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Jeremy Butler
Tasman District Council

By email: jeremy.butler@tasman.govt.nz

Dear Jeremy,

1.0 Introduction

Tasman District Council (**Council**) has engaged Styles Group to undertake road-traffic noise modelling to inform the appropriate management of transport noise effects associated with Plan Change 81 (**PC81**).

This advice sets out the inputs, assumption and outputs of road-traffic noise modelling for high noise generating road corridors affecting the proposed Medium Density Residential Zone (**MDRZ**) of PC81.

We have recommended that the modelled "Road Traffic Noise Area" is used in conjunction with a land use control that will ensure future buildings containing noise sensitive activities are designed and constructed to protect occupants from road-traffic noise levels that may affect their health and amenity indoors.

Appendix A sets out the sets out the evidential basis for managing road-traffic noise effects on noise sensitive land use.

The recommendations for PC81 are designed to ensure ongoing land-use compatibility by ensuring noise sensitive activities are protected from adverse noise effects that may affect their health and amenity while indoors. In turn, these measures will adequately manage the potential for reverse sensitivity conflicts to arise on the road controlling authorities.

1.1 The preliminary control to manage road traffic noise effects from PC81

Early in our involvement we suggested a preliminary control to the Council prior to the resolution being passed. The preliminary control was intended to indicate the general mechanism for the land use control. We understand that Council passed a resolution to enable PC81 to include a land use control to manage noise effects from high noise generating road corridors.

The preliminary land use control is set out below. The preliminary control adopts a fixed distance where all dwellings within 60m of the edge of the road corridors (as listed) are required to be acoustically treated to deliver an adequately level of acoustic amenity.

PC81 Preliminary land use control

(t) Any new building or alteration to an existing building that contains a habitable room within 60 metres of the white edge line of the following roads must be designed, constructed and maintained so that road traffic noise from does not exceed 40 dB LAeq (24 hour) in all habitable rooms:

i. State Highway 6
ii. State Highway 60
iii. Salisbury Road
iv. Champion Road
v. Wensley Road
vi. Oxford Street
vii. Talbot Street
viii. Hill Street
ix. Ellis Street
x. Berryfield Drive
xi. Queen Street
xii. Aranui Road
xiii. Mapua Drive
xiv. Waimea West Road
xv. Cambridge Street
xvi. William Street
xvii. Washbourn Drive

Written certification of compliance from a Suitably Qualified and Experienced Acoustic Consultant shall be submitted with the relevant building consent application. The certification shall be based on the existing measured or predicted noise levels plus 3 dB. Noise level predictions for the building may be modelled by a Suitably Qualified and Experienced Acoustic Consultant using a recognised computer modelling method for road traffic, having regard to factors such as barrier attenuation, the location of the dwelling relative to the road, topographical features and any intervening structures.

(u) If opening windows of habitable rooms must be closed to achieve the design noise levels in Condition (1) those rooms must be designed, constructed and maintained with a mechanical ventilation system that achieves the following requirements:

i. Provides mechanical ventilation that can operate continuously to satisfy clause G4 of the New Zealand Building Code and that provides at least 1 air change per hour, but no less than 7.5L/s per occupant; and

ii. Provides cooling and heating that is controllable by the occupant and can maintain the inside temperature between 18°C and 25°C when assessed using a 2.5% design weather condition for Tasman; and

iii. Any system installed must not generate more than 35 dB $L_{Aeq(30s)}$ when measured 1 metre away from any grille or diffuser. The noise level must be measured after the system has cooled the rooms to the temperatures in (ii) above, or after a period of 30 minutes from the commencement of cooling (whichever is the lesser);

OR:

(iv) Alternatively, instead of (i) to (iii) above, a design verified by a suitably qualified and experienced HVAC expert stating the design proposed will provide ventilation and internal space temperature controls to meet or exceed the outcomes described in (i) to (iii) above.

(v) A commissioning report must be submitted to the Council prior to occupation of the building demonstrating compliance with the mechanical ventilation system performance requirements in Conditions (t) and (u) above.

At the time the preliminary land use control was prepared, the results of road-traffic noise modelling for the Tasman District were not available. The preliminary land use control was therefore set at a fixed distance from the relevant roads that was an estimate of the area of land that would be covered by modelled noise contours.

The adoption of a fixed distance in a land use control risks the control not correlating with the actual extent of land affected by high levels of road-traffic noise. In other words, the fixed distance may capture land that should not be subject to controls or exclude land that should be subject to controls. Accordingly, we recommend that the land use control should be informed by road-traffic noise modelling.

We understand that the resolution of Council provides scope for the provision to be amended / refined based on the results of road-traffic noise modelling that we have undertaken.

2.0 PC81 road-traffic noise modelling

Styles Group has undertaken a comprehensive road-traffic noise modelling exercise for high noise generating road corridors adjacent to the proposed MDRZ of PC81.

The modelling process uses computer noise mapping software that is based on inputs that are specific to the relevant road network and geospatial data for the Tasman District, including traffic volume, speed environment, road surface, topography, buildings and barriers.

This section sets out the inputs and assumptions that have been incorporated into the noise models for PC81.

2.1 Assumptions for traffic volumes and heavy vehicles

We understand that the traffic growth enabled by PC81 is likely to be significant on some of the major roads through the Tasman District and that the expected growth will be much greater than the standard growth allowances in the NZTA *Road-traffic noise contours* mapping that has recently been made available online[1].

The road-traffic noise modelling we have undertaken is therefore based on the specific growth allowances enabled by PC81. Tasman District Council's Transportation Team have identified the roads within the extent of PC81 that have an estimated Annual Average Daily Traffic (**AADT**) volume of more than 2,000 vehicles per day. These are the roads that have the potential to generate noise levels high enough to warrant land use controls to manage adverse health effects. The roads that exceed this threshold are identified in Table 1 overleaf, along with the Councils' estimated percentage of heavy vehicles.

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[1] These road-traffic noise contours were generated by AECOM for the *TAR 19/01 Social cost (health) cost of land transport noise exposure* research project, completed in 2023. We understand that the NZTA input data was based on the period between 2018-2020 which means that the road-traffic noise predictions do not take into account future AADT for future growth in the Tasman District- including the growth enabled by PC81.

2.2 Assumptions for built development

The vertical and horizontal screening of built development directly adjacent to the road corridor has a significant acoustic screening effect to other development that is further set back from the road corridor. The first row of buildings along the road corridor therefore have a significant effect on the spatial extent of road-traffic noise levels across the receiving environment.

Where there is a high level of certainty that the land directly adjacent to the road corridor will be built out and form a noise barrier to other dwellings, we consider that it is effective and efficient to take this screening into account when determining the spatial extent of land that should be subject to land use controls to mitigate road-traffic noise. This approach ensures that the burden of mitigation does not extend any further into the community than is appropriate.

We have worked with Tasman District Council's Policy Team to determine the anticipated build out (land coverage and building height) that will be enabled by PC81. The noise model is based on a building coverage of 60% per site and an average building height of 8m. The noise model is therefore based on a theoretical build-out that would be enabled by PC81.

2.3 Summary of road-traffic noise modelling inputs and assumptions

Table 1: Road traffic noise model input parameters

Parameters/calculation settings	Details
Software	DGMR iNoise
Calculation method	Source calculation method.
Meteorological parameters	Single value, C0 = 0
Ground attenuation over land outside road corridor	General method, ground factor: 0.3 (high proportion of hard ground)
Air temperature	293.15 K
Atmospheric pressure	101.33k Pa
Air humidity	60%
Source heights (relative)	0.5m
Building coverage and heights	MDRZ and IDP modelled as having 60% coverage of MDRZ area and average building height of 8m.
Noise level prediction heights	Noise level predictions are at a height of 4m (approximately 1-1.5m above floor height of second storey). Results are not sensitive to variations.

<table>
<tr><th>Parameters/calculation settings</th><th colspan="3">Details</th></tr>
<tr><td>Road surfaces:</td><td colspan="3">

SH6 Richmond Deviation – Stone Mastic asphalt
SH6 Gladstone Road – Stone Mastic asphalt
SH60 for PC81 area adjacent to Stringer Road – Chipseal Grade 5 or 6
SH60 for PC81 area adjacent to Takaka Collingwood Highway – Chipseal Grade 5 or 6
SH60 north of Three Brothers Corner - Chipseal grade 2 or 3 (incl. 2/4, 3.5, etc)Salisbury Road (Richmond) - Stone Mastic asphalt
Champion Road (Richmond) – Chipseal Grade 5 or 6
Wensley Road (Richmond) - Stone Mastic asphalt
Oxford Street (Richmond) - Stone Mastic asphalt
Talbot Street (Richmond) - Stone Mastic asphalt
Hill Street (Richmond) - Chipseal grade 2 or 3 (incl. 2/4, 3.5, etc)
Ellis Street (Brightwater – Chipseal Grade 5 or 6
Berryfield Drive (Richmond) - Stone Mastic asphalt
Queen Street (Richmond) - Stone Mastic asphalt
Aranui Road (Māpua) – Chipseal Grade 5 or 6
Mapua Drive (Māpua) – Chipseal grade 2 or 3 (incl. 2/4, 3.5, etc)
Waimea West Road (Brightwater) – Chipseal Grade 5 or 6
Cambridge Street - Stone Mastic asphalt
William Street (Richmond) Chipseal Grade 5 or 6
Washbourn Drive (Richmond) Chipseal grade 2 or 3 (incl. 2/4, 3.5, etc)
SH60 northeast end of town (Wakefield)- Chipseal grade 2 or 3 (incl. 2/4, 3.5, etc)
SH60 southwest end of town (Wakefield) - Chipseal grade 2 or 3 (incl. 2/4, 3.5, etc)
Pitfure Road (Wakefield) - Chipseal grade 2 or 3 (incl. 2/4, 3.5, etc)

</td></tr>
<tr><td>Speed environments</td><td colspan="3">Existing posted speed limits</td></tr>
<tr><td rowspan="10">Estimated AADT vehicle counts and % Heavy Vehicle Counts for 2035- including PC81 growth Provided to us by Tasman District Council.
We understand that the data is from NZTA's traffic model which covers Richmond through to Motueka. Manual estimates have been used for Māpua, and Tākaka.
The NZTA model includes the following assumptions for 2034:

FDS growth has been included. PC81 is largely consistent with the FDS
Stage 1 of the Hope Bypass is complete. Stage 1 includes:

</td><td>SH6 Richmond Deviation</td><td>36,000 AADT</td><td>10% HCV</td></tr>
<tr><td>SH6 Gladstone Road</td><td>24,000 AADT</td><td>10% HCV</td></tr>
<tr><td>SH60 for PC81 area adjacent to Stringer Road)</td><td>15,000 AADT</td><td>14% HCV</td></tr>
<tr><td>SH60 for PC81 area adjacent to Takaka Collingwood Highway</td><td>2,400 AADT</td><td>5% HCV</td></tr>
<tr><td>SH60 north of Three Brothers Corner (Richmond)</td><td>15,800 AADT</td><td>12% HCV</td></tr>
<tr><td>Salisbury Road (Richmond)</td><td>16,000 AADT</td><td>4% HCV</td></tr>
<tr><td>Champion Road (Richmond)</td><td>11,000 AADT</td><td>5% HCV</td></tr>
<tr><td>Wensley Road (Richmond)</td><td>11,000 AADT</td><td>5% HCV</td></tr>
<tr><td>Oxford Street (Richmond)</td><td>7,000 AADT</td><td>5% HCV</td></tr>
<tr><td>Talbot Street (Richmond)</td><td>13,000 AADT</td><td>5% HCV</td></tr>
</table>

Parameters/calculation settings	Details		
○ *Four laning of the Richmond Deviation between Salisbury Road Extension and Queen Street* ○ *Grade Separation at Salisbury Road Extension* ○ *Intersection upgrades at the SH6 / Queen Street / Lower Queen Street intersection* ○ *Stage 1 does NOT include construction of the bypass between Lower Queen Street and SH60 (Appleby Highway)*	Hill Street (Richmond)	7,000 AADT	6% HCV
	Ellis Street (Brightwater	5,000 AADT	5% HCV
	Berryfield Drive (Richmond)	5,000 AADT	8% HCV
	Queen Street (Richmond)	6,000 AADT	4% HCV
	Aranui Road (Māpua)	5,000 AADT	8% HCV
	Mapua Drive (Māpua)	6,500 AADT	7% HCV
	Waimea West Road (Brightwater)	3,000 AADT	11% HCV
	Cambridge Street	3,000 AADT	7% HCV
	William Street (Richmond)	4,000 AADT	4% HCV
	Washbourn Drive (Richmond)	3,000 AADT	5% HCV
	SH60 northeast end of town (Wakefield)	10,200 AADT	15% HCV
	SH60 southwest end of town (Wakefield)	4,600 AADT	10% HCV
	Pitfure Road (Wakefield)	3,600 AADT	9% HCV

3.0 Noise modelling outputs

We have provided Tasman District Council with an electronic file of the 55 dB $L_{Aeq(24hr)}$ contour, suitable for use as a road-traffic noise area in the District Plan maps and GIS mapping software. The road-traffic noise area is defined by the area between the road and the predicted 55dB $L_{Aeq(24hr)}$ noise level contour.

We recommend the road-traffic noise area is used to identify the area of land in which acoustic treatment controls apply to new or altered buildings containing noise sensitive activities.

3.1 Refining the contour

We have refined the contour to remove anomalies and to smooth it.

We have not “trimmed” or “cadastralised” the road-traffic noise area so that it correlates to land parcel boundaries. This can sometimes be appropriate but does lead to uncertainties where the contour crosses only a small part of a site. We can assist the Council GIS team to cadastralise the contour if required.

4.0 Recommendations

We recommend that PC81 identifies the spatial extent of the road-traffic noise area on the planning maps and includes the following land use control:

1. Any new building or alteration to an existing building within the [*MDRZ Road Traffic Noise Area*] must be designed, constructed and maintained so that road traffic noise does not exceed 40 dB $L_{Aeq(24hr)}$ in any new or altered habitable room(s) with a façade(s) within or partly within the Area.

   i. Compliance with (1) above shall be achieved where an acoustic design certificate from a suitably qualified and experienced acoustic expert is provided to the Council which certifies that the proposed design and construction of the building will achieve the internal sound levels. The building must be designed, constructed, and maintained in accordance with the design certificate.

   ii. The external noise levels incident on the façade of all habitable rooms subject to this rule must be the future predicted noise levels based on computer noise modelling undertaken by a suitably qualified and experienced expert. The modelling shall be based on the inputs set out in Appendix <insert reference>. The modelling must include all relevant factors such as barrier attenuation, the location of the dwelling relative to the road, topographical features and any intervening structures (including buildings that exist or buildings for which building consent has been granted and issued).

2. Where the opening windows of habitable rooms must be closed to achieve the design noise levels in (1) those rooms must be designed, constructed and maintained with a mechanical ventilation system that achieves the following requirements:

   i. Provides mechanical ventilation that can operate continuously to satisfy clause G4 of the New Zealand Building Code and that provides at least 1 air change per hour, but no less than 7.5L/s per occupant; and

   ii. Provides cooling and heating that is controllable by the occupant and can maintain the inside temperature between 18°C and 25°C when assessed using a 2.5% design weather condition for Tasman; and

   iii. Must not generate more than 35 dB $L_{Aeq(30s)}$ when measured 2 metres away from any grille or diffuser. The noise level must be measured after the system has cooled the rooms to the temperatures in (ii) above, or after a period of 30 minutes from the commencement of cooling (whichever is the lesser).

3. A commissioning report prepared by a suitably qualified and experienced HVAC expert must be submitted to the Council prior to occupation of the building demonstrating compliance with the mechanical ventilation system performance requirements in 2(i) and (ii) above, or alternatively, confirming that the system will provide ventilation and internal space temperature controls that will meet or exceed the outcomes described in 2(i) to (iii).

Appendix referred to in part 1(i) of the rule to contain the following information:

Road	AADT	% HCV	Surface
SH6 Richmond Deviation	36,000	10%	Stone mastic asphalt

Road	AADT	% HCV	Surface
SH6 Gladstone Road	24,000	10%	Stone mastic asphalt
SH60 for PC81 area adjacent to Stringer Rd)	15,000	14%	Chipseal Grade 5 or 6
SH60 for PC81 area adjacent to Takaka Collingwood Highway	2,400	5%	Chipseal Grade 5 or 6
SH60 north of Three Brothers Corner (Richmond)	15,800	12%	Chipseal grade 2 or 3 (incl. 2/4, 3.5, etc)
SH60 northeast end of town (Wakefield)	10,200	15%	Chipseal grade 2 or 3 (incl. 2/4, 3.5, etc)
SH60 southwest end of town (Wakefield)	4,600	10%	Chipseal grade 2 or 3 (incl. 2/4, 3.5, etc)
Salisbury Road (Richmond)	16,000	4%	Stone mastic asphalt
Champion Road (Richmond)	11,000	5%	Chipseal Grade 5 or 6
Wensley Road (Richmond)	11,000	5%	Stone mastic asphalt
Oxford Street (Richmond)	7,000	5%	Stone mastic asphalt
Talbot Street (Richmond)	13,000	5%	Stone mastic asphalt
Hill Street (Richmond)	7,000	6%	Chipseal grade 2 or 3 (incl. 2/4, 3.5, etc)
Ellis Street (Brightwater	5,000	5%	Chipseal Grade 5 or 6
Berryfield Drive (Richmond)	5,000	8%	Stone mastic asphalt
Queen Street Richmond)	6,000	4%	Stone mastic asphalt
Aranui Rd (Māpua)	5,000	8%	Chipseal Grade 5 or 6
Mapua Drive (Māpua)	6,500	7%	Chipseal grade 2 or 3 (incl. 2/4, 3.5, etc)
Waimea West Road (Brightwater)	3,000	11%	Chipseal Grade 5 or 6
Cambridge Street	3,000	7%	Stone mastic asphalt
William Street (Richmond)	4,000	4%	Chipseal Grade 5 or 6
Washbourn Drive (Richmond)	3,000	5%	Chipseal grade 2 or 3 (incl. 2/4, 3.5, etc)
Pitfure Road (Wakefield)	3,600	9%	Chipseal grade 2 or 3 (incl. 2/4, 3.5, etc)

Please contact me if you require any further information.

Yours sincerely,

Jon Styles, MASNZ
Director and Principal

Appendix A The background and justification for managing transport noise effects

It is well accepted and globally recognised that exposure to noise from road, rail and air transport infrastructure, industry, ports commercial activities (referred to generally in this advice as "*high noise environments*") has the potential to generate high levels of annoyance and adverse health effects if it is not managed carefully.

The general concept of enabling noise sensitive activities in high noise environments therefore presents a challenge in terms of how to avoid or minimise potential adverse health and amenity effects on people, and how to avoid the potential land use incompatibility and conflict that may give rise to potential reverse sensitivity effects on other permitted land use activities.

The NPS-UD does not provide any specific guidance to local authorities on how they should manage potential land use compatibility conflicts when implementing the NPS-UD. However, Objective 1 of the NPS-UD requires that urban environments enable communities to provide for their health and wellbeing:

> *"New Zealand has well-functioning urban environments that enable all people and communities to provide for their social, economic, and cultural wellbeing, and for their health and safety, now and into the future*

The World Health Organisation (**WHO**) has published many policies and studies documenting extensive investigations into the effects of noise exposure on people, estimating the burden of disease from environmental noise[2] and quantification of healthy life years lost as a result of exposure to environmental noise[3].

The 1999 WHO Community Noise Guidelines[4] was the first major international large-scale document addressing the effects of noise on large populations.

In 2011, WHO published the "Burden of Disease from Environmental Noise"[5] that quantified the healthy years of life lost in western European countries as a result of exposure to environmental noise[6]. The study identified that least 1 million healthy life years[7] are lost every year from exposure to transport noise in the western European countries[8]. The study provided sufficient evidence from large-scale epidemiological studies to link the exposure to environmental noise

2 WHO Regional Office for Europe (2012). Methodological guidance for estimating the burden of disease from environmental noise. Copenhagen,

3 WHO Regional Office for Europe (2011). Burden of disease from environmental noise: quantification of healthy life years lost in Europe. Copenhagen,

4 WHO, Geneva, (1999), Guidelines for Community Noise, Berglund B, Lindvall T, Schwela D H.

5 https://www.euro.who.int/__data/assets/pdf_file/0008/136466/e94888.pdf

6 WHO Regional Office for Europe (2011). Burden of disease from environmental noise: quantification of healthy life years lost in Europe. Copenhagen

10 This is measured in 'DALYs". DALYs are the sum of the potential years of life lost due to premature death and the equivalent years of "healthy" life lost by virtue of being in states of poor health or disability - WHO Burden of disease from environmental noise

8 Comprised of 61 000 years for ischaemic heart disease, 45 000 years for cognitive impairment of children, 903 000 years for sleep disturbance, 22 000 years for tinnitus and 654 000 years for annoyance.

with adverse health effects, including annoyance[9], tinnitus, sleep disturbance, cognitive impairment in children and cardiovascular disease. The 2011 study identifies road-traffic noise as the most prevalent source of environmental noise, with the largest contribution to the burden of disease due to noise.

The 2011 study found that sleep disturbance and annoyance, mostly related to road traffic noise, constitute the bulk the burden of disease. Available assessments place the burden of disease from environmental noise as the second highest after air pollution.

In 2018, WHO published the Environmental Noise Guidelines for the European Region[10] (**the 2018 Guidelines**). The purpose of the 2018 Guidelines is to provide robust public health advice to drive policy action to protect communities from the adverse effects of noise. The guidelines provide recommendations for protecting human health from exposure to environmental noise originating from various sources, including exposure to road-traffic noise.

The 2018 Guidelines provide strong recommendations to implement measures to reduce noise exposure from road traffic in the population exposed to levels above the guideline values for average and night noise exposure. The 2018 WHO Guidelines state[11]:

> *"For average noise exposure, the GDG[12] strongly recommends reducing noise levels produced by road traffic below 53 dB Lden[13], as road traffic noise above this level is associated with adverse health effects.*
>
> *For night noise exposure, the GDG strongly recommends reducing noise levels produced by road traffic during night time below 45 dB Lnight, as road traffic noise above this level is associated with adverse effects on sleep.*
>
> *To reduce health effects, the GDG strongly recommends that policy-makers implement suitable measures to reduce noise exposure from road traffic in the population exposed to levels above the guideline values for average and night noise exposure. For specific interventions, the GDG recommends reducing noise both at the source and on the route between the source and the affected population by changes in infrastructure."*

The recommended target noise level of 53dB L_{den} is approximately equivalent to 48dB $L_{Aeq(24hr)}$[14].

The 2018 WHO Guidelines also discuss the importance of interventions to reduce road traffic noise exposure. They conclude that:

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9 High annoyance is not classified as a disease in the International Classification of Disease (ICD-9; ICD-10), it does affect the well-being of many people and therefore may be considered to be a health effect falling within the WHO definition of health as being a "state of complete physical, mental and social well-being".

10 https://www.euro.who.int/__data/assets/pdf_file/0008/383921/noise-guidelines-eng.pdf

11 Section 3.1 of the 2018 WHO Guidelines.

12 The Guideline Development Group.

13 The L_{den}, or day-evening-night equivalent sound level represents the average sound level over a 24 hour period, with a penalty of 5 dB added for the evening hours or 19:00 to 22:00, and a penalty of 10 dB added for the night time hours of 22:00 to 07:00.

14 Based on the diurnal traffic flow of SH1 in the Waikato

"The GDG also considered the evidence for the effectiveness of interventions. The results showed that:

- *addressing the source by improving the choice of appropriate tyres, road surface, truck restrictions or by lowering traffic flow can reduce noise exposure;*
- *path interventions such as insulation and barrier construction reduce noise exposure, annoyance and sleep disturbance;*
- *changes in infrastructure such as construction of road tunnels lower noise exposure, annoyance and sleep disturbance;*
- *other physical interventions such as the availability of a quiet side of the residence reduce noise exposure, annoyance and sleep disturbance."*

Following the work of the WHO, the European Union has created policies aimed at reducing exposure to environmental noise across Europe.

The quotes below are from the official websites of the European Union (**EU**) and from the EU Environmental Noise Directive 2002/49/EC (the **END**). These quotes are intended to describe the steps that the EU is taking to reduce the adverse effects associated with exposing communities to unreasonable levels of noise from transport networks and other sources.

"According to the findings of the World Health Organisation (WHO), noise is the second largest environmental cause of health problems, just after the impact of air quality (particulate matter)."[15]

"Directive 2002/49/EC relating to the assessment and management of environmental noise (the Environmental Noise Directive – END) is the main EU instrument to identify noise pollution levels and to trigger the necessary action both at Member State and at EU level.

To pursue its stated aims, the Environmental Noise Directive focuses on three action areas:

- *the determination of exposure to environmental noise*
- *ensuring that information on environmental noise and its effects is made available to the public*
- *preventing and reducing environmental noise where necessary and preserving environmental noise quality where it is good"*[16]

"The Directive requires Member States to prepare and publish, every 5 years, noise maps and noise management action plans for:

- *agglomerations with more than 100,000 inhabitants*

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15 https://ec.europa.eu/environment/noise/health_effects_en.htm

16 https://ec.europa.eu/environment/noise/directive_en.htm

- *major roads (more than 3 million vehicles a year) (approximately 8200 vehicles per day)*
- *major railways (more than 30,000 trains a year)*
- *major airports (more than 50,000 movements a year, including small aircrafts and helicopters)"*[17]

Objectives *(of the END)*

1. The aim of this Directive shall be to define a common approach intended to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise. To that end the following actions shall be implemented progressively:

(a) the determination of exposure to environmental noise, through noise mapping, by methods of assessment common to the Member States;

(b) ensuring that information on environmental noise and its effects is made available to the public;

(c) adoption of action plans by the Member States, based upon noise-mapping results, with a view to preventing and reducing environmental noise where necessary and particularly where exposure levels can induce harmful effects on human health and to preserving environmental noise quality where it is good.

We consider that the END demonstrates the importance of reducing the serious adverse effects of exposure to noise and a good example of a method to achieve meaningful reductions.

4.1 The Government Policy Statement on land transport 2021 (NZ)

The WHO Guidelines are relevant to New Zealand's own strategic objectives under the Government Policy Statement on Land Transport[18] (**GPS 2021**) to reduce the number of people exposed to elevated levels of land transport noise by 2031.

GPS 2021 identifies that "*the purpose of transport system is to improve people's wellbeing, and the liveability of places*"[19]. To this end, the policy statement seeks to reduce the number of people exposed to elevated levels of land transport noise. We consider that a similar objective would be appropriate for PC81.

GPS 2021 states that "*Reduced air and noise pollution*" is a short to medium term goal that will be delivered by 2031.

17 https://ec.europa.eu/environment/noise/directive_en.htm

18 https://www.transport.govt.nz/area-of-interest/strategy-and-direction/government-policystatement-on-land-transport/

19 https://www.transport.govt.nz//assets/Uploads/Paper/GPS2021.pdf