

Public benefits and detriments from Telstra-TPG network sharing agreement

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Public version

Confidential to Telstra

Confidential to TPG

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Definitions

17% Regional Coverage Zone	The coverage area of the Multi-Operator Core Network services agreement. The area covers 81.4% to 98.8% of the Australian population.
ABS	Australian Bureau of Statistics
ACCC	Australian Competition and Consumer Commission
ACMA	Australian Communications and Media Authority
CCA	Competition and Consumer Act 2010
Counterfactual	The scenario where the Proposed Transaction is not implemented
EB	Exabyte
GB	Gigabyte
GDP	Gross Domestic Product
IoT	Internet of Things
LTE	Long Term Evolution
LTE-A	Long Term Evolution - Advanced
MBSP	Mobile Black Spot Program
MNO	Mobile Network Operator
MOCN	Multi-Operator Core Network
MORAN	Multi-Operator Radio Access Network
MVNO	Mobile Virtual Network Operator
Merger Authorisation Guidelines	ACCC October 2018 Merger Authorisation Guidelines
NPV	Net Present Value
NZCC	New Zealand Commerce Commissions
Optus	SingTel Optus Pty Limited
OTT	Over-the-Top
Proposed Transaction	The three interrelated commercial agreements that Telstra and TPG entered on 21 February 2022: The MOCN Service Agreement dated 17 February 2022, the Spectrum Authorisation Agreement dated 17 February 2022, and the Mobile Site Transmission Agreement dated 17 February 2022.
Radiocommunications Act	The Radiocommunications Act 1992 (Cth)
RAN	Radio Access Network
Outer Regional and Remote Coverage Zone	The area outside of the 17% Regional Coverage Zone where Telstra’s network provides coverage. That is, the coverage area between 98.8% and 99.5% of the population.
RTIRC Report	The 2021 Report prepared by the Regional Telecommunications Independent Review Committee
Telstra	Telstra Corporation Limited
TPG	TPG Telecom Limited
Tribunal	Australian Competition Tribunal



Summary of findings

1. I have been asked to examine the public benefits and detriments that are likely to arise from a proposed transaction between Telstra Corporation Limited (**Telstra**) and TPG Telecom Limited (**TPG**).

Context

2. The **Proposed Transaction** consists of three agreements which:
 - a. provide TPG with access to 4G and 5G Multi-Operator Core Network (**MOCN**) services in a regional area that covers approximately 17% of the Australian population (**the 17% Regional Coverage Zone**),
 - b. enable spectrum that TPG owns to be pooled with Telstra's spectrum and used by both parties, and enable Telstra to use certain spectrum in areas where the MOCN does not operate, and
 - c. transition the rights for up to 169 TPG sites to Telstra, to be operated as part of the MOCN.
3. Strong growth in demand for mobile broadband services means that Telstra's network is experiencing congestion, particularly at regional sites. Much of this congestion is related to the Radio Access Network (**RAN**), rather than backhaul constraints.
4. Access to additional spectrum, particularly sub-1 GHz, would allow Telstra to alleviate network congestion. However, Telstra is unlikely to have an opportunity to acquire additional spectrum through auction processes in the near term.
5. Without access to further spectrum, Telstra could build further sites to reuse spectrum and address congestion. However, this is highly unlikely to be economic in regional areas and in some cases is simply not practical due to unavailability of necessary sites.
6. By pooling the spectrum of TPG and Telstra, the Proposed Transaction will lessen congestion on Telstra's network in regional areas, improving service levels experienced by its customers, and avoiding costly site densification. The Proposed Transaction will also provide Telstra with wholesale revenue from the provision of MOCN access services.
7. For TPG, the Proposed Transaction increases its 4G network coverage to 98.8% of the population and increases 5G coverage to where it becomes available within the MOCN, allowing TPG to provide its customers with greater coverage than it is currently able to, including under its 3G roaming arrangement with Optus, which is also subject to technical and commercial limitations.

Public benefits and detriments of the Proposed Transaction

8. The types of public benefits and detriments that are relevant depend on the counterfactual. I consider the benefits and detriments in the following counterfactual scenarios which consider how TPG would provide coverage to its customers without the Proposed Transaction:

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- a. Status Quo - A situation similar to the current context where TPG owns its existing sites in the 17% Regional Coverage Zone and extends that coverage by purchasing 3G roaming services from Optus,
 - b. Updated Roaming Agreement – A situation where TPG and Optus agree on an updated roaming agreement which provides TPG with 4G roaming, and potentially provides 5G roaming at a later date.
 - c. A situation where TPG enters an alternative active network sharing arrangement – for example, a Multi-Operator Radio Access Network (**MORAN**) with Telstra, or a MOCN or MORAN agreement with Optus, and
9. When assessing the Proposed Transaction against the counterfactual described in 8a above, I find that the public benefits of the Proposed Transaction include:
- a. Economic and consumer benefits of less mobile congestion in regional areas. Indications from studies that examine the impact of mobile broadband on consumer benefits and Gross Domestic Product (**GDP**) are that the benefits could be in the range of billions of dollars over a 10-year period.
 - b. Public benefits of potentially bringing forward Telstra’s 5G roll-out in regional areas. By freeing up resources and capital that would otherwise be used to provide infill coverage to address congestion issues, the Proposed Transaction could bring forward 5G network expansion in regional areas. 5G networks open up a huge range of applications over many sectors, enabling consumer, social and economic benefits.
 - c. Public benefits of government funds being used to expand mobile coverage rather than to address congestion.
 - d. Productive efficiencies of Telstra (and/or the government) avoiding the costs of building new sites in the 17% Regional Coverage Zone because use of TPG’s spectrum will address congestion instead. I estimate the Net Present Value (**NPV**) of these productive efficiencies to be **[Confidential-Telstra ██████████]** by the end of 2031.
 - e. Dynamic efficiency benefits of enabling three full-service Mobile Network Operators (MNOs) to provide services in the 17% Regional Coverage Zone. Through its partnerships, TPG has access to significant international Internet of Things (**IoT**) expertise and innovative solutions. The extra innovation that is likely to arise in regional areas as result of TPG being a full-service provider of 4G and 5G services would likely bring significant consumer, social and economic benefits.
 - f. Productive efficiencies of TPG avoiding the costs of maintaining and upgrading at least 550 existing sites that will be decommissioned by TPG following the Proposed Transaction, and of TPG not needing to establish new sites in the 17% Regional Coverage Zone. I estimate the Net Present Value (**NPV**) of these productive efficiencies to be in the range of **[Confidential-TPG ██████████]** over a 10-year period.



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- g. Environmental benefits associated with point (f). These include avoiding the ongoing energy use for at least 550 TPG sites that will be decommissioned and new sites that TPG would have built in the 17% Regional Coverage Zone.
10. For the counterfactual described in 8 b, all of the types of benefits would be relevant except potentially for 9 e if the roaming agreement in the counterfactual provided 5G services to TPG.
 11. For the counterfactual described in 8 c, the relevant benefits include those described in paragraphs 9 a to d, but not e. Whether the benefits described in f and g are relevant would depend on how many sites are decommissioned under the alternative network sharing arrangement.
 12. Public detriments can in some cases include the effects of a lessening of competition. I have not been asked to consider the impacts of the Proposed Transaction on competition, so do not comment on whether these types of detriments exist. However, if the Australian Competition and Consumer Commission (ACCC), or any other party, were to conclude that the Proposed Transaction would lead to a lessening of competition in a relevant market (or markets), then the detriments associated with that lessening of competition would need to be assessed and weighed against the public benefits of the transaction. The analysis in my report identifies the public benefits that could be used in that analysis.
 13. I have not found any material detriments associated with Proposed Transaction.



1 Introduction and overview

14. Gilbert + Tobin, acting for Telstra Corporation Limited (**Telstra**), has engaged me to provide an independent expert economic opinion on the application to the Australian Competition and Consumer Commission (**ACCC**) for authorisation of three commercial agreements (**the Proposed Transaction**) between Telstra and TPG Telecom Limited (**TPG**):
 - a. the Multi-Operator Core Network (**MOCN**) Services Agreement,
 - b. the Spectrum Authorisation Agreement, and
 - c. the Mobile Site Transition Agreement.
15. Telstra will supply 4G and 5G services in parts of its mobile network to TPG under the MOCN Service Agreement. The Spectrum Authorisation Agreement enables spectrum that TPG owns to be pooled with Telstra’s spectrum and used by both parties, and enables Telstra to use certain spectrum in areas where the MOCN does not operate. The Mobile Site Transition Agreement provides for some of TPG’s sites to be transitioned to Telstra.
16. I have been instructed by Gilbert + Tobin that pursuant to s68(1) of the Radiocommunications Act 1992 (Cth), TPG’s grant of authorisation to Telstra to use its spectrum is deemed to be an acquisition within the meaning of s50 of the Competition and Consumer Act (the **CCA**) and capable of merger authorisation under Part VII. Telstra and TPG have sought ACCC authorisation (in the **Authorisation Application**) for aspects of the Proposed Transaction deemed to enliven the operation of s50 and Part VII of the CCA.
17. I have been provided with copies of Optus’ submission¹ and the accompanying expert reports prepared by CEPA (the **CEPA Report**),² HoustonKemp (the **HoustonKemp Report**),³ and Analysys Mason (the **Analysys Mason Report**).⁴ I have been asked to provide an expert economic opinion on the likely public benefits and detriments of the Proposed Transaction, aside from the benefits and detriments that are directly associated with the impact of the transaction on competition. I focus on the effects of the Proposed Transaction on productive efficiency and dynamic efficiency, and flow-on economic and environmental benefits and detriments. The scope of my report does not include an analysis of whether the Proposed Transaction would be likely substantially lessen competition in any relevant market and, as a result, does not consider allocative efficiency gains or losses.

¹ Optus (June 2022), “Submission in response to ACCC market inquiry – Telstra and TPG application for merger authorisation for proposed spectrum sharing in regional Australia, Public Version.”

² CEPA (24 June 2022), “Competition impacts of the proposed Telstra-TPG network and spectrum sharing agreements.”

³ HoustonKemp (28 June 2022) “Competitive effects of the proposed Telstra-TPG arrangement.”

⁴ Analysys Mason (27 June 2022), “The ACCC’s consideration of the Telstra-TPG agreement.”



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18. This report is based on my expertise in economics and telecommunications markets and the facts set out in the Application and my letter of instruction provided to me by Gilbert + Tobin (**Instruction Letter**) which I attach in Appendix C.

1.1 Qualifications

19. I am an economist with expertise in regulatory and competition economics, with 25 years of experience applying economic analysis to the telecommunications sector. I have provided expert reports for numerous merger authorisations and clearances, including in the telecommunications sector.
20. I am the owner of consultancy Link Economics Limited, which I established in 2012. I have worked with a number of international consultancies including Charles River Associates where I was a Principal Economist and Castalia where I was a Director in the New Zealand and Pacific Practice.
21. I hold a Bachelor's degree and a Master's degree, both in economics from the University of Auckland.
22. Appendix A contains my CV.

1.2 Compliance with the Expert Evidence Practice Note and the Harmonised Expert Witness Code of Conduct

23. I have read, complied with, and agree to be bound by the requirements for expert reports set out in the Federal Court's Expert Evidence Practice Note (GPN-EXPT) (Practice Note) and the Harmonised Expert Witness Code of Conduct. I have attached a declaration of compliance with the code.
24. I understand that I am not an advocate and that my report is an objective and impartial assessment from my specialised knowledge in competition assessment and telecommunications economics.

1.3 Structure of this assessment

25. My report is structured as follows:
- a. Section 2 describes relevant context, including the Australian mobile landscape and industry trends,
 - b. Section 3 summarises the agreements between Telstra and TPG,
 - c. Section 4 discusses the relevant framework for assessing the likely public benefits and detriments of the agreements,
 - d. Section 5 identifies potential counterfactuals – that is, the scenarios where the Proposed Transaction is not authorised,
 - e. Section 6 identifies and evaluates the public benefits of the Proposed Transaction,



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- f. Section 7 identifies and evaluates the public detriments of the Proposed Transaction, and
 - g. Section 8 provides concluding remarks.

2 Mobile market context

- 26. In considering the benefits from the Proposed Transaction, I have reviewed both the current landscape of the mobile markets as well as the infrastructure, spectrum and technology positions of the parties to the agreements. I have also examined trends in demand growth and implications for network congestion.

2.1 The Australian mobile landscape

- 27. Telstra, Optus and TPG operate vertically integrated telecommunications businesses, offering a range of retail products and services. In addition to the Mobile Network Operators' (MNOs') flagship retail brands (Telstra, Optus, and TPG's Vodafone), a range of mobile virtual network operators (MVNOs) acquire wholesale connectivity from the MNOs to provide retail services to consumers. The MNOs also operate sub-brands that compete at the more price sensitive segment of the retail market.
- 28. The three MNOs provide their services using a range of technologies, 3G and 4G are now widely employed while 5G is now being rapidly deployed.

2.1.1 Mobile network infrastructure and coverage

Telstra's mobile network

- 29. Telstra currently provides mobile coverage to approximately 99.5%⁵ of the population using 3G, 4G and 5G technologies. The land mass coverage of Telstra's mobile networks is more than 2.6 million square kilometres.⁶
- 30. Telstra's 4G network reaches 99.4%⁷ of the population and its 5G network reaches more than 75% of the population.⁸ As described on Telstra's website, by the end of June the company's 5G network had a presence in more than 2,700 suburbs and over 200 cities and towns across Australia.⁹ Under its T25 strategy, Telstra intends to extend 5G coverage to 95% of the population by the end of 2025 and expand 4G regional coverage to provide 100,000 km² of new coverage by Financial Year (FY) 25.¹⁰

⁵ Telstra submission to the Regional Telecommunications Review 2021 (30 September 2021) p 10: <https://www.infrastructure.gov.au/sites/default/files/documents/rtr2021-submission-no-613-telstra-public.pdf>

⁶ <https://www.telstra.com.au/coverage-networks/our-network>

⁷ <https://www.telstra.com.au/coverage-networks/our-network>

⁸ <https://exchange.telstra.com.au/our-5g-network-now-reaches-75-of-australians/>

⁹ <https://exchange.telstra.com.au/our-5g-network-now-reaches-75-of-australians/>

¹⁰ T25, Telstra Investment Day, 16 September 2021 <https://www.telstra.com.au/content/dam/tcom/about-us/investors/pdf-g/2021-Investor-Day.pdf>



31. Telstra provides 3G network coverage using spectrum in the 850 MHz band,¹¹ and has announced that it will switch off the 3G network in June 2024. Doing so will free up the 850 MHz spectrum which can then be re-farmed to provide 5G coverage in regional Australia and improve Telstra’s in-building coverage in metropolitan areas.¹²
32. Telstra provides 4G network coverage using the Long-Term Evolution-Advanced (LTE-A) standard to aggregate multiple spectrum bands.¹³ The company uses spectrum in the following bands to supply 4G LTE-A services: 700 MHz, 900 MHz, 1800 MHz, 2100 MHz, and 2600 MHz.
33. Telstra’s 5G network uses low-band, mid-band and high-band spectrum.

Optus’ mobile network

34. Optus provides mobile coverage to 98.5% of the population.¹⁴ At December 2021 it had more than 8,200 mobile sites.¹⁵
35. Optus has operated its 3G networks on the 900 MHz and 2100 MHz spectrum bands and is re-farming the 2100 MHz spectrum for use on its 4G and 5G networks.¹⁶ Optus has not announced when it will shut down its 3G service.
36. Optus’ 4G Plus network reaches 97.3% of the Australian population and is in more than 700 regional towns. Optus’ website states that it has more than 6,100 4G mobile base stations in Australia, with more than 2,200 being located in regional areas. The network uses frequencies in the 700 MHz, 1800 MHz, 2100 MHz, 2300 MHz, and 2600 MHz bands.¹⁷

TPG provides mobile coverage using its own mobile network and a roaming arrangement with Optus

37. TPG’s network provides coverage to 96% of the population. TPG uses a 3G roaming agreement with Optus to extend its service coverage to [Confidential-TPG 18

¹¹ Telstra previously also used spectrum in the 2100 MHz band to provide 3G services, particularly in metropolitan areas. Telstra has repurposed this spectrum to provide 4G services.

¹² https://www.telstra.com.au/content/dam/shared-component-assets/tecom/campaigns/3g-exit/3G%20Service%20Closure%20FAQ%20Oct%202019_.pdf

¹³ <https://www.telstra.com.au/coverage-networks/telstra-4gx>

¹⁴

<https://www.optus.com.au/portal/site/shop/menuitem.26522dd2345d90435fdcf21060a08a0c/?vgnextoid=6fe99309ee210410VgnVCM1000001f80ff0aRCRD&vgnextfmt=default#:~:text=Whether%20you're%20down%20town,quality%2C%20SMS%20and%20mobile%20internet>

¹⁵ ACCC (December 2021), *Mobile Infrastructure Report 2021*, Table 2.1.

¹⁶ <https://www.optus.com.au/support/mobiles-tablets-wearables/important-changes-3g>

¹⁷ <https://www.optus.com.au/for-you/support/answer?pid=1644#:~:text=The%20Optus%204G%20Plus%20network,on%20your%20device%20and%20address>

¹⁸ Authorisation Application, para 27.



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38. As at the end of 2021, TPG had around 5,900 mobile sites in service.¹⁹ TPG's mobile network operates using the 700 MHz, 850 MHz, 900 MHz, 1800 MHz, 2100 MHz, and 3600 MHz bands.
 39. Since mid-2020 TPG has been progressively rolling out 5G to selected areas in Sydney, Melbourne, Brisbane, Adelaide, Canberra and Perth.

State and Federal Government investment in regional mobile services and mobile blackspots

40. The Australian federal government has co-funded 1,270 sites through the Mobile Black Spot Program (MBSP) programme, with the vast majority being in with the 17% Regional Coverage Zone or the Outer Regional and Remote Coverage Zones.²⁰ State governments have also provided significant funding towards addressing mobile blackspots and increasing mobile coverage. For example, in 2020 the Victorian government announced that \$300 million would be provided to continue to address mobile blackspots in populated areas of regional Australia.²¹ The NSW Telco Authority works with Regional NSW and carriers to deliver targeted rounds of the Mobile Black Spot Program in NSW, and the NSW government contributes funding.^{22 23} In WA, the state government has funded 460 mobile infrastructure sites.²⁴
41. In the 2022 budget, the federal government has committed to a further \$1.3 billion of investment in regional telecommunications services, including \$811.8 million on mobile services.

The COVID-19 pandemic, a growing digital economy and natural disasters have emphasised the critical importance of access to high-quality telecommunication services in regional, remote and peri-urban areas of Australia.

The Government's \$1.3 billion investment in regional Australia's telecommunications will give households easier access to education and healthcare. It also better connects regional businesses to urban and global markets.

Improving access and resilience

Building on existing investments to improve regional connectivity, the Government is committing a further \$811.8 million to:

- *ensure up to 8,000km of new open-access mobile coverage on regional roads and adjacent premises, businesses and tourist hotspots*

¹⁹ ACCC (December 2021), *Mobile Infrastructure Report*, Table 2.1.

²⁰ <https://www.infrastructure.gov.au/media-technology-communications/phone/mobile-services-coverage/mobile-black-spot-program>

²¹ <https://www.itnews.com.au/news/victoria-bankrolls-gigabit-internet-mobile-blackspot-elimination-558175#:~:text=The%20%24626%20million%20package%20also,co%2Dcontribution%20from%20the%20Commonwealth>

²² <https://www.nsw.gov.au/telco-authority/mobile-black-spot-program>









²³ <https://www.nsw.gov.au/sites/default/files/2020-04/Mobile-Black-Spot-Program-fact-sheet.pdf>

²⁴ <https://www.agric.wa.gov.au/econnected/mobile-connectivity-regional-telecommunications>



- *deliver targeted improvements to digital connectivity*
- *improve resilience against natural disasters*
- *support affordability and increase Indigenous connectivity.*²⁵

2.1.2 The three MNOs and a range of MVNOs supply retail services

42. Telstra, Optus and TPG operate vertically integrated telecommunications businesses, offering a range of services provided over cellular networks, including: mobile phone plans (a bundle of voice, short message service (SMS) and data services), standalone mobile broadband services, and fixed wireless services capable of delivering broadband to fixed addresses at home and small business premises.
43. In addition to the MNOs' flagship retail brands (Telstra, Optus, and TPG's Vodafone), a wide range of MVNOs acquire wholesale connectivity from the MNOs to provide retail services to consumers. The MNOs also operate sub-brands that compete at the more price sensitive segment of the retail market. These sub-brands include Belong, Boost, Gomo, Felix, Amaysim and TPG.
44. The precise market shares vary according to the way in which share is measured. The ACCC estimated that national mobile market shares in 2020/21 were: 44% for Telstra, 31% for Optus, 17% for TPG, and 9% for MVNOs.²⁶ As discussed in paragraph 170 of the Authorisation Application, Roy Morgan estimates that national market shares for mobile services are: [Confidential-Telstra 

].] The Roy Morgan market share estimates are based on a survey of residential customers.
45. [Confidential-TPG 



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²⁵ Budget 2022-23 <https://budget.gov.au/2022-23/content/regions.htm>

²⁶ ACCC Communications Market Report 2020-21, Figure 3.13.



2.2 Spectrum holdings in regional areas

46. All three MNOs hold spectrum across a range of low and mid-range bands in regional and rural areas, as described in Table 4 of the Authorisation Application. As explained in paragraph 75 of the Authorisation Application, sub-1 GHz spectrum is particularly relevant to providing services in regional and rural areas because its signal carries further and can penetrate obstacles such as trees. In regional and rural Australia, Telstra holds 2 x 20 MHz in the 700 MHz band, and 2 x 25 MHz in the 850 MHz band. In the December 2021 auction for the 850 MHz and 900 MHz bands, Telstra's acquisition of 850 MHz took it to the maximum amount of low-band spectrum that it could bid for within the limit that applied to that auction.^{27 28} The entirety of the 900 MHz band available for mobile services at the December 2021 auction was acquired by Optus.²⁹
47. Further sub-1 GHz spectrum is unlikely to be available in the near future. As I discuss in more detail in section 5.2, while the 600 MHz (currently used for DTV) could potentially be freed up at some point as a second "digital dividend," if this does occur, the time taken for past processes indicates that the spectrum is unlikely to become available until at least 2030.

2.3 Mobile technology trends

48. 3G technology is based on packet access and has been the technology foundation for mobile devices for more than two decades. It is being phased out in a number of countries, with the spectrum able to be reused for other mobile services. Telstra has announced that it is closing its 3G network effective from 30 June 2024.³⁰
49. 4G technology, which is based on Long Term Evolution (LTE) technology, has gradually replaced 3G over the last 10 years. In comparison to 3G, 4G provides higher user speeds enabling more data downloads in the same amount of time, and improvements in latency.
50. 5G, however, is more than just a faster version of the 4G mobile broadband - it will enable significantly faster mobile broadband speeds but also provides, ultra-low latency (as low as 1ms) for delivering real-time "mission-critical" services, and can provide simultaneous connectivity to potentially 1 million connections per square kilometre enabling a Massive Internet of Things (mIoT).³¹ The benefits of 5G have become visible and studies indicate that 5G will enable material productivity increases and GDP growth when it is widely deployed.³²

²⁷ <https://exchange.telstra.com.au/2021-spectrum-auction/>

²⁸ <https://www.acma.gov.au/spectrum-allocation-and-auction-summary-850900-mhz-band-2021>

²⁹ ACMA, 850/900 MHz band auction results. Available at: <https://www.acma.gov.au/850900-mhz-band-auction-results-0>

³⁰ <https://exchange.telstra.com.au/3g-is-closing-but-its-not-going-anywhere-until-june-2024/>

³¹ Accenture (February 2021), The Impact of 5G on the US Economy

³² For example <https://www.infrastructure.gov.au/department/media/publications/impacts-5g-productivity-and-economic-growth>

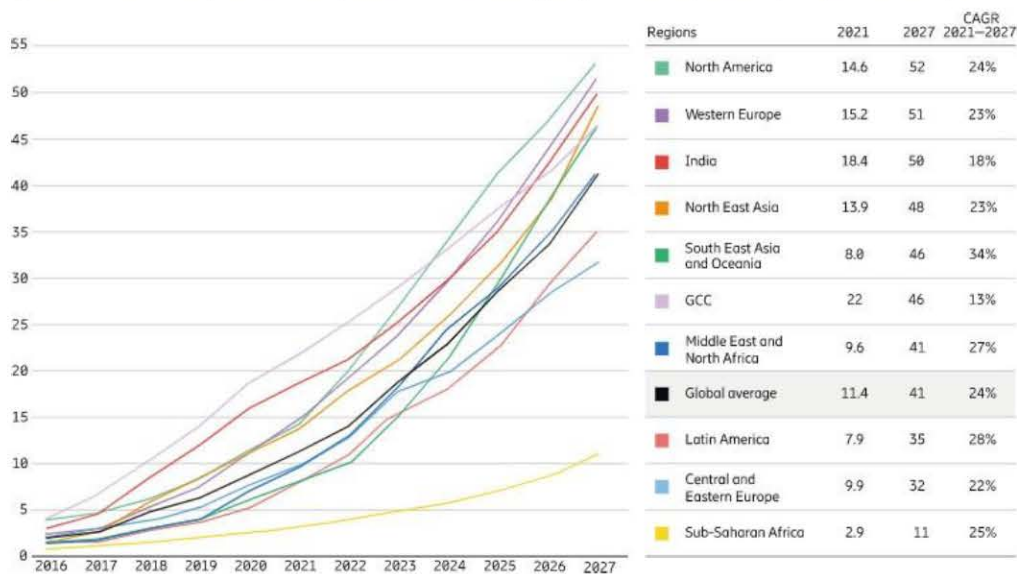


2.4 Mobile broadband demand is growing, putting pressure on mobile network capacity

2.4.1 Mobile capacity demand has been growing steadily

51. The ACCC Internet Activity Report (July 2022)³³ found that the national average monthly volume of data downloaded on mobile devices had increased steadily over the prior two years, though had dipped in the December 2022 quarter.
52. Demand for mobile data is expected to continue to grow in future. For example, Ericsson finds that total global mobile data traffic³⁴ is projected to grow by a factor of around 4.4 from 2021 to reach 288 EB per month in 2027, with smartphones continuing to account for the vast majority of mobile data.³⁵ Ericsson forecasts that the global average downloads per smartphone forecast to grow at an average of 24% per year from 2021 to 2027 (see Figure 1).

Figure 1: Ericsson forecasts of mobile data traffic per smartphone (GB per month)



Source: Ericsson Mobility Report³⁶

53. As the Authorisation Application notes (paragraph 19), regional areas have seen population growth since the onset of COVID-19. ABS found that the population of regional Australia grew by 70,900

³³ ACCC (December 2021), *Internet activity report for the period ending 31 December 2021*.

³⁴ Excluding traffic generated by fixed wireless access.

³⁵ Ericsson finds that about 97% of the world’s mobile data use is currently generated by smartphones, and predicts that this percentage will increase.

³⁶ https://www.ericsson.com/en/reports-and-papers/mobility-report/dataforecasts/mobile-traffic-forecast?gclid=Ci0KCOjwmuITBhDoARIsAPiv6L99_zmC5VS_WCmoMadVU-vMEIfAuF4_394Go-tDNn1tS_Uv7DieOJoaAstPEALw_wcB&gclsrc=aw.ds



people during 2020-21, the population in capital cities reduced by 26,000.³⁷ The increased population will have resulted in growth in mobile broadband demand in regional areas.

2.4.2 Demand growth is causing congestion, particularly in regional areas

54. The 2021 Regional Telecommunications Review also reported on the significant growth in demand for data with a focus on regional Australia. The report comments on the congestion issues discovered during the review:

*The increasing demand for data in regional, rural and remote Australia is not always being adequately met by the oftentimes constrained connectivity options available to regional consumers. Participants in the Review have reported significant congestion issues, particularly on the mobile and NBN fixed wireless networks, which are impacting everyday business transactions and other activities.*³⁸

55. Following the recommendations of the RTIRC, the government has asked the ACCC to “examine appropriate mobile network quality and coverage reporting requirements for MNOs” and it has stated that it will commission independent audits of mobile coverage in 2022/23 and 2023/24 to gather data on coverage and congestion ahead of the 2024 Regional Review.

2.4.3 Telstra’s assessment of mobile network congestion in regional areas

56. Telstra reports that network congestion (defined as 4G speeds that are less than [Confidential-Telstra] during specific hours within a 4-week period) is a material issue for many sites and customers accessing its network in the 17% Regional Coverage Zone and in the remoter Telstra-unique areas beyond. Once speeds drop below these levels, customers’ experience of services such as high-definition video, may start to suffer degradation.³⁹
57. Telstra illustrates the extent of the issue in regional areas as compared with metro areas as follows:
- in major cities around [Confidential-Telstra] of Telstra’s 4G sites are congested with around [Confidential-Telstra] of 4G active users currently impacted by congestion.
 - in regional and remote areas around [Confidential-Telstra] of Telstra’s 4G sites are congested and around [Confidential-Telstra] active users currently impacted by congestion.⁴⁰

³⁷ ABS (29 March, 2022), Media Release, “More growth in the regions during the pandemic.” Available at: [https://www.abs.gov.au/media-centre/media-releases/more-growth-regions-during-pandemic#:~:text=The%20population%20of%20regional%20Australia,Bureau%20of%20Statistics%20\(ABS\).](https://www.abs.gov.au/media-centre/media-releases/more-growth-regions-during-pandemic#:~:text=The%20population%20of%20regional%20Australia,Bureau%20of%20Statistics%20(ABS).)

³⁸ RTIRC Report, p. 8.

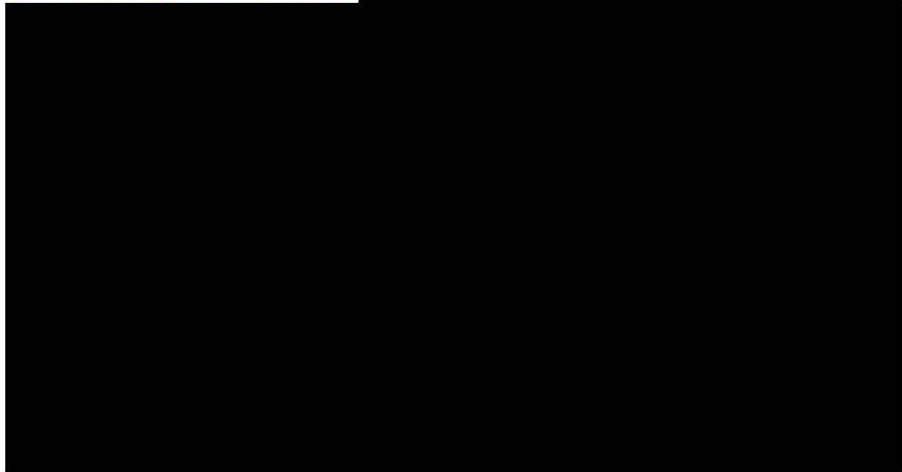
³⁹ Authorisation Application, paragraph 259.

⁴⁰ Authorisation Application, paragraph 260.



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- 58. This indicates that customers in the regional/remote areas (17% Regional Coverage Zone and the Outer Regional and Remote Coverage Zone) are nearly [Confidential-Telstra] times more likely to suffer from congestion than customers in the major metro and larger regional cities.
 - 59. Some of this congestion is on 3G-only sites and this will be relieved prior to June 2024 as Telstra upgrades all such sites to 4G and in many cases also upgrades backhaul. Other sites will require backhaul upgrades to be lifted out of congestion.
 - 60. However, as explained in the Authorisation Application (paragraph 262), the source of congestion is mostly in the RAN, rather than backhaul. The Authorisation Application also explains that RAN congestion can only be addressed through additional spectrum or RAN densification.⁴¹
 - 61. Telstra’s analysis shows that currently around [Confidential-Telstra] 4G sites are RAN-congested and estimates that by mid-2023 this will have grown to around [Confidential-Telstra] sites.⁴² This is the congestion that is forecast to occur if the Proposed Transaction, and associated spectrum benefits, do not occur. Figure 2 shows Telstra’s forecast of the number of Telstra sites in regional and remote Australia facing material congestion to mid-2023.

Figure 2: [Confidential-Telstra]



- 62. The increased spectrum made available through the Proposed Transaction, especially the low band (700/850), will help reduce this congestion.⁴³

⁴¹ Authorisation Application, paragraph 262.

⁴² Authorisation Application, paragraph 269. The analysis uses the same definition of congestion as discussed above.

⁴³ Authorisation Application, Paragraph 268 to 270.



2.4.4 Options to relieve congestion include accessing more spectrum or building more sites

63. RAN congestion can be addressed by either acquiring access to further spectrum or densifying sites, as described in paragraph 264 of the Authorisation Application.
64. Where additional spectrum is available, it can be used to increase capacity and address network congestion that is limiting connection speeds. Where additional spectrum is not available, additional sites can be built to reuse the existing spectrum. However, given the sparse population and wide areas in the 17% Regional Coverage Zone, in my view it is likely to be uneconomic and or impractical to invest in additional sites to fully address congestion. In reaching this view, I rely on:
 - a. the information provided in Table 1 of the Authorisation Application which shows that the cost per person captured by sites in the 17% Regional Coverage Zone is currently more than [Telstra-Confidential] times than in metropolitan areas;
 - b. The observation that many of the existing sites in the 17% Regional Coverage Zone were co-funded by government (as discussed above in paragraphs 40 and 41), which I assume occurred on the basis that the sites were uneconomic; and
 - c. The observation that site locations may not, in practice, be available in all required areas.
65. The Authorisation Application (paragraph 271) describes the improvements in mobile service speeds that Telstra expects to achieve in the 17% Regional Coverage Zone as a result of the additional spectrum availability through the Proposed Transaction.

3 Proposed Transaction between Telstra and TPG

66. The proposed MOCN agreement covers the supply of specific mobile access services to TPG using Telstra's RAN in the defined coverage area. The MOCN arrangement is accompanied by agreements to allow for the transition of rights to up to 169 TPG mobile sites to Telstra, and for the sharing of the mobile spectrum that TPG holds or controls.

3.1 The purpose of the Proposed Transaction

67. The MOCN Service Agreement describes the objectives to be:

to facilitate access by TPG's Customers to mobile coverage in the Coverage Area and minimise the capital and operating expenditure incurred in rolling out network infrastructure by engaging in an active network sharing arrangement in the Coverage Area while preserving each party's independent ability to continue to offer End Users differentiated public mobile telecommunications services.⁴⁴

⁴⁴ MOCN Service Agreement, paragraph C.



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68. To facilitate those objectives, Telstra and TPG have agreed to implement a MOCN on the Telstra Network to provide MOCN Services to TPG in the coverage area. The parties have also agreed that Telstra will be granted authorisation to operate radiocommunication devices in specified parts of the spectrum licences that are owned or controlled by TPG.
69. The MOCN services are provided on a non-exclusive basis.⁴⁵

3.2 The structure of the proposed sharing arrangement

3.2.1 The MOCN services agreement

70. The MOCN provides TPG, the access seeker, with a level of control over its services and customers that is comparable to the control which TPG would have in its own RAN, subject only to the terms of the MOCN Agreement, the primary requirement of which is non-discrimination.⁴⁶
71. The agreement is framed around a set of high-level principles that will guide how the parties will develop and provide the services and implement the MOCN. The core principle is that Telstra must supply the MOCN service so as not to discriminate between TPG end users and Telstra end users using the MOCN service in respect of the level of the MOCN service. Non-discrimination is broadly defined to include treatment of network traffic, network performance, quality of service, RAN features, the classification of fault severity and priority for restoration of services following fault, fault management and resolution.⁴⁷
72. The MOCN service shown in the red cloud below (Figure 3) will provide TPG with access in the 17% Regional Coverage Zone, where it currently owns only a limited amount of network – TPG currently owns approximately 750 sites in this Zone and uses a roaming agreement with Optus, but under the Proposed Transaction will access MOCN services through Telstra’s approximately 3,700 sites.

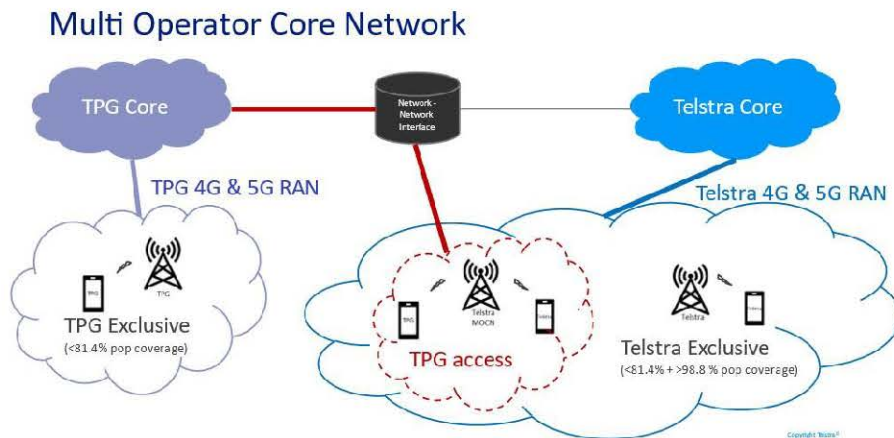
⁴⁵ MOCN Service Agreement, section 8.

⁴⁶ See MOCN Service Agreement, s4, Telstra service obligations.

⁴⁷ MOCN Service Agreement, s4 and s5.



Figure 3: Multi-Operator Core Network



Source: Figure 5 of the Authorisation Application

73. For customers, the MOCN arrangement will mean that:⁴⁸
- a. TPG customers' devices will show that they are connected to the TPG network,
 - b. the TPG 'Core' is responsible for authenticating TPG users in the shared RAN in the same way as in TPG's own RAN,
 - c. the 'policy rules' set by the TPG service Core apply across TPG's own RAN and the shared RAN,
 - d. TPG is responsible for connecting traffic between its end users in the shared RAN and third-party networks, and
 - e. no individual customer information (such as physical address, location at any time, service plan details, billing details) is needed by the MOCN RAN and this information is kept entirely separate within each MNO's Core. The only data that flows between the two networks is comprised of the encrypted customer voice and internet data, the device origin/source ID (for example, phone numbers) and the server source/destination addresses used for routing, and traffic class. None of this data is accessible by Telstra.⁴⁹
74. The MOCN agreement has a 10-year term and can be renewed for two further five-year periods, at TPG's option. TPG can terminate the agreement at the 10- and 15-year mark with a transition period of up to 3 years, at its election, to allow it to continue receiving services while it seeks alternative options. TPG can put alternatives in place before exit, including building its own network or entering a shared infrastructure arrangement with another MNO.

⁴⁸ Summary of s12 of MOCN Service Agreement.

⁴⁹ As described in MOCN Service Agreement - Service Description, TPG traffic between the shared network cells and TPG security gateways is to be encrypted utilising TPG Public Key Infrastructure (PKI) to verify TPG certificates.



3.2.2 The Spectrum Authorisation Agreement

75. The Spectrum Authorisation Agreement provides Telstra with access to the spectrum currently held by TPG in the following bands:⁵⁰
 - a. 10 MHz of paired spectrum in the 700 MHz band,
 - b. 5 MHz of paired spectrum in the 850 MHz band,
 - c. 5 MHz of paired spectrum in the 2100 MHz band, and
 - d. 20 – 45 MHz of spectrum in the 3.6 GHz band.
76. The above spectrum will be pooled with Telstra’s spectrum in the 17% Regional Coverage Zone. Telstra will also have access to some of TPG’s spectrum in the more remote regions outside of the 17% Regional Coverage Zone.⁵¹
77. TPG has licensed all of its regional spectrum to Telstra other than its 1800 MHz spectrum⁵² and 5 MHz of 700 MHz spectrum, which TPG has retained. This will allow TPG to use that spectrum for managed private networks or other uses if needed.⁵³

Mobile Site Transition Agreement

78. The Mobile Site Transition Agreement sets out the commercial arrangements for transitioning the rights for up to 169 sites for Telstra’s use and the process and timing around the planning and transition periods for the transfer.⁵⁴

3.3 Commercial rationale for the agreements

TPG’s rationale

79. The Proposed Transaction provides TPG with access to five times more sites than it currently has in the 17% Regional Coverage Zone resulting in an increase in its network coverage by more than 1 million square kilometres, covering 98.8% of the population. Under the MOCN arrangement, TPG retains control of its mobile core network in which product differentiation occurs. The Proposed Transaction also provides TPG with Fixed Wireless Access over the 3.6 GHz band.⁵⁵
80. I understand from the Authorisation Application (paragraph 28) that TPG’s existing regional coverage makes it difficult for TPG to compete for customers in regional areas or to capture significant

⁵⁰ Authorisation Application, Table 5.

⁵¹ Authorisation Application, page 7.

⁵² However, Telstra’s 1800 MHz is included in the pool.

⁵³ I note that TPG can also use some of the authorised spectrum for private networks.

⁵⁴ Mobile Site Transition Agreement, 17 February 2022

⁵⁵ TPG’s rationale is set out in the Authorisation Application, section 2.



numbers of metropolitan customers who travel to urban fringe and regional areas. I also understand from the Authorisation Application (paragraph 28) that TPG considers that the Proposed Transaction will improve its ability to compete for customers in both metropolitan and regional areas.

[Confidential-TPG]

the low population density in the 17% Regional Coverage Zone means that it would be highly inefficient and costly for TPG to duplicate the networks of Telstra and Optus.

[Confidential-TPG]

Telstra's rationale

81. For Telstra, the Proposed Transaction provides an additional revenue stream from its network assets in the 17% Regional Coverage Zone.
82. Besides the benefits from additional revenue and better utilisation of the RAN network, Telstra will gain immediate benefits from the pooled spectrum allowing it to improve services to customers who experience congestion in those non-urban areas where this is currently an issue. Telstra has experienced negative reviews in some of the non-urban areas that it serves, and the additional spectrum means it can avoid the investment required to in-fill cell sites that would otherwise be needed to overcome the congestion.⁵⁶

3.4 Ownership arrangements

83. The MOCN sharing arrangements will be implemented through a series of agreements for access services, rather than contracts to sell or purchase assets. As a result, Telstra will retain ownership of its network infrastructure, including the RAN that will be used by TPG to provide mobile services to its customers.
84. The TPG spectrum is subject to a sharing arrangement as part of the MOCN deal. The pooled spectrum is available for use by both TPG and Telstra. As there are no constraints on TPG's use of the spectrum pool for mobile services,⁵⁷ TPG could win market share of retail mobile customers and account for a significant proportion of the pooled spectrum. Both Telstra and TPG have an equal opportunity to compete using the pooled spectrum.

3.5 Operational arrangements

85. Much of the technical and operational details are yet to be developed and the MOCN will not be implemented until ACCC authorisation is obtained. However, a draft technical agreement has been prepared that sets out the service and technical principles that will guide the service arrangements.

⁵⁶ Telstra's rationale is set out in the Authorisation Application, s2.4.

⁵⁷ I note that caps do apply to each party's use of 3.6GHz spectrum for Fixed Wireless.



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86. The guiding principle is that Telstra must supply the MOCN service in a manner that does not discriminate, in respect of the level of MOCN service, between the TPG end users and the Telstra end users that are using the MOCN service. Non-discrimination is broadly defined to include treatment of network traffic, network performance, quality of service, RAN features, the classification of fault severity and priority for restoration of services following fault as well as fault management and resolution.⁵⁸

3.6 Implementation and transition arrangements

87. The parties intend to undertake various implementation planning activities in parallel to the ACCC authorisation process. These are set out in the Agreements and relate to developing documentation such as technical specifications, security plans and others. However, some costs such as investing in the build of the MOCN capability, the network configuration activities, investments in the network interfaces and OSS will not occur until the ACCC is satisfied with the authorisation application. The MOCN could be operational within 6 months of ACCC approval.⁵⁹

4 Framework for assessing public benefits and detriments

88. My approach to assessing public benefits and detriments is informed by the ACCC October 2018 Merger Authorisation Guidelines (**Merger Authorisation Guidelines**).
89. The following issues discussed by the ACCC in the Merger Authorisation Guidelines are particularly relevant to my assessment approach:
- a. The interpretation of what constitutes a public benefit and detriment – The ACCC notes in the Merger Authorisation Guidelines that the terms public benefit and detriment are not defined in the CCA, but that the Competition Tribunal has interpreted these broadly to include:
- anything of value to the community generally, any contribution to the aims pursued by society including as one of its principal elements (in the context of trade practices legislation) the achievement of the economic goals of efficiency and progress". Plainly the assessment of efficiency and progress must be from the perspective of society as a whole: the best use of society's resources. We bear in mind that (in the language of economics today) efficiency is a concept that is usually taken to encompass "progress"; and that commonly efficiency is said to encompass allocative efficiency, production efficiency and dynamic efficiency.*⁶⁰
- I take a broad view accordingly.
- b. Economic efficiency – The Merger Guidelines discuss each of the three types of efficiency.

⁵⁸ The non-discrimination requirements are referenced earlier in my report.

⁵⁹ Pre-commencement activities are set out in s3 of the MOCN Service Agreement.

⁶⁰ ACCC (October 2018), Merger Authorisation Guidelines paragraph 8.1.



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- i. Allocative efficiency – I have not examined allocative efficiency because my analysis does not cover the effects of the Proposed Transaction on competition. To the extent that the ACCC or another party found that the Proposed Transaction would lead to a change in the intensity of competition in one or more markets, then the allocative efficiencies impacts (gains or losses) would need to be included in the assessment of public benefits.
 - ii. Productive efficiency – As the Merger Guidelines explain, these arise where a merger results in a more cost-effective outcome by “increasing economies of scale, scope, allowing better use of existing capacity, reducing cost through asset rationalisation, or through combining complementary production capabilities.”
 - iii. Dynamic efficiency – In looking at dynamic efficiency, I focus on innovation that would likely not have occurred (or would have been lower) without the Proposed Transaction.
 - c. Other benefits – I have sought to identify some of the most obvious environmental benefits that could arise as a result of the productive and dynamic efficiencies from the Proposed Transaction. I have also examined broader economic effects, consumer benefits and social benefits of the Proposed Transaction.
 - d. Quantification of benefits and detriments – The Merger Guidelines note that the ACCC is not required to quantify public benefits and detriments, but encourage applicants, where possible to quantify the size of claimed benefits and detriments. Where it is possible, I have attempted to quantify the outcomes from the merger so that the size and nature of the benefits is visible. However, due to the difficulties in estimation, my estimates are indicative only.
 - e. Public detriments – The Merger Guidelines state that in most cases the public detriments will be those associated with a lessening of competition, but also acknowledge that other types of public detriments can also be relevant (such as pollution and public health and safety).

5 Counterfactual scenarios

- 90. In this report, the purpose of identifying the counterfactual is to compare outcomes with and without the Proposed Transaction in order to examine the public benefits and detriments of the transaction.
- 91. With regard to TPG’s options for achieving regional coverage without the Proposed Transaction, I do not express a view on the most likely counterfactual scenario, but instead adopt three counterfactuals (described in section 5.1. below) that are informed by the views expressed in the expert reports submitted by Optus and Telstra/TPG.
- 92. When looking at what Telstra may do without the Proposed Transaction, I focus on how it will address capacity constraints in its RAN network (see section 5.2).



5.1 Counterfactual scenarios for TPG

93. The expert reports filed by the applicants and by Optus discussed a number of counterfactuals about how TPG would provide coverage in the 17% Regional Coverage Zone. I have attempted to capture the scenarios discussed in three counterfactual options:
- a. **TPG Option 1** – Continuation of the Status Quo,
 - b. **TPG Option 2** – An updated TPG-Optus Roaming Agreement, and
 - c. **TPG Option 3** – An alternative MOCN or MORAN Agreement.
- (together, the **TPG Counterfactuals**).
94. In later sections of this report, I consider the public benefits and detriments that relate to each of these three options.

5.1.1 TPG Option 1 (Status Quo)

95. The first counterfactual I adopt for TPG is a continuation of the status quo (TPG Option 1). I note that the CEPA Report refers to the relevance of the status quo – for example, in Table 4.1. The HoustonKemp Report also refers to the use of a status quo scenario as a good baseline and adopts the status quo as one of two potential counterfactuals.⁶¹ A counterfactual that reflects Status Quo avoids the difficulties highlighted in the expert reports of attempting to determine what hypothetical arrangements might arise through commercial negotiations of an alternative agreement.⁶²
96. In TPG Option 1, I assume that TPG continues to supply service in the 17% Regional Coverage Zone using its existing cell sites. I also assume that TPG continues to build a similar number of new sites in the 17% Regional Coverage Zone as it has in recent years – I assume this to be approximately 20 sites per year based on an ACCC report that shows TPG built 20 sites outside major cities in 2021.⁶³ I also assume that, as is currently the case, TPG’s coverage is supplemented with the existing 3G domestic roaming service which I assume continues to be provided until Optus shuts down its 3G network.

⁶¹ I note that the report also takes the view that alternative arrangements are more likely to occur than a continuation of the status quo.

⁶² For example, Richard Feasey’s report discusses the uncertainty of what the commercial terms of alternative agreements might be in paragraph 35 of his report that is Annexed to the Authorisation Application.


⁶³ ACCC (December 2021), Mobile Infrastructure Report 2021, Table 2.1.



5.1.2 TPG Option 2 (Updated Roaming Agreement)

- 97. Under this counterfactual I assume that the existing roaming agreement is renegotiated to extend beyond 3G services (TPG Option 2). This is a variation on the Status Quo and would involve a roaming agreement that provides 4G, and potentially 5G services at a later date.
- 98. Whether or when 5G roaming would be included in an updated roaming agreement is uncertain. The Authorisation Application (para 199) explains that 5G roaming would not be available for some time because the relevant standards are yet to be finalised and will then need to be adopted by vendors before being deployed. The approach suggested by CEPA of using a counterfactual in which “the future without the proposed transactions should reflect the state of competition in the market today”⁶⁴ may point towards a scenario where 4G roaming is provided but not 5G, given that currently TPG has access to a roaming agreement that provides 3G roaming but not 4G. When examining the public benefits of the Proposed Transaction under TPG Option 2, I consider both the cases of a 4G-only roaming agreement, and a roaming agreement that provides 5G roaming at a later date, after it becomes technically and commercially feasible.
- 99. I assume that under this scenario TPG retains its existing sites but does not invest in any additional sites in the 17% Regional Coverage Zone.

5.1.3 TPG Option 3 (Alternative MOCN or MORAN agreement)

- 100. In the third TPG counterfactual that I consider (TPG Option 3), TPG engages in an alternative active network sharing agreement with Optus (either a MORAN or a MOCN) or with Telstra (a MORAN). Richard Feasey identifies this type of counterfactual in his expert report on the basis that it is the more conservative approach (that is, more likely to result in a substantial lessening of competition). The HoustonKemp Report identifies two counterfactuals: the status quo and a scenario where TPG enters into some form of network sharing agreement with Optus (paragraph 21).
- 101. **[TPG-Confidential]** 
- 102. Under TPG Option 3, I assume that TPG decommissions sites where there is an unnecessary overlap with the access provider’s network, in order to achieve cost efficiency benefits. If the access provider is Telstra (providing a MORAN), then I assume that the same number of sites would be decommissioned by TPG as for the Proposed Transaction (at least 550 sites). If Optus is the access provider, then the number of decommissioned sites would depend on the extent of overlap between the TPG and Optus network in the 17% Regional Coverage Zone.

⁶⁴ CEPA Report, page 7.



5.1.4 Extensive network build by TPG seems unlikely

103. A further counterfactual that has been discussed in the expert reports is the scenario where TPG deploys its own network in the 17% Regional Coverage Zone area to such an extent to seek to match either Telstra's or Optus' network in this area. I consider it unlikely that TPG would deploy its own network in the 17% Regional Coverage Zone to such an extent to seek to match either Telstra's or Optus' network in this area. I note that where this counterfactual has been discussed in expert reports, it has been dismissed as being unlikely.⁶⁵ Given that there appears to be agreement between the experts of the Applicants and Optus that this counterfactual is unlikely, I do not examine the associated public benefits and detriments of this scenario.

5.2 Counterfactual scenarios for Telstra

104. Without the Proposed Transaction, Telstra faces growing congestion at its regional sites. Unless further spectrum is available, then to address the congestion by providing more capacity Telstra could 'densify' the network which involves building more sites and reusing the spectrum that it currently has access to. However, building additional sites to relieve congestion will require significant amounts of capital expenditure and will increase ongoing operational costs. As the expert reports submitted to date by the applicants and Optus have not examined in detail how Telstra would address congestion without the Proposed Transaction, I consider a number of candidate options and select what I consider to be the most likely counterfactual.

105. As discussed below, I find that the most likely scenario in the counterfactual for Telstra is that it will invest in additional sites in some areas, some of which may be co-funded by the government, but other areas will face growing congestion as constructing new sites will be either not practicable or unviable. While additional sub-1 GHz spectrum may become available at some stage, this is unlikely to occur in the medium term.

5.2.1 Candidate Telstra counterfactuals

106. For Telstra, options in the absence of the Proposed Transaction include:

- a. **Telstra Option 1:** Do nothing – congestion continues to worsen,
- b. **Telstra Option 2:** Telstra funds and builds a large number of sites to provide additional capacity and address congestion,
- c. **Telstra Option 3:** Telstra engages in a co-funding arrangement with the government to build a large number of additional sites and address congestion,

⁶⁵ See paras 45 to 47 of Richard Feasey's report, and para 136 of the expert report of Greg Houston.



-
- d. **Telstra Option 4:** Telstra acquires additional spectrum, either through an agreement to use spectrum held by another party, or by acquiring spectrum in another band, or
 - e. **Telstra Option 5:** A combination of some or all of the above – Telstra invests in new sites to lessen some of the RAN congestion and some of those sites may be partially funded by state or federal governments, but in many cases, where it simply is not practical or viable to establish new sites, congestion worsens. Potentially, at some point in the future further spectrum become available.

107. I examine these options and find that Telstra Option 5 is most likely. For the purposes of this report, I call this the **Telstra Counterfactual**.

Congestion is likely to be addressed for at least some sites

- 108. In Option 1 above, Telstra does not address any RAN congestion within the area to be covered by the Proposed Transaction. Telstra’s analysis of congestion on its network has found that around [Confidential-Telstra] 4G sites currently have RAN congestion, and that over time this will grow to [Confidential-Telstra]⁶⁶
- 109. Telstra’s mobile coverage and high service quality are a key selling point of the company. The importance to the Telstra brand of continuing to provide quality services would likely provide commercial incentive to invest in at least some additional mobile sites. As a result, I find that Telstra is unlikely to “do nothing” and let congestion grow.
- 110. Political considerations also make it unlikely that congestion will not be addressed at all. As discussed in section 2.4, congestion on mobile networks in regional areas has attracted attention and was an area of focus in the RTIRC report. The Federal Government has recently announced that it will allocate \$811m to improve mobile coverage in regional areas. Given that announcement, the significant State Government programs to improve coverage,⁶⁷ and public discontent with the congestion that is occurring in regional areas, it seems quite possible that some government funding would support additional sites to alleviate congestion.

Comprehensive build of sites to address congestion is unlikely to be practicable or commercially viable

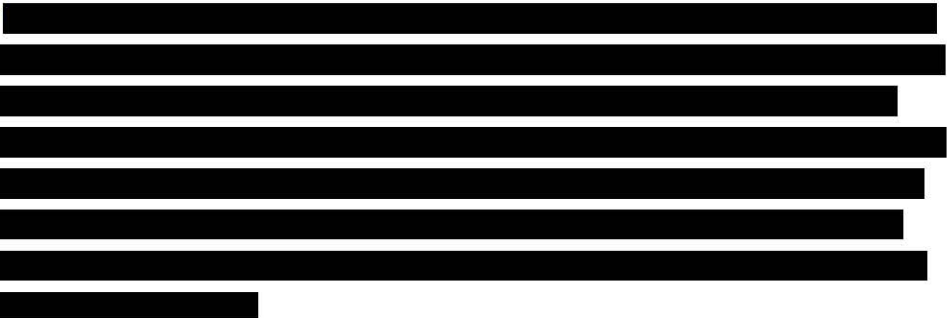
- 111. Even with investment by both Telstra and the government, it is likely that more sites will remain congested without the Proposed Transaction than with it, because of the sheer cost of building additional sites to relieve congestion. Telstra estimates (Table 1 of the Authorisation Application) that the capital costs of new sites in the 17% Regional Coverage Zone are approximately [Confidential-Telstra] per site. Telstra has also indicated that it likely would not be possible to acquire access for all of the sites that would be needed to provide sufficient capacity to address congestion.

⁶⁶ Authorisation Application, paragraph 269.

⁶⁷ As discussed above in section 2.1.1



112. I conclude that Telstra Option 2 is unlikely due to very high cost and the practical difficulty in acquiring the required sites. Many of the existing sites in the MOCN areas were not economic and were built using a co-investment model with federal or state governments (as discussed above in paragraphs 40 and 41), therefore many additional sites are also likely to be uneconomic. Telstra may build some additional sites to relieve congestion in the relevant counterfactual, but it is unlikely to do so to the extent that congestion is completely relieved.

113. **[Confidential-Telstra]** 

114. Similarly, while co-investment with the government will relieve congestion at some sites, it is unlikely that co-investment will result in congestion being fully addressed.

Other sources of spectrum are unlikely to be available within the next 5 years

115. Under Telstra Option 4, Telstra acquires additional spectrum and uses it to address congestion.

116. The spectrum required to address RAN congestion most effectively and efficiently in the 17% Regional Coverage Zone is in the sub-1 GHz bands.

117. Spectrum in the 600 MHz band could potentially be made available in future for mobile operators. The 600 MHz band is currently used to provide digital television services, but in some countries it is used to provide mobile services. The Australian Communications and Media Authority (ACMA) has noted the potential for the 600 MHz band to provide a second digital dividend, but also has also noted that this would require a further restack of spectrum to yield a contiguous block. The ACMA is engaging with industry and government on the potential for the 600 MHz to be freed up for use by mobile networks, but is currently in a “monitoring” rather than implementation stage. As a result, it is unlikely that frequency in the 600 MHz would be available in the medium term. Based on previous spectrum availability processes, it seems likely that the 600 MHz would not be available until around 2030:

- a. The extended 850 MHz band (814-825/849-870 MHz) was first flagged for clearance by ACMA in 2015, and licences for this band will commence in mid-2024 – a close to 10-year process.
- b. The first “digital dividend” (when 700 MHz spectrum used by TV broadcasters was released for mobile services) took about 15 years from initial concept to licences being issued (1998 to end 2014).



118. Given the above, clearing 600 MHz would likely take around 10 years to complete from the initial proposition (Media Reform Green Paper issued in 2020).⁶⁸ In other words, my view is that if the 600 MHz is made available for mobile services, this is unlikely to happen until around 2030, or later.

A combination of the above scenarios appears to be the most likely

119. I consider that the likely counterfactual is Telstra Option 5 (a combination of Options 1, 2, and 3) – that is, Telstra invests in some new sites, the Federal and/or State Governments and Telstra co-invest in others, but for the remaining sites congestion continues and worsens. Spectrum in the 600 MHz band may become available at some point in the future, however, if it does, this seems unlikely to occur before 2030.

6 Public benefits of the Proposed Transaction

120. I have identified the following seven types of public benefits of the Proposed Transaction that are relevant when viewed against the TPG Counterfactuals and the Telstra Counterfactual:

- a. Consumer benefits and economic benefits of relieving congestion on Telstra’s network,
- b. Public benefits if Telstra’s planned T25 coverage expansions can be accelerated because the Proposed Transaction frees up capex and resources that would have been used to address congestion in the counterfactual,
- c. Similarly, if government funding would have been used to address congestion in a counterfactual, then by reducing the funding required to address the congestion the Proposed Transaction could result in those funds to instead be used to expand 4G and/or 5G coverage, providing further public benefits,
- d. Productive efficiencies through the avoided costs of reducing the number of new Telstra sites needed to address congestion,
- e. Dynamic efficiencies of increased innovation in the 17% Regional Coverage Zone through full 3-player competition for 5G services leading to economic, consumer and social benefits,
- f. Productive efficiencies of avoiding the costs of operating, maintaining and upgrading equipment for at least 550 existing sites that will be decommissioned by TPG following the Proposed Transaction, and of TPG not establishing new sites in the 17% Regional Coverage Zone, and
- g. Environmental benefits of decommissioning TPG sites.

121. I examine each of these types of benefits in sections 6.1 to 6.7, and then in section 6.8 evaluate the relevance of each type of benefit in the context of each of the 3 TPG Counterfactuals.

⁶⁸

https://www.infrastructure.gov.au/sites/default/files/documents/media-reform-greenpaper-december2020_0.pdf













6.1 Consumer benefits and economic benefits of relieving congestion in regional areas

- 122. Mobile congestion in the 17% Regional Coverage Zone and in the Outer Regional and Remote Zone will likely be significantly lower with the Proposed Transaction than without the Proposed Transaction. As a result, a greater number of consumers and businesses in regional and remote areas will have reliable 4G mobile broadband access, providing a range of consumer benefits and business benefits. This applies for each of the three TPG Counterfactuals and the Telstra Counterfactual.
- 123. The RTIRC Report provides specific examples of how mobile congestion is currently affecting Australian consumers and businesses in regional and rural Australia. Submissions to the ACCC by councils and businesses on the merger authorisation application also provide examples of how current limitations on mobile bandwidth are affecting consumers, businesses and communities, and discuss the benefits that the Proposed Transaction could bring by addressing congestion and improving bandwidth.
- 124. More generally, as I detail below in section 6.1.2, empirical studies on the effects of mobile broadband show significant benefits in terms of consumer surplus, business productivity, and broader economic activity (including enhanced GDP growth and job creation). As I explain in paragraphs 137 to 143 below, I use the results of these studies to estimate that economic benefits of the Proposed Transaction could be in the range of billions of dollars over a 10 year period.

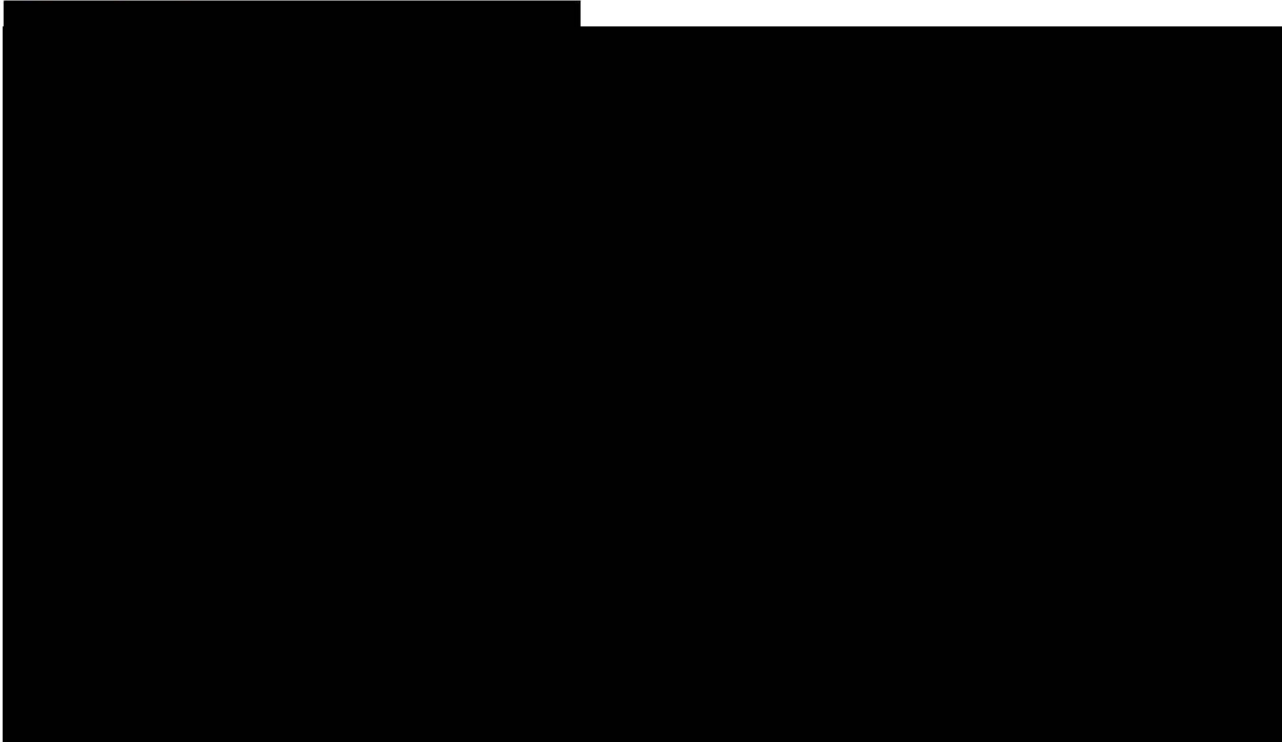
6.1.1 Mobile congestion will be significantly lower with the Proposed Transaction than without it

- 125. Under the Proposed Transaction, the pooling of spectrum in the 17% Regional Coverage Zone and availability of TPG’s spectrum to Telstra in the Outer Regional and Remote Coverage Zone will provide immediate RAN congestion relief to many users of Telstra’s network. The sites that Telstra takes over from TPG will also help address congestion.
- 126. In the Telstra Counterfactual, while Telstra is likely to build some new sites to alleviate RAN congestion (as discussed in more detail in section 6.4), given the high cost of deploying sites in regional and remote areas, the sparse population, and difficulty in obtaining access to required sites, it is likely that congestion on Telstra’s regional and remote network will be still be significantly higher than with the Proposed Transaction.

127. **[Confidential-Telstra** 










[REDACTED]

Figure 4: [Confidential-Telstra [REDACTED]]



Source: Schedule 2 of Instruction Letter

128. [REDACTED] [Public
text: By June 2024, it is estimated that the Proposed Transaction will address congestion for between approximately 70,000 to 90,000 users]

6.1.2 By reducing the number of congested sites, the Proposed Transaction allows more consumers and businesses to receive the full benefits provided by mobile broadband than under any identified counterfactual

129. Mobile network congestion leads to consumers and businesses in the affected regions not being able to fully benefit from the advantages of 4G mobile broadband. The Proposed Transaction will enable more consumers and businesses to achieve the full benefits of 4G.

⁶⁹ Mobility traffic sees customers moving around the network, resulting in them seeing different levels of performance depending on their location. To address this complexity, Telstra used the notion of an "effective" user in estimating how many users would be affected. This is effectively the amount of traffic generated by an average user on the network. The level of traffic on each cell experiencing congestion was calculated, and this aggregate congested traffic level was converted into an "effective" user measure.



Access to uncongested mobile broadband provides benefits to consumers, businesses, and the economy more broadly

130. Access to mobile broadband is widely viewed as providing benefits to consumers, businesses and the broader economy. In particular, mobile broadband provides the following benefits:

- a. **Consumer benefits**, through the convenience of accessing information and services (including navigation, online searches, web-browsing, news, banking, buying and selling goods and services, and use of a wide range of apps), communication (including OTT messaging, calling and video calling, email, and social media), and entertainment (such as streaming and gaming). While some consumers value mobile broadband more highly than others, on average, access to reliable fast broadband provides significant value.

A 2015 study by BCG estimated the consumer surplus to Australian consumers of mobile broadband to be more than US\$6,000 (AU\$8,700) per user per year.⁷⁰ The study used consumer surveys to prepare a bottom-up estimate of the value that consumers receive, over and above what they pay for devices, apps, services, and Internet access.

- b. **Benefits to businesses**, through increased productivity, as well as improved access to customers and suppliers.

A 2018 literature review by Deloitte for the Department of Digital, Culture, Media and Sport in the UK observed that mobile broadband can increase productivity by saving time, enabling more efficient ways of working, and increasing opportunities for working on the move.⁷¹ While noting the difficulty of quantifying the productivity benefits of mobile broadband, Deloitte identified a number of empirical studies that examine benefits of mobile broadband for businesses, including:

- i. A 2011 study that examined the download time that businesses in the UK could save by using 4G mobile broadband instead of 3G estimated that over 37 million business hours could be saved per year at a value of £730 million per annum.⁷²
- ii. A 2014 report by Capital Economics for UK mobile network EE, which found that business users save an estimated 13 minutes per day by using 4G. Based on this, Capital Economics estimated that a full transition of mobile data users to 4G could lead to £11 billion of time savings.⁷³

⁷⁰ BCG (February 2015), *The Growth of the Mobile Internet Economy – The Connected World*.
<https://www.bcg.com/publications/2015/technology-industries-growth-global-mobile-internet-economy>

⁷¹ Deloitte (June 2018), *The impacts of mobile broadband and 5G – A literature review for DCMS*.

⁷² Firth, James and Dominique Lazanski (2011), "Estimating the cost to UK businesses of slow mobile broadband." Commissioned by the Open Digital Policy Organisation.

⁷³ Capital Economics (2014) "Improving connectivity – stimulating the economy." Commissioned by EE.



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- iii. A study prepared by Arthur D. Little for EE, which found 67% of businesses using 4G in the US reported productivity increases, with 86% stating that they can get more done on the move.⁷⁴
 - iv. An econometric study conducted using firm-level data from Germany, which found that mobile internet has a significant and positive impact on productivity, with benefits such as improved information flows and flexibility outweighing potential negative effects on productivity (such as employee distraction).⁷⁵

A 2021 conference paper by Harald Edquist used panel data of 116 countries in 2014–2019 to investigate the association between mobile broadband speed and labour productivity. The paper found a significant and robust effect between labour productivity and a one-year lag of mobile broadband speed. In particular, it found that that a 10 percent increase in mobile broadband speed in period t-1 is associated with 0.2 percent increase in labour productivity.⁷⁶

In a 2014 report prepared by the Centre for International Economics (CIE) for the ACMA found mobile broadband (over the period 2006 to 2013) led to higher productivity in the mobile communications sector in Australia, as well as higher productivity from businesses that use mobile broadband.⁷⁷ Using a survey of over 1,000 businesses in Australia, the CIE found that those businesses reported an average time saved of 2.3 per cent from mobile broadband and an average cost saving of 1.4 per cent. Businesses in the survey found that mobile broadband increased sales (21%), improved quality (60.6%), allowed access to new markets (32.3%), and allowed access to new suppliers (28.9%).

Mobile broadband availability has also been shown to support entrepreneurship. A 2017 econometric study conducted across a wide panel of developed and developing countries found mobile broadband to increase entrepreneurship, measured by the number of adults per 100 involved in nascent or young firms.⁷⁸

- c. **Benefits for the broader economy**, by stimulating GDP growth and creating jobs.

Studies that examine the macroeconomic effects of mobile broadband, include:

- i. A 2020 AEI working paper by Jeffrey Eisenach and Robert Kulick, which uses an econometric model, found strong evidence of a direct relationship between the pace of

⁷⁴ Deloitte (June 2018), “The impacts of mobile broadband and 5G – A literature review for DCMS.” Commissioned by EE.

⁷⁵ Bertschek, Irene and Thomas Niebel (2016), “Mobile and more productive? Firm-level evidence on the productivity effects on the productivity effects of mobile Internet use.”

⁷⁶ Edquist, Harald (2021), “The Economic Impact of Mobile Broadband Speed,” Conference Paper for the International Telecommunication Society Biennial Conference 21-12 June 2021 Gothenburg, Sweden.

⁷⁷ ACMA (April 2014) The economic impacts of mobile broadband on the Australian economy, from 2006 to 2013 Research report prepared for the ACMA by The Centre for International Economics

⁷⁸ Alderete, Maria Veronica (2017) “Mobile Broadband: A Key Enabling Technology for Entrepreneurship?”



4G adoption and growth in employment and output. The authors found that “a one-percentage point increase in mobile broadband adoption in each of the previous eight quarters would increase job creation in the current quarter by 0.097% of the level of employment in the previous quarter and increase GDP by 0.560% of the level of GDP in the previous quarter.”⁷⁹

- ii. The 2014 study by CIE for the ACMA found that mobile broadband is estimated to have increased the growth rate of the Australian economy by 0.28 per cent each year from 2007 to 2013.
- iii. The 2014 report by Capital Economics described above found that the time savings associated with the faster speeds provided by 4G adds 0.7% per annum to GDP in the UK.
- iv. The Imperial College Business School (2017), using a cross-country econometric analysis, estimated that a 10% increase in mobile broadband penetration leads to a 0.6% to 2.8% increase in GDP.⁸⁰
- v. Deloitte found in a 2012 study using cross-country data on mobile broadband usage that a doubling of mobile data use is associated with a 0.5% increase in GDP per capita growth. The study found that effects were more pronounced for countries that have higher average levels of data consumption.⁸¹

131. Where 4G mobile broadband connectivity is congested, the types of benefits discussed above will be restricted. By reducing the number of sites that are congested, the Proposed Transaction will enable consumers and businesses in regional and remote areas to unlock the full potential of 4G mobile broadband.

The RTIRC report and the submissions to the ACCC on the Authorisation Application identify specific examples of how mobile congestion relief would provide benefits to consumers and businesses in regional and remote areas

132. The RTRIC’s consultation process collected information from many stakeholders about the impact of congestion in regional and remote Australia. Examples of the effects of mobile network congestion identified through consultation include:

⁷⁹ Eisenach, Jeffrey A. and Robert Kulick (May 2020), “Economic impacts of mobile broadband innovation: Evidence from the transition to 4G.” AEI Economics Working Paper 2020-05.

⁸⁰ Deloitte (June 2018), “The impacts of mobile broadband and 5G – A literature review for DCMS.”

⁸¹ Deloitte (2012), “What is the impact of mobile telephony on economic growth?” Commissioned by the GSMA and Cisco.



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- a. Impact on everyday business transactions,⁸² including the inoperability of payment systems such as EFTPOS⁸³
 - b. Interruptions to cloud-based business systems including accounting systems, booking systems and email systems⁸⁴
 - c. Congestion at events such as stock auctions when many attendees are attempting to connect to the same mobile tower at the same time⁸⁵
 - d. Inability to scan QR codes during the pandemic, creating difficulties for businesses in complying with COVID-related requirements⁸⁶
 - e. Safety concerns for those working in remote areas or emergency situations, including traffic incidents⁸⁷
 - f. Inability to stream and use other data-intensive services.

133. More generally, the RTIRC found that users facing mobile network congestion experience slow download and upload rates during peak periods of use, especially in the tourist season or when there is an influx of temporary workers (such as near mining camps).⁸⁸

134. The RTIRC report concluded that:

... there is a risk that rural and remote communities will continue to experience ongoing network congestion issues, entrenching digital disadvantage and impacting users' ability to leverage data-intensive services for work, study and leisure.⁸⁹

135. By lessening the number of congested sites, the Proposed Transaction will help to close the gap between consumers and businesses in regional and remote areas, and their counterparts in metropolitan areas in terms of access to the benefits of mobile broadband. Paragraph 271 of the Authorisation Application details the degree of improvement in speeds that Telstra estimates can be achieved in the 17% Regional Coverage Area as a result of the Proposed Transaction.

136. The benefits of congestion relief are also discussed in submissions to the ACCC on the merger application for authorisation of the Proposed Transaction. For example:

⁸² RTIRC Report, p. 8.
⁸³ RTIRC Report, p. 53
⁸⁴ RTIRC Report, p. 52
⁸⁵ RTIRC Report, p. 52
⁸⁶ RTIRC Report, p. 53
⁸⁷ RTIRC Report, p. 53
⁸⁸ RTIRC Report, p. 52.
⁸⁹ RTIRC report, p. 53



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- a. The Narrabri Shire Council, representing a region that is a significant agricultural producer, states that:

Given the ongoing limitations on data access and telecommunications coverage, our Producers are inhibited from accessing and implementing new technology, particularly within the Agribusiness sphere. These barriers ultimately result in a stymying of economic development and social growth opportunities. The availability of improved download speeds, reliability and reduction in cost would increase application and uptake exponentially.⁹⁰

- b. The Australian Trucking Association highlights the importance to regional and rural transportation of addressing congestion efficiently:

Providing access for Telstra to TPG owned spectrum will improve service quality, both within the regional coverage zone and in areas beyond the zone where Telstra may be the only provider. Increasing demand for data services can affect service quality, which can result in patchy service or slow speeds. Modern trucks are data intensive and service quality is important to the road transport industry.⁹¹

- c. The Canberra Business Chamber comments that better network capacity would support flexible and remote working with the effect of helping businesses address the significant skills and labour shortages that are currently being experienced.⁹²

- d. The Murray River Group of Councils highlights how mobile black spots and network capacity issues affect their communities:

from limiting personal communication, hampering emergency services, to hindering point-of-sale and other technology for tourism and retail operators. Health care and education providers are affected as they increasingly rely on mobile phone networks to provide high quality services to regional and remote residents.⁹³

⁹⁰ Narrabri Shire Council Submission. <https://www.accc.gov.au/system/files/public-registers/documents/Submission%20by%20Narrabri%20Shire%20Council%20-%2014.06.22%20-%20PR%20-%20MA1000021%20Telstra%20TPG.pdf>

⁹¹ Australian Trucking Association (14 June 2022), Submission to the ACCC on Telstra and TPG proposed spectrum sharing, p. 2 <https://www.accc.gov.au/system/files/public-registers/documents/Submission%20by%20Australian%20Trucking%20Association%20-%2014.06.22%20-%20PR%20-%20MA1000021%20Telstra%20TPG.pdf>

⁹² Canberra Business Chamber Submission <https://www.accc.gov.au/system/files/public-registers/documents/Submission%20by%20Canberra%20Business%20Chamber%20-%2013.06.22%20-%20PR%20-%20MA1000021%20Telstra%20TPG.pdf>

⁹³ Murray River Group of Councils (14 June 2022), Telstra TPG Spectrum Transaction – submission. <https://www.accc.gov.au/system/files/public-registers/documents/Submission%20by%20Murray%20River%20Group%20of%20Councils%20-%2014.06.22%20-%20PR%20-%20MA1000021%20Telstra%20TPG.pdf>



The submission expresses support for the Proposed Transaction as it would increase network capacity at peak times when the mobile phone network struggles to keep up with demand in some of the towns covered by the group of Councils.

- e. The Bunbury Geographe Economic Alliance expresses the view that mobile coverage limitations and data service inadequacies place businesses in their region at a competitive disadvantage and limits the region's ability to attract new investment through expansion of attraction of new industries. The Alliance supports the Proposed Transaction, finding that it makes the best of use of Telstra existing infrastructure, which, when combined with TPG's spectrum, will provide more bandwidth and ultimately an improved mobile service.⁹⁴

Quantification of the benefits of congestion relief is difficult but empirical studies on the economic benefits of mobile broadband provide an indication of the size of the benefit

- 137. For the 17% Regional Coverage Zone, Telstra estimates that the 10% of customers with the lowest speeds (due to congestion) will see a [Confidential-Telstra] [Public text: an approximately 55 to 65%] uplift in speeds on average as a result of the Proposed Transaction, from an average of approximately [Confidential-Telstra].⁹⁵ I understand that Telstra has used a conservative approach, which means that the increase in speed would likely be greater than [Confidential-Telstra] [Public text: the estimate of approximately between 55 to 65%].⁹⁶
- 138. At peak times, users of congested sites experience speeds that are much lower than the average – the definition used by Telstra of a congested site is one where download speeds at peak times are [Confidential-Telstra] for 4G sites.⁹⁷
- 139. Although I have not found any literature that specifically evaluated the consumer or economic benefits of relieving mobile network congestion, studies that examine the effects of increasing the uptake or speed of mobile broadband could be used to provide some indication of the quantum of benefits that the Proposed Transaction may provide. For example, the Edquist (2021) paper found that a 10% increase in mobile broadband speed increases productivity by 0.2% the year after the speed increase. This suggests that productivity will increase by around 1.2% in areas where cell sites will no longer be congested as a result of the Proposed Transaction.
- 140. I also consider that the BCG (2015) study on consumer surplus of Australian mobile broadband users (described above at paragraph 130 a) can be used to estimate the increase in consumer surplus that results from improving access to mobile broadband in the 17% Regional Coverage Zone. Telstra has estimated the annual number of users that will benefit from congestion relief as a result of the Proposed Transaction. Applying the BCG estimate of consumer surplus to those users indicates that

⁹⁴ Bunbury Geographe Economic Alliance Submission. <https://www.accc.gov.au/system/files/public-registers/documents/Submission%20by%20Bunbury%20Geographe%20Economic%20Alliance%20-%2014.06.22%20-%20PR%20-%20MA1000021%20Telstra%20TPG.pdf>

⁹⁵ Schedule 2 of the Instruction Letter.

⁹⁶ Schedule 2 of the Instruction Letter.

⁹⁷ Authorisation Application paragraph 259.



in the first ten years, users in areas where congestion is relieved through the Proposed Transaction will receive in the order of [Confidential-Telstra ██████████] [Public text: approximately between \$2 to \$3 billion] of consumer surplus from using mobile broadband (calculated as \$8,000 surplus per user multiplied by [Confidential-Telstra ██████████]⁹⁸ users who would have faced congested in the Telstra Counterfactual but do not face congestion under the Proposed Transaction. These users would likely be able to access some of this surplus without the transaction, but some would be lost because the congestion in the Telstra Counterfactual restricts consumers ability to use mobile broadband connectivity when demand is highest. I do not have information on what proportion of the benefits of mobile broadband would be achieved, so I have looked at some scenarios – if I assume that in the Telstra Counterfactual consumers in congested areas can achieve 50% of the surplus that is achievable with the Proposed Transaction, then the consumer surplus benefit is more than \$1.25 billion. If I instead assume consumers in congested areas can achieve 80% of the surplus in the Telstra Counterfactual then the consumer surplus benefit of the Proposed Transaction is more than \$500 million in the first ten years. I note that I do not consider there to be any material difference in the quantum of these benefits between the three TPG Counterfactuals.

141. The Eisenach and Kulick (2020) paper which looked at the effect of increases 4G mobile broadband adoption on GDP can be used to examine the value of the congestion relief that arises from the Proposed Transaction. In the congested areas, [Confidential-Telstra ██████████] [Confidential-Telstra ██████████]⁹⁹ – for example, Opensignal found that the average speed on Telstra’s 3G network in 2019 was 5.5 Mbps. Where congestion is addressed by the Proposed Transaction, consumers can access the full benefits [4G mobile broadband. Using the Eisenach and Kulick results, I estimate that the lagged GDP effects of addressing congestion are up to \$11.8 billion within the first 10 years of the Proposed Transaction. To calculate this estimate:
- a. I used Eisenach and Kulic’s finding that a 1 percentage point increase in mobile broadband adoption in each of the previous eight quarters would increase GDP by 0.560% of the level of GDP.
 - b. I found that in 2017/18, the GDP in Regional Australia was \$577,644,000 as reported in Table 1 of the December 2018 report by SGS Economics and Planning on “Economic Performance of Australia’s Cities and Regions.” I projected this forward an average using a 2% growth rate.
 - c. To estimate the percentage points of change in 4G mobile broadband penetration, I used Telstra’s analysis of how many users would no longer face congestion as a result of the Proposed Transaction. With reference to the endpoint of the analysis which was [Confidential-Telstra ██████████] [Confidential-Telstra ██████████] percentage point increase in 4G mobile broadband penetration in Regional Australia (using the population in Regional Australia of 5.785 million, sourced from the SGS Economics and Planning Report).

⁹⁸ Provided in the Instruction Letter

⁹⁹ Provided in the Instruction Letter



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- d. I then multiplied: 0.56 x the percentage point increase in 4G mobile broadband penetration x GDP for each of 8 years for the period 2025 to 2032 to calculate the GDP increase for each year. (I estimated 8 years of benefit, because the econometric analysis shows a 2-year lag before the effects on GDP are fully realised).
 - e. I calculated the NPV using a discount rate of 5%.
142. Some portion of the economic benefits may be achieved without the transaction because the mobile network is not congested at all times of the day, but there is likely to be a significant proportion of the economic benefit that is only achieved as a result of the transaction because applications and uses of broadband that require consistent high speeds would not be adopted at all because of network congestion (for example, see the Narrabri Shire Council's comments in para 132.a). If only half of the economic benefits were enabled by the Proposed Transaction then the benefit would be around \$4.5 billion. Again, I do not consider that there would be any difference in the quantum of these benefits between the three TPG Counterfactuals.
143. While not definitive, these estimates indicate that the public benefits from the mobile congestion relief would amount to billions of dollars in the first 10 years of the deal.

6.2 Economic benefits of potentially bringing forward Telstra's mobile coverage expansion and 5G deployment in regional areas

144. Telstra's forecasts of capital expenditure from the year ending June 2023 to the year ending June 2031 on sites in the 17% Regional Coverage Zone with and without the Proposed Transaction indicates that the Proposed Transaction would avoid approximately [Confidential-Telstra] [Redacted] [Redacted]¹⁰⁰ [Public text: between \$110 to \$130 million]. These savings arise from reduced need to densify sites to address coverage, given that the Spectrum Authorisation Agreement and the Site Transition Agreement both alleviate congestion on Telstra's 4G network. Telstra may divert that capital investment to other mobile network investments, such as expanding 4G and 5G network coverage, bringing forward the economic benefits associated with that extra coverage.
145. Telstra has passed the milestone of 75% 5G coverage (as discussed in section 2.1.1), with the network now providing services in metropolitan areas and in over 100 regional cities and towns. Telstra's T25 strategy has set a target of extending 5G coverage to 95% of the population by the end of 2025.¹⁰¹ The T25 strategy also includes expanding regional coverage so that Telstra provides 100,000 km² of new coverage by FY25.

¹⁰⁰ I calculated this figure using the capex forecasts contained in the Instruction Letter, by calculating the difference for each year between the "with" and "without" scenarios, and then summing across all years of data.

¹⁰¹ T25, Telstra Investment Day, 16 September 2021 <https://www.telstra.com.au/content/dam/tcom/about-us/investors/pdf-g/2021-Investor-Day.pdf>



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146. By freeing up resources and capital that would otherwise be used to provide infill coverage to address congestion issues, the Proposed Transaction could potentially bring forward Telstra's extended 4G coverage and 5G coverage. For example, Telstra could build approximately [Confidential-Telstra: 120]¹⁰² additional sites in Regional or Remote areas, extending its 4G or 5G coverage. Doing so would enable regional Australia to achieve more quickly the economic, consumer and social benefits discussed in section 6.1.2 (for 4G services) and in section 6.5 (for 5G services).

6.3 Economic benefits of enabling government funding to enhance mobile coverage

147. As discussed in section 2.1.1, in the 2022 budget, the Australian federal government has announced \$811 million of funding to improve mobile connectivity in regional areas. If in the Telstra Counterfactual, some government funding would be spent on alleviating the congestion on regional cell sites, then with the Proposed Transaction those funds could instead be spend extending mobile coverage in regional or remote areas. In that case, the Proposed Transaction would have the effect of providing public benefits associated with the extended coverage. That is, the benefits discussed in section 6.1.2 for consumers, businesses, and the broader economy could be extended to additional portions of the population.

6.4 Productive efficiencies of using pooled spectrum to reduce the need for site densification

148. As discussed in section 2.4.3, Telstra's regional mobile network has suffered from increasing congestion. The Proposed Transaction enables Telstra to lessen congestion on its network. More specifically:
- a. The Spectrum Authorisation Agreement enables Telstra to reduce congestion on its network in the 17% Regional Coverage Zone by pooling the spectrum of Telstra and TPG, and in the Outer Regional and Remote Coverage Zone the agreement allows Telstra to use TPG's spectrum.
 - b. The Mobile Site Transition Agreement provides Telstra with up to 169 of TPG's sites in the 17% Regional Coverage Zone. These are typically sites that are well placed to provide additional capacity and hence reduce congestion, but also in some cases are sites that offer a degree of unique coverage breadth/depth that would become unavailable to TPG customers if they were decommissioned.
149. As a result, the Proposed Transaction enables Telstra to avoid the construction of additional cell sites that it would have built and operated in the counterfactual to alleviate congestion. The productive efficiencies that the Proposed Transaction provides by reducing the number of new Telstra sites include the capital costs associated with building the sites and installing RAN and backhaul

¹⁰² I calculate this figure by dividing the avoided capital expenditure calculated in paragraph 142 above by Telstra's estimate of the average capital expenditure of building new sites stated in Table 1 of the Authorisation Application.

equipment, the operating and maintenance costs associated with running the sites, and the asset renewal costs associated with periodically replacing equipment.

150. To estimate the productive efficiencies, I rely Telstra's analysis of capex and opex in the 17% Regional Coverage Zone with and without the Proposed Transaction for the year ending June 2023 to the year ending June 2031. Using the results of Telstra's analysis which are contained in the Instruction Letter, I estimate the NPV of the productive efficiencies to be [Confidential-Telstra ██████████] [Public text: approximately between \$130 to \$150 million] over this 9- year period. To calculate this figure, I applied a discount rate of 5% to the capex and opex.
151. I note that the productive efficiencies would be higher if the Government were to co-fund additional sites in the Telstra Counterfactual. Telstra's analysis considered only the additional sites that it would invest in itself. However, in the Telstra Counterfactual, if the federal and/or state governments choose to co-fund sites (as has been done in the past) then the productive efficiency of new site capex and opex would be higher than the [Confidential-Telstra ██████████] [Public text: approximately \$130 to \$150 million] over estimated above. In 2021, for example, 28% of Telstra's new sites were co-funded. In the Outer Regional Australia area (as defined by the ABS), approximately 67% of Telstra's new sites were co-funded.¹⁰³ Given that the government has allocated significant funding in the most recent budget for improving the resilience of mobile communications in regional areas it is quite possible that the government would co-fund sites in the 17% Regional Coverage Zone.

6.5 Dynamic efficiencies of 3-player MNO competition in the 17% Regional Coverage Zone

152. By enabling TPG to be a full-service provider in the 17% Regional Coverage Zone, the Proposed Transaction is likely to generate significant dynamic efficiencies through greater innovation in 5G service offerings. Despite being the smallest MNO in Australia, TPG will be able to draw on the international expertise and innovation of its partners to offer IoT solutions in regional areas of Australia.

6.5.1 5G solutions enable large social and economic benefits

153. As discussed in section 2.2, 5G enables provision of improved mobile broadband speeds, large-scale IoT connections and low latency. These features of 5G open a huge variety of new applications across many sectors, enabling economic, consumer and social benefits. Some specific examples of use cases for 5G include:
- Remote healthcare:** As the Australian Mobile Telecommunications Association (AMTA) explains: "5G networks will support the Internet of Medical Things (IoMT), critical medical innovations, and artificial intelligence (AI) through remote access, real-time monitoring and fast data transfers and processing."¹⁰⁴ The AMTA finds that 5G-enabled medical devices and wearables

¹⁰³ ACCC (2021), Mobile Infrastructure Report, p. 12.

¹⁰⁴ <https://amta.org.au/health-5g-transforming-healthcare/>



will allow remote patient monitoring, and that 5G speeds and low latency pave the way for robotic surgery to provide live saving procedures for patients living in rural and regional areas, providing remote access to medical specialists. AMTA also highlight emergency response, personal health monitoring, and precision treatment (for example using artificial intelligence as a tool for diagnosis using medical imaging and data) as further applications of 5G for remote healthcare.

- b. **Precision agriculture:** Using a large number of 5G IoT sensors (such as soil and air quality, humidity, and temperature) farmers can improve crop management through maximising fertilisation, seeding, and harvesting and early disease detection.¹⁰⁵ 5G solutions also enable improved livestock monitoring and management, animal health monitoring and feed management, allowing greater efficiency and lower stock losses.¹⁰⁶
- c. **Automated manufacturing:** Remote control and monitoring of automated factory equipment has the potential to provide significant operational benefits and increased productivity.¹⁰⁷
- d. **Driverless transportation vehicles:** Driverless vehicles provide potential for benefits across various industries through time and cost savings. As Deloitte (2017) discusses in a report for the AMTA, driverless vehicles are already in use for mining, providing cost efficiencies through saved hours and the ability to operate 24 hours a day, 7 days per week.¹⁰⁸
- e. **Smart utilities:** IoT services allow for increased remote monitoring of assets, improving information available for asset management, and reducing the need for inspection visits.

6.5.2 The Proposed Transaction will enable TPG to bring innovative 5G solutions to regional Australia

154. Developing 5G solutions, including those that are adapted to context of regional Australia, requires significant investment in research and development. Despite being the smallest of the three Australian operators in terms of both market share and network coverage, TPG has international partnerships that provide opportunities for drawing on significant expertise in providing IoT hardware, device management systems (and required security), and industry-specific solutions. For example, Vodafone, which provides 136 million IoT connections across 182 countries,¹⁰⁹ has sought to position itself as global leader in IoT.¹¹⁰ Vodafone's website states that it has 1,400 IoT experts globally.¹¹¹

¹⁰⁵ <https://www.vodafone.com.au/red-wire/regional-australia-internet-of-things>

¹⁰⁶ <https://www.vodafone.com.au/red-wire/iot-agriculture>

¹⁰⁷ Deloitte (June 2018), The impacts of mobile broadband and 5G – A literature review for DCMS.

¹⁰⁸ Deloitte (2017) 5G mobile – enabling businesses and economic growth for the Australia Mobile Telecommunications Association (AMTA), p. 14.

¹⁰⁹ <https://newscentre.vodafone.co.uk/viewpoint/building-iot-trust-in-a-world-of-risk/>


¹¹⁰ <https://www.vodafone.com/business/news-and-insights/analyst-views/vodafone-named-a-leader-in-2022-gartner-magic-quadrant-for-managed-iot-connectivity-services>

¹¹¹ <https://www.vodafone.com.au/business/internet-of-things>






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155. TPG has stated that one of the key drivers of a MOCN architecture is its ability to offer services and products of its choosing. It highlights that it has significant innovation and expertise from its many shareholders, global market leadership in IOT and 5G and the cutting-edge product bundling and E2E support that comes with this.
 156. By enabling TPG to become a full-service 5G provider in the 17% Regional Coverage Zone, the Proposed Transaction is likely to bring increased innovation in 5G solutions in that zone, earlier than in the TPG-Option 1 or TPG-Option 2 Counterfactuals.
 157. While difficult to quantify, the dynamic efficiency benefits in the form of increased, and earlier, innovation in 5G applications of the Proposed Transaction are likely to be very significant across a wide range of industries and services, as are the flow-on economic, consumer and social benefits.

6.6 Productive efficiencies of decommissioning TPG sites
















158. TPG currently operates approximately 725 sites in the 17% Regional Coverage Zone. Following the Proposed Transaction, it is anticipated that at least 550 of these sites will be decommissioned. The remaining sites will potentially be operated by Telstra to provide in-fill coverage within the 17% Regional Coverage Zone.
159. Assessed against a counterfactual which involves a roaming arrangement with Optus (TPG Options 1 or 2) the Proposed Transaction provides productive efficiencies associated with the avoided operations, maintenance and renewal/upgrade costs of at least 550 sites.
160. I estimate the NPV over a 10-year period of the productive efficiencies associated with TPG's decommissioned sites to be approximately [Confidential-TPG - a. The number of avoided sites in each year (row 1 of Table 1) by assuming that 550 sites are avoided in the first year and that this increases in TPG-Option 1 by 20 sites per year for each year in the 10-year period (that is, a total of 200 new sites), but remains at 550 for TPG-Option 2,¹¹²
- b. The avoided costs of running existing and new sites (row 2 of Table 1), by assuming annual running costs of \$60,000 and multiplying this by the number of sites in each year, dividing by 1,000,000 to express the costs in \$million, and calculating the NPV using an assumed discount rate of 5%,

¹¹² My assumption of 20 sites per year is a conservative estimate based on the number of new sites that TPG has established in the last 2 years in regional areas. The ACCC's Mobile Infrastructure Report 2021 shows that TPG added 20 sites in 2021 and 29 sites in 2020.



- c. The annual avoided equipment replacement costs (row 3 of Table 1) as [TPG-Confidential] ¹¹³ per site x 550 sites)/[TPG-Confidential]  years¹¹⁴], divided by 1,000,000 to express the cost in \$millions, and discounted by the assumed discount rate of 5% to calculate the NPV,
- d. For TPG-Option 1, the annual avoided costs of establishing new sites (row 4 of Table 1), by assuming an indicative build cost of \$1 million per site in the 17% Regional Coverage Zone and multiplying this cost by 20 new annual sites. I then applied the assumed discount factor of 5% to calculate the NPV.
- e. The total NPV of the avoided costs associated with running and renewing the equipment (row 5 of Table 1) at TPG’s existing and new sites, by adding the NPV estimates from Rows 2 to 4,
- f. The site decommissioning cost (Row 6 of Table 1) by multiplying 550 sites by the decommissioning cost per site of [Confidential-TPG]  provided in Schedule 2 of the Instruction Letter, dividing by 1,000,000 to express in \$millions, and discounting by 5%,¹¹⁵ and
- g. The total avoided costs net of decommissioning costs by subtracting the NPV of the costs of decommissioning (row 6) from the NPV of the total avoided costs (row 5).



Row		NPV	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1	Avoided sites		550	570	590	610	630	650	670	690	710	730
2	Avoided running costs of sites (\$m)	\$289.7	\$33.0	\$33.7	\$34.9	\$36.1	\$37.3	\$38.6	\$39.8	\$41.0	\$42.2	\$43.5
3	Avoided equipment replacement costs (\$m)											
4	Avoided costs of establishing new sites (\$m)	\$154.4	\$20.0	\$20.0	\$20.0	\$20.0	\$20.0	\$20.0	\$20.0	\$20.0	\$20.0	\$20.0
5	NPV – total avoided costs (\$m)											
6	Decommissioning cost (\$m)											
7	Total avoided costs net of decommissioning costs (NPV, \$m)											

¹¹³ As listed in Schedule 2 of the Instruction Letter, this is TPG’s estimate of the capital expenditure associated with the replacement of site equipment.

¹¹⁴ As described in Schedule 2 of the Instruction Letter, this is TPG’s estimate of the frequency of replacing site equipment.

¹¹⁵ I also assume that the RAN equipment currently used by TPG will not be redeployed at other sites.



Row		NPV	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1	Avoided sites		550	550	550	550	550	550	550	550	550	550
2	Avoided running costs of sites (\$m)	\$259.3	\$33.0	\$33.7	\$33.7	\$33.7	\$33.7	\$33.7	\$33.7	\$33.7	\$33.7	\$33.7
3	Avoided equipment replacement costs (\$m)	████	████	████	████	████	████	████	████	████	████	████
4	Avoided costs of establishing new sites (\$m)	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
5	NPV – total avoided costs (\$m)	████										
6	Decommissioning cost (\$m)	████	████									
7	Total avoided costs net of decommissioning costs (NPV, \$m)	████										

161. I note that I use a 10-year period in my calculations, which reflects the initial period of the MOCN Services Agreement. If the agreement is extended, then the productive efficiencies would be higher than what I have estimated above.

6.7 Environmental benefits of avoiding operation of existing 550 sites

162. The Proposed Transaction will give rise to environmental benefits of avoiding the operation, maintenance, and equipment renewals for at least 550 existing TPG sites in the 17% Regional Coverage Zone, including:

- a. Reduced carbon emissions associated with the electricity that would have been used to operate the sites. I estimate that currently electricity use at 550 cell-sites would cause annual carbon dioxide emissions of approximately [Confidential-Telstra █████] tonnes.¹¹⁶ I note that the size of the avoided emissions associated with electricity consumption of the 550 cell-sites in future years will depend on a number of factors such as changes in the energy consumption of cell-site equipment,¹¹⁷ changes in how much grid-supplied electricity is generated using renewables, and changes in TPG’s use of renewable energy at its sites (such as solar),¹¹⁸
- b. Reduced carbon emissions associated with avoiding the energy and resources used to produce and transport replacement equipment and, at the end of the asset lifecycle, recycling or disposing of that requirement, and
- c. Reduced carbon emissions associated with maintaining the sites (such as use of fuel to travel to the sites).

¹¹⁶ I estimate these Scope 2 emissions by adopting the assumption from the Instruction Letter that sites use an average of [Confidential-Telstra █████] per year. I relied on the Scope 2 emission factor of 0.61 tCO2 per MWh for 2022 sourced from Australian Government Department of Industry, Science, Energy and Resources (December 2020), “Australia’s emissions projections 2020,” p.74. I then multiplied 550 sites by [Confidential-Telstra █████] by 0.61 tCO2 per MWh, which gave [Confidential-Telstra █████] tCO2 emissions.



equipment,¹¹⁷ changes in how much grid-supplied electricity is generated using renewables, and changes in TPG's use of renewable energy at its sites (such as solar),¹¹⁸

- d. Reduced carbon emissions associated with avoiding the energy and resources used to produce and transport replacement equipment and, at the end of the asset lifecycle, recycling or disposing of that requirement, and
- e. Reduced carbon emissions associated with maintaining the sites (such as use of fuel to travel to the sites).

163. Environmental detriments associated with decommissioning the 550 sites would need to be set against the benefits described above.

6.8 How the public benefits vary by according to the choice of counterfactual

164. Each of the 7 public benefits discussed above in sections 6.1 to 6.7 would be relevant if the selected counterfactual is one where TPG continues to maintain its sites in the 17% Regional Coverage Zone and either:

- a. uses a 3G roaming agreement to increase its network coverage in that area (TPG-Option 1), and increases its sites by 20 sites per year; or
- b. uses an updated roaming agreement that provides 4G, and potentially later 5G services, and does not build any further sites (TPG – Option 2). However, if the agreement provides for 5G services then the dynamic efficiencies may not be relevant (because TPG would already be able to provide 5G services).

165. If the counterfactual is one where TPG uses a network sharing agreement such as a MORAN or MOCN with Optus, or a MORAN with Telstra then the benefits described in sections 6.1 to 6.4 above would be relevant. That is, all of the benefits that are either directly or indirectly associated with addressing congestion would continue to be relevant. However the dynamic efficiencies of 3 player provision of 5G (described in section 6.5) would not be relevant.

166. If, without the Proposed Transaction, TPG has a MORAN with Telstra then the productive efficiencies and environmental benefits of avoiding the operation, maintenance and equipment renewal for at least 550 TPG sites discussed in (f) and (g) above would not be relevant to a public benefits assessment as these benefits would be achieved both with and without the Proposed Transaction. If, without the Proposed Transaction, TPG would have a MORAN or MOCN agreement with Optus, then

¹¹⁷ For example, 5G base stations may consume significantly more power than 4G base stations. Fierce Wireless (3 April, 2020), "5G base stations use a lot more energy than 4G base stations: MTN"

<https://www.fiercewireless.com/tech/5g-base-stations-use-a-lot-more-energy-than-4g-base-stations-says-mtn>

¹¹⁸ TPG has announced a goal of powering its operations with 100% renewable energy by 2025.

https://www.tpgtelecom.com.au/sites/default/files/media-release/20210331%20TPG%20Telecom%20media%20release_Sustainability%20Report%202020.pdf



a number of TPG's existing sites may be decommissioned and new sites avoided. I do not have the necessary information to know whether the sites that would be decommissioned would be at least 550, as is the case for the Proposed Transaction. If a network sharing arrangement with Optus would result in TPG decommissioning at least 550 sites then none of the benefits estimated (f) and (g) would be relevant to assessing the public benefits of the Proposed Transaction. However, if a lower number of sites would be decommissioned under an Optus network sharing agreement under the Proposed Transaction, then the Proposed Transaction would result in some public benefits of the type described in (f) and (g) but the value of those benefits would depend on the difference between the number of sites avoided through the Telstra MOCN arrangement (at least 550) and the number of sites avoided through the alternative network sharing arrangement with Optus.

7 Public detriments of the Proposed Transaction

167. The assessment of whether the Proposed Transaction is likely to lead to a lessening of competition is outside the scope of my report (as per my instructions contained in Appendix C). If a lessening of competition is identified, then any associated allocative efficiencies losses and any other associated public detriments would need to be set against the public benefits that I have identified.
168. I have not identified any material source of public detriment in conducting my analysis.
169. I note that while some economic activity may be lost as a result of the reduced number of sites to be maintained, the Tribunal's definition of public detriment quoted by the ACCC in the Merger Guidelines suggests that this lost economic activity would not be a public detriment if the activity was inefficient.
170. I also note that the CEPA report and the Optus submission discuss a reduction in resilience as a potential detriment of the Proposed Transaction because TPG would no longer have its own cell sites in the 17% Regional Coverage Zone. I do not consider that the Proposed Transaction would result in any material reduction in resilience for the following reasons:
- a. TPG has materially fewer sites than either Telstra or Optus in the 17% Regional Coverage Zone.
 - b. In practice, many of the TPG sites are likely to be in reasonably close proximity to Telstra sites, so the same events that cause an outage at a Telstra site, such as loss of power, are also likely to cause an outage at TPG sites. For example, in its report on the impacts of the 2019-2020 bushfires on the telecommunications network, the ACMA's review found that 88% of telecommunications outages between December 2019 and January 2020 were caused by loss of mains power.¹¹⁹

¹¹⁹ The Australian Communications and Media Authority's review into the impacts of the 2019-2020 bushfires on the telecommunications network found that, of 888 telecommunication outages observed between December 2019 and January 2020, 779 (which equates to 88%) were caused by mains power outages: CMA.8001.0001.0023, quoted in the final report of the Royal Commission into National Natural Disaster Arrangements, para 9.16.



-
- c. TPG sites that are not close to the Telstra sites are most likely to be the sites that are transitioned to Telstra to improve coverage, and so any resilience provided by those sites will be retained under the Proposed Transaction.

8 Concluding comments

- 171. I have identified public benefits of the Proposed Transaction to include: productive efficiencies and environmental benefits associated with decommissioning TPG sites, productive efficiencies associated with reducing site densification to address congestion on Telstra's network, economic benefits associated with reducing congestion, dynamic efficiencies associated with enabling TPG to provide 5G services in the 17% Regional Coverage Zone, and public benefits of bringing forward Telstra's expansion of 4G and 5G coverage.
- 172. While difficult to quantify, these benefits are material and in the order of billions of dollars over the next 10 years (and may extend beyond this if TPG exercises its option to extend the agreements).
- 173. If the ACCC, or any other party, were to conclude that the Proposed Transaction would lead to lessening of competition in a relevant market (or markets), then the detriments associated with that lessening of competition would need to be assessed and weighed against the public benefits of the transaction.





Appendix A: Curriculum Vitae of Emma Ihaia (Lanigan)

I am an economist with 25 years of experience in economic regulation and competition analysis, with specialist knowledge in the telecommunications and electricity sectors. I also have experience in applying regulatory and competition policy principles to a range of other sectors.

I have provided expert evidence for regulatory proceedings, competition investigations, clearances and authorisations. I have submitted evidence before the New Zealand Commerce Commission, the New Zealand Electricity Authority, the Australian Competition and Consumer Commission, and other international competition and regulatory authorities.

My clients have included regulators, policy makers, utilities, access seekers, and industry organisations. I have advised clients in New Zealand, Australia, Europe, Asia, and the Pacific Islands.

Career Summary

2012 to present	<i>Director and Owner, Link Economics Limited, New Zealand</i>
2020 to present	<i>Senior Advisor (and previously Director), Castalia, New Zealand and Pacific Practice</i>
2021 to present	<i>Non-Executive Director, Electricity Invercargill, New Zealand</i>
2014 to 2018	<i>Regulatory & Commercial Manager, Network Tasman, New Zealand</i>
2009 to 2012	<i>Self-employed telecommunications regulatory and competition economist, New Zealand</i>
2008 to 2009	<i>Principal Economist, Concept Economics, New Zealand</i>
2004 to 2008	<i>Principal Economist, CRA International, New Zealand</i>
1996 to 2004	<i>Principal Economist (and prior roles), Network Economics Consulting Group, Australia</i>
1995 to 1996	<i>Data Analyst, Air New Zealand, New Zealand</i>

Education

Bachelor of the Arts, Major in Economics, Minor in Mathematics, University of Auckland, New Zealand (1995)

Master of the Arts in Economics (First Class Honours), University of Auckland, New Zealand (1997), with Masters Thesis on “Modelling Interconnection Agreements of Monopolistic Network Providers”

Competition and Regulatory Consulting Experience

Telecommunications

- **Palau telecommunications market development and sector investment plan (Palau), 2021-2022:** I led a project for the government of Palau, with funding administered by the World Bank, to assess the current state of the market and examine options for the deployment of a fibre-to-the-premise network.
- **Expert report on NBN pricing structure for Gilbert + Tobin (Australia), 2021:** I prepared an expert report on broadband access prices for Telstra to use in regulatory proceedings. The report forecast broadband uptake by download speed, forecast peak demand capacity requirements, and estimated nbn’s average revenue per user over a five-year period.

-
- **Expert report for Trustpower on regulation of fibre access services (New Zealand), 2019-20:** I prepared an expert report which was submitted to the NZCC on the fibre access regulatory framework. I commented on the methodology to apply a building block model to calculate access prices, and on other issues including cost allocation, Weighted Average Cost of Capital (WACC), pricing principles and non-discrimination.
 - **Benchmarking wholesale broadband prices for Telstra (Australia), 2019-2020 and update in 2021-2022:** In preparing the benchmarking study, I researched for a sample of countries: regulatory approaches, wholesale product specifications, and the structures and levels of pricing applied.
 - **Expert report on Sky-Vodafone merger clearance application (New Zealand), 2016-2017:** I was engaged by utility retailer Trustpower and entrant wireless network BlueReach to provide expert reports on the proposed merger. My reports defined the relevant markets, examined the state of competition and the effects on competition in fixed and mobile telecommunications markets of the proposed merger between Vodafone and Sky.
 - **NBN cost review for Australian Department of Communications (Australia), 2014:** I prepared cost estimates for the cost-benefit assessment of the Australian National Broadband Network (NBN). I reviewed NBNCo's cost models for Fibre-to-the-Premise (FTTP), Fibre-to-the-Node (FTTN), Hybrid Fibre-Coax (HFC), Fixed Wireless and Satellite technologies, conducted sensitivity analyses, and provided a report summarising my findings.
 - **Expert report on NZCC clearance of acquisition of 5 MHz of 700 MHz spectrum (New Zealand), 2013:** I co-authored an expert report with Dr John Small and Aaron Schiff for Two Degrees Mobile which examined the potential acquisition by Telecom or Vodafone of spectrum in the 700 MHz band and compared these potential acquisitions against a counterfactual where 2degrees later acquired the spectrum.
 - **Expert report on the effect of spectrum allocation on competition in the context of 700MHz 'Digital Dividend' spectrum auction (New Zealand), 2013**
 - **Expert report on the competitive effects of a merger between Vodafone New Zealand and TelstraClear (New Zealand), 2012:** I co-authored an expert report with Professor Justus Haucap which examined the effects of the proposed merger on barriers to competition associated with on-net/off-net price discrimination, drawing on economic literature. The report also examined the competition effects of bundling.
 - **Regulatory support to the Bermuda Department of Telecommunications and the Bermuda Regulatory Authority (Bermuda), 2011-2014:** I provided ongoing support over a three year period in conjunction with Gabel and Associates, including market definition analysis, identification of electronic communications markets most likely to require *ex ante* regulation, state of competition analysis for each electronic communications market, designation of dominant operators, determination of appropriate regulatory remedies including retail price caps, and development of radio-spectrum policy.
 - **Expert report on mobile markets and retail price discrimination (Papua New Guinea), 2012:** My expert report for BeMobile, which was submitted to the regulator, examined market definition and market power, as well as investigating calling externalities and the implications for retail price regulation.

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- **Evaluation of the Commerce Commission’s methodology for monitoring telecommunications markets, 2012:** Two Degrees Mobile engaged me to evaluate the Commission’s annual telecommunications market monitoring reports. I assessed the information contained in the reports to provide insights on the state of competition and how market outcomes compare with other countries. I presented recommendations to the Commission on additional measures that could be included in annual market monitoring.
 - **Economic advice for 2degrees on mobile network sharing and colocation (New Zealand), 2011**
 - **Expert witness statement for BeMobile in Papua New Guinea, 2011:** My report examined whether Digicel’s mobile termination pricing was anti-competitive, and was filed in support of a successful application by BeMobile for an interim injunction.
 - **Expert evidence on anticompetitive conduct in Samoan telecommunications markets (Samoa), 2010:** I appeared before the Samoan Competition Tribunal as an economic expert on an anti-competitive conduct matter. My expert evidence covered market definition, market power and conduct assessment.
 - **Economic analysis for 2degrees of a national roaming commercial agreement (New Zealand)**
 - **Expert reports for 2degrees on mobile termination rates (MTRs) and on-net pricing (New Zealand), 2008 to 2011:** I was retained by Two Degrees as an expert to provide evidence to the Commerce Commission on Mobile Termination Rate regulation. I assessed pricing principles and access methodologies and carried out international benchmarking.
 - **Expert report on mobile tower co-location (New Zealand), 2008:** I prepared an expert report for 2degrees which examined the incentives of incumbent network operators to supply mobile colocation. The report was submitted to the NZCC in the context of its consultation process for the standard terms determination for co-location on cellular mobile transmission sites.

Competition analysis in other sectors

- **Expert report for an authorisation of collective bargaining by the New Zealand Tegel Growers Association, New Zealand, 2021-22:** I was retained to provide expert economics evidence for applications to the NZCC for provisional and full authorisation of collective bargaining by chicken growers who supply Tegel Foods Limited. I defined the relevant markets, identified the relevant factual and counterfactual scenarios, and assessed the public benefits and detriments of the proposed authorisation.
- **Expert economics analysis for retail grocery market study, New Zealand, 2021:** I have been the Food and Grocery Council’s (FGC’s) economic advisor throughout the Commerce Commission’s market study process and prepared an expert report that was included with the FGC’s submission on responses to the Commerce Commission’s Preliminary Issues Paper. My advice has included: assessing profitability of supermarkets, market effects of excessive buyer power, the effect of private labels on competition and market outcomes, barriers to entry and expansion, conditions for tacit collusion, and the extent of competitive constraints on the main supermarket banners.
- **Peer review of Cayman Islands Fuel Market Assessment, 2021:** The Utility Regulation and Competition Office (OfReg) engaged me to provide a review of a report they had commissioned on market definition, market power and market remedies for fuel markets.

-
- **Competitive neutrality and the parcel market (New Zealand) 2020:** Freightways engaged me to analyse the impact on competition of an investment supported by the Government's Covid Response and Relief Fund. I examined the relevant markets, the state of competition, and reviewed international best practice and economic literature on competitive neutrality regimes.
 - **Expert report on postal access pricing, 2019:** I prepared an expert report which examined whether the access pricing methodology used by New Zealand Post was compliant with the Efficient Component Pricing Rule (ECPR), whether the pricing would have been rational in a contestable market, whether it was likely to substantially lessen competition; and how the methodology compared with access pricing in other jurisdictions.

Regulatory analysis in other sectors

- **Expert report on Default Price-Quality Path (DPP) impacts, 2021:** I prepared an expert report that was submitted to the Commerce Commission by a distribution network as evidence that an amendment to the distributor's information disclosures would not lead to a regulatory breach of the revenue cap applied to electricity distributors.
- **Review of water and wastewater regulation for the Government of Bermuda, 2021:** I led a Castalia project which involved a comprehensive benchmarking exercise of Bermuda's current water and wastewater technical and economic regulatory framework against global best practice.
- **Peer review of electricity price impacts for the NZCC, 2020:** The NZCC asked me to peer review its assessment of the consumer pricing impact of the Aurora Customised Price-quality Path (CPP). The Commission published my expert report alongside its Draft Decision on the CPP.
- **Chair of industry working group on electricity pricing reform, Chairperson – Electricity Networks Association Pricing Working Group Leading a project to evaluate pricing reform options:** I have chaired a national working group of electricity lines companies over the past four years, leading the networks' strategic review of electricity network pricing in the context of emerging technologies such as solar generation, batteries and electric vehicles. I led the working group to identify price reform options, evaluate each option drawing on stakeholder feedback, and produce a guidance paper on electricity distribution network pricing.
- **Review of a Building Block Model (BBM) of airport landing fees, 2019:** I critically reviewed a BBM of a regional airport for clients Freightways and New Zealand Post. I also conducted a benchmarking study to compare the airport's landing charges with those of other New Zealand airports.

Professional memberships

Member, Competition Law and Policy Institute of New Zealand (CLPINZ)

Member, Law and Economics Association New Zealand (LEANZ)

Member, New Zealand Institute of Directors

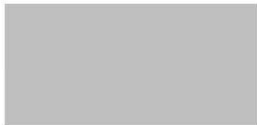


Appendix B: Declarations made in accordance with the Federal Court's Harmonised Expert Witness Code of Conduct

I, Emma Jane Ihaia, of 23 Champion Terrace, Moana, Nelson, New Zealand, declare that:

- I have read the Federal Court's Harmonised Expert Witness Code of Conduct and agree to be bound by it
- I have made all the inquiries that I believe are desirable and appropriate (save for any matters identified explicitly in the report), and no matters of significance which I regard as relevant have, to my knowledge, been withheld

Signed:



Date: 28 July, 2022



Appendix C: Letter of instructions

Special Counsel
Contact

Geoff Petersen
Andrew Low
T [REDACTED]
GCP:1049539

Our ref



27 July 2022

By email: [REDACTED]

Emma Ihaia
Principal Economist and Director
Link Economics

[REDACTED]
Dear Ms Ihaia

Application to the Australian Competition and Consumer Commission for Merger Authorisation

- 1 We refer to our letter of engagement to you dated 29 April 2022. Defined terms in that letter have the same meaning in this letter.
- 2 As you are aware, Gilbert + Tobin act for Telstra. We are instructed to seek your expert opinion, in the form of a written report, in connection with the Authorisation Application.
- 3 This letter sets out the instructions for the preparation of your expert report.

Background

- 4 On 27 June 2022, the ACCC received a submission from Optus in relation to the Authorisation Application (**Optus Submission**). The Optus Submission was accompanied by reports from HoustonKemp, Analysys Mason and Cambridge Economic Policy Associates (**CEPA**).
- 5 The Optus Submission makes certain claims regarding the potential public benefits and detriments associated with the Proposed Transaction. Optus states that it "*rejects most of the claimed public benefits set out in the Authorisation Application and submit[s] that even if any of these benefits do materialise, they are significantly outweighed by the substantial detriment to competition and consumers that will result if the Proposed Transaction is authorised*" (Optus Submission, [8.2]).

Question

- 6 Please answer the following question based on your training, study and/or experience in economics and telecommunications markets and on your review of the materials identified in Schedule 1 and 2 to this letter:

In your opinion, what are the likely public benefits and detriments of the Proposed Transaction?

We do not require your report to address any potential effect (or likely effect) of the Proposed Transaction on competition, or any associated public benefits or detriments.

Documents and Assumptions

- 7 In preparing your report, you may rely on the documents listed in **Schedule 1** (being the relevant agreements, Authorisation Application and Optus submission and reports) and the factual matters identified in **Schedule 2**.

Contents of your report

- 8 We ask that you prepare your report in accordance with the requirements of the Federal Court's Expert Evidence Practice Note (GPN-EXPT) (**Practice Note**), which includes the Harmonised Expert Witness Code of Conduct (**Code**). A copy of the Practice Note (including the Code) was enclosed with your letter of engagement.
- 9 Under the Code, your report must clearly state the following:
- (i) your name and address;
 - (ii) an acknowledgement that you have read this code and agree to be bound by it;
 - (iii) your qualifications as an expert to prepare the report;
 - (iv) the assumptions and material facts on which each opinion expressed in the report is based (this letter of instructions may be annexed);
 - (v) the reasons for and any literature or other material utilised in support of each such opinion;
 - (vi) (if applicable) that a particular question, issue or matter falls outside your field of expertise;
 - (vii) any examinations, tests or other investigations on which you have relied, identifying the person who carried them out and that person's qualifications;
 - (viii) the extent to which any opinion which you have expressed involves the acceptance of another person's opinion, the identification of that other person and the opinion expressed by that other person;
 - (ix) a declaration that you have made all the inquiries which you believe are desirable and appropriate (save for any matter identified explicitly in the report), and that no matters of significance which you regard as relevant have, to your knowledge, been withheld from the court;
 - (x) any qualifications on an opinion expressed in the report without which the report is or may be incomplete or inaccurate;
 - (xi) whether any opinion expressed in the report is not a concluded opinion because of insufficient research or insufficient data or for any other reason; and
 - (xii) where the report is lengthy or complex, a brief summary of the report at the beginning of the report.

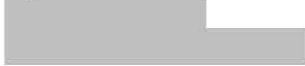
Next steps

10 We look forward to receipt of your report in due course.

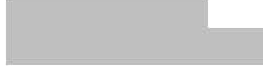
Yours faithfully
Gilbert + Tobin



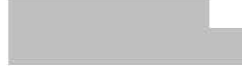
Geoff Petersen
Special Counsel



Simon Muys
Partner



Andrew Low
Partner



Schedule 1 – Documents

No.	Document description
1.	Mobile Site Transition Agreement (Variation No 1 - 07.04.22)
2.	MOCN Service Agreement (Variation No.1 - No site list - 07.04.22)
3.	Spectrum Authorisation TPG and Telstra (Variation No 1 - 07.04.22)
4.	Variation Agreement - MOCN arrangements (No attachments - 07.04.22)
5.	Annexure A to Schedule 3 - Execution SA1 List
6.	Annexure B to Schedule 3 - Execution Sites in Boundary SA1s List
7.	Application to the ACCC for Merger Authorisation – Telstra Corporation Limited and TPG Telecom Limited arrangement for the sharing of active infrastructure and spectrum in regional Australia [Confidential version] (23 May 2022)
8.	Optus: Submission in response to ACCC market inquiry - Telstra and TPG application for merger authorisation for proposed spectrum sharing in regional Australia (June 2022)
9.	CEPA: Competition impacts of the proposed Telstra-TPG network and spectrum sharing agreements: for Optus (24 June 2022)
10.	Analysys Mason: Final report for Optus: The ACCC’s consideration of the Telstra–TPG agreement (27 June 2022)
11.	HoustonKemp: Competitive effects of the proposed Telstra-TPG arrangement (28 June 2022)

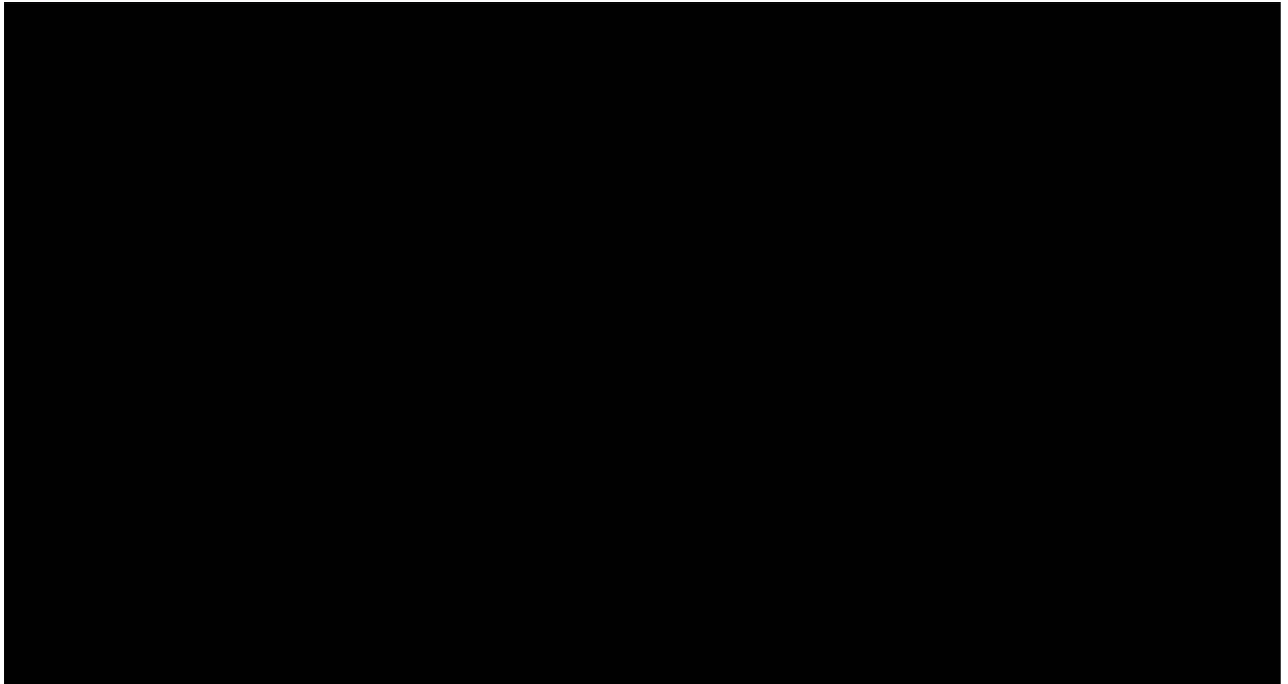
Schedule 2 – Factual Assumptions

[Note: Telstra confidential information is highlighted green and TPG confidential information is highlighted blue.]

Telstra network information

- 11 Telstra's estimates of congested sectors in the 17% Regional Coverage Zone and in areas beyond 98.8% coverage with and without the Proposed Transaction are as follows:

Figure 1: Estimated congested sectors



- 12 Telstra's analysis estimates that by June 2024, the Proposed Transaction will address congestion for approximately [REDACTED] users who would have otherwise faced congestion.¹ On average over the period to June 2031, approximately [REDACTED] more users will face congestion without the Proposed Transaction than with the Proposed Transaction.
- 13 In the 17% Regional Coverage Zone, Telstra estimates that the 10% of customers with the lowest speeds (due to congestion) will see a [REDACTED] uplift in speeds on average as a result of the Proposed Transaction, from an average of approximately [REDACTED]. Telstra notes that it has used a conservative approach in estimating the potential service improvement, which means that the increase in speed would likely be greater than [REDACTED].
- 14 In the 17% Regional Coverage Zone and in areas beyond 98.8% coverage, Telstra estimates that it would invest in [REDACTED] new sites over the period July 2022 to June 2031 without the Proposed Transaction, and [REDACTED] sites during that same period with the Proposed Transaction.

¹ Mobility traffic sees customers moving around the network, resulting in them seeing different levels of performance depending on their location. To address this complexity, Telstra used the notion of an "effective" user in estimating how many users would be affected. This is effectively the amount of traffic generated by an average user on the network. The level of traffic on each cell experiencing congestion was calculated, and this aggregate congested traffic level was converted into an "effective" user measure.

- 15 Telstra estimates its operating and capital expenditure requirements in the 17% Regional Coverage Zone and in areas beyond 98.8% coverage would be as set out in the table below:

- 16 Telstra estimates that the average site electricity power usage in the 17% Regional Coverage Zone is 25MWh per year. The vast majority of Telstra's mobile sites use grid-supplied power. There are also a limited number of sites relying on either solar panels combined with battery, solar panels combined with a diesel generator, or a continuously running diesel generator.

TPG network information

- 17 TPG estimates that: