

**BEFORE THE INVERCARGILL CITY COUNCIL**

**Independent Hearing Commissioner**

**IN THE MATTER** of the Resource Management Act 1991

**AND**

**IN THE MATTER** a Resource Consent Application RMA/2018/111 by the Invercargill Licencing Trust, to demolish buildings, including a Class 2 heritage building, and construct and operate a new, eight level hotel incorporating 80 hotel suites, a restaurant, café, bars, function spaces, car parking and other guest facilities at the corner of Dee and Don Street.

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**STATEMENT OF EVIDENCE OF DR JEREMY TREVATHAN**  
**Acoustic Evidence**  
13 November 2018

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## **1 QUALIFICATIONS AND EXPERTISE**

1.1 My name is Jeremy Trevathan. I am an Acoustic Engineer and Director of Acoustic Engineering Services Limited, an acoustic engineering consultancy based in Christchurch. I hold the degrees of Bachelor of Engineering with Honours and Doctor of Philosophy in Mechanical Engineering (Acoustics) from the University of Canterbury. I am an Associate of the New Zealand Planning Institute, and a Member of the Acoustical Society of New Zealand.

1.2 I have more than ten years experience in the field of acoustic engineering consultancy and I have been involved with a large number of environmental noise assessment projects throughout New Zealand. I have previously presented evidence at Council and Environment Court Hearings, and before Boards of Inquiry. I have acted on behalf of applicants, submitters and as a peer reviewer for Councils.

## **2 CODE OF CONDUCT**

2.1 I have read the Code of Conduct for Expert Witnesses issued as part of the Environment Court Practice Notes. I agree to comply with the code and am satisfied the matters I address in my evidence are within my expertise. I am not aware of any material facts that I have omitted that might alter or detract from the opinions I express in my evidence.

2.2 I have also reviewed the application documents, submissions, and Council Officer's Section 42A Report (s42A report) in relation to the noise effects.

## **3 SCOPE OF EVIDENCE**

3.1 This evidence will address the following matters:

- a. a summary of the acoustic assessment;

- b. comments on concerns raised in submissions in respect to demolition and construction noise, and operational noise once construction is complete; and
- c. comments on the s42A report and draft conditions of consent.

#### **4 SUMMARY OF FINDINGS**

- 4.1 The existing buildings on the site are to be demolished using excavators. After a hard fill base has been prepared on site, bored piles will be installed and construction of the hotel superstructure will begin.
- 4.2 I have considered the main noise sources associated with the demolition of the existing buildings.
- 4.3 During the demolition phase, key noise sources will be a 45 tonne high reach excavator for work at heights and a smaller 20 – 30 tonne excavator to assist and to load and sort waste.
- 4.4 Our assessment considered a situation where a high reach excavator fitted with a pneumatic breaker is demolishing the existing buildings. The following noise levels are expected at the residential / visitor accommodation facilities in the vicinity of the site, when this activity occurs at the worst case locations.

83 Dee Street – 82 dB  $L_{Aeq}$

55 Dee Street – 83 dB  $L_{Aeq}$

76 Dee Street – 75 dB  $L_{Aeq}$

- 4.5 This analysis indicates that noise levels may exceed 70 dB  $L_{Aeq}$  when the external facades of the building on site are to be demolished at high level. Due to the height that these works will occur, there are limited physical mitigation options.
- 4.6 I therefore recommend that the neighbours are consulted and updated on when this activity will occur. I also recommend that works are only undertaken between 0730 and 1800 hours

Monday to Saturday so neighbours can plan around these high noise times. Conditions 7 and 11 recommended in the s42A report would be appropriate to ensure this occurs.

4.7 Other mitigation measures which should be implemented on site are outlined in the Demolition Management Plan as follows:

- The use of a hydraulic jaw / crusher as the primary breaker, with a nibbler attachment only to be used where stubborn concrete needs to be weakened before breaking into truckable sizes.
- Moving rubble 25 metres from the site boundaries before further breaking is undertaken.
- Fitting all mechanical plant with approved muffler devices and ensuring that all plant and equipment is well maintained and working in accordance with the manufacturer's specifications.
- Not leaving truck engines idling on site unnecessarily.

4.8 I also recommend that where practical, demolition works are staged to maximise screening from existing buildings, and that 3 metre high acoustic hoarding is installed to the north east and south site boundaries. Condition 13 recommended in the s42A report would be appropriate to ensure that appropriate screening is installed.

4.8 If these measures are implemented, then I consider that noise effects from demolition works will be acceptable.

4.9 Once the existing buildings on the site have been demolished and the rubble removed, I understand that a hard fill base will be installed over the site. During this phase, key noise generating equipment will be trucks bringing material to site, an excavator distributing the materials, and compaction equipment.

4.10 Our analysis shows that it is realistic for noise levels from the hardfill compaction to comply with a noise limit of 70 dB  $L_{Aeq}$  at the neighbouring dwellings to the north, east and west, and at

the nearest window of the 55 Dee Street façade. Noise levels of 62 dB  $L_{Aeq}$  are expected at the skylight of 55 Dee Street.

4.11 Bored piles are to be used for this project and noise from a crane mounted auger is anticipated to be the highest noise generator.

4.12 Our assessment considered a scenario where this equipment is operating in the worst case locations for the closest residential / visitor accommodation facilities in the vicinity of the site. The expected levels are as follows:

34 - 36 Dee Street - 73 dB  $L_{Aeq}$

55 Dee Street - 90 dB  $L_{Aeq}$

Alexandra Building - 71 dB  $L_{Aeq}$

4.13 This illustrates that while compliance is expected at the majority of neighbouring properties there will be cases where the noise limit is exceeded, with particularly high noise levels expected at 55 Dee Street.

4.14 Due to the high noise generation from this activity, we recommend that piling is limited to between 0730 and 1800 hours Monday to Friday, and that the neighbours are consulted regarding predefined times of operation so neighbours can plan around these high noise times. Conditions 9 and 11 recommended in the s42A report would be appropriate to ensure this occurs.

4.15 We have also assessed noise generated by concrete activities on the site, including concrete being pumped onto the site and power floats being used to finish the setting slab.

4.16 Based on our analysis, noise from concrete pumping / pouring can comply with the noise limit of 70 dB  $L_{Aeq}$  to the north, east and south. Due to the likely close proximity of the truck and pump to 55 Dee Street, noise levels of greater than 70 dB  $L_{Aeq}$  would be expected at 55 Dee Street.

- 4.17 I recommend that concrete pouring only occurs between 0730 and 1800 hours Monday to Friday, and that the neighbours at 55 Dee Street are advised of predefined operating times so they can plan around them. Conditions 9 and 11 recommended in the s42A report would be appropriate to ensure this occurs.
- 4.18 When a power float is being used at ground level and the site hoarding is installed as described above, compliance with a 70 dB  $L_{Aeq}$  limit is expected between the hours of 0730 to 1800 hours apart from the solid facades of 55 Dee Street and 34 – 36 Esk Street when the concrete float is being used in close proximity.
- 4.19 Noise from a power float working on the upper levels of the building would also be less than 70 dB  $L_{Aeq}$  at the north, east and west neighbouring site boundaries. However, if concrete floats are to be used in close proximity to 55 Dee Street on the upper levels, noise levels may exceed 70 dB  $L_{Aeq}$ . If this is the case then additional localised screening should be considered. I recommend that an appropriate procedure is incorporated into a Construction Noise and Vibration Management Plan (CNMVP), as recommended by Condition 9 of the s42A report.
- 4.20 Based on a site entrance 10 metres from 55 Dee Street, noise associated with heavy vehicles will be in the order of 45 dB  $L_{Aeq}$  when received at this property, if there are two movements in a fifteen minute period. This is well below the 70 dB  $L_{Aeq}$  construction noise limit.
- 4.21 I consider that the best approach with reducing noise effects from heavy vehicles is to adopt operational controls limiting arrival and departure times on site, discouraging vehicles idling on site for extended periods of time and limiting the use of reversing beepers. These measures should be outlined in the CNMVP (as recommended by Condition 9 of the s42A report).
- 4.22 I have considered what construction noise limits may be appropriate, and analysed the noise levels which are expected to be generated by all aspects of the construction process.

- 4.23 Based on a review of the District Plan and New Zealand Standard NZS 6803:1999, I consider that as far as practicable, compliance with NZS 6803:1999 is appropriate and would result in reasonable and acceptable noise effects.
- 4.24 The key control is a 70 dB  $L_{Aeq}$  limit between 0730 and 1800 on weekdays and Saturdays at residential receivers and on all days at commercial receivers.
- 4.25 Where higher noise generating activities do not comply with these limits even with all practicable mitigation adopted, then managerial controls will be required to minimise the impact on neighbours. This will include limiting the hours on site where practical and consulting with neighbours to identify less intrusive times to undertake the high noise activities.
- 4.26 If these controls are adopted, then I consider that the noise effects will be acceptable. I note that these higher noise generating activities will not consistently occur at the same location on site, or for the duration of the construction programme. In the context of this constrained urban site noise associated with demolition and construction will inevitably be high at times.
- 4.27 I note that the properties next to the site, at 55 Dee Street and 34-36 Esk Street, have solid concrete block walls which face onto the site. Even if high noise levels are generated in these locations, the solid façades will be effective in reducing construction noise received within these buildings.
- 4.28 In summary, there are some aspects of the demolition and construction which are expected to exceed the long-term noise limits set out in NZS 6803:1999. However, this is due to the constrained urban nature of the site. Where physical mitigation is not practical to reduce noise levels, I consider that with appropriate controls on the timing of high noise activities and consultation with neighbours, noise effects will be acceptable, and noise will not be unreasonable.

4.29 With regard to vibration, I note that vibration is perceptible at levels significantly lower than those required to cause building damage and so will be noticed in adjoining buildings from time to time. The consultation with neighbours and timing of activities discussed above will reduce the effect of this vibration.

## **5 COMMENTS ON SUBMISSIONS**

5.1 5 submissions mention noise among other concerns. Specific concerns of submitters include:

- General demolition and construction noise levels.
- Vibration from demolition and construction, including the potential for structural damage to 55 Dee Street.
- Noise during future operation of the hotel for entertainment events.
- Noise associated with the electrical transformer.
- The effects of loud noise from demolition and construction on live broadcasts and recordings for the Southland Community Broadcasters Charitable Trust Inc. (Radio Southland).

5.2 Noise associated with demolition and construction has been discussed in some detail in the preceding sections.

5.3 The submitters at 55 Dee Street have raised concern regarding noise from the operation of the hotel during entertainment events and noise from the electrical transformer.

5.4 I note that the applicant has volunteered a condition stating that operational noise from the site shall comply with the District Plan noise limits. This includes noise from entertainment events and the transformer.

5.5 I have reviewed the spaces within the development which are likely to accommodate functions and consider compliance with the District Plan limits practical for the following reasons.

- 5.6 The hotel incorporates bar, café and restaurant spaces on the ground floor, oriented towards Don Street. There is also a conference room and private dining space on level 1. On level 7 there is an event space which includes a semi-enclosed outdoor terrace.
- 5.7 As the key entertainment spaces are oriented towards Don Street, and not 55 Dee Street, due to the inherent screening provided I expect that noise from the food and beverage spaces will comply with the District Plan limits by some margin at 55 Dee Street.
- 5.8 The outdoor terrace on level 7 is enclosed to the south (towards 55 Dee Street), and partially to the east. It is also located 40 metres from the boundary. Given the orientation, setback and relatively lenient District Plan Business night time limit of 50 dB  $L_{Aeq}$  in this area, I consider that noise from typical functions in this space would comply with this limit without any specific controls.
- 5.9 However, if high level amplified music will occur in this space, then external doors to the exterior terrace may need to remain closed after 2200 hours to achieve the District Plan night time limit.
- 5.10 I understand that the design of the substation has not been finalised, although the intent is to locate transformers within a concrete bunker adjoining the boundary with 55 Dee Street. I also understand that natural ventilation is expected to be sufficient and forced air ventilation fans will not be required.
- 5.11 On this basis, I consider that it will be realistic to comply with both the daytime and night time noise limits in this location.
- 5.12 When submitting in support of the application, Radio Southland has raised concern that noise from construction works may affect live broadcasts and recordings on their premises.
- 5.13 The Radio Southland building appears to be located in the order of 30 metres south of the site and will have some screening from

the intermediate buildings at 43 – 55 Dee Street. The areas where live broadcasts and recordings take place are likely to already include some level of sound insulation to control noise break-in from Dee Street. Therefore it may be relatively unlikely that construction noise causes significant disruption.

- 5.14 Radio Southland has requested that they are notified before any high noise activities so that broadcasting activities can be rescheduled. Notwithstanding the above, I consider that this would be a reasonable approach.
- 5.15 NZTA have requested a condition that any noise sensitive rooms in the development are designed to achieve an indoor design sound level of 40 dB  $L_{Aeq} (24 \text{ hr})$ . As the development is high quality and intended to achieve a 4.5 star rating, this indoor design sound level will likely be inherently met by the hotel design. Notwithstanding this, I am aware that NZTA have subsequently confirmed that the proposed condition referring to sound levels complying with rule 3.13.9 of the Proposed Invercargill District Plan satisfies its concerns regarding internal noise. Condition 15 recommended in the s42A report is therefore appropriate.

## **6 COUNCIL'S PLANNER'S REPORT**

- 6.1 Tim Joll of Planz Consultants Ltd has prepared the s42A report on behalf of Invercargill City Council.
- 6.2 Mr Joll discusses the noise effects rising from demolition and construction on the site, and agrees with the intent of the conditions proposed by the applicant regarding the management of noise. I generally agree with Mr Joll's conclusions relating to noise, including the statement that *"these effects would likely arise with any proposed redevelopment of the site and are not unique to this proposal"*.
- 6.3 The concerns of the Southland Community Broadcasters Charitable trust regarding interference from demolition or construction noise on their broadcasts have been noted by Mr Joll. I have discussed this in more detail earlier in my evidence.

6.4 I agree that the noise related draft conditions of consent proposed by Mr Joll are reasonable and will ensure the noise effects of the demolition, construction and operation of the proposal are acceptable.

## **7 CONCLUSION**

7.1 There are some aspects of the demolition and construction which are expected to exceed the long-term noise limits set out in NZS 6803:1999. However, this is due to the constrained urban nature of the site. Where physical mitigation is not practical to reduce noise levels, I consider that with appropriate controls on the timing of high noise activities and consultation with neighbours, noise effects will not be unreasonable.

7.2 It is practical for other operational aspects including the transformer and entertainment events in the hotel to comply with the relevant District Plan noise limits.

7.3 I therefore expect the noise effects of the proposal to be acceptable.

**DR JEREMY TREVATHAN**

Acoustic Evidence

Acoustic Engineering Services

13 November 2018