IN THE HIGH COURT OF NEW ZEALAND **AUCKLAND REGISTRY**	**CIV-2021-404-1618**
I TE KŌTI MATUA O AOTEAROA **TĀMAKI MAKAURAU ROHE**	
UNDER	the Judicial Review Procedure Act 2016
IN THE MATTER OF	an application for judicial review
BETWEEN	**ALL ABOARD AOTEAROA INCORPORATED** Applicant
AND	**AUCKLAND TRANSPORT** First Respondent
AND	**THE REGIONAL TRANSPORT COMMITTEE FOR AUCKLAND** Second Respondent
AND	**AUCKLAND COUNCIL** Third Respondent

AFFIDAVIT OF RALPH BROUGHAM CHAPMAN
December 2021

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AFFIDAVIT OF RALPH BROUGHAM CHAPMAN

I, Ralph Brougham Chapman, of Te Whanganui-a-Tara, economist, swear –

1. I make this affidavit in support of All Aboard Aotearoa Incorporated's application for judicial review of decisions made by Auckland Transport, the Regional Transport Committee for Auckland and Auckland Council concerning the Regional Land Transport Plan for Auckland 2021.

2. I confirm that I have read and complied with the Code of Conduct for Expert Witnesses in preparing this affidavit.

Qualifications and experience

3. I hold a degree in engineering (first class honours, University of Auckland), a master's in public policy (Princeton University, USA), and a PhD in economics (University of Auckland).

4. I was Director of Environmental Studies at Victoria University of Wellington for 16 years from 2005 to July 2021, when I retired from that position. I am now an Adjunct Professor at the University and am currently supervising several master's students.

5. My research has explored topics including climate change mitigation policy, transport policy, urban policies and planning for sustainable transport, the implications of transport and land use systems for climate change and health outcomes, and preferences for transport, neighbourhoods and housing.

6. My academic papers have been cited over 3,200 times[1] and include many on climate change mitigation, transport and urban form-related research, as well as housing and other urban-related topics. In 2015 I wrote a book about climate change policy, *Time of Useful Consciousness*.

7. I am currently co-leading a strand of research on transport and carbon emissions (as well as playing a role in other strands) in the *Public Housing and Urban Regeneration – Increasing Well-being* programme funded by MBIE, which is being co-delivered by University of Otago, Victoria University of Wellington, Massey University, Motu Public Policy Research and other partner organisations.

8. I have previously co-led research in the *Resilient Urban Futures* programme of the NZ Centre for Sustainable Cities, focused on climate change mitigation, active travel, and compact development/urban form.[2]

9. I have been a visiting scholar at New York University and at University College London. I have also worked with the OECD in Paris and participated in four expert teams carrying out 'country' environmental performance reviews. I was recently invited by the OECD to write a

[1] https://scholar.google.com/citations?user=Isjj4lIAAAAJ&hl=en&oi=ao
[2] http://sustainablecities.org.nz/members/ralph-chapman/

background paper on managing the transition to carbon-neutral cities, which I presented at a Paris OECD/EC workshop.[3]

10. Before joining academia, I had over 20 years of policy experience in the New Zealand Treasury, HM Treasury in the United Kingdom, the New Zealand Beehive and the Ministry for the Environment. During this last stage, I was a negotiator for New Zealand of the Kyoto Protocol (in addition to negotiating in other contexts).

Documents provided to me

11. I have been provided with the following documents:

    (a) The pleadings filed in the proceeding;

    (b) The Government Policy Statement on Land Transport 2021 (**GPS 2021**);

    (c) The Regional Land Transport Plan for Auckland 2021 (**RLTP**); and

    (d) An Auckland Transport paper prepared for a meeting of the Regional Transport Committee on 18 June 2021 titled "How the draft RLTP 2021-2031 meets the requirements of section 14 of the LTMA" (**Auckland Transport Advice**).

Instructions

12. I am instructed to address the following issues:

    (a) The need to reduce Auckland's transport emissions, including the relevant international, domestic and local targets for emissions reductions;

    (b) The available levers for reducing transport emissions, including the impact of investment decisions;

    (c) The social, cultural and economic impacts of reallocating road space to sustainable modes; and

    (d) The costs of failing to reduce Auckland's transport emissions.

The need to reduce Auckland's transport emissions

13. The International Panel on Climate Change (**IPCC**) SR15 stated in 2018, "Pathways limiting global warming to 1.5°C with no or limited overshoot require rapid and far-reaching transitions in energy, land, urban and infrastructure (including transport and buildings), and industrial systems."

[3] Chapman, R. *Managing the Transition to a Climate-Neutral Economy in Cities and Regions. Background Paper for an OECD/EC Workshop on 17 May 2019 within the Workshop Series, 'Managing Environmental and Energy Transitions for Regions and Cities'.* OECD (Paris: 17 May 2019). https://www.oecd.org/cfe/regionaldevelopment/Chapman-2019-Managing-Transition-Regions-Cities.pdf

14. Transport emissions reductions in the Auckland region are critical to the efforts of New Zealand as a whole to deliver on its urgent commitments under the Paris Agreement (ratified in 2016), confirmed and strengthened at COP26 in November 2021. These commitments are to reduce net emissions by 50% by 2030, and to zero by 2050 in line with New Zealand's Zero Carbon Act. I note that this is expressly acknowledged in the RLTP itself:

> Given the scale of Auckland's contribution to New Zealand's transport emissions, failure to make substantial emissions reductions in Auckland will severely limit New Zealand's ability to meet its climate change targets". (p.34) [[301.0035]]

15. When the Paris Agreement was negotiated in 2015, the focus was on keeping warming 'well below 2 degrees C' and pursuing efforts to hold warming to 1.5C, but with the IPCC's 2018 SR15 report, the urgency of holding warming to 1.5C has become more evident. This requires emission reductions of 45-50% by 2030, from a base year of 2010 (IPCC, 2018). The urgency of such reductions by the end of the current decade is now obvious, and was underlined with an even greater sense of urgency in November 2021 at COP26 (the 2021 United Nations Climate Change Conference).

16. Auckland's transport 'contribution' to New Zealand's emissions reductions is important because Auckland is such a significant part of the New Zealand economy (around 38% of GDP in the year to March 2020),[4] and because of Auckland's part in New Zealand's emissions inventory. Auckland's emissions are around 25% of New Zealand's emissions from households and industry of carbon dioxide, which is the most important long-lived greenhouse gas (**GHG**).[5] Carbon dioxide is most important because it lingers in the atmosphere for a long time. Of a pulse of CO_2 injected into the atmosphere now, 30% approximately will still be around in 100 years' time and about 19% in 1,000 years. Changes in CO_2 "endure on the scale of many human lives,"[6] driving climate change and acidifying the oceans.

17. A substantial part of Auckland's carbon emissions is from transport. In New Zealand as a whole, transport makes up 33% (in 2019) of long-lived GHG emissions, which in the urban context are almost all carbon dioxide (He Pou a Rangi [Climate Change Commission], 2021, pp., p.261).

18. According to the OECD, certain characteristics of Auckland, such as a high degree of sprawl, "contribute to the [high] share of greenhouse gas emissions generated by road transport in Auckland (37.6%), which is high but comparable to that of other sprawled cities" (OECD, 2020). Auckland cannot credibly exempt its transport sector from making a major and urgent contribution to emissions reduction.

19. Auckland's Climate Plan Te Tāruke-ā-Tāwhiri (Auckland Council, 2020) also includes a commitment to *halve* Auckland's overall greenhouse GHG emissions by 2030, and to transition to net zero by 2050. This, like central [[301.0190]]

[4] https://www.stats.govt.nz/information-releases/regional-gross-domestic-product-year-ended-march-2020
[5] https://www.stats.govt.nz/information-releases/greenhouse-gas-emissions-by-region-industry-and-household-year-ended-2019
[6] https://climate.nasa.gov/news/2915/the-atmosphere-getting-a-handle-on-carbon-dioxide/

government's 2030 and 2050 commitments, reflects the reality that emissions reductions cannot reasonably be postponed if New Zealand is to play a fair part in achieving the global goals of the Paris Agreement, which was ratified in 2016.

20. Halving overall emissions by 2030 against the backdrop of a rising population means a more than 50% reduction in *per capita* terms over 2016-2030. Moreover, translating this specifically into *transport* emissions means these emissions need to fall by 64% by 2030.[7] The CURB modelling tool used to quantify a transition pathway is, like all modelling, not definitive, but it gives a good idea of what is necessary to meet the 'halving' goal. Note that transport emissions represent "Auckland's largest source of emissions [and] represents 68 per cent of the overall emissions reduction modelled [using CURB] for 2030."

21. While central government's emissions reduction plan is still being developed, with a target date of May 2022, it is clear from both the Ministry of Transport's Green Paper, Hīkina te Kohupara, Transport Emissions: Pathways to Net Zero by 2050 (MoT, 2021) and from the 'final advice' to the Government from the Climate Change Commission (He Pou a Rangi [Climate Change Commission], 2021), that road transport emissions reductions will be a key part of delivery of overall carbon emissions reductions for New Zealand by both 2030 and 2050. [[306.2473]] [[307.2755]]

22. The Climate Change Commission sets out two straightforward reasons for transport having a key role within New Zealand's overall emission reductions. One is the 33% figure cited above, i.e. transport makes up 33% (in 2019) of long-lived GHG emissions. The other is that:

> Investing in [transport] infrastructure, behaviour change and technology that is available now is important. Action in these areas will be critical for achieving the 2050 net zero target for long-lived gases. (p.261) [[307.3032]]

23. I note that infrastructure is listed first, and currently-available technology last. This reflects my own sense that investing in assets such as public transport networks, together with active travel promotion through road space reallocation and investment in walking and cycling infrastructure, will indeed 'be critical for achieving the scale of change required' (He Pou a Rangi [Climate Change Commission], 2021, p.262). [[307.3032]]

24. New Zealand's emissions reduction commitments are recognised in the GPS 2021. One of the four strategic priorities of the GPS 2021 is, "Transforming to a low carbon transport system that supports emissions reductions aligned with national commitments, while improving safety and inclusive access." The associated primary outcome is, "Investment decisions will support the rapid transition to a low carbon transport system, and contribute to a resilient transport sector that reduces harmful emissions, giving effect to the emissions reduction target the Climate Change Commission recommended to Cabinet until emissions budgets are released in 2021." [[301.0152]]

[7] Auckland's Climate Plan Te Tāruke-ā-Tāwhiri's. P.51 outlines the modelling; p.52 gives the 64% reduction figure. [[301.0240]]

25. The RLTP indicates (p.79) that Auckland's total transport emission will increase by 6% between 2016 and 2031 under the RLTP's investment programme, or decrease by 1% if certain already announced government interventions are made. Even with further factors taken into account, such as increasing fleet efficiency and further policy interventions, the RLTP indicates emissions might drop by around 5%. Increased EV uptake might strengthen the reduction to a 'possible' 12% (p.80). In my view, there is no doubt that this does not align with New Zealand's national commitments, or give effect to the emissions reduction target the Climate Change Commission (p.77) has recommended to Cabinet (being a 47% reduction in net CO_2 emissions by 2030 against a 2019 baseline). [[301.0079]] [[307.2847]]

Levers for reduction of transport emissions

26. The Auckland Transport Advice asserts that the "there is little ability to further reduce overall emissions through RLTP direct investment in infrastructure and services" (p.121). It also says, "Fundamentally, investment in infrastructure or services only has a very minor impact on total emissions, whether positive or negative." This understates the potential impact on emissions of major investments and underestimates a number of instruments other than infrastructure investment. The statement in my view is unduly definitive, and rests on a conception of transport behaviour and modelling that appears not to adequately consider system-wide effects. [[301.0121]]

27. Various policy instruments can make a significant difference to certain transport sector outcomes, including emissions, with effects varying depending on the scale of the instruments and the time period at issue. Effects also depend on complementary application of other instruments, i.e. through systemic impacts (Chapman, Howden-Chapman, & Capon, 2016). The effects can also be positive or negative in terms of emissions, and the factors which determine emissions growth or reduction. The most powerful lever is altering the balance of transport infrastructure assets, including removing assets that support driving and building assets that support the use of alternative modes, such as interconnected bus routes and separated bike paths.

28. Critical complementary policy levers are those which affect the perceived need for and convenience of travel, determined largely by urban form and design; prices (petrol or diesel, or congestion prices); regulation, such as banning car use in parts of urban centres; the removal of car parking (including Council-owned car parks); the promotion of public awareness about alternatives to road transport; and so on (Hasan, Chapman, & Frame, 2020).

29. It is true that asset investment can take time to have an impact, but conversely investment or non-investment in transport assets, including rapid transit corridors and bus fleets which offer attractive modal alternatives to motor vehicle traffic, can make a substantial difference to traffic outcomes within a decade. For example, a clear indication that Auckland Transport and central government will not be investing in road expansion in Auckland and will be repurposing road space for public and active transport would, together with a mass transit investment programme, send a strong signal to car drivers (and others) not to depend on cars for

everyday mobility, but to consider other modes, including active modes such as bikes/e-bikes, or public transport options.

30. A recent review of international evidence by Javaid, Creutzig, and Bamberg (2020) draws the conclusion that infrastructure assets (for example mass transit systems, cycling networks and bus exchanges) make a large difference in transport mode choice. Individual and social factors also influence mode choice, of course, which is why investment programmes need to be strongly complemented by behaviour change signals including regulation.

31. New Zealand is an instance of relatively high levels of highway and road building – together with the highest car ownership level in the OECD (OECD, 2017) – which have not solved urban transport congestion problems but instead have encouraged additional demand for road use. This conforms to a pattern of 'induced demand' whereby the expansion of road system capacity contributes to increased demand for road vehicle travel and higher vehicle kilometres travelled and carbon emissions, and fails to reduce congestion. This pattern is seen around the world and is perhaps best documented in the UK (Matson, Taylor, Sloman, & Elliott, 2006) and the US (Duranton & Turner, 2009). The pattern also works in reverse – when road capacity is reduced, traffic tends to diminish overall rather than simply being spread around nearby roads. In both directions, road provision/expansion or removal affects mode choices, the nature of the wider transport system and, in turn, carbon emissions from transport.

32. It is safe to say that, internationally, the lessons around 'optimal' investment in roading assets are now widely accepted, and many jurisdictions have moved past an emphasis on roads to a more systemic view of the transport system in which a more sustainable, low-emissions balance in mode choices is being sought (Chapman & Howden-Chapman, 2020; Creutzig et al., 2018).

33. It is useful to note that the Ministry of Transport's Pathways Green Paper referred to earlier (MoT, 2021), and Auckland Council's work on the Transport Emissions Reduction Plan (**TERP**) both recognise that investment and service decisions play an important role in either reducing emissions or maintaining their growth (see, for example, p.24 of the Pathways Green Paper). It is notable that the Auckland Transport Advice appears to be significantly more pessimistic about the emissions reduction potential of investment and services than the Ministry of Transport, and the Auckland Council and Auckland Transport staff who are preparing the TERP (Auckland Council Environment and Climate Change Committee (2 December), 2021). [[306.2500]]

Social and economic impacts of reallocating road space to sustainable modes

34. The Auckland Transport Advice addresses reallocation of road space as follows:

> General road space reallocation towards cycling and other sustainable modes has also been proposed by submitters as a way of addressing climate issues. This is already occurring as part of the wider cycling programme and projects such as Connected Communities that will provide for bus lanes, bus priority and cycling and safety improvements. As noted, there is no available funding for further reallocation. In practice, it is also likely that gains from deterring car travel through lane reallocation alone would be largely offset by the increase in emissions associated with increased congestion and diversion amongst the remaining traffic. Reallocation of general traffic lanes without additional effective alternatives (which cannot be funded) would also materially reduce the RLTP's contribution to LTMA objectives around effectiveness and economic, social and cultural public interests. [[301.0121]]

35. In my view, these assertions are incorrect and unsupported by evidence. In particular, (i) moving away from a car-dependent transport system will deliver economic and other benefits; and (ii) road space reallocation is important as a means of reducing emissions.

36. At a high level, the international literature (including some New Zealand contributions) makes overwhelmingly clear that there are major benefits to moving away from a car-dependent transport system, whether in the short or long term. These benefits include not only environmental benefits (primarily the reduction in carbon emissions) but also economic and social benefits (especially health gains from increased physical activity, reduced air pollution and reduced traffic injuries) (Chapman, 2019; Chapman et al., 2018; OECD, 2021; Randal et al., 2020).

37. The benefits are likely to be high for a country like New Zealand with a high level of car dependence, where transport choices have to date often been quite limited, depending on the context (for example, many small cities have very limited public transport options available), and where parts of the population such as those without vehicle licences face systemic difficulties in accessing many facilities and amenities (Chapman, 2018).

38. Reallocation of transport investment (and already existing transport assets) towards public and active transport will work best in conjunction and synergy with urban planning instruments and price instruments to reduce car traffic such as road or congestion pricing, and reduction of carparking. Many gains arise through providing greater transport choice, easier access to employment, and hence enhanced economic welfare. The recent detailed OECD study of Auckland cited above (OECD, 2020) makes clear that reallocation of resources towards better public transport in particular plays a significant part:

> [This OECD] report examines a package of policies that promotes public transport over private vehicles. This package drastically increases the cost of private vehicle ownership while **channelling a large subsidy to public transport fares**. This policy package targets a **modal shift to public transport** and reduces aggregate emissions by 40% in 2050, relative to the reference case in which these policies are not implemented. Further, the public transport policy package yields a welfare gain equivalent to 0.9% of net income in 2050. Therefore, **incentivising a switch to public transport, while ensuring that public transport is electrified should be a priority**. [Emphasis added]

39. A report by the International Transport Federation (**ITF**) (ITF, 2021) concludes that road space reallocation is an important means of changing mode share in favour of lower-emitting, more efficient[8] and more sustainable transport modes in cities:

[[304.1829]]

> Significantly reducing the modal share of private vehicles in urban mobility implies significant long-term change in the spatial form of cities. In the short to medium-term, it means reallocating space away from roads and parking. In the longer-term, it implies changes in land-use patterns to maintain high levels of accessibility with lower overall levels of mobility. (p.6)

40. The same ITF report also concluded, on the basis of studies such as Goodwin et al.(1998), that reductions in road space can indeed lead to 'disappearing traffic', and that:

[[304.1835]]

> reallocation of road space does not simply shift traffic from one place to another but leads to an overall reduction in the number of motor vehicles on roads. (p.12)

41. Other voices from the OECD (2021) echo this conclusion:

[[312.5047]]

> Policies with the potential to transform the system's functioning include …**[s]treet redesign and improved management of public space [which]** can **reverse induced demand** by reallocating public space and investment to low carbon and space efficient modes, and balancing space use between transport and other uses; leading instead **to disappearing traffic**.' (p.9) [Emphasis added]

42. Auckland Transport suggests that there is no available funding for further road space reallocation, i.e. that 'additional effective alternatives' cannot be funded. It would of course be counterproductive to create effective alternatives in the form of roading elsewhere. But more to the point, reallocation automatically increases the attraction of the existing, more sustainable modes of public transport, walking, cycling and micro-mobility. Reallocating general traffic space to such modes is not costly, and is efficient and effective,[9] and would form a small part of the RLTP's planned funding of some $36.2 billion over 2021-31.

43. It is simply a question of what Auckland Transport prioritises. An external observer looking at the allocation of funding would be surprised at how little of the $36 billion appears to be earmarked for investment to support emission reductions, and how much is still allocated to roading projects.

Costs of failing to reduce Auckland's transport emissions

44. It is clear that there will be significant national economic costs (including the need to pay to buy emissions offsets) if Auckland's emissions are not reduced. It is worth underlining that the new COP26 Nationally Determined Contribution (**NDC**) commitment made by New Zealand in November 2021, to a 50% emission reduction (below 2005 levels) by 2030, is a very real

[8] Although efficiency (including space efficiency) is only one dimension of performance, it is notable that the ITF report cites evidence that 'when a car is driven at 50km/h, it requires 70 times more space than a cyclist or pedestrian' (ITF, 2021, p.10).
[9] As indicated by the footnote immediately above.

commitment.[10] It has the corollary that all sectors and parts of New Zealand will need to contribute to achieving this strengthened goal.

45. The costs of achieving this stronger target, and the risks associated with it, are real in three ways. Even if international units are largely bought offshore (Minister James Shaw has indicated that around two-thirds of the target reductions may come from international offsets), the price of such units is likely to rise over time. There is a considerable fiscal risk if the price of these units rises significantly. Second, resources allocated to buying such units have a high opportunity cost – they could have been used to make domestic emission reductions, perhaps at lower cost and, potentially, higher benefit. Third, there is a reputational cost to New Zealand of failing to reduce emissions as much as it can, domestically: New Zealand may be seen by some as not making a credible effort to explore all options to mitigate.[11]

46. Inaction and inadequate action in respect of Auckland's transport emissions will have many costs. Some will fall on Aucklanders, and others on New Zealanders as a whole, who will bear the 'national level' costs. In addition, people in New Zealand and other countries will have to bear the costs of a destabilised climate. These last impacts are likely to be severe, as the IPCC (IPCC, 2018) has made clear, and others have reinforced. For example, as Xu et al. (2020) note:

> …in a business-as-usual climate change scenario, the geographical position of this temperature niche [the liveable niche for humans] is projected to shift more over the coming 50 years than it has moved since 6000 BP [before the present]…
>
> We demonstrate that depending on scenarios of population growth and warming, over the coming 50 years, 1 to 3 billion people are projected to be left outside the climate conditions that have served humanity well over the past 6,000 years.' (p.1)

Conclusion

47. All available policy instruments, especially investment in public and active transport, and the reallocation of investment away from roads, and road space away from cars, will need to be deployed to achieve the scale of reductions in transport emissions that is urgently needed by 2030, and that is contemplated by the GPS 2021 and Auckland's Climate Plan. In addition, greater emphasis needs to be placed on changes in urban form, as this can support some relatively short-term benefits in terms of mode shift, while laying the foundations for critical longer-term shifts with larger benefits.

[10] Notwithstanding that, on a like-with-like basis, New Zealand's '30% by 2030' Paris NDC has now been strengthened to a 41% reduction target, rather than 50%, it still represents a marked increase in effort.

[11] This reputational cost and risk have dogged New Zealand since Kyoto in 1997. It was raised again in the frosty reception New Zealand received from some commentators, including NGOs, when it outlined its plans at COP26. See https://www.nzherald.co.nz/nz/politics/climate-change-conference-emissions-to-be-cut-by-50-per-cent-below-2005-levels-by-2030/WRDDTBYBIRDSOTQSDP7UH6KWLI/

48. Interestingly, a similar conclusion is apparent in the recent comments made by Auckland Council and Auckland Transport officers in their paper "Transport Emissions Reduction Plan– Progress Update" (Auckland Council Environment and Climate Change Committee (2 December), 2021), commenting on the results of preliminary modelling of the TERP: [[312.5234]]

> - although central government has outlined a number of actions in its ERP, these do not go far enough, nor do they act fast enough to achieve a 64 per cent reduction in emissions. TERP must fill a large gap between the baseline and the target.
> - all levers across transport and a range of other sectors will need to be pulled as hard as they can be within the timeframe available.
> - among the levers, mode shift is by far the most powerful to meet the 2030 target. However, significant mode shift to all sustainable modes is required, especially active modes. A compact urban form and accelerated decarbonisation of the public and private vehicle fleet are also crucial.[12]

49. What is most disturbing about the RLTP is that it does not align with the current policy environment, centring on an urgent response to the climate emergency, other than in the most basic way of extending some extant emission-reducing policies. It essentially does not offer any substantial departure from business as usual. It therefore cannot be considered to be credible as a local government plan for dealing with transport emissions in an age of urgent climate change mitigation, and a policy environment in which scientists, a large majority of the public, (most of) local government, central government and the Climate Change Commission are signalling the need for transformative change.

SWORN at Wellington this 21st day of December 2021 before me:

R B Chapman

Ralph Brougham Chapman

Matthew Craig Beleskey

A solicitor of the High Court of New Zealand

[12] Paragraph 3 of the executive summary also notes that "The TERP will provide an evidenced approach (a recommended pathway) that achieves a modelled 64 per cent reduction in transport emissions in Auckland by 2030, as modelled in Te Tāruke-ā-Tāwhiri's decarbonisation pathway."

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