



NOISE EFFECTS

NS ROAD DEVELOPMENT SL1 HAMILTON SOUTH

PREPARED FOR

Ōhaupō Land LP and Chinamans Hill Ltd

DATE

18 November 2025

Acoustic assessment prepared by Styles Group for Ōhaupō Land LP and Chinamans Hill Ltd.

REVISION HISTORY

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Statement of experience

I am and have been the Director and Principal of Styles Group Acoustics and Vibration Consultants for 20 years. I am a Council Member of the Acoustical Society of New Zealand, and I am on the Board of Directors of the Australasian Association of Acoustical Consultants.

I have over 24 years' experience advising on the management of construction and operational noise and vibration effects. I have worked on a significant number of plan changes and resource consent applications for large-scale residential and mixed-use developments across New Zealand. I have extensive experience advising on the management of noise effects between land use activities and the development of controls to achieve ongoing land use compatibility.

I am a regular and experienced expert witness for Council, Environment Court, District Court, High Court and Board of Inquiry hearings. I confirm that, in my capacity as author of this report, I have read and abide by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses Practice Note 2023.

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Table of contents

Statement of experience	1
Executive summary	1
1.0 Introduction	3
2.0 The proposal	3
3.0 The Site and receivers of noise.....	4
4.0 The key noise considerations for the management of noise effects.....	6
5.0 Assessment of construction noise and vibration effects.....	6
5.1 Permitted construction noise standards	6
5.1.1 Key recommendations for construction noise	7
5.1.2 Construction noise and vibration assessment to be provided as part of the substantive application	7
5.2 Construction vibration	8
5.2.1 Construction vibration assessment to be provided as part of substantive application	8
6.0 Operational noise levels received <i>beyond</i> the Site	8
6.1 The permitted standards for noise received at adjacent sites	9
6.2 Industrial noise levels received at adjacent sites	9
6.3 Commercial noise levels received at adjacent sites	10
6.4 Noise levels from residential and retirement living	10
6.5 Vehicle noise	11
7.0 Recommendations to manage noise compatibility <i>within</i> the Site.....	11
8.0 Road traffic noise effects	18
8.1 Road traffic noise effects from SL1	18
8.2 Road traffic noise effects from SH3	18
8.2.1 Rule 3.4.2.27- SH3 road traffic noise received in the Houchens Road Structure Plan Area	18
8.2.2 Rule 4.4.2.26 – road traffic noise from SH3 received in the Rural Zone	19
8.2.3 Recommendations to identify and manage SH3 noise effects	19
8.2.4 Mechanical ventilation and cooling system requirements	20
9.0 Summary of findings	20
Appendices	
Appendix A	WDP Noise standards
Appendix B	HCDP Noise standards

Executive summary

Styles Group has assessed the operational and construction noise and vibration effects from the Houchens Road Development in the Southern Links 1 (**SL1**) growth area. This assessment has been prepared to accompany a referral application under the Fast-Track Approvals Act 2024.

The Houchens Road Development is a comprehensive residential and industrial development at the interface with the Large Lot Residential Zone and Rural Zone of the Waipa District and Residential Zone of Hamilton City.

Noise generated from the Site

This assessment finds that future industrial and commercial activities within the site can be designed, located and managed to achieve compliance with the permitted noise levels for the Rural Zone and Large Lot Residential Zone of the Waipa District when measured and assessed at all adjacent receivers beyond the site.

All industrial lots are well separated from the territorial boundary of Hamilton City. Noise levels from the industrial lots and received in the Residential Zone of Hamilton City will comply with the permitted noise levels prescribed by the Hamilton City District Plan due to separation distance.

This assessment finds that construction noise and vibration effects can be managed to be reasonable for all receivers. The substantive application will include a detailed construction noise and vibration assessment that determines compliance with the recommended numerical limits and assessment procedures set out in NZS 6803:1999 *Acoustics – Construction Noise* and German Standard DIN 4150-3:1999 *Structural vibration – Effects of vibration on structures*.

Noise generated and received within the Site

We have provided recommendations for the appropriate management of noise effects between land use activities within the Site. The recommended measures are based on the same general principles that would apply if the proposal was a plan change, including a combination of noise limits (designed to manage noise levels within the industrial area and at the industrial interface) and activity-based land use controls to manage noise sensitive activities. The proposed mechanisms for achieving land use compatibility will be further explored and refined as part of the substantive application and proposed condition set (if required).

The application site is adjacent to the designated road corridor for SL1 and State Highway 3 (SH3). The Waipa District Plan includes acoustic treatment requirements for noise sensitive land use adjacent to both corridors.

This assessment finds that compliance with the permitted activity standards will be straightforward to achieve as part of any future building consent application for any noise sensitive activity within 80m of SH3. I have also recommended that the investigations for the substantive application include a road-traffic noise modelling exercise to refine the extent of the road-traffic noise effects area and to identify the nature and extent of acoustic treatment requirements on specific lots. These recommendations are designed to ensure that any mitigation response is tailored to the

predicted road-traffic noise levels across the Site, and to streamline the compliance process for future lots in accordance with recognised best practice.

The land adjacent to SL1 will be developed for industrial land use that is not sensitive to noise. This development will not trigger any acoustic treatment requirements.

Overall, this assessment finds that the proposal can be designed to achieve compatibility with the level of acoustic amenity anticipated and provided for in the adjacent Rural Zone and Residential Zone of Waipa District as well as the adjacent Residential Zone of Hamilton City.

1.0 Introduction

Ōhaupō Land LP and Chinamans Hill Ltd have engaged Styles Group to assess the operational and construction noise and vibration effects from the SL1 Houchens Development (the **Site**). This advice has been prepared accompany a referral application under the Fast-Track Approvals Act 2024.

This assessment provides an assessment of the potential construction noise and vibration and operational noise effects generated *from* the Site, in accordance with the relevant permitted noise standards prescribed by the Waipa District Plan (**WDP**) and Hamilton City Operative District Plan (**HCDP**).

This assessment also includes recommended measures (to be addressed by the substantive application) to manage land use compatibility between the range of proposed land use activities *within* the Site.

This report should be read in conjunction with the documentation submitted with the Referral application and plans. A glossary of acoustical terms used within this document is attached as Appendix A.

2.0 The proposal

The SL1 Houchens Development is a combined residential and industrial development that comprises approximately 145 hectares.

The residential component includes approximately 55ha of net residential, including 1,300 residential units of varying typologies (including single detached, duplex, terraced apartments), a 400-unit retirement village, along with two supporting mixed-use neighbourhood centres. A number of open spaces, waterbodies and wetlands are distributed throughout the development.

The proposal includes 25ha of industrial land, providing for between 24 – 47 industrial-sized lots for industrial activities. The industrial lots are located in the western part of the Site that is partially bisected by the Southern Links corridor, a Road of National Significance. The north-western edge of the Site is strategic industrial land that provides key connectivity to the potential Southern Links Houchens interchange.

The proposed internal transport network includes a 30-metre-wide spine road running north-to-south supported by existing and proposed local roads, cycle connections and pedestrian pathways.

Two neighbourhood centres (in the central and eastern part of the Site) will provide a range of amenities and services to support the residential and industrial developments. This neighbourhood centre will likely include commercial properties, childcares, cafés, and a local superette.

A retirement village (**Village**) is proposed in the southern part of the Site. The village comprises approximately 15 hectares and provides 400 units of varying typologies, including traditional villas

and apartments. The Village will be serviced by its own private transport network, infrastructure, and high amenity open spaces.

The SL1 Houchens Development includes a proposed Water Reservoir, to provide the ability for a long term strategic water asset for Hamilton City Council to be designated.

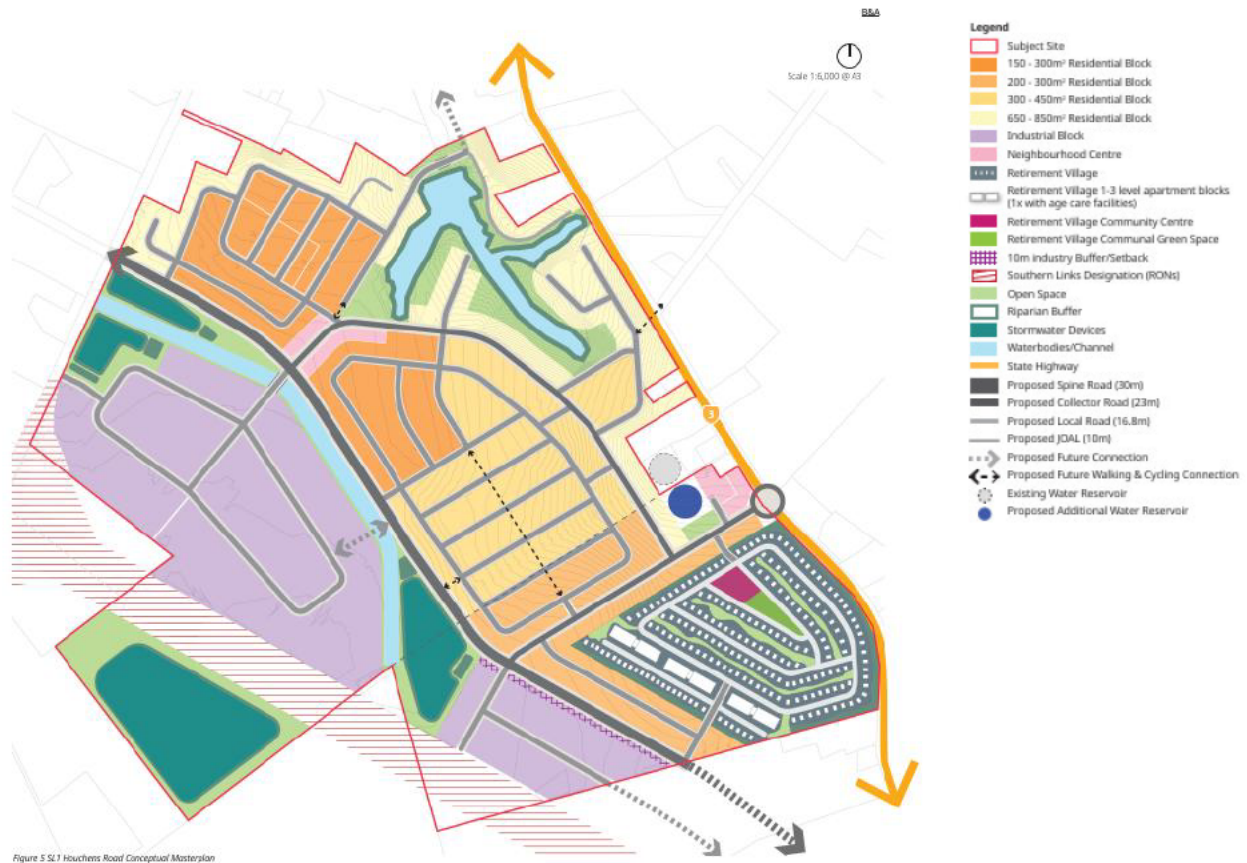


Figure 1 Houchens Development High Level Masterplan

3.0 The Site and receivers of noise

The Site is in the Large Lot Residential Zone (**LLRZ**) and Rural Zone of the WDP. The land adjacent to the northern boundary is in the LLRZ, while the western and southern boundaries are adjacent to the Rural Zone.

The eastern boundary of the Site borders Ohaupo Road / State Highway 3 (**SH3**) which forms the territorial boundary of Hamilton City. The adjacent land on the western side of SH3 is in the Peacocke Medium Density Residential Zone (**Residential Zone**) of Hamilton City.

Figure 2 displays the zoning arrangements applying to the Site and surrounding area and **Error! Reference source not found.** displays the closest dwellings on adjacent sites.

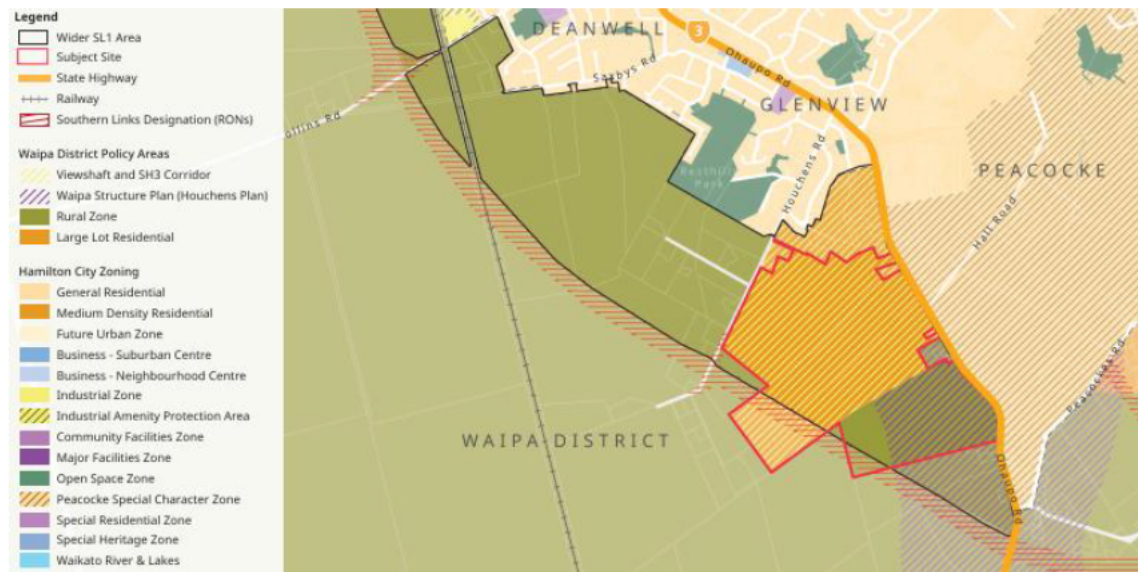


Figure 2 Zoning arrangements applying to the Site and surrounding land



Figure 3 Closest Receivers in Waipa District (white circle) and Hamilton City (orange circle)

The Site is subject to the Airport Overlays (Conical and Horizontal Surface). The Site is not affected by any overlays relating to aircraft noise.

4.0 The key noise considerations for the management of noise effects

Noise from the Site has the potential to be received in the LLRZ and Rural Zones of the Waipa District and Residential Zone of Hamilton City.

The WDP does not control the noise levels affecting receivers in the Hamilton District. Notwithstanding, I have reviewed the proposal to identify any measures that may be required to ensure the appropriate management of cross-territorial boundary noise effects for receivers in Hamilton City.

This report comprises a high-level assessment in accordance with the relevant permitted activity noise standards prescribed by the WDP and HCDP. The relevant permitted activity noise standards of the WDP and HCDP are reproduced in Appendices B and C.

The key considerations for the management of noise effects generated from the Site and received outside the Site are:

- To ensure that **construction noise and vibration** effects will be reasonable for the receivers (occupied dwellings) adjacent to the Site.
- To ensure that **operational noise** from future industrial and commercial activities will be compatible with the level of noise amenity that is anticipated and provided for in the LLRZ and Rural Zone of the Waipa District and Residential Zone of Hamilton City.

The key considerations for the management of noise effects generated and received within the Site are:

- To ensure that the substantive proposal includes appropriate mechanisms to control **operational noise** generated and received between industrial and commercial lots, and any lot containing noise sensitive activities.
- To ensure that the **road traffic** noise levels from the Southern Links Designation and SH3 3 will be reasonable for land use activities adjacent to either corridor.

5.0 Assessment of construction noise and vibration effects

5.1 Permitted construction noise standards

Rule 3.4.2.24¹, Rule 4.4.2.19² of the WDP and Rule 25.8.3.2 of the HCDP all require that construction noise levels are managed in accordance with the recommended numerical limits and assessment procedures set out in NZS 6803:1999 '*Acoustics – Construction Noise*' (NZS6803:1999).

¹ The construction noise standard for the LLRZ

² The construction noise standard for the Rural Zone

NZS6803 provides guideline noise limits that are based on the duration of construction works at any one location, and the occupation of the receiving site. The construction timeframe will be greater than 20 weeks in duration and will therefore be subject to NZS6803's recommended noise limits for long term duration projects³.

NZS6803:1999 recommends a noise limit of 70 dB L_{Aeq} and 85 dB L_{AFmax} applies to construction work undertaken between 7:30am and 6:00pm, Monday to Saturday. The construction noise limits apply when measured and assessed 1m from the façade of any occupied dwelling in a rural or residential zone.

5.1.1 Key recommendations for construction noise

At this point in time, a contractor has not yet been appointed which means that I have not been able to review a proposed construction methodology, including the specific construction equipment and durations of construction work in various parts of the Site. The findings below are based on a preliminary review of the masterplan and my experience on a large number of similar projects.

The masterplan indicates that the majority of enabling works that are likely to be undertaken near to the Site boundaries will comprise bulk earthwork at the beginning, followed by recontouring, compaction and paving of access roads and installation of services. I expect that the works will require very typical plant and machinery such as bulldozers, compactors, excavators, paving machines, concrete pours and trucks.

The construction noise levels from vertical construction phase will generally be quieter than the noise from civil works, especially where proposed buildings are separated from external boundaries. The highest construction noise levels are likely to be experienced where high noise generating works (such as road construction and any vegetation removal) are undertaken within 50m of occupied dwellings on adjacent sites.

My preliminary assessment is that construction noise levels from high noise generating activities (namely vegetation removal and compacting work for road construction) may require the implementation of noise mitigation to ensure compliance with the permitted construction noise limits for occupied dwellings within 50m of the works.

5.1.2 Construction noise and vibration assessment to be provided as part of the substantive application

A construction noise assessment will be provided as part of the substantive application, in accordance with the recommended numerical limits and assessment procedures set out in NZS 6803:1999. The construction noise assessment will confirm whether construction work can be managed to comply with the permitted construction noise standards.

The assessment will provide details of how a Construction Noise and Vibration Management Plan (**CNVMP**) will be used to ensure the best practicable option is adopted to minimise noise effects

³ The construction noise limit applying to construction projects greater than 20 weeks in duration.

as far as practicable in the event that specific aspects of the construction phase require resource consent for short-term exceedances of the permitted noise standards.

Based on my experience with similar projects, I expect that construction noise levels can be managed to be reasonable for all receivers through a CNVMP. The CNVMP will be designed to mitigate the effects of any minor exceedances of the construction noise limits as far as practicable, and to ensure the timing, duration and level of high noise generating construction work close to dwellings will be reasonable for the receivers.

5.2 Construction vibration

The WDP does not include any rules or standards to control vibration generated from construction work.

Rule 25.8.3 of the HCDP requires that construction vibration received by any building on any other site shall comply with the provisions of and be measured and assessed in accordance with German Standard DIN 4150-3:1999 *Structural vibration – Effects of vibration on structures* (the **DIN limits**). The DIN limits are designed to ensure that construction vibration avoids damage to buildings and are commonly adopted in District Plans and resource consents throughout New Zealand.

I consider that vibration generated by construction work will be able to comply with the limits for avoiding building damage without requiring any specific mitigation due to the separation distances between any vibration-generating activities on Site. This finding applies to receivers in both Waipa District and Hamilton City.

5.2.1 Construction vibration assessment to be provided as part of substantive application

I consider that vibration generated by construction work on the Site is likely to readily comply with the DIN limits for avoiding building damage without requiring any specific mitigation measures. This is due to the separation distances between potential vibration-generating construction activities on Site and the nearest physically existing and potential future buildings.

I recommend that the substantive application demonstrates that construction vibration levels can be managed to comply with the limits in German Standard DIN 4150-3:1999 *Structural vibration – Effects of vibration on structures*.

6.0 Operational noise levels received *beyond the Site*

I have reviewed the proposed masterplan to determine any measures that may be required to ensure noise levels generated from industrial and commercial land use activities will be compatible with the permitted noise levels in the LLRZ and Rural Zone of the Waipa District and anticipated level of amenity in the Residential Zone of Hamilton City.

6.1 The permitted standards for noise received at adjacent sites

The noise generated by any land use activity on the Site will be controlled by the permitted noise levels prescribed by Rule 3.4.22 or Rule 4.4.2.15 of the WDP (depending on whether the noise is generated from the LLRZ or Rural Zone). These noise limits are reproduced in Table 1 along with the permitted noise levels for noise received in Hamilton City.

Rule 3.4.22 and Rule 4.4.2.15 of the WDP prescribe the same permitted noise levels for noise received at the notional boundary of any dwelling (in any zone). The only difference is that the LLRZ noise levels are designed to deliver a greater level of acoustic amenity before 8am and after 6pm on Sundays and Public Holidays.

Table 1 Maximum permitted noise levels

Rule 3.4.22 of the WDP	Rule 4.4.2.15 of the WDP	Rule 25.8.3.7 of the HCDP
<i>This rule controls noise generated in the LLRZ and received at the notional boundary of any dwelling</i>	<i>This rule controls noise generated in the Rural Zone and received at the notional boundary of any dwelling</i>	<i>This rule controls the level of noise received in the Residential Zones of Hamilton City</i>
50 dB LAeq between 7am and 10pm, Monday to Saturday	50 dB LAeq between 7am and 10pm	45 dB LAeq and 75 dB LAmax between 6am and 7am
50 dB LAeq between 8am and 6pm, Sundays and Public Holidays	40 dB LAeq and 70 dB LAmax between 10pm and 7am.	50 dB LAeq between 7am and 8pm
40 dB LAeq at all other times		45 dB LAeq between 8pm and 11pm
Any single noise event between 10pm and 7am - 70 dB LAmax		40 dB LAeq and 75 dB LAmax between 11pm and 6am

The permitted noise levels prescribed by the WDP are similar to the permitted noise standards prescribed by the HCDP. The only difference is that the HCDP standards allow a slightly higher noise level (+ 5dB) in the mornings between 6am and 7am. In practice, this means that meeting compliance with the permitted noise standards at the closest receivers within the Waipa District will deliver a level of acoustic amenity that is consistent with (or slightly better than) the permitted noise environment in the Residential Zone of the HCDP.

6.2 Industrial noise levels received at adjacent sites

The proposed industrial lots are located in the western and south-west of the Site, adjacent to the Southern Links Designation. All future industrial lots will be separated from the closest notional boundaries by the Southern Links and Houchens Road corridors. The closest receivers are in the Rural Zone of the Waipa District. The receivers in the LLRZ of Waipa District and Residential Zone of Hamilton City are well separated from the areas of proposed industrial activity.

I have not identified any constraints in terms of future industrial lots locating, designing and operating in a way that meets compliance with Rule 4.4.2.15 of the WDP at all notional boundaries beyond the Site. This takes into account the separation provided by the adjacent road corridors.

The requirement to comply with Rule 4.4.2.15 at any notional boundary on an adjacent site will constrain those industrial activities that establish near to the periphery of the Site (when compared to a situation where there are no proximate notional boundaries). This is an inherent feature of situations where industrial activity has an interface with residential activity.

The types of operational constraints that will apply to future industrial activities may involve limitations on the timing and location of high noise generating activities that are unable to be effectively screened. An example of an industrial activity that may be constrained by the requirement to comply with the noise limits might include an open industrial yard with forklifts and heavy vehicles near to the periphery of the Site. The constraints can often be minimised and in some cases avoided with good site design and by using built form to screen noise generating activities from the adjacent sites that contain (or may contain) dwellings.

I expect that the typical due diligence process will ensure that any future industrial activities are aware of the need to comply with the relevant noise limits before establishing on the Site.

6.3 Commercial noise levels received at adjacent sites

The proposal incorporates two Neighbourhood Centres that will provide a range of amenities and services to support the residential and industrial developments. This neighbourhood centre will likely include commercial properties, childcares, cafés, and a local superette.

I have not identified any constraints in terms of future commercial activities locating, designing and operating in a way that meets compliance with the permitted noise levels prescribed by the WDP at all notional boundaries beyond the Site.

Compliance with the WDP noise standards at all proximate notional boundaries will ensure compliance with the permitted noise levels prescribed by Rule 25.8.3.7 of the HCDP for receivers in the Residential Zone of Hamilton City.

6.4 Noise levels from residential and retirement living

The masterplan shows that the area of the Site to the east of the proposed Spine Road will be developed for residential and retirement village activity.

The noise from residential and retirement village activity is expected to be consistent with a residential area where the noise environment will primarily be controlled by vehicle movements and intermittent noise from typical residential activities.

I have not identified any challenges in terms of residential and retirement village activities complying with the permitted noise levels prescribed by the WDP at all proximate notional boundaries. Compliance with the WDP will also deliver compliance with the permitted noise levels prescribed by Rule 25.8.3.7 of the HCDP for receivers in the Residential Zone.

6.5 Vehicle noise

I understand that the internal access roads will be vested as a public road. The noise limits in the WDP and HCDP do not apply to noise generated by traffic on public roads. Therefore, Rule 25.8.3.4 of the HCDP is not triggered by the construction of the proposed internal road network.

7.0 Recommendations to manage noise compatibility *within* the Site

The proposal is to enable the operation of industrial, commercial and residential activity on LLRZ and Rural Zone land. The underlying noise standards for the LLRZ and Rural Zone are not designed for a scenario requiring the management of noise between industrial, commercial and noise sensitive activities. I have therefore provided recommendations that are designed to manage ongoing land use compatibility between industrial, commercial and rural-residential lots. The controls I have recommended are based on the same general principles that would apply if the proposal was a plan change. These measures are designed to achieve land use compatibility through a combination of noise limits and activity-based land use controls

The recommendations in Table 1 are based on the general arrangement of the land use activities shown in the masterplan in Figure 4. These recommendations to manage noise levels between lots within the Site apply in conjunction with the prevailing requirement to achieve compliance with the permitted noise standards prescribed by the WDP at all assessment locations outside the Site.

3.3 Industrial and Commercial Yield

Landholdings	Lot size (m ²) range	Blocks	Net Area (m ²)	Yield (approx.)
Chinamans Hill Limited	5,000 - 5,000	4-12, 14-16	103,609	20 - 38
	-	C1, C2	7,244	-
	-	Total	-	20 - 38
Orange Land Limited Partnership	5,000 - 5,000	42 - 44	51,138	4 - 9
	-	C3, C4	6,840	-
	-	Total	-	4 - 9
Total (all landholdings - industrial)				24 - 47

Legend

- Subject Site
- Industrial Block
- Neighbourhood Centre
- 10m Industry Buffer/Setback
- Southern Links Designation (RONs)
- Open Space
- Riparian Buffer
- Stormwater Devices
- Waterbodies/Channel
- State Highway
- Proposed Spine Road (30m)
- Proposed Collector Road (23m)
- Proposed Local Road (15.8m)
- Proposed JOL (10m)
- Proposed future connection
- Proposed Future Walking & Cycling Connection
- Existing Water Reservoir
- Proposed Additional Water Reservoir

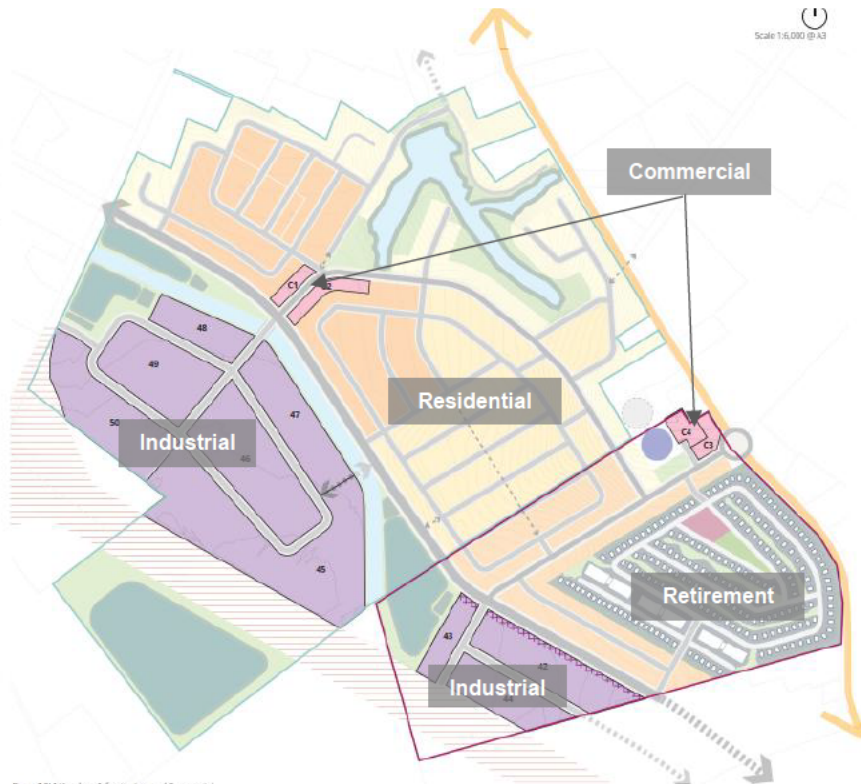


Figure 7 SL1 Houchens Infrastructure and Commercial

Figure 4 Houchens Development High Level Masterplan

Table 2 Recommendations to manage noise within the Site

Site generating noise	Site receiving the noise	Recommended mechanism to manage land use compatibility	Reason for recommendation
<i>Recommendations to manage Industrial noise</i>			
Industrial	 Any other industrial lot (that does not contain a noise sensitive activity- see recommendation below)	I recommend that the substantive applications includes noise limits to control noise levels between industrial lots. I recommended noise limits that will enable noise levels of up to 65 dB L_{Aeq} at all times, when measured and assessed at the boundary of any other industrial lot.	The underlying LLRZ/ Rural Zone noise limits will not control the noise levels between industrial lots because there will be no notional boundary on the receiving site. This means that without specific consent conditions, there will be no noise limits between industrial lots. In my experience, the absence of any noise limits between sites can give rise to incompatibility and conflict between land use activities. We therefore recommend that the application controls the noise levels between industrial lots. This will provide greater certainty on the permitted noise environment inside the industrial area and ensure future land use activities are established with an understanding of the permitted noise environment. The recommended noise limits for noise generated and received in the industrial area are designed to be sufficiently enabling for industrial activities (that are otherwise well separated from noise sensitive activities). <i>Note: The recommended noise limits of 65 dB L_{Aeq} at all times (inside the industrial area) would be incompatible for any noise sensitive activity that may attempt to co-locate within the industrial area. The use of activity based controls are therefore recommended to avoid the potential for reverse sensitivity conflicts (as set out below).</i>

Site generating noise	Site receiving the noise	Recommended mechanism to manage land use compatibility	Reason for recommendation
Industrial lot	Any residential lot within the Site	I recommend that the substantive application includes non-compliance with Rules 3.4.22 and 4.4.2.15 (the underlying WDP noise limits) as a reason for consent and includes measures that will set noise limits for noise generated from industrial lots and received at notional boundaries <u>within</u> the Site. The recommended noise limits applying at any notional boundary within the Site are 55 dB L_{Aeq} (daytime) and 45 dB L_{Aeq} and 75 dB L_{AFmax} (nighttime) when measured and assessed at the boundary of any residential lot within⁴ the Site	The recommended noise limits are designed to provide an adequate level of acoustic amenity to non-acoustically treated dwellings near to an industrial interface. The recommended noise limits are typically applied to residential zones that are near to the interface with industrial zones. The noise limits will reduce the degree of noise constraint on industrial activities (and are therefore more enabling) when compared to the underlying noise limits. The recommended noise limits between industrial and residential lots within the Site are 5dB higher than the underlying noise standards for the Rural Zone.
Recommended activity based controls for activities that establish on industrial lots		I recommend that the substantive application considers the use of activity-based land use controls that will preclude the establishment of any noise sensitive activity on the industrial lots. Noise sensitive activities are defined by the Waipa District Plan as: <i>“BUILDINGS used for RESIDENTIAL ACTIVITIES, including boarding establishments, homes for elderly person,</i>	The Masterplan is designed to separate noise generating industrial land use activities from noise sensitive activities. I have therefore recommended noise limits within the industrial area that are designed to be sufficiently enabling for industrial activities that will be well separated from noise sensitive land use within and adjacent to the Site. I understand that the permitted activity standards for the underlying Rural Zone could enable the establishment of noise sensitive activities within the proposed industrial area. The introduction of notional

⁴ Rules 3.4.22 and 4.4.2.15 of the WDP will control the noise levels received at any notional boundary outside the Site. These rules requires that the noise levels received at the notional boundary of any dwelling must not exceed 50 dB L_{Aeq} between 7am and 10pm and 40 dB L_{Aeq} and 70 dB L_{Amax} between 10pm and 7am.

Site generating noise	Site receiving the noise	Recommended mechanism to manage land use compatibility	Reason for recommendation
		<i>RETIREMENT VILLAGE ACCOMMODATION AND ASSOCIATED CARE FACILITIES, in-house aged care facilities, hotels and motels, and other BUILDINGS used for residential accommodation but excluding camping grounds; and MARAE ;and HOSPITALS; and Teaching areas and sleeping rooms in an EDUCATION FACILITY."</i>	boundaries within the proposed industrial area would introduce a significant constraint on the operation of the closest industrial lots by requiring the industrial activities to meet noise limits that are compatible with noise sensitive activities. I therefore recommend that the substantive application incorporates a mechanism that will preclude the establishment of noise sensitive activities from establishing on the industrial lots. This measure will assist to achieve appropriate separation distances between industrial and noise sensitive activities and will manage the potential for incompatibility and conflict within the industrial area.

Recommendations to manage activities in the Neighbourhood Centre

Any lot in the Neighbourhood Centre	↔	Any other lot in the Neighbourhood Centre	I recommend that the substantive application includes appropriate measures to control noise levels between activities in the Neighbourhood Centre. The specific noise limit inside the Neighbourhood Centre will depend on the extent to which noise sensitive activities (including Early Childhood Education Centres/ ECE's) are enabled in the Neighbourhood Centre. The potential options include: Option 1: Noise levels of 55 dB L_{Aeq} (daytime) and 45 dB L_{Aeq} and 75 dB L_{AFmax} (nighttime). These noise limits would	The underlying LLRZ noise limits will require compliance with noise levels of 50 dB L_{Aeq} between 7am and 10pm and 40 dB L_{Aeq} and 70 dB L_{Amax} between 10pm and 7am. These noise limits will not be sufficiently enabling for some commercial activities. In addition, the LLRZ noise limits are not designed to control noise levels between buildings that contain a mix of commercial and noise sensitive activities. I therefore recommend that the substantive application includes non-compliance with Rule 3.4.22 as a reason for consent and includes measures that will set appropriate noise limits to manage land use compatibility in the Neighbourhood Centre.
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Site generating noise	Site receiving the noise	Recommended mechanism to manage land use compatibility	Reason for recommendation
		present a constraint to some commercial activities but would provide an adequate level of acoustic amenity for non-acoustically treated residential dwellings. Option 2: Noise levels of 60 dB L_{Aeq} (daytime) and 50 dB L_{Aeq} and 75 dB L_{AFmax} (nighttime) where noise sensitive activities within the Neighbourhood Centre are <u>acoustically treated</u> to achieve internal noise levels of 35 dB L_{Aeq} inside bedrooms or 40dB L_{Aeq} inside other habitable rooms.	I have provided two options for noise limits to be explored and refined as part of the substantive application. The noise limits in Option 1 are designed to be compatible with non-acoustically treated noise sensitive activities (and outdoor areas of ECE's) that may co-locate within the Neighbourhood Centre. These noise limits may present an operational constraint to some commercial activities (i.e. a superette with a loading zone) where they are near to noise sensitive activities. The noise limits in Option 2 are designed to be more enabling for commercial activities but will require noise sensitive activities to be acoustically treated to achieve an adequate level of internal noise amenity. The external noise levels in Option 2 may constrain the establishment of ECE's⁵ in the Neighbourhood Centre. Activity based restrictions on ECE's inside the Neighbourhood Centre may be required if the permitted daytime noise levels will exceed 55 dB L_{Aeq} in outdoor play areas.
Any lot in the Neighbourhood Centre	Any residential lot within the Site	Rely on permitted noise standards for the underlying zoning	The underlying noise limits can be used to manage the noise levels generated from a commercial activity and received at residential lots within the Site.

⁵ Acoustic treatment will not provide protection to outdoor areas of noise sensitive activities. We note that the Ministry of Education's licensing requirements for Early Childhood Education Centre's (ECE's) require that noise levels received in play areas must not exceed 55 dB L_{Aeq} . Restrictions on ECE's should be considered if the permitted daytime noise levels will exceed 55 dB L_{Aeq} .

Site generating noise		Site receiving the noise	Recommended mechanism to manage land use compatibility	Reason for recommendation
Recommendations to manage noise levels from residential and retirement village activities				
Any lot in the Retirement Village	↔	Any residential lot within the Site	Rely on permitted noise standards for the underlying zoning	The underlying noise limits can be used to manage the noise levels generated from the retirement village and received at residential lots within the Site.
Proposed water reservoir	→	Any residential lot within the Site	Rely on permitted noise standards for the underlying zoning	The underlying noise limits will manage the noise levels associated with the water reservoir and received at residential lots within the Site.

8.0 Road traffic noise effects

The designation for the SL1 corridor runs diagonally across the western part of the Site. The eastern boundary of the Site abuts SH3.

The potential road-traffic noise effects from both corridors and measures to achieve ongoing land use compatibility are set out below.

8.1 Road traffic noise effects from SL1

Rule 3.4.2.26 (LLRZ) and Rule 4.4.2.26 (Rural Zone) of the WDP requires the acoustic treatment of any noise sensitive activities within 100m of a designated State Highway. The Masterplan shows that the land adjacent to the SL1 will be used for industrial activity.

I have not identified any concerns in terms of road traffic noise levels affecting future industrial land uses given that industrial land use is not sensitive to noise.

I have recommended that the substantive application includes measures that would preclude noise sensitive activities from establishing within the industrial area. This measure will ensure that any proposed noise sensitive activities will be separated from the SL1 corridor by distances exceeding 200m.

8.2 Road traffic noise effects from SH3

SH3 runs along the eastern boundary of the Site. The proposal is to develop the LLRZ and Rural Zoned land adjacent to SH3 for residential and retirement living.

8.2.1 Rule 3.4.2.27- SH3 road traffic noise received in the Houchens Road Structure Plan Area

Rule 3.4.2.27 applies to LLRZ land that is inside the Houchens Road Structure Plan Area. This rule requires the acoustic treatment of any buildings that are within 80m of SH3 to achieve the “satisfactory” internal design levels in Australian / New Zealand Standard AS/NZ 2107:2000 *Acoustics- Recommended design sound levels and reverberation times for building interiors* (AS/NZ 2107:2000). This standard requires that houses and apartments near to major roads should achieve an internal noise level of 35 dB to 45 dB L_{Aeq} inside living areas and 35 dB to 45 dB L_{Aeq} inside sleeping areas.

AS/NZ 2107:2000 has been superseded⁶. I also note that AS/NZS2107 is not designed for road traffic noise. Section 2.2 of AS/NZS2107 states:

“2.2 Limitation

This Standard is not intended for-

...

- (c) *either the assessment or prescription of acceptable recommended noise levels from transient or variable noises outside the building such as-*

⁶ The current version of standard prescribes the same internal noise levels for houses and apartments near to major roads.

...
.....

v. road traffic noise (see AS 3671 or NZ 6806)

8.2.2 Rule 4.4.2.26 – road traffic noise from SH3 received in the Rural Zone

Rule 4.4.2.26 applies to Rural Zone land adjacent to SH3. This rule requires the acoustic treatment of any noise sensitive activity that is within 80m of SH3 (as measured from the edge of the carriageway)⁷.

Compliance with Rule 4.4.2.26 will require all noise sensitive activities within 80m of SH3 to be acoustically treated to achieve internal noise levels of 40 dB $L_{Aeq(24hr)}$ inside all habitable rooms. These internal noise levels will be straightforward to achieve using acoustic treatment specified as part of the detailed design process and confirmed in any future building consent application.

8.2.3 Recommendations to identify and manage SH3 noise effects

We note that Rule 3.4.2.27 and Rules 4.4.2.26 apply a relatively “coarse” approach to managing road-traffic noise effects as they apply the controls based on a standard setback distance, rather than determining the specific area of land affected by road-traffic noise levels greater than 55 dB $L_{Aeq(24hr)}$.

I recommend that investigations undertaken for the substantive application consider a road-traffic noise modelling exercise to more accurately understand the extent of land affected by road-traffic noise levels greater than 55 dB $L_{Aeq(24hr)}$ ⁸. This modelling would take into account site specific features (i.e. topography) that affects the spatial propagation of noise from the road corridor. Road traffic noise modelling will determine whether the area of land that should be subject to acoustic treatment controls may be less than 80m in this case.

If the substantive application is accompanied by road traffic noise modelling, the application will confirm whether non-compliance with Rule 3.4.2.27 and Rules 4.4.2.26 of the WDP will form a reason for consent⁹ so that:

- Compliance with the acoustic treatment requirements can be informed by noise modelling (rather than relying on a uniform 80m distance from SH3). Any road-traffic noise modelling investigation would identify the specific lots that will require acoustic treatment to achieve internal noise levels of 40 dB $L_{Aeq(24hr)}$ inside all habitable rooms.
- The acoustic treatment requirements can be streamlined to apply a consistent set of acoustic treatment controls across the Site, regardless of whether the development is in

⁷ Where the posted speed limit is equal to or greater than 70km/hour. We understand that the current speed environment along this section of SH3 is currently 100km/hour and the speed environment is likely to be maintained above 70km/hour in the future.

⁸ External noise levels greater than 55 dB $L_{Aeq(24hr)}$ represent the threshold at which future buildings will require acoustic treatment to provide adequate protection to noise sensitive occupants while indoors.

⁹This approach will technically require resource consent as a discretionary activity to modify the compliance pathway in Rule 4.4.2.26. The overall outcome of the recommended approach will ensure the mitigation response (acoustic treatment to achieve 40 dB $L_{Aeq(24hr)}$ inside all habitable rooms) is tailored to the site and future receivers.

the LLRZ or Rural Zone. I recommend that the proposed controls (including internal noise levels and mechanical ventilation requirements) are based on current best practice for managing road-traffic noise effects on noise sensitive activities.

Overall, the approach I recommend will deliver the same outcome intended by the rules. It will simply ensure that any mitigation response is specifically tailored to this section of the road network, the site, and proposed development layout.

8.2.4 Mechanical ventilation and cooling system requirements

The provision of a mechanical ventilation and cooling system is likely to be a core component of any acoustic treatment requirement for dwellings affected by road-traffic noise. Rules 4.4.2.26 and 3.4.2.27 do not provide appropriate specifications for a mechanical ventilation and cooling systems that will enable occupants to remain thermally comfortable and adequately ventilated when external windows are closed to reduced road traffic noise. In our experience, it is typical for District Plan controls and Waka Kotahi's standard conditions to include these specifications.

I therefore recommend that the substantive application provides greater clarity for future lot owners by including specifications for any required mechanical ventilation and cooling system. These recommendations will be based on several recent plan review processes involving collaboration between acoustic and HVAC experts working together to produce a contemporary and robust set of performance standards for mechanical ventilation and cooling systems that are suitable for occupants of homes in high noise environments that are commonly available on the New Zealand market.

The overall objective of the approach recommended above is to ensure a tailored and efficient response to mitigating road traffic noise effects from SH3. These options can be explored and refined as part of the ongoing investigations for the substantive application.

9.0 Summary of findings

Styles Group has assessed the potential operational and construction noise and vibration effects from the Houchens Road Development in the SL1 growth area. The proposal is to enable a comprehensive residential and industrial development at the interface with the LLRZ and Rural Zone of the Waipa District and Residential Zone of Hamilton City.

Management of noise and vibration effects beyond the Site

My analysis of the masterplan finds that future activities on the proposed industrial lots can be located, designed and managed to achieve compliance with the relevant noise limits prescribed by the Waipa District Plan at all assessment locations beyond the Site. I consider that the proposal can be designed to achieve compatibility with the level of acoustic amenity anticipated and provided for in the adjacent LLRZ and Rural Zone of the Waipa District.

All industrial lots are well separated from the territorial boundary of Hamilton City. Noise levels from the industrial lots will comply with the permitted noise levels prescribed by the Hamilton City District Plan due to separation distance.

I have recommended that the substantive application includes a construction noise and vibration assessment that demonstrates compliance with the recommended numerical limits and assessment procedures set out in NZS 6803:1999 *Acoustics – Construction Noise* and German Standard DIN 4150-3:1999 *Structural vibration – Effects of vibration on structures*.

The assessment for the substantive application will detail how a CNVMP will be used to ensure that construction noise effects are minimised to ensure compliance with the permitted standards for as much of the project as is practicable. I am confident that the construction noise and vibration effects can be managed to be reasonable for all receivers.

Management of noise effects between land use activities within the Site

Compatibility between the industrial / commercial and noise sensitive activities within the Site can be readily achieved through a combination of separation, activity based land use controls and noise limits.

I have set out recommendations to ensure the permitted noise environment within the industrial area is sufficiently enabling for industrial activities, whilst ensuring ongoing compatibility with nearby noise sensitive activities on residential lots. I have recommended that consent is sought to apply the higher noise limits of 55 dB L_{Aeq} (7am to 7pm), 50 dB L_{Aeq} (7pm to 10pm) and 45 dB L_{Aeq} and 70 dB L_{AFmax} (10pm to 7am)) for noise generated between industrial lots and received at residential lots that are within the Site.

I provided recommendations to ensure the acoustic treatment of noise sensitive activities exposed to road traffic noise levels from SH3. I have recommended the work for the substantive application investigates the road-traffic noise levels from SH3 to identify the specific lots that will require acoustic treatment (i.e. where road traffic noise levels are predicted to exceed 55 dB $L_{Aeq(24hr)}$). This approach is designed to ensure the mitigation response is tailored to the Site and to streamline future compliance requirements in accordance with recognised best practice.

Overall, my analysis of the masterplan finds that the proposal is capable of achieving compatibility with the level of acoustic amenity anticipated and provided for in the LLRZ and Rural Zone of the Waipa District and Residential Zone of Hamilton City, and options are available through the substantive application to appropriately manage noise effects.

Appendix A WDP Noise standards

These provisions apply to noise generated from the Site and received between sites in the Waipa District

Definition of Noise Sensitive Activities

*“BUILDINGS used for RESIDENTIAL ACTIVITIES, including boarding establishments, homes for elderly persons, RETIREMENT VILLAGE ACCOMMODATION AND ASSOCIATED CARE FACILITIES, in-house aged care facilities, hotels and motels, and other BUILDINGS used for residential accommodation but excluding camping grounds; and
MARAE ;and
HOSPITALS; and
Teaching areas and sleeping rooms in an EDUCATION FACILITY.”*

Rule 3.4.2.22 Noise (Large Lot Residential Zone)

Activities shall be conducted and buildings located, designed and used to ensure that they do not exceed the following limits at the notional boundary of any dwelling:

- | | | |
|----|--|----------------------------|
| a. | Monday to Saturday - 7.00am to 10.00pm | 50 dBA (L _{eq}) |
| b. | Sundays & Public Holidays - 8.00am to 6.00pm | 50 dBA (L _{eq}) |
| c. | At all other times | 40 dBA (L _{eq}) |
| d. | Any single event noise 10.00pm to 7.00am | 70 dBA (L _{max}) |

Provided that:

- i. This rule shall not apply to the use or testing of station and vehicle sirens or alarms used by emergency services; and
- ii. Noise from farm animals including farm dogs, agricultural vehicles (when not being used for recreational purposes), agricultural machinery or equipment operated and maintained in accordance with manufacturer's specifications and in accordance with accepted management practice (excluding frost fans) are exempt from this rule provided that the best practicable option to keeping noise at a reasonable level is adopted.

All noise levels shall be measured and assessed in accordance with the requirements of New Zealand Standard NZS 6801:2008 Acoustics – Measurement of environmental sound and assessed in accordance with New Zealand Standard NZS 6802:2008 Acoustics – Environmental noise

Rule 4.4.2.15 Noise (Rural Zone)

Noise generating activity other than that from farm animals including farm dogs, agricultural vehicles (when not being used for recreational purposes), agricultural machinery or equipment (including produce packing facilities where the only produce packed is grown on-site) operated and maintained in accordance with the manufacturer's specifications and in accordance with accepted management practices (e.g. for milking,

spraying, harvesting, packing and the like, but not including frost fans) and provided that the best practicable option (including the option for the activity to take place at another time of the day), is adopted to ensure that the emission of noise does not exceed a reasonable level; shall be conducted and buildings located, designed and used to ensure that they do not exceed the following limits within the notional boundary of any dwelling (excluding dwellings within mineral extraction sites):

- | | | |
|----|-------------------------------|--------------|
| a. | Day time - 7.00am to 10.00pm | 50dBA (Leq) |
| b. | Nighttime- 10.00pm to 7.00am | 40dBA (Leq) |
| c. | Night time single noise event | 70dBA (Lmax) |

The noise levels shall be measured and assessed in accordance with the requirements of New Zealand Standard NZS 6801:2008 Acoustics – Measurement of environmental sound and assessed in accordance with New Zealand Standard NZS 6802:2008 Acoustics – Environmental noise. Provided that this rule shall not apply to the use or testing of station and vehicle sirens or alarms used by emergency services.

Activities that fail to comply with this rule will require a resource consent for a discretionary activity.

Rule 3.4.2.24 Construction noise (Large Lot Residential Zone)

Construction noise emanating from a site shall meet the limits recommended in and be measured and assessed in accordance with New Zealand Standard NZS 6803:1999 Acoustics – Construction noise.

Rule 4.4.2.21 Construction noise (Rural Zone)

Construction noise emanating from a site shall meet the limits recommended in and be measured and assessed in accordance with New Zealand Standard NZS 6803:1999 Acoustics – Construction noise.

Rule 3.4.2.27 Road traffic noise within the Houchens Road Large Lot Residential Structure Plan Area

Within the Houchens Road Large Lot Residential Structure Plan Area, any new buildings, or any alteration(s) to existing buildings otherwise intended for noise sensitive activities (such as accommodation or education facilities, or offices) constructed within 80m (measured from the nearest painted edge of the carriageway) of State Highway 3/Ohaupo Road or land that is subject to a notice of requirement or designation for State Highway 3/Ohaupo Road:

- a. The building or alteration shall be designed, constructed and maintained to meet the “satisfactory” internal design sound levels in Australian/New Zealand Standard AS/NZS 2107:2000 Acoustics – Recommended design sound levels and reverberation times for building interiors; or
- b. Prior to the construction of any habitable building(s) on the site, an acoustic design certificate from a qualified acoustic engineer is to be provided to Council demonstrating that the above internal sound levels of Australian/New Zealand Standard AS/NZS 2107:2000 Acoustics – Recommended design sound levels and reverberation times for building interiors are achieved; or

- c. The dwelling or alteration shall be designed, constructed and maintained in accordance with the schedule of typical building construction set out in Appendix A of Australian/New Zealand Standard AS/NZS 2107:2000 Acoustics – Recommended design sound levels and reverberation times for building interiors.

Rule 4.4.2.26 Road traffic noise received in the Rural Zone

Where a noise sensitive activity is proposed to be located within:

- a. 40m of State Highways 1, 1B, 3, 21 and 39 (as measured from the edge of the carriageway) where the posted speed limit is less than 70km/hour; or
- b. 80m of State Highways 1, 1B, 3, 21 and 39 (as measured from the edge of the carriageway) where the posted speed limit is equal to or greater than 70km/hour; or
- c. 100m of the Waikato Expressway section of State Highway 1 or any other designated State Highway (as measured from the edge of the carriageway or the edge of the designation if the carriageway location has not been confirmed in writing by the Requiring Authority); or
- d. The Cambridge North Road Noise Effects Area as identified on the Planning Maps;

then the building shall be insulated so that it achieves the following noise levels:

- i. Inside habitable rooms (including bedrooms) 40dB L_{Aeq} (24hr)

Appendix B HCDP Noise standards

These provisions are relevant to cross territorial noise effects generated from the Site and received in Hamilton City.

Definition of Noise-Sensitive Activities

Noise-sensitive activities: Means residential activities (including residential accommodation in buildings which predominantly have other uses such as commercial or industrial premises), marae, spaces within buildings used for overnight patient medical care, and teaching areas and sleeping rooms in buildings used as educational facilities. For the purpose of this definition educational facilities includes tertiary institutions and schools, and premises licensed under the Education (Early Childhood Services) Regulations, and playgrounds which are part of such facilities and located within 20m of buildings used for teaching purposes.

Construction noise and vibration

25.8.3.2

Construction Noise

All construction noise shall comply with the relevant noise levels stated in NZS6803: 1999, section 7.2 'Recommended numerical limits for construction noise' and shall be measured and assessed in accordance with NZS 6803:1999 'Acoustics – Construction Noise'.

25.8.3.3

Construction Vibration

Construction vibration received by any building on any other site shall comply with the provisions of and be measured and assessed in accordance with German Standard DIN 4150-3:1999 Structural vibration – Effects of vibration on structures.

Noise performance standards for noise received in Residential Zones

25.8.3.7

Noise Performance Standards for Activities in all Zones Except Major Facilities, Knowledge, Open Space, Ruakura Logistics and Ruakura Industrial Park Zones

Activities in all Zones except Major Facilities, Knowledge, Open Space, Ruakura Logistics and Ruakura Industrial Park Zones, shall not exceed the following noise levels at any point within the boundary of any other site in the:

i. Residential Zones.

Time of day	Noise level measured in L _{Aeq} (15min)	Noise level measured in L _{AFmax}
0600- 0700 hours	45 dB	75 dB
0700- 2000 hours	50 dB	-
2000- 2300 hours	45 dB	-
2300- 0600 hours	40 dB	75 dB

Rules – Specific Standards

25.8.3.1

Measurement and Assessment of Noise

Noise levels shall be measured in accordance with NZS 6801:2008 “Acoustics – Measurement of Environmental Sound” and assessed in accordance with NZS 6802:2008 ‘Acoustics – Environmental Noise’. These apply unless otherwise stated.

Design and Construction of New and Altered Roads

25.8.3.4

Design and Construction of New and Altered Roads

- a. Application of this standard.
 - i. This standard shall apply only to new and altered roads predicted to carry at least 2000 annual average daily traffic (AADT) at the design year.
- b. This standard shall not apply:
 - i. In circumstances where NZS 6806: 2010 does not apply, as listed in paragraph 1.3.1 of NZS 6806: 2010.
 - ii. To local transport corridors identified within Volume 2, Appendix 15-4, Figures 15-4b to 15-4f.
 - iii. To altered roads where the vertical or horizontal alignment changes relate solely to providing pedestrian footpaths, cycleways, dedicated passenger transport or high-occupancy vehicle lanes, vehicle stopping or parking whereby that part of the carriageway dedicated to usual vehicle movement does not move closer to any protected premises and facilities.
- c. Road-traffic noise shall be measured and assessed in accordance with NZS 6806:2010 ‘Acoustics – Road traffic noise – New and altered roads.
- d. Subject to 25.8.3.4.a and b. above, new or altered roads are designed and constructed to mitigate road-traffic noise in compliance with NZS 6806: 2010 ‘Acoustics – Road traffic noise – New and altered roads’.

Note

1. This rule mainly affects road controlling authorities such as Council and the New Zealand Transport Authority, but sometimes may affect a private developer building or altering a road in a subdivision designed to carry the requisite traffic volumes. The practical effect of the standard is that traffic noise received at ‘protected premises and facilities’ will be reduced by design features such as quieter road surfaces.