government's programme to develop enhanced broadband infrastructure in non-urban areas of New Zealand.

RSP	Retail Service Provider. They provide telecommunications services to end-users (eg, Spark and Slingshot).
Specified service	A specified service is a service described in Part 3 of Schedule 1 of the Telecommunications Act 2001. This means services where only non-price terms are regulated.
STD	Standard Terms Determinations. STDs are the Commerce Commission's primary mechanism for regulating non-fibre telecommunications services under the Telecommunications Act 2001.
TES	Tail Extension Service. A Chorus product bundling an access product such as UBA with backhaul. TES services are sold on a per-user connection basis.
UBA	Unbundled Bitstream Access services. This means a DSL-enabled service that allows access to, and interconnection with, that part of Chorus' fixed Public Data Network between the first data switch and the end-user.
UCLF	Unbundled Copper Low Frequency Service. This is a regulated service that provides the low frequency component of a copper path between the exchange and the end-user. This service is essentially a voice only service.
UCLL	Unbundled Copper Local Loop Service. This service means a layer 1 Unbundled Copper Local Loop service which enables access to, and interconnection with, Chorus' copper local loop network.
UFB	Ultra-Fast Broadband. Often used as an umbrella term for UFB1 and UFB2.
UFB1 initiative	The initial phase of the Ultra-fast Broadband Initiative, to develop fibre-to-the-premises broadband networks connecting at least 75% of New Zealand households and to all priority users (such as schools and businesses).
UFB2 initiative	The extension of the UFB1 initiative, to develop fibre-to-the-premises networks connecting at least 80% of New Zealand households, which, to avoid doubt, includes the extension to UFB2 known as UFB2+.

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Chapter 1 The study and looking ahead

Purpose of this paper

- 1.1 The purpose of this paper is to present the findings of our domestic backhaul services study in New Zealand.¹ This paper also provides information on the study's process and consultation with interested parties that has led to these findings.
- 1.2 This paper is set out in the following sections:
 - 1.2.1 'The study and looking ahead' (Chapter 1). This chapter outlines the purpose of this study, provides an overview of domestic backhaul services, and sets out our process to date. It also looks ahead to future activities related to backhaul services;
 - 1.2.2 'Background of our study' (Chapter 2). This chapter provides information on the study's process and consultation;
 - 1.2.3 'What we investigated' (Chapter 3). This chapter sets out the scope of our investigation, and explains why we focussed on parts of Chorus' backhaul portfolio; and
 - 1.2.4 'Key findings from our investigation' (Chapter 4). In this chapter we summarise the study's key findings.

Purpose of this section 9A study

- 1.3 This study into domestic backhaul services has been undertaken under section 9A of the Telecommunications Act 2001 (Act).² It follows on from our review under clause 1(3) of Schedule 3 of the Act (Schedule 3 review). This review considered whether there are reasonable grounds for commencing an investigation into omitting any of the relevant services in Schedule 1 from the Act.

¹ As required by Section 9A(1)(d) of the Telecommunications Act 2001 (Act). We consider that domestic backhaul services are backhaul services supplied within New Zealand, excluding any international links. This is defined in more detail at Figure 1.1.

² Decisions on what and how recommended regulatory changes (if any) should be implemented in relation to the existing regulation are outside the scope of a section 9A study. As noted in para 1.50 we intend to look at backhaul services during our copper review under section 69AH.

1.4 As we noted in the Schedule 3 review:³

...access to backhaul services is likely to become increasingly important as higher-speed broadband services are deployed particularly outside of the main urban centres, because of the rural broadband initiative (**RBI**) and ultra-fast broadband (**UFB**) initiatives.

1.5 We started this study to gain an improved understanding of domestic backhaul services. Our Preliminary Questions Paper sought answers to the following key questions:⁴

1.5.1 how domestic backhaul services have evolved in today's telecommunication environment and what they might look like in the future; and

1.5.2 what, if any, change may be required to the regulatory framework around domestic backhaul services to best promote competition for the long-term benefit of end-users.

1.6 We have been subsequently guided by submissions on our Preliminary Questions Paper to narrow the scope of our study to focus on parts of Chorus' backhaul portfolio.

1.7 Chapter 2 provides further information on the study's process and consultation to date.

Overview of backhaul services

What is backhaul

1.8 Backhaul is the intermediary link in a telecommunications network between the edge of the network (eg, copper or fibre connecting homes, or mobile sites) and the core network (eg, internet gateways and content provision). It transports traffic between the two parts of the network. Generally, backhaul is provided over fibre, but wireless technologies can be used eg, in high-cost remote areas.

³ Commerce Commission "Review of Designated and Specified Services under Schedule 1 of the Telecommunications Act 2001 – Reasons for final decision on whether to commence an investigation under clause 1(3) of Schedule 3 of the Telecommunications Act 2001" (30 June 2016) paras 128, 141-142.

⁴ Commerce Commission "A Section 9A Backhaul Study – Preliminary questions in understanding domestic backhaul services" (12 August 2016).

1.9 The following aspects have been central to our assessment of the backhaul sector:

1.9.1 service(s);

1.9.2 geographic availability;

1.9.3 technology; and

1.9.4 pricing.

Service(s)

1.10 Providers may offer backhaul on:

1.10.1 a **service-specific basis**, meaning that restrictions are applied to the types of traffic that customers can aggregate and transport; or

1.10.2 a **service-agnostic basis**, meaning that customers can choose what kind of traffic they transport or can aggregate multiple types of traffic.

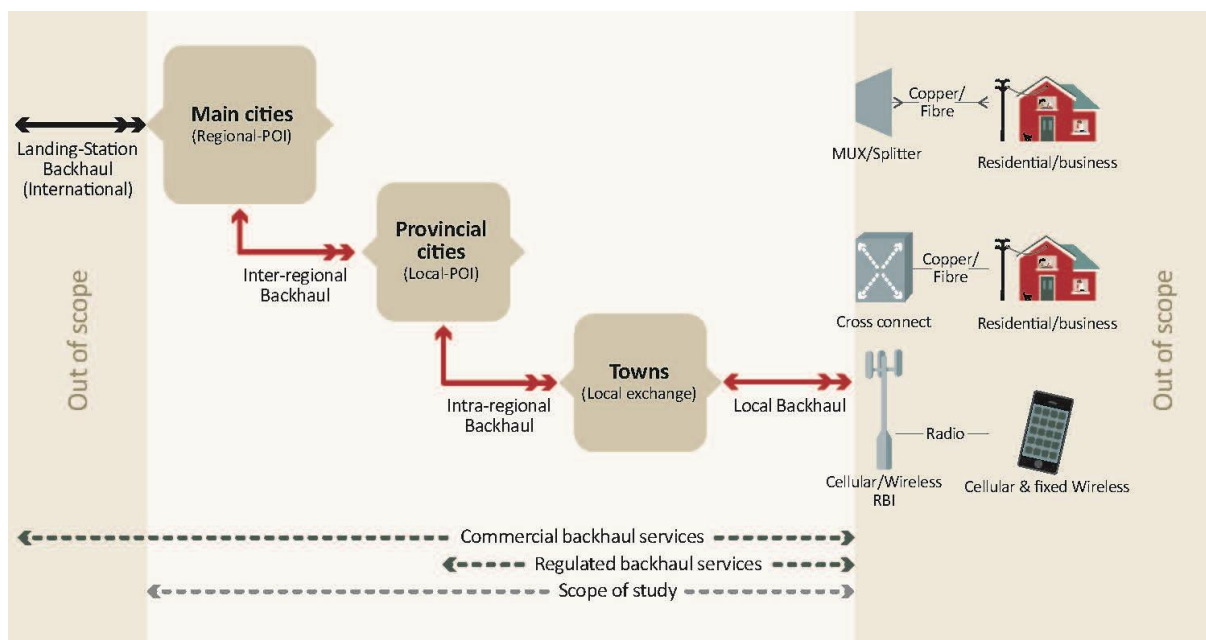
1.11 Providers can also offer a 'dark fibre' variant or a 'managed' backhaul variant.⁵

Geographic availability

1.12 Backhaul may appear anywhere (geographically) within a service provider's network – nationally, regionally and locally. Figure 1.1 shows that backhaul services may be classified by their geographic reach, irrespective of the underlying technology or purpose to which they are applied.

⁵ 'Dark fibre' is where access to the optical fibre cable is provided and the customer supplies their own electronics. 'Managed capacity' is where the provider supplies the electronics as well as the optical fibre.

Figure 1.1 Simplified network view of backhaul



1.13 We consider that backhaul services can be broadly classified into the following categories based on their geographic reach:

1.13.1 **inter-regional backhaul services** – the set of services between main and provincial cities (eg, Auckland to Christchurch, Auckland to Whangarei, Whangarei to Tauranga);⁶

1.13.2 **intra-regional backhaul services** – the set of services between the provincial cities and neighbouring towns (eg, Whangarei to Kaitaia, Palmerston North to Feilding); and

1.13.3 **local backhaul services** – the set of services within a town (eg, Feilding) or central business district (eg, Dunedin) that link the first points of traffic aggregation (eg, wireless site).

⁶ Submissions to our 9A study also used the terms 'national' or 'main-trunk' backhaul to describe inter-regional backhaul between the main cities. We note that there appear to be no agreed industry terms to define exactly the geographic reach of backhaul, and the precise meaning must be derived from the context.

- 1.14 It is important to note that Figure 1.1 is a simplified backhaul hierarchy. The actual network (comprised of many nodes and links) does not follow a rigid hierarchy. For example, the distance between the edge and core of the network may only require a local or intra-regional backhaul link:
- 1.14.1 where the local exchange also happens to be a main city exchange (eg, Christchurch), or
 - 1.14.2 where an intra-regional link is required between a local exchange and its neighbouring main city exchange (eg, Akaroa to Christchurch).
- 1.15 Accordingly, backhaul customers purchase and optimise combinations of backhaul services based on:
- 1.15.1 the points they need their traffic transported between; and
 - 1.15.2 their ability to aggregate traffic across these geographies.
- 1.16 Depending on the specific points between which backhaul customers need traffic transported, they might have more than one option on where to aggregate the traffic and the route over which the traffic is transported.

Technology

- 1.17 Backhaul links are generally provided over fibre cables. These cables are made up of strands of glass fibres. These fibres carry communication signals using light. The light is provided by electronics on each end of the fibre. Upgrading a backhaul network is largely a process of upgrading the technology (ie, the capability of the electronics).
- 1.18 The cost of backhaul between two geographic points is primarily driven by:
- 1.18.1 the technology deployed (which determines the capacity of the link) and the deployment method;
 - 1.18.2 the distance involved; and
 - 1.18.3 local geography.

Pricing

1.19 The pricing of backhaul services can be broadly categorised into:

1.19.1 **Regulated** – the prices for some of Chorus' service-specific backhaul services (as described under Schedule 1 of the Act) are set using a formula based on radial distances and bandwidth purchased. These regulated services are only available with their corresponding copper access services (eg, UBA and UBA backhaul, UCLF and UCLF backhaul). These prices are specified in, for example, the 2008 Unbundled Bitstream Access (**UBA**) Backhaul Standard Terms Determination (**STD**).⁷

1.19.2 **Commercial** – the prices are set by each individual provider typically based on some combination of distance (actual cable length, distance by road, or radial ie, direct point-to-point distance) and bandwidth purchased. The exact formulas used to set prices vary with the backhaul product purchased, but generally, as capacity increases, distance becomes less of a price driver. Most commercial backhaul services are service-agnostic which allows greater economies of scale for customers wanting to transport a range of traffic types.

Backhaul customers in New Zealand

1.20 Customers purchasing backhaul are mainly:

1.20.1 retail service providers (**RSPs**) of fixed line (data and voice) services over fibre, cable or copper technologies – both for the residential and business sectors;

1.20.2 retail providers of managed data services - who, as part of their bundled offering, provide connectivity between sites for large corporate and Government customers; and

1.20.3 cellular network operators – linking their cell sites to their core networks.

1.21 Customers purchase backhaul to transport aggregated traffic between different parts of the network. Customers choose what kind of traffic (data, voice, mobile, etc.) they transport. Depending on the backhaul product purchased, customers can aggregate multiple types of traffic to be carried over a given backhaul link.

⁷ Commerce Commission “Standard Terms Determination for the designated service Telecom's unbundled bitstream access backhaul” (27 June 2008). Schedule 1 of the Act currently only provides for the regulation of Chorus' backhaul services.

Backhaul providers in New Zealand

- 1.22 A number of suppliers in New Zealand operate significant backhaul networks. These suppliers either offer backhaul services on a wholesale basis, or support their own retail requirements, or both.

Inter-regional backhaul network providers

- 1.23 As backhaul networks are built and upgraded to meet traffic demand, the high-volume links to main and provincial cities are typically served by competing backhaul networks. Backhaul competition falls away for the lower-volume links outside of the cities.
- 1.24 Chorus is a major provider of inter-regional backhaul following the allocation of Telecom's fibre cables between Spark and Chorus. Spark also provides inter-regional backhaul over its network.
- 1.25 Vodafone has core fibre and points of presence around New Zealand, though not ubiquitously aligned with Chorus exchanges and cabinets. Vodafone self-supplies backhaul for its own retail operations and offers backhaul to third parties on inter-regional links.
- 1.26 Vector Communications operates a high capacity data network linking the main urban centres throughout New Zealand. In addition to serving the needs of Vector's business customers, the network is used to provide inter-regional backhaul services.
- 1.27 Vital operates a nationwide managed inter-regional fibre network. The network links Vital's digital microwave radio sites that can be used to provide inter-regional backhaul services to third parties.
- 1.28 Vocus has deployed and operates an inter-regional fibre optic network and provides wholesale backhaul services over it.
- 1.29 Kordia operates its own inter-regional fibre backhaul network and supplies backhaul both to its own operations and third parties.

Intra-regional backhaul networks

- 1.30 Intra-regional backhaul is predominantly provided by Local Fibre Companies (**LFCs**).
- 1.31 Other LFCs (Northpower, Ultra-Fast Fibre, and Enable) provide wholesale intra-regional backhaul services in and around Whangarei, Hamilton, and Christchurch respectively.

1.32 Chorus operates the bulk of the intra-regional network across New Zealand, where it faces no or limited competition for the supply of backhaul services.

Local backhaul networks

1.33 There are several operators who offer local backhaul services over their local access networks. Examples of these operators include:

1.33.1 Vector Communications which operates local fibre networks in Auckland;

1.33.2 Vital operates local fibre networks in Auckland and Wellington;

1.33.3 Kordia also operates an extensive wireless network which may also provide backhaul service; and

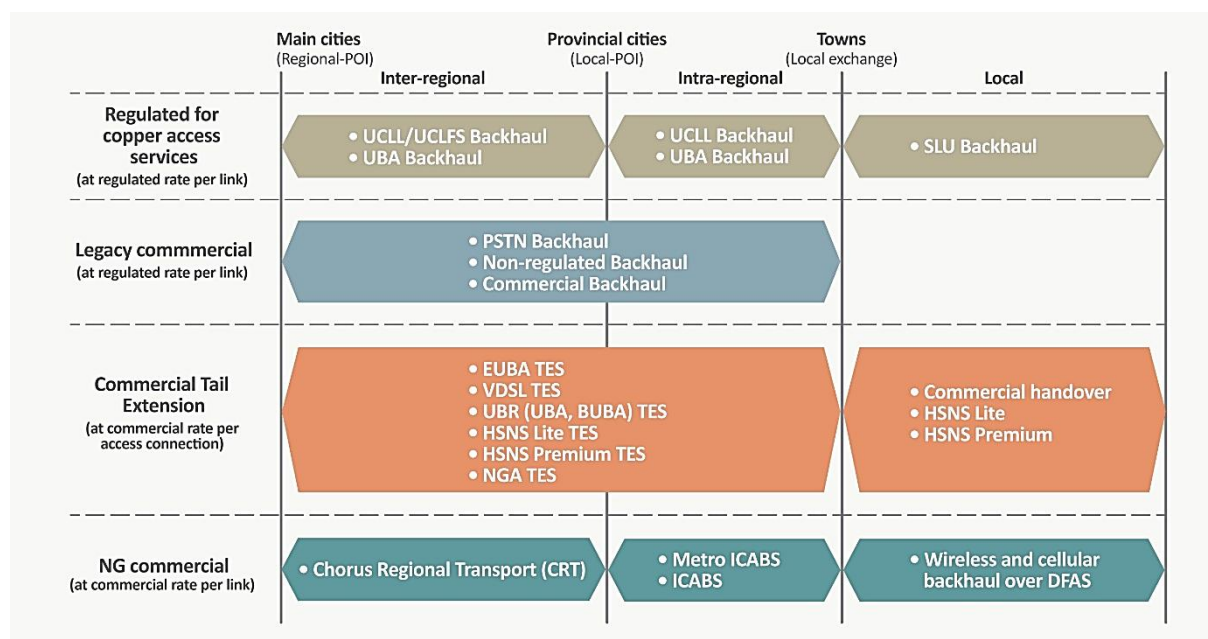
1.33.4 in several towns throughout New Zealand, Vodafone, Spark and the LFCs (in their respective UFB) areas self-supply local backhaul and could provide local backhaul to third parties.

1.34 Chorus offers local backhaul services in Auckland, Wellington and other towns throughout New Zealand. In some areas Chorus has limited or no competition for local backhaul services.

Chorus' backhaul services

1.35 Chorus supplies a range of backhaul services, which are offered on regulated or commercial terms across different geographic dimensions. An indicative set of services is shown in Figure 1.2.

Figure 1.2 Chorus' regulated and commercial backhaul services by geography



Regulated backhaul

- 1.36 The backhaul services that are currently regulated under Schedule 1 of the Act (regulated backhaul) are always linked to a Schedule 1 regulated access service, ie, they are service-specific.⁸ There are very low volumes of traffic backhauled over regulated services, with virtually all traffic backhauled over commercial services, which support multiple types of traffic.
- 1.37 Schedule 1 of the Act currently contains three designated backhaul services supplied by Chorus:
- 1.37.1 Chorus' UBA backhaul service, which provides transmission capacity between the trunk side of a first data switch (where the UBA service terminates) and the access seeker's nearest available point of interconnection (**POI**).
 - 1.37.2 Chorus' Unbundled Copper Local Loop (**UCLL**) backhaul service (distribution cabinet to telephone exchange). This service provides transmission capacity between Chorus' distribution cabinet and Chorus' local exchange enabling access to Chorus' UCLL network.
 - 1.37.3 Chorus' UCLL backhaul service (telephone exchange to interconnect point). This service provides transmission capacity between Chorus' local exchange and the access seeker's nearest available POI. It enables access to Chorus' UCLL network and Chorus' Unbundled Copper Low Frequency (**UCLF**) service.⁹

Commercial backhaul

- 1.38 Commercial backhaul services are used in circumstances where traffic from more than one access service is aggregated over a given route. For example, UCLL services, UBA services and fibre fixed line access services (**FFLAS**).

⁸ Each of the backhaul services contained in Schedule 1 of the Act can only be used for the purposes of connecting to a specific regulated access service. For example, the UBA backhaul service provides transmission capacity which can only be used to support the UBA service. Similarly, the UCLL backhaul service can only be used for the purposes of connecting to the UCLL service. Therefore, UCLL traffic and UBA traffic cannot be carried over the same regulated backhaul service. The Schedule 1 service descriptions do not specify the transmission medium (eg, fibre, copper, wireless).

⁹ Unless it appears otherwise from the context, all references in this paper to UCLL backhaul refer to both UCLL and UCLF services.

- 1.39 As the commercial backhaul services do not fall within the service descriptions for backhaul in Schedule 1, they cannot currently be regulated via the existing STDs. However, Chorus chooses to price some intra-regional and local commercial backhaul services at the regulated price set in 2008 for UBA (service-specific) backhaul.¹⁰
- 1.40 Chorus' commercial backhaul services can be broadly split into the following types:
- 1.40.1 'Legacy' commercial backhaul priced per link using the formula set by the UBA Backhaul STD. The STD relates prices to the bandwidth purchased and the radial distance between exchanges;
 - 1.40.2 'Next generation' commercial backhaul, such as Chorus Regional Transport (CRT) or Intra-Candidate Area Backhaul Service (ICABS) is priced per link. The price is a function of the amount of bandwidth purchased and the distance between exchanges;¹¹ and
 - 1.40.3 Commercial 'Tail Extension Services' (TES), which include services such as Unspecified Bit Rate (UBR) backhaul, are priced on a 'per end-user' basis rather than per link.¹²

What we have done

- 1.41 In August 2016, we commenced our study into backhaul services by publishing a Preliminary Questions Paper to better understand backhaul services.¹³ Shortly after we received submissions on this paper, the Government announced its review of the Telecommunications Act.
- 1.42 The study was put on hold in February 2017 while the Government proceeded with its review due to the potential flow-on effects for the study and backhaul services more generally.

¹⁰ Commerce Commission "Standard Terms Determination for the designated service Telecom's unbundled bitstream access backhaul" (27 June 2008).

¹¹ Chorus uses different formulas to determine the prices of different commercial backhaul services. [] Likewise, different minimum or maximum distances apply to the different commercial services.

¹² Chorus describes UBR backhaul as a 'backend service which allows service providers to transport Basic Unbundled Bitstream Access (Basic UBA) traffic from any Handover Point.' Chorus "UBR Backhaul" (2019) see <https://sp.chorus.co.nz/core-network/ubr-backhaul>.

¹³ Commerce Commission "A Section 9A Backhaul Study - Preliminary questions in understanding domestic backhaul services" (12 August 2016). Further detail of this is provided in Chapter 2.

- 1.43 The study recommenced in January 2018 following the Amendment Bill process. Since then, we have used our information gathering powers to investigate and reach findings on matters raised in submissions relating to parts of Chorus' backhaul portfolio.

Looking ahead

Chorus' backhaul portfolio consultation

Clarity and transparency

- 1.44 During our study, we discovered and investigated several anomalies and errors in Chorus' backhaul portfolio. We consider this situation to be indicative of a portfolio that has lacked the appropriate level of attention for a company of Chorus' size and resources.¹⁴
- 1.45 Chorus has recently announced a review of its backhaul portfolio.¹⁵ We welcome this review and encourage Chorus to:
- 1.45.1 provide more clarity and transparency to customers on the suite of backhaul services that are available on a given route, including expected future availability; and
 - 1.45.2 provide more clarity and transparency to customers on the pricing methodology used to price different commercial backhaul services (including, but not exclusively whether the chargeable distances are based on actual cable lengths or radial distances).
- 1.46 These changes would allow Chorus' customers to better compare different backhaul options.

Chorus' use of regulated backhaul pricing methodology

- 1.47 Chorus has chosen to use the pricing formula determined for regulated (UBA/UCLL) backhaul to set the prices of some of its commercial (service-agnostic) backhaul services.

¹⁴ Chorus has advised that any anomalies or errors are due to the complexities of the backhaul portfolio. This is driven by overlapping regimes with different pricing methodologies and because Chorus' backhaul portfolio has been built up over time to address various situations.

¹⁵ Chorus "We are reviewing our backhaul portfolio and require your input" (22 November 2018). See <https://sp.chorus.co.nz/product-update/we-are-reviewing-our-backhaul-portfolio-and-require-your-input>.

- 1.48 The routes on which this pricing currently applies tend to be longer and carry less traffic compared to the rest of Chorus' network ie, higher cost. However, as this pricing formula is based on the international benchmark information available in 2008, we expect that costs on these routes have come down below the regulated benchmarks, as we discuss further in chapter 4.
- 1.49 We will consider the need for any re-benchmarking, and/or the addition of regulated service-agnostic backhaul services as part of the copper review, which we are required to complete prior to 2025. The extent to which Chorus uses its current consultation process to address this issue (and others raised in this Study) will be one of the factors informing the timing of our next review.

Future regulation of backhaul

Backhaul services under Schedule 1 of the Act

- 1.50 We are required to complete a copper review for Chorus' UBA backhaul and UCLL backhaul networks by no later than 31 December 2025.¹⁶ We intend to re-look at backhaul during this review.

Backhaul services under Part 6 of the Act

- 1.51 The scope of services that will be regulated under Part 6 of the Act will be determined in regulations made under s 226 of the Act. At this time, the regulations are not yet published, but it is possible that some backhaul services within Chorus' fibre candidate areas (eg, ICABS) may be regulated.
- 1.52 Accordingly, from 1 January 2022, Chorus may have some of its backhaul revenues captured under the overall maximum allowable revenue cap, and potentially future price caps on some services.
- 1.53 Chorus' provision of backhaul services within UFB and UFB2/2+ areas will serve a significant proportion of New Zealand consumers. We will consider the need for any further regulation of intra-regional backhaul within these areas after the coverage of Part 6 regulations is determined.¹⁷

¹⁶ In accordance with section 69AH(1)(a) of the Act. The review must consider whether Schedule 1 should be altered, amongst other things, by adding or omitting a telecommunications service in respect of certain services – including Chorus' UBA backhaul and UCLL backhaul services.

¹⁷ Service-agnostic intra-regional backhaul between local exchanges and the UFB POI in UFB1 areas from 1 January 2022, and the UFB POI for UFB2/2+ areas from 1 January 2025.

- 1.54 However, until there is more clarity on the extent of Part 6 regulations, we consider that it would be inappropriate to consider further price regulation of intra-regional backhaul.

Backhaul services not regulated under the Act

- 1.55 Some backhaul services are currently not regulated under the Act and will not be able to be made subject to Part 6 regulation when it comes into force on 1 January 2022. These include:

1.55.1 service-agnostic inter-regional backhaul; and

1.55.2 service-agnostic intra-regional backhaul outside UFB1 and UFB2/2+ areas.

- 1.56 We expect to look at backhaul services outside the Part 6 regulation during our copper review.

Ongoing monitoring

- 1.57 We will continue to monitor the availability and prices of the different commercial backhaul services in Chorus' portfolio on an ongoing basis as part of our section 9A functions.

Chapter 2 Background of our study

Purpose of this chapter

- 2.1 This chapter sets out the background of our study:
 - 2.1.1 re-visiting the original scope of the study, and our preliminary questions;
 - 2.1.2 providing an overview of stakeholders' responses to our Preliminary Questions Paper;
 - 2.1.3 refining the scope of our study to focus on matters raised by stakeholders; and
 - 2.1.4 steps subsequently taken to obtain further information from Chorus.

Commencement of our study

- 2.2 In August 2016 we commenced our study by publishing a Preliminary Questions Paper.¹⁸ Our preliminary questions were split into five sections:
 - 2.2.1 technical features of domestic backhaul or transmission capacity services;
 - 2.2.2 understanding supply of domestic backhaul services;
 - 2.2.3 understanding demand for domestic backhaul services;
 - 2.2.4 understanding how domestic backhaul services are priced; and
 - 2.2.5 assessing competition in the provision of domestic backhaul services.

Responses to our Preliminary Questions Paper

- 2.3 Responses to our Preliminary Questions Paper indicated that there are parts of the backhaul sector that appear to be competitive and functioning well. That is specifically inter-regional services and some intra-regional services around urban centres where the UFB roll-out is complete.

¹⁸ Commerce Commission "A Section 9A Backhaul Study - Preliminary questions in understanding domestic backhaul services" (12 August 2016).

2.4 However, potential issues were raised in respect of the following geographic dimensions:

2.4.1 intra-regional backhaul services (outside the main urban centres); and

2.4.2 inter-regional backhaul services (between some major urban centres).

High prices for intra-regional backhaul

2.5 Several submissions noted they have not observed material reductions in the price of commercial backhaul outside of the main inter-regional links. Submissions also raised concerns that backhaul prices on intra-regional links might not be reflective of efficient costs and that this might limit the roll-out of access technologies at the edge of the network.¹⁹

2.6 Specifically, Spark questioned whether Chorus' use of regulated backhaul service prices to set the price of its commercial services on low-demand intra-regional links is reflective of efficient costs.²⁰

2.7 The joint Internet NZ and TUANZ submission expressed concern that a lack of competition in backhaul might inefficiently limit the roll-out or performance of contemporary access technologies at the edge of the network.²¹ Chorus submitted that higher prices on intra-regional links are reflective of higher costs and not a function of the absence of competition.²²

¹⁹ Spark "The Section 9A Backhaul Study - Submission Commerce Commission" (23 September 2016) p 16; UFF "Submission on preliminary questions in understanding domestic backhaul services" (23 September 2016) p 3; 2degrees "Section 9A Backhaul Study - Response to submissions on the Commerce Commission preliminary questions" (14 October 2016) p 2.

²⁰ Spark "The Section 9A Backhaul Study - Submission Commerce Commission" (23 September 2016) p 19.

²¹ TUANZ and InternetNZ "Submission by InternetNZ and TUANZ on the Section 9A Backhaul Study" (23 September 2016) p 5.

²² Chorus "Submission in response to the Commerce Commission's Section 9A Backhaul Study" (23 September 2016) p 32.

Exclusionary prices for inter-regional backhaul

- 2.8 It was generally accepted by submitters that (significant) reductions had occurred in the prices of inter-regional backhaul services, such as Chorus' CRT service.²³ Spark considered this to be the result of the intensification of competition and newer, cheaper technologies.²⁴
- 2.9 However, Kordia raised concerns about price changes that reportedly dropped CRT prices by between 50-75% of the rates then offered by competitors to Chorus. It noted that CRT pricing between some centres is now so low that it does not financially stack up for other service providers to compete for these backhaul services.²⁵
- 2.10 Spark noted it is difficult to determine whether Chorus' pricing behaviour is a response to competition or strategic pricing behaviour intended to deter competitive investment.²⁶ Neither Spark nor other submitters provided evidence of potential competitors planning to build new backhaul links and these plans being disrupted by a threat or actual action from Chorus.

²³ Chorus "Submission in response to the Commerce Commission's Section 9A Backhaul Study" (23 September 2016) para 26.

²⁴ Spark "The Section 9A Backhaul Study - Submission Commerce Commission" (23 September 2016) p 15.

²⁵ Kordia "Kordia's response to the Commission's Preliminary questions in understanding domestic backhaul services" (23 September 2016) p 7.

²⁶ Spark "The Section 9A Backhaul Study - Submission Commerce Commission" (23 September 2016) p 19.

Other concerns raised with Chorus' backhaul portfolio

Bundling of services

2.11 Kordia mentioned Chorus' ability to vertically integrate in its submission:²⁷

Kordia is of the view that Chorus' recently announced offer of tail extension services threatens competition in the domestic backhaul services market. The tail extension service is essentially a vertically integrated backhaul option that will allow RSPs to have individual customer circuits delivered from the local handover location to the closest of one of (currently) five regional points of interconnect for a small incremental cost to the UFB access circuit.

The vertical integration of Chorus to provide both access and backhaul may discourage investment in backhaul networks in the future and this could impact market price, coverage, market choice and competition and also the resilience of our national backhaul infrastructure due to lack of alternative networks.

2.12 Similarly, Spark raised concerns about Chorus' ability to aggregate traffic across access and backhaul services:²⁸

Chorus is uniquely placed to aggregate traffic from backhaul services, and from traffic embedded within access services such as UBA and from RBI services for which is subsidised by the Crown. Accordingly, other operators are unlikely to be able to match Chorus' cost structure on any given intra-regional route simply due to the volume of traffic Chorus can uniquely aggregate.

For example, ..., a competing overbuilding operator could expect to competitively pick up a share of business data, wireless backhaul and public switched telephone network related traffic. However, Chorus UBA (funded through the monthly UBA charge), RBI and Baseband Internet Protocol (IP) related traffic is embedded within access services and is not available to a competing provider.

Transparency on availability and prices

2.13 Submitters (other than Chorus) are concerned by Chorus' pricing practices, including the lack of transparency. Heartland Connectivity noted that there is great variety in the availability of backhaul services and often there are long delays in determining service availability.²⁹

2.14 However, no submitters provided specific examples of customers (or potential competitors) delaying or cancelling investment in the backhaul network or in downstream services because of lack of transparency on Chorus' backhaul prices.

²⁷ Kordia "Kordia's response to the Commission's Preliminary questions in understanding domestic backhaul services" (23 September 2016) para 7(ii).

²⁸ Spark "Cross-submission on Section 9A backhaul study" (14 October 2016) para 20.

²⁹ Heartland Connectivity "Submission on Section 9A Backhaul Study" (23 September 2016) para 8.

Narrowing the scope of our study

- 2.15 Following consideration of submissions on our Preliminary Questions Paper, we decided to narrow the scope of our study, and investigate the following potential issues related to the price and non-price terms on which Chorus offers backhaul services on different links:
- 2.15.1 where it does not face competition (ie, intra-regional/rural links) Chorus could be exploiting its market power by charging prices that are not reflective of efficient costs (ie, excessive prices);
 - 2.15.2 where it may be engaging in strategic behaviour aimed at distorting or eliminating competition in the (potentially) competitive parts of the backhaul network (eg, on inter-regional links) through prices that are below the profit-maximizing level (ie, exclusionary or predatory prices);
 - 2.15.3 a possible lack of transparency on how Chorus prices individual backhaul links is resulting in lower investment in the backhaul sector or in downstream (broadband) markets; and
 - 2.15.4 where bundling of backhaul links, via services such as Chorus' TES and All of Business (**AoB**) deals, may represent anti-competitive discounts on Chorus' standard link by link prices.

Obtaining further information from Chorus

- 2.16 Following the submissions received on our Preliminary Questions Paper we needed more information to assist our evaluation of the issues that were raised.
- 2.17 In early 2018, we issued a section 98 notice requesting information from Chorus to help us assess:³⁰
- 2.17.1 the availability of different backhaul services on different links, including the importance of each backhaul link in terms of distance covered and access connections to the relevant exchange;
 - 2.17.2 the factors that impact the prices of backhaul services offered by Chorus, including the technology deployed and/or presence of competition; and
 - 2.17.3 the terms of any commercial contracts where Chorus contracted to supply backhaul services at prices below its standard prices for each service.

³⁰ In accordance with s 15(1)(f) of the Act.

2.18 Following Chorus' response we issued a further section 98 notice in late 2018 to clarify additional questions we had on the availability and prices of Chorus' portfolio of backhaul services.

Chapter 3 What we investigated

Purpose of this chapter

- 3.1 This chapter sets out what we investigated during this study, and the reasons why. Chapter 4 follows on by providing our key findings on each issue.
- 3.2 Our study investigated potential issues:
 - 3.2.1 related to Chorus' pricing of backhaul services:
 - 3.2.1.1 is there evidence of harm to customers or end-users from potentially excessive prices on some intra-regional links?
 - 3.2.1.2 is there evidence of harm to competition in the backhaul sector from potentially exclusionary (predatory) prices on some inter-regional links?
 - 3.2.1.3 is the lack of transparency on how Chorus prices individual backhaul links resulting in lower investment in the backhaul sector or in downstream (broadband) markets?
 - 3.2.2 related to Chorus' bundling of backhaul services:
 - 3.2.2.1 is there evidence of harm to competition in the backhaul sector from the prices of vertical or horizontal bundles involving backhaul services?
- 3.3 Reduced competition in the backhaul sector could result in long-term harm to end-users of telecommunication services in New Zealand because of higher backhaul prices or less choice in backhaul providers for RSPs and mobile operators in the long-term.

Pricing of backhaul services

Are prices on intra-regional links high (excessive)?

- 3.4 Following submissions on the Chorus pricing of backhaul services on intra-regional links, we wanted to understand:
- 3.4.1 whether Chorus is exploiting its market power on backhaul links where it does not face competition by charging prices (substantially) above efficient costs (ie, excessive prices); and
 - 3.4.2 whether such high (excessive) prices on some backhaul links (and particularly on intra-regional links priced at 'legacy' commercial rates) were having a negative impact both on end-users and on competition between RSPs.³¹
- 3.5 We specifically considered:
- 3.5.1 growth in demand (measured by the total access lines at the local exchange) for backhaul links priced by Chorus at legacy commercial prices relative to the growth in demand for backhaul links priced at next generation commercial prices;
 - 3.5.2 the extent to which Chorus faces competition on intra-regional links where it charges legacy commercial prices;
 - 3.5.3 whether there is evidence of Chorus responding to potential or actual entry on backhaul links by immediately lowering (or threatening to lower) prices; and
 - 3.5.4 whether there is evidence of impact on end-users in the form of higher broadband prices, data volume restrictions or less choice of retail providers in areas where backhaul to the local exchange is priced by Chorus at legacy commercial prices.

³¹ As explained in paragraph 1.40.1 above, Chorus currently sets its 'legacy' commercial backhaul prices using the formula set by the UBA STD for the regulated UBA/UCLL backhaul product.

- 3.6 If prices on some (intra-regional) backhaul links are significantly above efficient costs:
- 3.6.1 retail competition might be harmed in areas with high backhaul prices if some retail providers are excluded from the market due to high backhaul costs (ie, end-users will have less choice in broadband providers);
 - 3.6.2 end-users might be paying more (at least in the short-term) for their broadband services than they would be in a workably competitive market due to the higher costs for backhaul faced by RSPs; but
 - 3.6.3 potential profits made on those links might encourage entry in the backhaul sector – if such entry was efficient, this could benefit end-users through a more competitive backhaul sector in the long-term.
- 3.7 In theory, Chorus should not be able to sustain prices significantly above efficient costs on backhaul links where there is sufficient demand to allow for efficient entry by a competitor unless Chorus engaged in strategic behaviour to protect its monopoly on such links or unless there were other significant barriers to entry.
- 3.8 Even in the absence of evidence of such strategic behaviour, we might be concerned if potentially excessive prices on some intra-regional backhaul links were resulting in less competition in the retail broadband market. This could lead to less choice or higher prices for broadband packages for end-users in New Zealand.

Are prices on inter-regional and intra-regional links exclusionary (predatory)?

- 3.9 Stakeholders (Kordia and Spark) raised concerns that Chorus' backhaul prices on some inter-regional links might be so low as to make entry by competing providers uneconomical.³² Submissions provided no specific evidence of strategic pricing behaviour by Chorus aimed at deterring entry or eliminating existing competition.

³² Kordia "Kordia's response to the Commission's Preliminary questions in understanding domestic backhaul services" (23 September 2016) p 7. Also see para 2.8-2.10 of this paper.

- 3.10 We investigated whether there was any evidence that Chorus set its prices for its inter-regional backhaul service (CRT) and its intra-regional backhaul service in UFB1 areas (ICABS):
- 3.10.1 at levels intentionally below its costs of providing the product aimed at weakening competition in the future; and
 - 3.10.2 in ways specifically targeted to areas where Chorus faced actual (or potential) competition in the backhaul sector that could have led to competitors being excluded from the market.
- 3.11 We also considered whether Chorus had established a reputation in the market for pricing strategically to deter entry, thus making the mere threat of lowering backhaul prices after entry a credible deterrent to investment in the sector.
- 3.12 If Chorus' prices on some (inter-regional) links are too low (ie, predatory):
- 3.12.1 in the short-term this would benefit RSPs (and ultimately end-users) through the lower prices paid for backhaul on these links than would be the case in a workably competitive market; but
 - 3.12.2 such prices could act as a barrier to market entry and thus, could have a negative long-term effect on network competition.³³ If this were the case, customers (and ultimately end-users) are likely to have less choice of providers and pay higher prices for backhaul in the long-term.
- 3.13 It is often difficult to distinguish between low prices that are the result of competition in the market and 'predatory' prices that are likely to have a strategic exclusionary effect.³⁴
- 3.14 Competition enforcement agencies in different jurisdictions use different tests for 'predation', usually linked to some measure of costs, combined with either evidence of exclusionary intent or the probability of recoupment.

³³ Both on links where prices are currently low and, through the reputational effects, on links where prices are currently high, but Chorus has the option of decreasing prices if faced with potential entry.

³⁴ Spark acknowledges this issue in their submission. See Spark "The Section 9A Backhaul Study - Submission Commerce Commission" (23 September 2016) p 19.

- 3.15 The intent of these tests is to determine whether low prices charged by a company are likely to have an exclusionary effect on the market (and thus, could be defined as 'predatory').³⁵ In New Zealand, the test for predatory pricing involves demonstrating that a business:
- 3.15.1 is pricing below an appropriate measure of production costs; and
 - 3.15.2 has the ability to recover its losses by increasing its prices in the future, without having to worry about competitors entering the market.³⁶
- 3.16 Depending on the product or service in question and market conditions, however, there are situations where:
- 3.16.1 there are pro-competitive justifications for below cost pricing, eg, in the case of introductory offers; or
 - 3.16.2 prices above costs could still have exclusionary effects, especially in cases of asymmetric costs between the incumbent firm and other (potential) market participants or in cases where prices below the profit-maximizing level could only be explained by their effect on weakening future competition.³⁷
- 3.17 As explained in Chapter 1, backhaul services are provided over a network, where the costs of providing a specific backhaul service of a given bandwidth over a given link are likely to be shared to a significant extent with several other telecommunication services. For example, different bandwidth backhaul (eg 1Gb, 10Gb or 100Gb) or backhaul carrying different access traffic (eg, UBA backhaul vs ICABS vs Direct Fibre Access Service (**DFAS**)).

³⁵ For a survey of the different tests and cost standards used by individual agencies, see Unilateral Conduct Working Group, International Competition Network "Report on Predatory Pricing" (2008) www.internationalcompetitionnetwork.org/wp-content/uploads/2018/07/UCWG_SR_PredPricing.pdf Chapter II.

³⁶ See Commerce Commission "Fact Sheet: Taking Advantage of Market Power" (July 2018) https://comcom.govt.nz/_data/assets/pdf_file/0041/89897/Taking-advantage-of-market-power-Fact-sheet-July-2018.pdf.

³⁷ For an overview of the issues that can arise when using a pure cost-based standard to determine whether prices are likely to have an exclusionary effect, see Katz, Michael "Exclusionary Conduct in Multi-Sided Markets" (15 November 2017) [https://one.oecd.org/document/DAF/COMP/WD\(2017\)28/FINAL/en/pdf](https://one.oecd.org/document/DAF/COMP/WD(2017)28/FINAL/en/pdf) Chapter 3.1.

- 3.18 Further, the costs of providing backhaul have a significant up-front investment component (eg, the network build-out or technology upgrades) and fairly low ongoing costs (eg, for maintenance).
- 3.19 Even assuming there was agreement on the appropriate cost standard that should be used in a test for predation, establishing the correct cost level for individual backhaul services to which prices should be compared would be an extensive exercise that is likely to require several assumptions for allocating costs.
- 3.20 We therefore concentrated our investigation on whether Chorus' CRT and ICABS prices had the intent or effect of excluding competitors from the backhaul sector (rather than on price-cost comparisons).

Transparency of Chorus' backhaul portfolio

- 3.21 It has taken substantial effort on our part to understand Chorus' backhaul portfolio (availability and pricing), which raised concerns about the level of complexity and apparent lack of clarity. This led us to investigate whether this lack of transparency may be disincentivising investment:
 - 3.21.1 in downstream services – eg, by RSPs or mobile operators considering expansion in a given area; or
 - 3.21.2 in backhaul services by competing network operators – eg, because of confusing or inaccurate signals on the revenues that could be earned on a given link.
- 3.22 We note that increased market transparency could:
 - 3.22.1 lead to potential benefits for end-users through incentivising efficient investment in either downstream markets or in the backhaul sector; but
 - 3.22.2 these benefits would have to be weighed against the potential detriment to competition that could result from the increased scope for coordination between backhaul suppliers in a more transparent market.

Bundling of backhaul services

3.23 Following submissions on the Preliminary Questions Paper, we wanted to understand whether the bundling of backhaul products could lead to long-term harm to end-users by discouraging entry into the backhaul sector or in downstream markets. Specifically:

3.23.1 whether horizontal bundling of contested and uncontested backhaul links by Chorus (including through discounts or AoB deals) might have the effect of protecting Chorus' monopoly on uncontested links; and

3.23.2 whether horizontal and vertical bundling of one (or more) backhaul links with an access product might have the effect of reducing the contestability of the backhaul sector and thus, act as a barrier to entry into the sector.

Bundling of contested and uncontested backhaul links

3.24 Chorus could reduce the level of contestability on links where competitors are present (or are considering entry) to deter entry by:

3.24.1 offering discounts on its uncontested backhaul links conditional on purchasing backhaul from them on contested (or potentially contestable) links; or

3.24.2 tying the purchase of backhaul on uncontested links with the purchase of backhaul on contested (or potentially contestable) links through AoB deals.

Bundling backhaul links with an access product

3.25 The availability of bundles of backhaul and access links sold on a per-connection basis, such as Chorus' TES services could lower the barrier to entry for new RSPs while they build up their customer base.³⁸ As such, these types of bundles could promote retail competition which would be to the long-term benefit of end-users.³⁹

³⁸ TES services bundle an access service (eg, UBA or fibre access) with a backhaul service to the local or regional POI. This form of bundling has both vertical aspects (with the access product) and horizontal aspects (multiple backhaul links, eg, the link between the local exchange and the UBA POI is sold in a bundle with the link between the UBA POI and the regional POI). Chorus has a range of TES services depending on the access product included in the extension service - eg, UBR Backhaul.

³⁹ While the two services are not directly comparable, the price per implied connection is higher for TES than the price of stand-alone backhaul services (sold per link) for higher volumes of connections. For example, purchasing 10G of bandwidth on a link of up to around 100km in radial distance would require approximately 100 connections for the ICABS product sold on a per-link basis to be priced lower than the required number of TES connections. This 'break-even' point is greater for longer distances.

- 3.26 However, TES-style pricing may make it more difficult for a potential entrant in the backhaul sector to reach the necessary scale (ie, attract enough demand) to make entry profitable on a given backhaul link.
- 3.27 Accordingly, bundling backhaul links with access products could have a negative impact on potential competition in the backhaul sector in the long-term, particularly where TES combine backhaul on contested (inter-regional) links with backhaul on uncontested (intra-regional) links.

Chapter 4 Key findings from our study

Purpose of this chapter

- 4.1 Following on from chapter 3, which set out potential issues, this chapter provides our key findings on these issues.

Our findings on Chorus' pricing of backhaul services

Are prices on intra-regional links high (excessive)?

- 4.2 We found no clear evidence of any direct impact on end-users in areas with high backhaul prices.
- 4.2.1 As RSPs tend to set and market nationwide prices for the different broadband packages, end-users in areas with high intra-regional backhaul prices are not subject to higher retail broadband prices than end-users in areas with lower backhaul prices.
- 4.2.2 However, to the extent that the prices on some intra-regional backhaul links do not reflect efficient costs, these higher backhaul costs might be passed on to end-users through higher nationwide retail prices, than would be the case in a workably competitive market.

Intra-regional prices

- 4.3 Chorus confirmed that legacy commercial backhaul services on intra-regional links that do not connect a local exchange to a UFB1 designated POI are priced using the Commission's 2008 pricing methodology. This methodology was developed for setting the maximum price of regulated copper backhaul services, specifically UCLL and UBA backhaul.
- 4.4 These legacy commercial prices of intra-regional backhaul are significantly higher than the Chorus prices of commercial backhaul on inter-regional links (ie, CRT prices) and intra-regional links in UFB1 areas (ie, ICABS prices).
- 4.5 Spark provided examples in their submission where a backhaul service priced at legacy commercial rates by Chorus was over ten times more expensive than a backhaul service with the same bandwidth over a similar or shorter distance priced at the CRT rates.⁴⁰

⁴⁰ Spark "The Section 9A Backhaul Study - Submission Commerce Commission" (23 September 2016) p 7 and p 15.

- 4.6 Our investigation confirmed that Chorus' prices for legacy commercial backhaul services were multiple times [] higher (on a \$/km basis) than the ICABS prices for equivalent bandwidth backhaul on average. The differences were even larger if legacy commercial prices were compared to CRT prices.
- 4.7 Chorus submitted that the higher prices on intra-regional backhaul links outside UFB1 areas are reflective of the higher costs of supplying backhaul in remote or rural areas.⁴¹
- 4.8 Both Spark and 2degrees acknowledge that it costs more to reach more dispersed locations outside of New Zealand's major cities and larger towns, even with lower technology costs.⁴²
- 4.9 We accept there may be additional costs to providing backhaul services to outlying geographic regions, outside of the UFB1 areas, where traffic volumes are low. It is also likely that CRT or ICABS backhaul can be delivered at a lower unit price than legacy backhaul because backhaul on inter-regional links and UFB intra-regional routes is delivered using newer high capacity dense wavelength division multiplexing technology.

⁴¹ Chorus "Submission in response to the Commerce Commission's Section 9A Backhaul Study" (23 September 2016) pp 6-8 and 32.

⁴² Spark "The Section 9A Backhaul Study - Submission Commerce Commission" (23 September 2016) p 19; 2degrees "Section 9A Backhaul Study - Response to submissions on the Commerce Commission preliminary questions" (14 October 2016) p 2.

- 4.10 We consider that some of the price difference between legacy commercial backhaul prices and the CRT/ICABS prices could be explained by the disproportionately low customer base over which the fixed network costs are recovered on these intra-regional links. In particular:
- 4.10.1 while a significant majority [] of Chorus' intra-regional backhaul links are priced as legacy commercial services (at the regulated rate), we observed that these links account for only a relatively small share [] of the total business and end-user active lines on Chorus' network; and
- 4.10.2 we found that legacy commercial backhaul links account for a significantly larger proportion of the total Chorus backhaul network length [] than their share of the total active lines on Chorus' network [].⁴³
- 4.11 It is also possible these intra-regional backhaul links outside UFB1 areas incur additional maintenance costs because of their remoteness and dependency on old technologies.

Impact on end-users

- 4.12 Backhaul costs form part of the retail prices that RSPs charge their end-users. The higher backhaul prices on some intra-regional links add to the total backhaul costs faced by RSPs. Therefore, to the extent that these backhaul prices do not reflect efficient costs, they could lead to higher retail prices for all end-users than would be the case in a workably competitive market.
- 4.13 As RSPs generally market and price their retail offerings at a national level, they would carefully consider the additional cost of serving end-users in areas with higher backhaul costs. RSPs could recover these costs from all end-users (not just the end-users in higher cost areas), or follow a regional strategy, which could include pricing or availability aspects (eg, only offer a subset of retail plans).

⁴³ The majority of backhaul links on Chorus' network are priced based on the radial distance between exchanges. We therefore considered it appropriate to use radial distances to represent the backhaul network length that a customer that needed national backhaul coverage in New Zealand would have to purchase. As explained above at paragraph 1.15, customers may have more than one options for the POI where traffic is aggregated - for example, the local UFB POI for a given exchange might be different from the local UBA POI. To estimate the total network length we assumed that traffic is aggregated in the first instance at the local UFB POIs for each exchange. However, the results are not materially different if we assume that traffic is aggregated at the local UBA POIs.

- 4.14 We considered whether high backhaul prices might have an impact on end-users in these areas (relative to end-users in areas where Chorus' ICABS backhaul product is available). We specifically compared whether end-users in areas served by legacy commercial intra-regional backhaul services:
- 4.14.1 incur higher prices for their broadband;
 - 4.14.2 have less choice in retail providers eg, because RSPs choose not to enter areas with high backhaul prices; or
 - 4.14.3 face data restrictions eg, because RSPs try to moderate demand by only offering packages with data caps.
- 4.15 We surveyed the availability and prices of naked, unlimited broadband plans over Digital Subscriber Line (**DSL**) technology on a 12-month contract offered by six broadband providers at a total of 100 exchange areas.⁴⁴ ⁴⁵We found no clear evidence of impact on end-users in areas with high backhaul prices as:
- 4.15.1 on average, end-users in areas where the backhaul link is priced at legacy commercial (regulated) rates, paid similar retail prices for unlimited broadband packages over DSL technology as end-users in areas where the backhaul link is priced at next generation commercial terms; and
 - 4.15.2 end-users generally have the same level of choice, in terms of retail providers, irrespective of backhaul prices.
- 4.16 The results of our survey are summarised in Table 4.1.

⁴⁴ The six broadband suppliers surveyed included Vodafone, Spark, 2Degress, Voyager, My Republic and Trustpower. Collectively, these suppliers account for between 80-90% of all residential broadband connection in New Zealand. We focused on DSL (ADSL or VDSL) broadband plans because Chorus' ICABS backhaul product is generally (but not exclusively) available in areas where fibre roll-out to end-user premises is significantly advanced or completed. Conversely, in areas where only legacy commercial backhaul is available from Chorus, fibre roll-out is generally either in early stages or not yet begun/planned. Where unlimited broadband packages over fibre are available to end-users, those offer significantly higher speeds than unlimited DSL packages and are, on average, associated with higher monthly prices.

⁴⁵ The sample was drawn randomly from all Chorus exchanges. It included 50 exchanges where ICABS backhaul is available to the local exchange and 50 exchanges where only legacy commercial backhaul is available. The sample included exchanges in both the South and North islands.

Table 4.1 Comparison of retail providers and prices/speeds of DSL broadband plans in areas served by different backhaul services⁴⁶

Backhaul Product Type to the Local POI	Avg Number of Providers of DSL Unlimited Plans	Avg Maximum Download Speed (mbps)	Avg Price of the Cheapest Offer (\$/month)
Legacy commercial	5	89	\$ 77
ICABS	4	88	\$ 79

4.17 We considered the compound annual growth rate (**CAGR**) of data consumption in 71 districts in New Zealand relative to the share of active lines in the districts served from exchanges where only legacy commercial backhaul is available from Chorus.⁴⁷ As illustrated in Figure 4.1, we found no evidence that average data consumption at a district level was negatively affected by higher backhaul prices to the local exchange as:

4.17.1 data consumption grew at approximately the same rate across the vast majority of New Zealand districts, irrespective of the type of backhaul available to the local exchange;⁴⁸ and

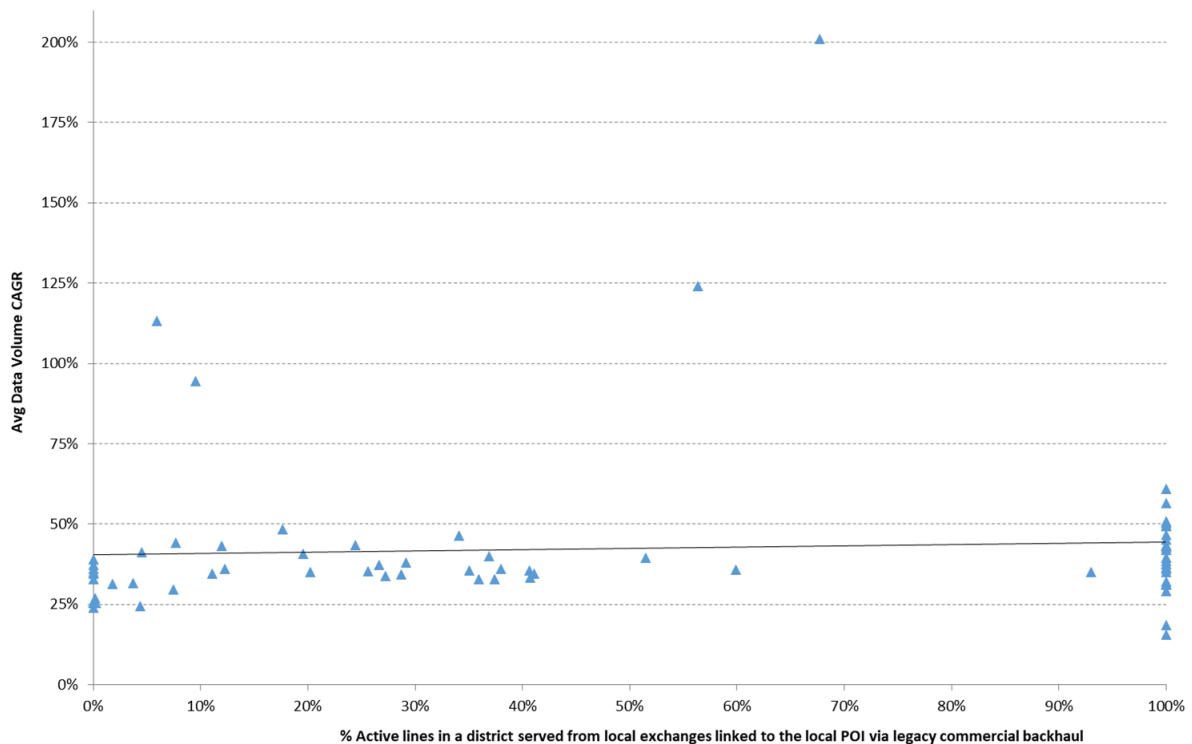
4.17.2 this implies that end-users in areas served by higher cost backhaul are not subject to material location-specific retail-level data restrictions.

⁴⁶ Information sourced from operator websites (accessed January 2019). These were: 2degrees: www.2degreesmobile.co.nz/broadband/; Vodafone: www.vodafone.co.nz/broadband/internet-plans/; Spark: www.spark.co.nz/shop/internet/#/; My Republic: <https://myrepublic.net/nz/>; Voyager: <https://voyager.nz/home>; Trustpower: www.trustpower.co.nz/plan-builder

⁴⁷ Based on data on monthly average data volumes by district provided by Chorus for the period October 2015 to December 2017.

⁴⁸ There is no statistically significant relationship between the growth rate of data consumption by district and the prices of backhaul available at the local exchange, even when we controlled for other factors such as the size of the exchange (in terms of active lines connected in September 2018 or the average volume consumed by each exchange in January 2016) or the growth rate of average speeds during the period.

Figure 4.1 Growth in data used by district's share of exchanges with legacy commercial backhaul⁴⁹



4.18 We found no evidence that the prices of backhaul to the local exchange affected the growth rate of broadband and data connections in the area. We considered:

4.18.1 the CAGR of the number of active lines connected to a given exchange in the three-year period between March 2014 and March 2018 relative to the size of the exchange;⁵⁰ and

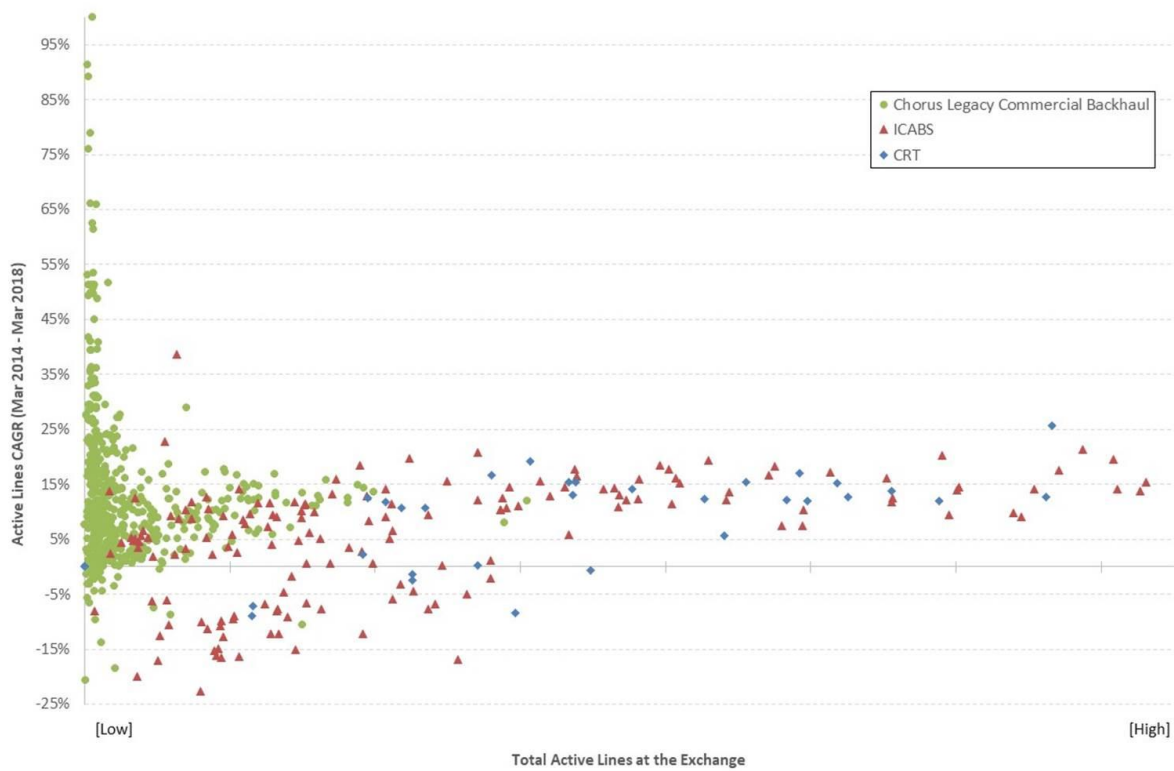
4.18.2 the type of backhaul pricing available from Chorus to the exchange.

4.19 Figure 4.2 illustrates that while backhaul at next generation (CRT or ICABS) commercial prices tend to be offered by Chorus at larger exchanges, these exchanges did not grow faster (in terms of active lines connected to the exchange) in the last three years than exchanges where backhaul is only available at legacy commercial prices by Chorus.

⁴⁹ Information sourced as part of our Telecommunications monitoring report process and provided by Chorus in response to our s 98 notice.

⁵⁰ Measured by the total active lines connected to the exchange in September 2018.

Figure 4.2 Growth in connections by exchange size and backhaul availability⁵¹



4.20 We note that Chorus tends to offer cheaper commercial intra-regional backhaul services (ICABS) at exchanges where UFB1 roll-out is completed or is near completion. If Chorus expands ICABS availability (or a similarly low priced backhaul service) in line with the UFB1 and UFB2 networks, the share of end-users potentially affected by high backhaul prices will drop significantly in the next three to four years (from 21% in September 2018 to only 6% by the end of 2022).⁵²

4.21 Higher prices for intra-regional backhaul in some areas do not appear to have negatively affected end-user demand for broadband connections or for data volumes consumed. However, we note that this could be because the demand for broadband data is inelastic and largely driven by factors other than price.

⁵¹ Chorus information provided in response to our s 98 notice. For clarity of presentation, [] exchanges each with more than [] active lines in September 2018 are not illustrated on the chart.

⁵² Proxied by the total number of active connections to a given exchange.

- 4.22 We consider that the substantially higher prices charged by Chorus for legacy commercial backhaul services are likely to have some impact on end-users overall through the higher overall costs for backhaul faced by RSPs. We therefore plan to monitor the developments in the backhaul sector going forward.⁵³

Chorus' use of regulated backhaul pricing methodology

- 4.23 Chorus' use of the pricing formula set for regulated UBA/UCLL backhaul in 2008 is likely to over-state the price level an updated benchmarking exercise would produce because:
- 4.23.1 modern equivalent backhaul technologies have significantly lower unit costs for a given level of capacity than those available at the time of the STD; and
 - 4.23.2 market conditions, including traffic volumes carried, are significantly different for backhaul services available today from those that applied to the STD.
- 4.24 Chorus is free to price its commercial backhaul services as it sees fit. For this reason, there is limited value in undertaking a price review of the backhaul services in Schedule 1 now.
- 4.25 However, we are required to complete a copper review for Chorus' UBA backhaul and UCLL backhaul network by no later than 31 December 2025.⁵⁴ We intend to re-look at backhaul and the ongoing suitability of Schedule 1 services during this review.

⁵³ See paragraphs 1.50-1.57 of this document.

⁵⁴ In accordance with section 69AH(1)(a) of the Act.

Are prices on inter-regional and intra-regional links exclusionary (predatory)?

4.26 We found no evidence that Chorus' commercial pricing on inter-regional (CRT) and intra-regional (ICABS) links is selectively available where Chorus faces competition in the backhaul sector.⁵⁵ Specifically:

4.26.1 Chorus faces competition for the supply of inter-regional backhaul at the vast majority of exchanges where it offers the CRT product, but there are a small number of exchanges [] where competitors are not present with their own inter-regional networks;⁵⁶

4.26.2 Chorus faces no competition for the supply of intra-regional backhaul by other network operators at the majority (approximately 90%) of all exchanges where it offers the ICABS product; and

4.26.3 Chorus charges legacy commercial backhaul prices at some exchanges [] where it faces competition from at least one operator offering backhaul over their own network (or self-supplying backhaul).

4.27 On links where Chorus faces more competition - ie, inter-regional (CRT) links and intra-regional links in the Auckland and Wellington areas (Metro ICABS links) – in general Chorus offers lower prices than on intra-regional backhaul links where Chorus faces little or no competition (legacy commercial and ICABS links).

4.28 []. However, within these broad geographic categories:

4.28.1 Chorus' list prices do not vary depending on how many competitors are present on a given link; and

4.28.2 Chorus does not offer any discounts linked to the number of competitors on individual links.

⁵⁵ Competitors are not necessarily located at the same physical exchange as Chorus. We consider that an overlap exists if competitors are in the same locality (using geographical town names) as the Chorus exchange. This might understate the extent of competitors' networks as competitors do not have the same network configurations as Chorus and may have backhaul exchanges in locations where Chorus is not present (eg, Kordia).

⁵⁶ In all of these exchanges, however, there is at least one competitor present that wholesales backhaul links purchased from Chorus and re-sold to customers in a bundle with backhaul over their own network.

- 4.29 Internal Chorus documents we reviewed indicated that Chorus sets its CRT prices to:
- 4.29.1 respond to perceived market conditions in a way that was intended to cover the [] cost of providing the product;
 - 4.29.2 []; and
 - 4.29.3 provide a positive contribution to margins.
- 4.30 The documents we reviewed did not contain any information that indicated that Chorus targeted the availability of either the CRT or the ICABS services on specific links to respond to the presence (or expected entry) of backhaul competitors.
- 4.31 Finally, we have no evidence that Chorus has engaged in strategic behaviour threatening to lower backhaul prices on links where potential competitors considered investing in the backhaul network. For 'potential low pricing' to be an effective entry deterrent, Chorus would have to have a reputation of dropping prices after entry.

Transparency of Chorus' backhaul portfolio

- 4.32 We found no evidence of potential competitors planning to build new links and these plans being disrupted by a lack of transparency on Chorus' backhaul portfolio (availability and pricing).
- 4.33 As Chorus' pricing methodologies and backhaul service availability are not clear, we accept there is potential for misunderstanding and errors to occur in the application of pricing of backhaul services. This seems to lead customers and potential competitors to question Chorus' motives and intentions.

Clarity and application of pricing methodologies

- 4.34 We understand a provider may choose to price services based on a distance element assessed by the way of actual cable/road distances or radial (ie, line-of-sight) distances between exchanges. The choice of methodology for commercial services is the provider's, taking account of the needs and understanding of their customers, internal engineering and accounting practices and policies.

- 4.35 However, through our investigation we found:
- 4.35.1 instances where Chorus appears to be misapplying its own stated methodology; and
 - 4.35.2 anomalies that do not appear to be errors, but just general confusion around correct pricing and what backhaul service is available on each route.
- 4.36 The assignment of prices by the categorisation of distances into chargeable bands (eg, A, B, C, ...) is not an unusual industry practice, as it serves to simplify presentation of pricing and billing.⁵⁷
- 4.37 However, care needs to be exercised in the application of this methodology to prevent coding and classification errors occurring over time. Pricing errors can open the provider to criticism and can send incorrect signals to customers or potential providers of competing backhaul services.
- 4.38 If backhaul customers have a better understanding and visibility of the pricing methodology being applied, they will be better placed to check that they are being charged the correct amount.

Service availability

- 4.39 We found it difficult to confirm the availability of services at specific exchanges or the high-level business rules under which a service is deemed to be available at a given exchange.
- 4.40 We acknowledge that the lack of clarity on service availability does not appear to be a deliberate strategy by Chorus aimed at obstructing entry or investment plans by potential competitors.
- 4.41 For example, Chorus' internal documents stated that the proposed structure of CRT prices is:⁵⁸

to be transparent and provide certainty to our customers for their planning and scoping purposes.

⁵⁷ Regardless of whether the distance is measured on a radial or actual cable basis.

⁵⁸ Information provided by Chorus as part of our section 98 notice.

- 4.42 However, we found that the CRT product description document published on Chorus' website contained maps showing CRT availability at exchanges that Chorus clarified were included in the maps in error.⁵⁹
- 4.43 We have highlighted these errors to Chorus, who have fixed them by updating their website.

Bundling of Chorus' backhaul services

Tail Extension Service

- 4.44 Chorus' backhaul portfolio includes TES services, such as UBR Backhaul.⁶⁰ These services bundle an access service (eg, UBA or fibre access) with a backhaul service to the local or regional POI and are sold on a per-connection basis.⁶¹
- 4.45 This form of bundling has both:
- 4.45.1 vertical aspects - with the access service; and
 - 4.45.2 horizontal aspects with multiple backhaul links. For example, where the link between the local exchange and the UBA/UFB POI is sold in a bundle with the link between the UBA/UFB POI and the regional POI.
- 4.46 The availability of TES does not appear to be directly linked to backhaul links that are currently priced at legacy commercial (regulated) rates. Chorus offers TES over only a subset of all backhaul links in its network – specifically, TES including backhaul to the local or regional POI is offered at less than 20% [] of all exchanges.

⁵⁹ The information was last accessed by Commission staff on Chorus' website (<https://sp.chorus.co.nz/core-network/chorus-regional-transport>) on 29 March 2019. This page can now be found at <https://sp.chorus.co.nz/product/chorus-regional-transport-crt/support>.

⁶⁰ Chorus describes UBR Backhaul as a 'backend product which allows service providers to transport Basic Unbundled Bitstream Access (Basic UBA) traffic from any Handover Point'. Chorus "UBR Backhaul" (2019) <https://sp.chorus.co.nz/core-network/ubr-backhaul>. Chorus has a range of TES services depending on the access service included in the extension service (eg, UBA TES or HNSN TES).

⁶¹ Chorus advised that TES is offered where there is RSP demand to warrant Chorus investing in providing it, so it is a service driven by RSPs demand (where they do not want to buy bandwidth capacity and have to manage the service themselves).

- 4.47 Where Chorus does offer TES, in most cases [], the backhaul link included is along a route where it offers inter-regional (CRT) or an intra-regional (ICABS) service. There are only a small number [] of exchanges [] in Chorus' network, where the availability of TES combines an access product with a legacy commercial backhaul product priced at the regulated rate.⁶²
- 4.48 On balance, we consider that the current availability of TES is not likely to lead to long-term harm to end-users because:
- 4.48.1 TES allows RSPs with low volume demands to purchase backhaul 'as needed' (rather than buying 'blocks' of bandwidth), and thus could facilitate entry in the retail markets; and
 - 4.48.2 TES availability does not appear to be concentrated on uncontested backhaul links (priced at regulated rates) and thus, it does not appear to be strategically positioned to foreclose potential competitors in the backhaul sector.

All of Business deals

- 4.49 At this stage, we do not consider that AoB deals signed by Chorus could lead to exclusion of competitors from the sector. Our study established that Chorus [] does not offer any conditional discounts on non-contested backhaul links linked to purchases of backhaul from Chorus on contested links.

⁶² The [] exchanges that offer TES where one of the backhaul links is priced at legacy commercial rates account for only a small share [] of all backhaul links where Chorus offers only legacy commercial backhaul services sold at regulated prices.