

Rochdale Holdings Pty Ltd A.B.N. 85 009 049 067 trading as:

## **HERRING STORER ACOUSTICS**

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## **LANDFORM RESEARCH**

# **LOTS 4 – 7 JARRAHDAL AND TRANSIT ROADS MARDELLA SAND PIT**

## **NOISE ASSESSMENT**

MAY 2013

OUR REF: 16273-1-13108



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# NOISE ASSESSMENT MARDELLA

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**Herring Storer Acoustics**

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## 1. INTRODUCTION

Herring Storer Acoustics was commissioned by Landform Research to carry out an acoustical assessment of noise emissions of a sand pit located at Lots 4 – 7 Jarrahdale and Transit Roads, Mardella. The objectives of the study were to:

- Determine, by modelling, noise propagation from the pit.
- Assess the predicted noise levels received at the neighbouring noise sensitive premises, for compliance with the *Environmental Protection (Noise) Regulations 1997*.
- If exceedances are predicted, investigate possible noise control options that will reduce noise emissions to achieve compliance with the regulations.

For information a locality plan is attached in Appendix A.

## 2. SUMMARY

It is understood that the pit would only operate during the day period, therefore, noise emissions from the pit need to comply with the assigned day period noise levels at the neighbouring residences. As shown on the locality plan attached, the closest residences to the pit operations are located to the west and south. It is noted that access to the pit is via Jarrahdale Road, hence an assessment of noise received at the closest residence to the access road from trucks entering and leaving the site, was also undertaken.

Note : Under the Environmental Protection (Noise) Regulations 1997 noise emissions from vehicles travelling a gazetted road are exempt from the Regulations. Therefore, only noise emissions from trucks on the access road or within the pit have been assessed.

Given the close proximity of the South West Highway to the pit, it is likely that noise received at the neighbouring residence would be deemed not to contain any annoying characteristics, however to be conservative, the assessment includes a +5 dB(A) adjustment for tonality.

For the proposed operating hours and with the inclusion of the 2 metre bund, as outlined on the Figure attached in Appendix B (Proposed Sand Extraction), noise received at the neighbouring residence would, even with the inclusion of the +5 dB(A) penalty for a tonal component, comply with the requirements of the Environmental Protection (Noise) Regulations 1997. Noise received at the neighbouring residence from trucks entering and leaving the site would also comply with the Regulatory requirements.

## 3. CRITERIA

The *Environmental Protection (Noise) Regulations 1997* stipulate the allowable noise levels that can be received at a premise from other premises. The allowable noise level when received at a residence is determined by the calculations of an influencing factor, which is then added to base noise levels. The influencing factor is calculated for the usage of land within two circles, having radii of 100m and 450m from the premises of concern.

**TABLE 1 - BASELINE ASSIGNED OUTDOOR NOISE LEVEL**

| Premises Receiving Noise | Time of Day  | Assigned Level (dB) |                 |                   |
|--------------------------|--|---------------------|-----------------|-------------------|
|                          |  | L <sub>A10</sub>    | L <sub>A1</sub> | L <sub>Amax</sub> |
| Noise sensitive premises | 0700 - 1900 hours Monday to Saturday (Day)   | 45 + IF             | 55 + IF         | 65 + IF           |
|                          | 0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day Period)                        | 40 + IF             | 50 + IF         | 65 + IF           |
|                          | 1900 - 2200 hours all days (Evening)   | 40 + IF             | 50 + IF         | 55 + IF           |
|                          | 2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night) | 35 + IF             | 45 + IF         | 55 + IF           |

Note: L<sub>A10</sub> is the noise level exceeded for 10% of the time.  
L<sub>A1</sub> is the noise level exceeded for 1% of the time.  
L<sub>Amax</sub> is the maximum noise level.  
IF is the influencing factor.

The assigned noise levels are also conditional on no annoying characteristics existing such as tonal components etc. If such characteristics exist, then any measured level is adjusted accordingly. The adjustments that apply are shown in Table 2.

**TABLE 2 - ADJUSTMENTS TO MEASURED LEVELS**

| Where <b>tonality</b> is present | Where <b>modulation</b> is present | Where <b>impulsiveness</b> is present |
|----------------------------------|------------------------------------|---------------------------------------|
| +5 dB(A)                         | +5 dB(A)                           | +10 dB(A)                             |

Note: these adjustments are cumulative to a maximum of 15 dB.

The Influencing Factor at these neighbouring noise sensitive premises of concern has been determined and is listed in Table 3.

**TABLE 3 – CALCULATION OF NOISE INFLUENCING FACTOR**

| Description               | Residence to West      | Residence to South | Residence Adjacent to Access Road |
|---------------------------|------------------------|--------------------|-----------------------------------|
| Industrial (Inner Circle) | 0% = 0 dB              | 8% = 1 dB          | 23% = +2 dB                       |
| Industrial (Outer Circle) | 26% = +3 dB            | 21% = 2 dB         | 20% = +3 dB                       |
| Roads                     |                        |                    |                                   |
| Major (Inner Circle)      | -                      | -                  | -                                 |
| Major (Outer Circle)      | -                      | -                  | -                                 |
| Secondary                 | (South West Hwy) +2 dB | -                  | -                                 |
| <b>TOTAL</b>              | +5 dB                  | +3 dB              | +4 dB                             |

Based on the above determinations of influencing factors, the assigned day period noise levels for the neighbouring residential locations would be as listed in Table 4.

**Table 4 - Assigned Outdoor Day Period Noise Level At Residence**

| Residence               | Assigned Level (dB) |                 |                   |
|-------------------------|---------------------|-----------------|-------------------|
|                         | L <sub>A10</sub>    | L <sub>A1</sub> | L <sub>Amax</sub> |
| West                    | 50                  | 60              | 70                |
| South                   | 48                  | 58              | 68                |
| Adjacent to Access Road | 49                  | 59              | 69                |

It is noted that under the regulation 3, noise emissions from vehicles travelling on roads are exempt from the Regulations. Hence it is only the noise received at the neighbouring from the truck movement on site that needs to be assessed under the Regulations.

#### 4. PIT OPERATIONS

It is understood that the pit would only operate during the day period, including truck loading. Therefore, noise received at the neighbouring residence the pit operations only needs to comply with the assigned day period noise levels.

From information supplied, we understand that there would be one Front End Loader operating within the pit. It is also understood that there would be up to 7 trucks per hour. Given this number of truck movements, noise emissions from trucks movements on site would be for less than 10% of the time. Therefore, noise emissions from truck movements would need to comply with the assigned  $L_{A1}$  noise level at the neighbouring residence. However, the loader would operate for more than 10% of the time and hence needs to comply with the appropriate day period assigned  $L_{A10}$  noise level. The assigned noise levels for the Front End Loader and truck movements are listed in Table 5.

**TABLE 5 - ASSIGNED DAY PERIOD NOISE LEVEL AT RESIDENCE FOR FEL AND TRUCK**

| Residence               | Assigned Level (dB) |                    |
|-------------------------|---------------------|--------------------|
|                         | FEL ( $L_{A10}$ )   | Truck ( $L_{A1}$ ) |
| West                    | 50                  | 60                 |
| South                   | 48                  | 58                 |
| Adjacent to Access Road | 49                  | 59                 |

#### 5. MODELLING

Modelling of the noise emission propagation was carried out using "SoundPlan". SoundPlan uses the theoretical sound power levels determined from measured sound pressure levels to calculate the noise level received at a specific location. For this study, single point calculation were undertaken to determine the noise that would be received at the neighbouring residence.

The calculations used the following input data:

- a) Ground contours.
- b) Sound power levels as listed in Table 7.
- c) The ground contours within the pit were supplied by Landform Research.

Weather conditions for the modelling were as stipulated within the Environmental Protection Authority's "Draft Guidance for Assessment of Environmental Factors No. 8 - Environmental Noise" for the day period were as listed in Table 6.

**TABLE 6 - WEATHER CONDITIONS**

| Condition                | Day Period |
|--------------------------|------------|
| Temperature              | 20 °C      |
| Relative Humidity        | 50%        |
| Pasquill Stability Class | E          |
| Wind Speed               | 4m/s*      |

\* From sources, towards receivers.

**TABLE 7 - SOUND POWER LEVELS dB(A)**

| Item             | Sound Power Level dB(A) |
|------------------|-------------------------|
| Front End Loader | 105                     |
| Haulage Trucks   | 103                     |

We understand that the pit would be worked from the north towards the south. Therefore, various scenarios were modelled to represent the worst case noise emissions. To determine the worst case noise levels received at the residence to the west and south of the pit, noise modelling was undertaken with extraction occurring opposite the residence to the west and at the south end of the pit.

The noise modelling also includes the 2 metre high bund that would be created around the pit area from the overburden.

The results of the modelling, for the worst case, are shown in Table 8 below.

**TABLE 8 - CALCULATED NOISE LEVELS AT RESIDENCES**

| Residence               | Calculated Noise Level dB(A) |       |
|-------------------------|------------------------------|-------|
|                         | FEL                          | Truck |
| West                    | 36                           | 41    |
| South                   | 38                           | 44    |
| Adjacent to access road | 29                           | 49    |

## 6. ASSESSMENT

Given the close proximity of the South West Highway, it is likely that noise received at the neighbouring residence would be deemed not to contain any annoying characteristics, however to be conservative, the assessment includes a +5 dB(A) adjustment for tonality.

Based on the above total calculated noise level, the following adjustments as listed in Tables 9 and 10 could be applicable.

**Table 9 – Applicable Adjustments and Assessable Level of Noise Emissions –  
Front End Loader, dB(A)**

| Residence               | Calculated Noise Level | Applicable Adjustments to Measured Noise Levels |            |               | Assessable Noise Level |
|-------------------------|------------------------|---|------------|---------------|------------------------|
|                         |                        | Where Noise Emission is NOT music               |            |               |                        |
|                         |                        | Tonality  | Modulation | Impulsiveness |                        |
| West                    | 36                     | +5  | -          | -             | 41                     |
| South                   | 38                     | +5  | -          | -             | 43                     |
| Adjacent to access road | 29                     | +5  | -          | -             | 34                     |

**Table 10 – Applicable Adjustments and Assessable Level of Noise Emissions – Trucks, dB(A)**

| Residence               | Calculated Noise Level | Applicable Adjustments to Measured Noise Levels |            |               | Assessable Noise Level |
|-------------------------|------------------------|---|------------|---------------|------------------------|
|                         |                        | Where Noise Emission is NOT music               |            |               |                        |
|                         |                        | Tonality  | Modulation | Impulsiveness |                        |
| West                    | 41                     | +5  | -          | -             | 46                     |
| South                   | 44                     | +5  | -          | -             | 49                     |
| Adjacent to access road | 49                     | +5  | -          | -             | 54                     |

Tables 11 and 12 summarise the applicable Assigned Noise Levels, and assessable noise level emissions for each identified noise.

**Table 10 –Assessment of Front End Loader**

| Residence               | Assessable Noise Level, dB(A) | Applicable Times of Day                 | Applicable LA <sub>10</sub> Assigned Noise Level (dB) | Exceedance to Assigned Noise Level (dB) |
|-------------------------|-------------------------------|---|---|---|
| West                    | 41                            | 0700 – 1900 hours<br>Monday to Saturday | 50  | Complies                                |
| South                   | 43                            | 0700 – 1900 hours<br>Monday to Saturday | 48  | Complies                                |
| Adjacent to access road | 34                            | 0700 – 1900 hours<br>Monday to Saturday | 49  | Complies                                |

**Table 11 –Assessment of Trucks**

| Residence               | Assessable Noise Level, dB(A) | Applicable Times of Day                 | Applicable LA <sub>10</sub> Assigned Noise Level (dB) | Exceedance to Assigned Noise Level (dB) |
|-------------------------|-------------------------------|---|---|---|
| West                    | 46                            | 0700 – 1900 hours<br>Monday to Saturday | 60  | Complies                                |
| South                   | 49                            | 0700 – 1900 hours<br>Monday to Saturday | 58  | Complies                                |
| Adjacent to access road | 54                            | 0700 – 1900 hours<br>Monday to Saturday | 59  | Complies                                |

## 7. DISCUSSION

The neighbouring residence of concern from the pit operations are located to the west (opposite side of South West Highway) and south (south of Transit Road), as shown on the locality plan attached. It is noted that access to the pit is via Jarrahdale Road, hence an assessment of noise received at the closest residence to the access road was also undertaken.

It is understood that the pit would only operate during the day period, therefore, noise emissions from the pit operations need to comply with the assigned day period noise at the neighbouring residences. From information supplied, we understand that there would be one Front End Loader operating within the pit. It is also understood that there would be up to 7 trucks per hour. Given this number of truck movements, noise emissions from trucks movements on site would be for less than 10% of the time. Therefore, noise emissions from truck movements would need to comply with the assigned LA<sub>A1</sub> noise level at the neighbouring residence. However, the loader would operate for more than 10% of the time and hence needs to comply with the appropriate day period assigned LA<sub>10</sub> noise level.

Note : Under the Environmental Protection (Noise) Regulations 1997 noise emissions from vehicles travelling along gazetted roads are exempt from the Regulations. Therefore, only noise emissions from trucks on the acces road or within the pit has been assessed.

Given close proximity of the South West Highway, it is likely that noise received at the neighbouring residence would be deemed not to contain any annoying characteristics, to be conservative, the assessment includes a +5 dB(A) adjustment for tonality.

For the proposed operating hours and with the inclusion of the 2 metre bund, as outlined on the Figure attached in Appendix B (Proposed Sand Extraction), noise received at the neighbouring residence would, even with the inclusion of the +5 dB(A) penalty for a tonal component, comply with the requirements of the Environmental Protection (Noise) Regulations 1997. Noise received at the neighbouring residence from trucks entering and leaving the site would also comply with the Regulatory requirements.