Appendix 1: Summary of Acousafe District Plan Review of Noise Provisions

Activity / Zone	Discussion	Recommendation
General District Plan Noise Provisions	High noise activities should be encouraged to locate in Industrial and Business Environment Areas and the rules should reflect this. These activities include factories and warehouses, including a concentration of trucks throughout the day and night, with higher levels of noise generated from time to time. The Operative District Plan has relaxed noise limits within these Environment Areas but not at the interfaces with other Environment Areas.	High noise activities should be encouraged to locate in Industrial and Business Environment Areas and the rules should reflect this.
NZ Standards	Performance standards use L_{10} descriptor rather than L_{Aeq}. The different descriptors assess noise in different ways: L_{10} is a statistical analysis while L_{Aeq} is an energy average. L_{Aeq} is now used more universally than L_{10} and modern noise modelling software predicts levels as L_{Aeq}.	Performance standards are reviewed and updated, changing the L_{10} descriptor to L_{Aeq} to reflect the 2008 versions of the NZ Noise Standards.
	NZS6802:2008 introduces an evening transition noise limit. The daytime noise limits in the Operative Plan are generally standardised between 7am to 10pm. However, the evening times are important for amenity, being times when people are often at home and relaxing. This combines with the gradual fall of ambient sound levels from 6pm onwards until it gets particularly quiet towards midnight.	Provide for a (5dB) step reduction in the noise limit in the evening (between 7pm and 10pm).
	The Operative District Plan sets a daytime noise limit of L_{10} 65dBA and night-time limits as set out in standards 7.1 and 7.2 of the Appendix 12 table. It is proposed to introduce reference to the 1999 construction noise standard and to rely on the tables in that Standard to establish the noise limits. NZS 6803 also contains methods of measuring and assessing construction noise and describes the matters to be considered when preparing noise management plans.	Introduce reference to the 1999 construction noise standard and to rely on the tables in that Standard to establish the noise limits.
State Highways	Over the next 20 years, between 5000 and 6000 new homes will be built on greenfield sites to the east of New Plymouth at Bell Block, Highlands Park and Barrett Road. This will create additional traffic demand along State Highway 3 east and may exacerbate existing safety issues along this corridor. Data shows the highest average traffic numbers are located on State Highway routes close to, and within, the city, with significant traffic volumes on SH 3 south of the city. The State Highways in the District can be roughly divided into three different environments when considering reverse sensitivity impacts:	In the Rural Environment Area, any habitable room in a new noise sensitive activity or any alteration(s) to an existing noise sensitive activity constructed within 80 metres (measured from the nearest painted edge of the carriageway) of a State Highway shall be designed, constructed and maintained to meet an internal noise level of 40 dB L_{Aeq} (24 hour) inside any habitable room with ventilating windows open.

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	1. Routes through urban or urban fringe areas where significant uncontrolled noise sensitive development has already occurred. These sections of the route are mostly subject to lower speeds limits e.g. <80km/hr; 2. Busy high-speed urban or urban fringe routes (with speeds of 80-100 km/hr) close to existing residential developments and where future subdivision is likely; and 3. Rural routes with speeds of 80-100 km/hr. Providing for any controls in the District Plan relating to the first scenario depicted above does not achieve any significant protection either to the State Highways (as reverse sensitivity) or protection of new residential development. This is because these areas are already significantly developed. SH 3 to the east of the City carries high volumes of traffic at greater speed and these volumes would be expected to grow. SH 3 has experienced considerable upgrades in this area which is expected to continue eastwards. There is also expected to be significant growth of residential subdivision in this area. It is important therefore to ensure that any new rural subdivision is set back from SH 3 by the maximum 40 metres shown in the NZTA planning guide. This applies wherever the posted speed limit on the State Highway is 80 km/hr or greater. Further from the City, at some point, the route transitions from scenario 2 to scenario 3 and becomes more rural. At this point the setback distance can be reduced (according to the NZTA guide) as the traffic volumes reduce. It is recommended that the setback becomes 30 metres, north of Urenui (say). This allows for future traffic growth. Heading south from the City on SH 3, the traffic volumes remain high up to the District boundary. The set-back of 40 metres is again appropriate. The setbacks would only apply where the speed limit is 80 km/hr or greater. Beyond the setback distances noise sensitive activities would require noise insulating and ventilating to ensure that the internal residential amenity values are maintained and that reverse sensitivity impacts are avoided.	
Railways	There is little point in providing for reverse sensitivity controls within the City precincts given the historical development that has already occurred. Protecting against reverse sensitivity impacts needs to be directed at future development. If KiwiRail is concerned about reverse sensitivity impacts from existing properties	In the Rural Environment Area, any habitable room in a new noise sensitive activity or any alteration(s) to an existing noise sensitive activity constructed within

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	within the City then it should consider providing noise sensitive activities with an appropriate level of noise insulation and providing ventilation. Noise predictions provided by KiwiRail for STDC for the same railway line show the outside noise level of 58 dB L_{Aeq} (1 hour) occurs at a distance of 80 metres from a busy line and between 50 and 60 metres from a minor branch line. Given the low numbers of trains on the MNPL we consider that 60 metres provides a reasonable distance within which ventilation is required. With train numbers of 5 per day, this is an average L_{Aeq} (24 hour) level of less than 50 dB. Within 60 metres windows can be assumed to be closed and the building can be noise insulated and ventilation provided to ensure an appropriate internal noise level is provided.	60 metres (measured from the nearest edge of the rail corridor) of the railway line shall be designed, constructed and maintained to meet an internal noise level of: (i) 35 dB L_{Aeq} (1 hour) inside bedrooms with ventilating windows open. (ii) 40 dB L_{Aeq} (1 hour) inside other habitable rooms with ventilating windows open.
Port Taranaki	Port noise is managed by NZS 6809:1991. The Standard recommends that new noise sensitive uses (and alterations or additions to existing buildings) between the Outer and Inner Control Boundaries (Area B) should be Permitted Activities subject to conditions requiring adequate insulation from the port noise. The Outer Control Boundary (OCB) is mostly within Industrial Area except where it extends out to Whitely Street and (partly) to Roy Terrace.	New dwellings between the Inner and the Outer Control Boundary should be designed and constructed to ensure that the internal noise level does not exceed 40 dB L_{dn} and that habitable spaces are ventilated in accordance with G4 of the Building Code.
	Providing noise insulation for minor alterations or additions to existing residences or other noise sensitive activities can cause difficulties where, say, a small alteration requires different building materials to be used that can conflict with the design of the existing structure.	The above provision should only apply where additions provide for completely new rooms.
	The Inner Control Boundary does not include any residential areas.	Prohibit new noise sensitive activities inside the Inner Control Boundary (>65 dB L_{dn}).
New Plymouth Airport	Airport noise is managed by NZS 6805:199210. The Standard recommends that new noise sensitive uses within the Air Noise Boundary (ANB) (>65 dB L_{dn}) should be prohibited. Our assessment is that there are currently no dwellings constructed within the ANB and that it would be appropriate to make dwellings prohibited activities.	Prohibit dwellings within the ANB given its proximity to the airport runway.
	NZS 6802:1992 recommends that new noise sensitive uses should be prohibited between the ANB and OCB unless a district plan permits such uses, subject to a	Any new dwellings between the OCB and ANB should be designed and constructed to ensure that the internal noise level

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	requirement to incorporate appropriate acoustic insulation to ensure a satisfactory internal noise environment.	does not exceed 40 dB L_{dn} and that habitable spaces are ventilated in accordance with G4 of the Building Code.
	The Standard also recommends that alterations or additions to existing residences or other noise sensitive activities should be fitted with appropriate acoustic insulation and encouragement should be given to ensure a satisfactory internal environment throughout the rest of the building.	The above provision should only apply where additions provide for completely new rooms.
Oil and Gas Industry	<u>Methanex sites</u> Issues have arisen with the monitoring of noise from the plants because of the variations in meteorological conditions and, at Motunui, contamination from traffic on SH 3. The discussion paper[2] prepared by Hegley Acoustic Consultants dated 16 August 2017 considers two options for managing noise: the first being to retain measurement and assessment using the 1991 versions of NZS 6801 and NZS 6802 and, the second being to update the modelling and control measures to utilise the 2008 versions of the Standards. The main difference between the two approaches is that the 2008 version uses slight downwind conditions whereas the 1991 versions use zero met conditions. It also results in the predicted noise contours being slightly further from the site. This is purely due to the modelling and does not allow any more noise to be generated than is currently the case. Some difficulty in monitoring of noise has also arisen but the recommended approach is a reasonable compromise that allows a check to be made on individual plant items.	Apply the 2008 versions of NZS 6801 and NZS 6802. Undertake sound intensity measurements of each piece of plant on each site and then use those measurements to predict the noise propagation.
	<u>Pohokura Production Station</u> Pohokura Production Station is located immediately adjacent to the Methanex Motunui Plant.	Combine the noise output of Pohokura with that of Motunui to present a cumulative noise management boundary within which the development of noise sensitive activities would be controlled.
	<u>Mangahewa McKee Production Station</u>	Consider applying similar land use management procedures for plants such as Mangahewa McKee Production Station

[2] The Council held discussions with Methanex regarding the best approach to managing noise from the Motunui and Waitara Valley plants. This resulted in a discussion paper being provided by Hegley Acoustic Consultants dated 16 August 2017.

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	Need the consent owner to provide a reliable noise contour (which needs to comply with the consented noise emissions). This allows consideration to be given to those persons that will be affected by the control measures.	where the resource consent provides for noise to spill over onto adjoining land.
Wind Farms	A decision relating to the Porirua City Council Plan Change made wind farms discretionary activities where the wind farm is separated by at least 700 metres from adjacent zone boundaries, and from boundaries with properties that do not form part of the wind farm site. Where the wind farm is within 700 metres from the adjoining site it becomes a non-complying activity. It is recommended that this Policy be adopted for the District Plan. There are some discretionary measures in the Wind Farm Noise Standard regarding the development of noise criteria. In particular whether there are "high amenity" areas as described by NZS6808:2010. The noise levels proposed for Rural and Residential Environment Areas would potentially qualify these as high amenity areas when establishing noise limits in terms of the Wind Farm Noise Standard.	• Wind farms are discretionary activities if separated by at least 700 metres from adjacent zone boundaries, and from boundaries with properties that do not form part of the wind farm site. Where the wind farm is within 700 metres from the adjoining site, it becomes a non-complying activity. • NZS6808:2010 deals with small turbines and they would be generally covered by the provisions of NZS6801 and NZS6802, although special measurement procedures may be required.
Temporary Military Training Activity (TMTA)	NZDF has sought to place a generic requirement for their TMTA in each District Plan. This generic requirement is based on a study undertaken by Malcolm Hunt Associates (The Hunt Report). This review takes that report on face value. NZDF is seeking is for TMTA to take place as a Permitted Activity, if it can comply with the large setback distances from noise sensitive activities. The distances sought have been reduced and reflect those sought at the South Taranaki District Plan review hearings. Our understanding from the information provided in the Hunt Report is that these distances are based on the noisiest Category 2 equipment which is the Howitzer. The distances are also conditional on a noise management plan being prepared and noise limits being met.	The Noise Standards for TMTA be adopted for the Rural Environment Area[3]. NZS6807:1994 to control TMTA helicopter noise. TMTA involving live firing of weapons, single or multiple explosive events and firing of blank ammunition be a Discretionary Activity except on the basis for single daytime (7am to 7pm) exercises over 3 day periods.

[3] The recommendations are consistent with recommendations made to Palmerston North City Council in the review of their Rural Environment Area (PC15) and follow on from recommendations on the Horowhenua and Manawatu District Plans. Because of the nature of the District Plans and ongoing mediation with NZDF (also in other Districts) significant differences have arisen over time. South Taranaki District Council decided (against Acousafe's advice) to accept the NZDF approach to controlling noise from Temporary Military Training Activities

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	NZDF seeks to make live firing of weapons and battle simulation a permitted activity at night provided it complies with the peak sound pressure noise limit of 90 dBC. While we accept that this is a strict noise limit we remain concerned with the context of weapons being fired at night upsetting residents who might be some distance from the activity. We consider that night-time live firing or battle simulation should not be a Permitted Activity and should be subject to a consent process that enables other impacts to be considered (such as the impact on stock and wildlife) and an assessment made on community consultation that might be appropriate. Making live firing at night a Permitted Activity would also have implications for the permitted baseline. We consider that TMTA that involves live firing and/or battle simulation should be a Discretionary Activity. Allowance could be made for a daytime (7am to 7pm) exercise to occur as a permitted activity over, say, 3 days. This could occur more than once in the District at locations that were well separated by distance (several kilometres). <u>Fixed Noise Sources</u> The proposal is to establish noise limits based on the least stringent noise limits as recommended by NZS 6802:2008 Acoustics – Environmental noise at the notional boundary of any rural dwelling, Residential Environment Area site, or building used for residential, educational or healthcare purposes. We concur with this because TMTA is temporary. <u>Mobile Noise Sources</u> The proposal is to control mobile noise sources by reference to the noise limits set out in Tables 2 and 3 of NZS6803:1999 Acoustics – Construction noise, with reference to 'construction noise' taken to refer to other, mobile noise sources. Given that TMTA is provided for as a short-term activity, this is considered to be an appropriate approach. <u>Helicopter Noise</u> NZS680713 is the noise Standard for helicopter landing areas which applies where ten or more flight movements occur in any month or where flight movements are likely to result in a maximum sound level (L_{Amax}) of 70dBA at night-time or 90dBA during daytime on any residential Environment Area or within the notional boundary of any rural land. Otherwise Table 1 of NZS 6807 contains a series of acceptable noise limits for day/night operations and L_{Amax} limits for night-time. It	TMTA noise from mobile noise sources (excluding those set out above) including personnel, light and heavy vehicles, self-propelled equipment, earthmoving equipment would comply with the noise limits set out in Table 2 and Table 3 of NZS6803:1999 Acoustics – Construction noise. TMTA noise from fixed stationary sources would comply with the following noise limits: Sound emissions from fixed (stationary) noise sources, excluding live firing of weapons and single or multiple explosive events, associated with Temporary Military Training Activities in the Rural Environment Area when measured at any point within any land zoned for residential purposes or at the notional boundary of any noise sensitive activity in the Rural Environment Area (other than site from which the noise is emitted or a road) shall not exceed the following: 7:00am-7:00pm 55dB L_{Aeq}(15mins) 7.00pm to 10.00pm 50dB L_{Aeq}(15mins) 10:00pm - 7:00am 45dB L_{Aeq}(15mins) Night-time L_{Amax} 10:00pm - 7:00am 75dBA L_{Amax}

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	is difficult to see how these limits, and the process in determining them, would be appropriate for short term helicopter activity by NZDF for temporary training purposes. However, there is no alternative to using NZS6807:1994 to control TMTA helicopter noise as generally proposed by NZDF.	
Notional Boundary	The Operative District Plan applies rural noise controls at the notional boundaries of dwellings on rural sites. The notional boundary is defined as a line 20 metres from the side of a rural dwelling or the legal boundary, where this is closer to the dwelling. This accords with the recommendations of NZS6802:2008. The use of the notional boundary concept, however, is poor as a future planning tool because it does not protect land in a situation where an owner has the right to build a dwelling but where this dwelling has not yet been constructed. In addition, applying the noise limit at the notional boundary does not protect residual amenity values on the remainder of the rural site. Our recommendation to the STDC District Plan review was to continue to apply the rural noise controls at the site boundary location (rather than to change to the notional boundary). As part of a subsequent mediation though, a hybrid arrangement was agreed whereby a noise limit was to be applied on a 24 hour basis at the site boundary and a noise limit was also to be applied at the notional boundary. This is a compromise solution which still leaves some uncertainty should the owner of land choose to build a new dwelling on that part of the site that is impacted upon by a neighbour's noise. The construction of a new dwelling will establish a new notional boundary closer to the neighbour thus imposing a stricter regime upon them. This is appropriate given that the land owner (may) currently have a right to construct that dwelling, a right which should not be removed, by the contamination of their land by noise.	Noise generated by any activity in the Rural Environment Area shall not exceed the following noise limits at any point within the boundary of any other Rural Environment Area site: All times 55 dB L_{Aeq} (15 min) Noise generated by any activity in the Rural Environment Area shall not exceed the following noise limits at any point within the notional boundary of any dwelling and at any point within any site in the Residential Environment Area: 7am to 7pm 50 dB L_{Aeq} (15 min) 7pm to 10pm 45 dB L_{Aeq} (15 min) 10pm to 7am 40 dB L_{Aeq} (15 min) 10pm to 7am 70 dB L_{Amax}
Noise limits	Generally, the noise limits in the Operative District Plan are adopted except that they are expressed as L_{Aeq} instead of L_{10}. The exceptions to this are the night-time Rural Environment Area noise limit which is recommended to be at 40 dB L_{Aeq} (15 mins) instead of 45 Db L_{10} as in the Operative District Plan. <u>Rural Zone</u> Noise levels in more remote Rural Environment Areas can fall to low levels at night. Experience of community reaction to new activities generating noise levels of 45dB L_{10}, or thereabouts, at night has been adverse close to some well drilling	This review brings the Operative District Plan noise provisions into line with the 2008 versions of NZS6801 and NZS6802. The main change is from L10 to L_{Aeq} and the move from the Appendix 12 approach to a more descriptive one. Noise limits in the Rural Zone are: - 50dB L_{Aeq} (15 mins) during the day.

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	operations and in the vicinity of large industrial plant. The change to L_{Aeq} has the potential to weaken this protection, albeit marginally. The Operative District Plan (Schedule 12) sets a day time limit of 50 dBA L_{10} and a night-time noise limits of 45 dBA L_{10} and 70 dBA L_{Amax} at the notional boundary. The daytime L_{10} and night-time L_{Amax} limits are 5 decibels stricter than the maximum guideline limits recommended by NZS 6802:1991 *Assessment of Environmental Sound* but the night-time L_{10} limit of 45 dB is the same as the maximum guideline limit recommended by that Standard. It is unusual to have inconsistency between the relative daytime and night-time limits/guidelines. The 2008 update of NZS 6802 has the same numerical maximum guideline recommendations (as the 1991 version) only using the L_{Aeq} descriptor rather than L_{10}. The World Health Organisation (**WHO**) guidelines for community noise[4] gave recommendations for maximum noise limits that have fashioned the New Zealand approach. WHO subsequently reviewed the available scientific evidence on the health effects of night noise, and derived health based guideline values and in 2006 reached agreement with the various stakeholders on guideline values for the final publication of the *Night Noise Guidelines for Europe.* The findings of the guidelines summarise the various effects, including biological, sleep quality, wellbeing and medical conditions. The indicators include (variously) $L_{Amax,inside}$ and $L_{night,outside}$ which are performance standards that apply inside and outside noise sensitive buildings respectively. L_{Amax} is the same indicator currently used in the NZ Standards and in the Operative District Plan but L_{night}[5] is calculated over a year which is markedly different from the New Zealand approach. While the health and amenity impact of noise is complex, and particularly night-time noise, the health effects observed in the population by WHO are stated to be:	- 40dB L_{Aeq} (15 mins) at night with an evening shoulder limit of 45dB L_{Aeq} (15 mins).

[4] WHO Guidelines for community noise. World Health Organization, Geneva. 1999

[5] Refers to the EU definition in Directive 2002/49/EC: equivalent outdoor sound pressure level associated with a particular type of noise source during night-time (at least 8 hours), calculated over a period of a year

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Average night noise level over a year $L_{night,outside}$	Health effects observed in the population
Up to 30 dB	Although individual sensitivities and circumstances may differ, it appears that up to this level no substantial biological effects are observed. $L_{night,outside}$ of 30 dB is equivalent to the no observed effect level (NOEL) for night noise.
30 to 40 dB	A number of effects on sleep are observed from this range: body movements, awakening, self-reported sleep disturbance, arousals. The intensity of the effect depends on the nature of the source and the number of events. Vulnerable groups (for example children, the chronically ill and the elderly) are more susceptible. However, even in the worst cases the effects seem modest. $L_{night,outside}$ of 40 dB is equivalent to the lowest observed adverse effect level (LOAEL) for night noise.
40 to 55 dB	Adverse health effects are observed among the exposed population. Many people have to adapt their lives to cope with the noise at night. Vulnerable groups are more severely affected.
Above 55 dB	The situation is considered increasingly dangerous for public health. Adverse health effects occur frequently, a sizeable proportion of the population is highly annoyed and sleep-disturbed. There is evidence that the risk of cardiovascular disease increases.

A number of instantaneous effects are connected to threshold levels expressed as L_{Amax} although these are difficult to establish. There is therefore no recommendation to alter the L_{Amax} limits in the Operative District Plan.

The Night Noise Guideline (NNG) recommended by WHO for Europe is:

$L_{night,outside}$ = 40 dB

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	Given that the context of the New Plymouth District rural area is that sound level will often fall to low levels away from major roads or industry therefore, for activity that occurs at night on a regular basis, the night-time noise limit of 40 dB L_{Aeq} is reasonable. This is 5 decibels stricter than the maximum guideline in NZS 6802:2008. <u>Central City</u> The Central City noise limits are relaxed and applied on a 24-hour basis. This encourages activity within the City. At the same time, new noise sensitive activities are to be provided with appropriate noise insulation. It is appropriate to continue to exclude noise emitted from agricultural vehicles, machinery or equipment used on a seasonal or intermittent basis from the rural noise limits. Such activities are reasonably controlled by adopting the best practicable option to ensure that noise emissions are maintained at a reasonable level. Such activities are appropriate in the rural area and are generally accepted as being necessary.	
Noise insulation	There are two ways of establishing noise insulation requirements to protect for noise sensitive activities where outside noise limits are greater than would normally be considered acceptable: 1. If the outside noise level is variable but able to be calculated, then set an acceptable internal noise limit, and 2. If the outside noise level is established by a limit, but can vary up to that limit, then established a noise insulation requirement. Option 1 is appropriate for new noise sensitive activities that could be established near to roads, rail or the airport. For this option to work it must be possible to either calculate or measure the outside noise limit. The level of sound insulation can then be determined to provide the internal sound requirements. Option 2 allows the noise insulation to be specified. This will provide for an acceptable internal noise amenity based on the maximum allowable outdoor noise level. This is an appropriate control mechanism in the City Centre for example where the District Plan establishes a maximum noise limit that can be designed against.	Noise insulation of buildings shall be as defined by ISO 717-1:2013(E) Acoustics — Rating of sound insulation in buildings and of building elements — Part 1: Airborne sound insulation and shall be assessed using ISO 16283-3 Acoustics — Field measurement of sound insulation in buildings and of building elements — Part 3: Façade sound insulation. Any habitable room in a new residential unit in the Central City Environment Area shall be designed, constructed and maintained to meet: (i) bedrooms - D2m,nT,w + Ctr. > 30 dB (ii) other habitable rooms - D2m,nT,w + Ctr > 25 dB

Activity / Zone	Discussion	Recommendation
	It is proposed to use the latest ISO Standard14 against which noise insulation can be assessed. The description for noise insulation at the façade is D2m,nT,w + Ctr. This is the weighted level difference between the outside noise (measured at 2 metres) and the inside noise, normalised to a reference reverberation time and adjusted for road traffic noise characteristics i.e. with protection against low frequency noise.	Compliance with Rule xx (ii) shall be achieved by an acoustic design certificate from a suitably qualified acoustic engineer being provided to Council, prior to the construction of any noise sensitive activity, demonstrating that the above noise insulation requirements will be achieved. The building will be designed, constructed and maintained in accordance with the design certificate. A ventilation system shall be installed for the habitable room(s).