



Appendix I

Airborne Noise Assessment

On behalf of



**Shetland
Islands
Council**

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Front Cover Photograph provided by Brian Gray

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Appendix I Airborne Noise

I.1 Assumptions and Limitations

I.1.1 *BS 5228: Code of practice for noise and vibration control on construction and open sites –Part 1: Noise* does not contain maximum sound level (dB $L_{max,f}$) data associated with construction activities data. The data required for the assessment of potential noise impact on ecological receptors has been collected by Stantec UK from manufacturers and suppliers of equipment likely to be used on site and is based on construction activities described by Mott MacDonald. Data that relates to likely equipment to be used and activities to be carried out is not always readily available or in the most preferred form to create a noise model. Therefore, any results presented should consider the following assumptions and limitations.

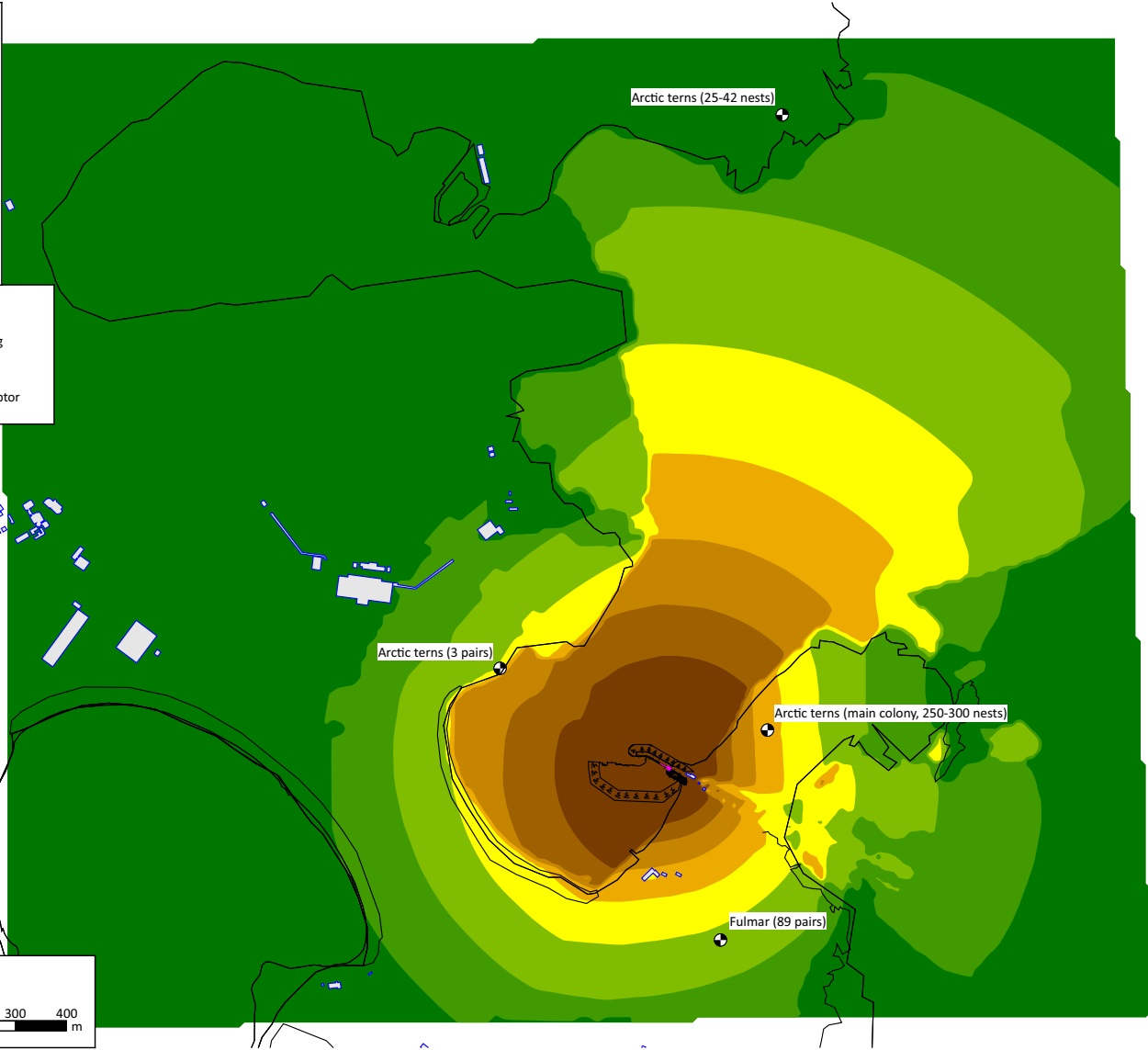
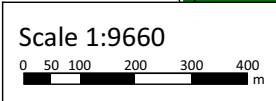
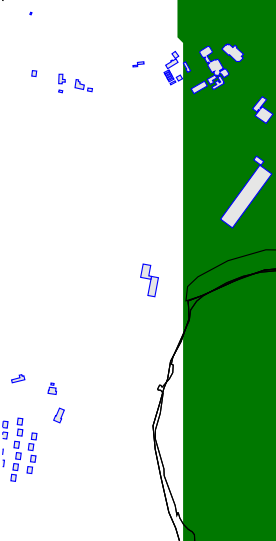
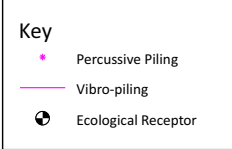
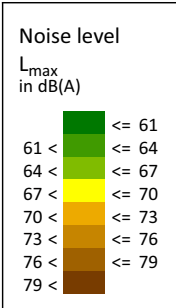
- The A-weighted dB L_{max} used is based on the following equipment after discussions with Mott MacDonald and contacting various suppliers and it is assumed that equipment selected is equivalent to what will be used on site:
 - Vibratory piling – Movax SG-75V (data relates to concrete round piles rather than sheet piles) - 88 dB L_{max} at 15 m
 - Percussive piling – Junttan HHK 5A #21171 - 107 dB $L_{eq,f}$ at 8 m
- The Junttan sound level data relates to fast time weighted L_{eq} data, which has been assumed is comparable to $L_{max,f}$ data.
- The octave band levels used in the model have been weighted to similar vibratory and percussive piling equipment data which is based on the unweighted L_{eq} octave-bands within BS 5228:
 - BS 5228-1:2009+A1:2014 Table C.3:8: Sheet steel piling – vibratory piling rig
 - BS 5228-1:2009+A1:2014 Table C.3:2: Tubular steel piling – hydraulic hammer
- In the model, the sound source relating to vibratory or percussive piling is assumed to be 4 m above ground.

I.2 Results

I.2.1 The noise contours that relate to piling activity (percussive and vibratory) at Grutness are shown in Figure 1. Sound levels at the ecological receptors from both sources are shown in Table 1.1. The noise from percussive piling is dominant therefore the percussive piling results represent the worst case. The receptor height has been assumed to be at 0.5 m above ground.

Table 1.1 Ecological Receptor and Noise Levels

Ecological Receptor	Piling L _{max,f} dB(A)	
	Percussive	Vibratory
Arctic Terns (main colony, 250-300 nests)	71.4	58.9
Arctic Terns (3 pairs)	67.2	54.6
Fulmar (89 pairs)	66.1	53.1
Arctic Terns (25-42 nests)	53.9	39.3



Client
Mott MacDonald

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Grutness and Fair Isle Ferry (Grutness)
Environmental Sound Levels - Piling - Day L_{max, f}

Mark	Revision	Drawn	Date	Chkd
Date	22/03/2023	FIGURE 1		
Scale	A4 - N.T.S			
Drawn by	JM			
Checked by	PT			