Appendix A – Glossary of Terminology

Noise is defined as unwanted sound. The range of audible sound is known to be from 0dB (threshold of hearing) to 140dB (threshold of pain). Examples of typical noise levels relating to 'everyday' occurrences are given in Table A-1 below.

Table A-1: Typical Noise Levels

Source	Sound Pressure Level in dB(A)	Subjective Level
Gun shot	160	Perforation of eardrum
Military Jet take-off	140	Threshold of pain
Jet Aircraft at 100m	120	Very Loud
Rock Concert, front seats	110	Threshold of Sensation
Pneumatic Drill at 5m	100	Very Loud
Heavy goods vehicle from pavement	90	
Traffic at kerb edge	70 – 85	Loud
Vacuum Cleaner, Hair Dryer	70	
Normal conversation at 1m	60	Moderate
Typical Office	50 – 60	
Residential area at night	40	Quiet
Rural area at night, still air	30	
Leaves Rustling	20	
Rubbing together of fingertips	10	
	0	Threshold of hearing

The frequency response of the human ear to noise is usually taken to be around 18Hz (number of oscillations per second) to 18,000Hz. However, the human ear does not respond equally to different frequencies at the same level; it is more sensitive in the mid-frequency range than lower and higher frequencies and, because of this, when undertaking the measurement of noise the low and high frequency components of any given sound are reduced in importance by applying a filtering (weighting) circuit to the noise measuring instrument. The weighting which is widely accepted to correlate best with the subjective nature of human response to noise and is most widely used to quantify this is the A-weighted filter set. This is an internationally accepted standard for noise measurement.

For variable noise sources within an area an increase of 3dB(A) would be the minimum perceptible to the human ear under normal conditions. It is generally accepted that an increase/decrease of 10dB(A) corresponds to a doubling or halving in perceived loudness. The 'loudness' of a noise is a purely subjective parameter, dependant not only upon the sound pressure of the event but also on the dynamics of the listener's ear, the time of the day and the general mood of the person.

Regarding environmental noise levels (in the open air), these are rarely steady but rise and fall according to the activities being undertaken within the surrounding area at any given time. To produce

a figure that relates this variable nature of noise to human subjective response, a number of statistical noise metrics have been developed. These and other useful terminology and descriptors are presented in Table A-2 below.

Table A-2: Terminology

Term	Definition
Sound	Pressure fluctuations in a fluid medium within the audible range of amplitudes and frequencies which stimulate the organs of hearing.
Noise	Unwanted sound emitted from a source and received by the sensitive receptor.
Decibel (dB)	Unit most often used to describe the sound pressure level. A logarithmic number, it correlates closely to the way in which humans perceive sound. Its wide range of values helps quantify sound pressures from a large variety of magnitudes.
A-Weighting (dB(A))	Human perception of sound is frequency dependant. A-weighting applies a range of corrections at each frequency to provide a 'human-averaged'. Can be frequency band or broadband values.
Frequency (Hz)	The number of cycles per second, for sound this is closely related (and often mistaken for) pitch.
Frequency Spectrum	A more detailed analysis of the frequency components that comprise a sound source.
$L_{A10,T}$	The 10th statistical percentile of a measurement period, i.e. the level that is exceeded for 10% of the measurement duration. Closely correlates with traffic sources, A-weighted.
$L_{A90,T}$	The 90th statistical percentile of a measurement period, i.e. the level that is exceeded for 90% of the measurement duration. Used to describe background sound levels, as this value is affected less by short, transient sound sources, A-weighted.
L_{Amax}	The root mean square (RMS) maximum sound pressure level within a measurement period, A-weighted.
Ambient Sound	The total sound climate of all sources incident at one location, both in the near- and far-field (*The ambient sound comprises the residual sound and the specific sound when present)*.
Ambient Sound Level $L_a = L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.
Background Sound Level $L_{A90,T}$	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.
Equivalent Continuous A-weighted Sound Pressure Level $L_{Aeq,T}$	Value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation: $$L_{A,T} = 10\log_{10}\left\{\left(\frac{1}{T}\right)\int_{t1}^{t2}\left[p_A\frac{(t)^2}{p_0{}^2}\right]d\right\}$$ Where p_0 is the reference sound pressure (20μPA); and

Term	Definition
	$P_A(t)$ is the instantaneous A-weighted sound pressure level at time t.
Measurement Time Interval T_m	Total time over which measurements are taken (*This may consist of the sum of a number of non-contiguous, short-term measurement time intervals)*
Rating level $L_{Ar,Tr}$	Specific sound level plus any adjustment for the characteristic features of the sound, over a period of time, T.
Reference Time Interval, T_r	Specified interval over which the specific sound level is determined (This is 1hr during the day from 07:00 to 23:00 hours and a shorter period of 15-min at night from 23:00 to 07:00 hours).
Residual Sound	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Residual sound level $L_r = L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level of the residual sound in a given situation at the assessment location over a given time interval, T.
Sound Pressure Level	The level of fluctuation in air pressure, caused by airborne sound sources. Measured in Pascals (Pa).
Sound Power Level	The rate at which sound is radiated by a source. This parameter is useful as it describes sound energy before environmental or decay factors. Quantified in dB and notated usually as L_w or SWL.
Specific sound level $L_s = L_{Aeq,Tr}$	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given time interval, T.
Specific Sound Source	Sound source being assessed.

Appendix 9.2 – Baseline Noise Measurements

Table A9.2-1: Location MP1, Consett Road/Berry Edge Development

Start Time	$L_{Aeq,T}$	L_{AFmax}	L_{A10}	L_{A90}
06/08/2020 14:03	75.6	88.7	60.2	79.5
06/08/2020 14:18	75.9	91.7	60.1	80.1
06/08/2020 14:33	69.2	83.1	53.3	72.3
06/08/2020 14:48	76.1	87.7	60.4	80.3
06/08/2020 16:28	76.9	86.3	63.5	80.9
06/08/2020 16:43	76.6	87.3	61.5	81.2
06/08/2020 16:58	77.4	87.5	62.7	81.7
06/08/2020 17:13	77.1	85.9	62.9	81.4
Overall (Daytime)	**76.1**	**91.7**	**60.6**	**79.7**
Start Time	**$L_{Aeq,T}$**	**L_{AFmax}**	**L_{A10}**	**L_{A90}**
07/08/2020 00:45	65.4	86.1	23.5	61.6
07/08/2020 01:00	64.6	83.9	25.3	60.5
07/08/2020 02:12	65.9	90.7	28.3	60.3
07/08/2020 02:27	60.1	82.4	24.9	53.3
Overall (Daytime)	**64.5**	**90.7**	**25.5**	**58.9**

Table A9.2-2: Location MP2, The Chequers

Start Time	$L_{Aeq,T}$	L_{AFmax}	L_{A10}	L_{A90}
06/08/2020 12:26	68.8	87.1	42.8	73.1
06/08/2020 12:41	69.4	81.3	43.3	74.1
06/08/2020 12:56	69.1	83.0	43.3	73.8
06/08/2020 13:11	68.3	81.6	41.0	73.1
06/08/2020 15:13	68.1	83.6	45.4	73.0
06/08/2020 15:28	67.6	83.7	40.5	72.2
06/08/2020 15:43	67.5	80.4	36.9	72.2
06/08/2020 15:58	68.0	81.8	41.3	72.5
Overall (Daytime)	**68.4**	**87.1**	**41.8**	**73.0**
Start Time	**$L_{Aeq,T}$**	**L_{AFmax}**	**L_{A10}**	**L_{A90}**
06/08/2020 23:58	47.7	74.0	31.5	36.7
07/08/2020 00:13	56.2	78.0	31.0	41.7
07/08/2020 01:28	54.3	79.4	33.3	38.2
07/08/2020 01:43	45.7	70.3	30.3	34.0
Overall (Daytime)	**53.0**	**79.4**	**31.5**	**37.7**

Table A9.2-3: Location MP3, Knitsley Lane

Start Time	$L_{Aeq,T}$	L_{AFmax}	L_{A10}	L_{A90}
06/08/2020 12:20	48.6	71.3	32.0	43.4
06/08/2020 12:35	46.8	70.2	33.7	42.5
06/08/2020 12:50	49.5	71.1	31.6	46.6
06/08/2020 13:05	51.5	77.3	33.0	45.9
06/08/2020 15:08	49.8	71.7	36.9	49.8
06/08/2020 15:23	46.7	68.2	34.3	46.9
06/08/2020 15:38	51.7	69.2	44.0	53.0
06/08/2020 15:53	53.7	76.0	40.9	50.4
Overall (Daytime)	**50.4**	**77.3**	**35.8**	**47.3**
Start Time	**$L_{Aeq,T}$**	**L_{AFmax}**	**L_{A10}**	**L_{A90}**
06/08/2020 23:53	43.8	56.3	37.7	46.0
07/08/2020 00:08	41.3	51.6	26.5	45.9
07/08/2020 01:25	30.0	36.4	22.1	33.0
07/08/2020 01:40	22.4	30.5	20.4	23.9
Overall (Daytime)	**39.8**	**56.3**	**26.7**	**37.2**

Table A9.2-4: Location MP3, Howns Farm

Start Time	$L_{Aeq,T}$	L_{AFmax}	L_{A10}	L_{A90}
06/08/2020 13:40	57.0	78.2	31.7	46.8
06/08/2020 13:55	42.2	62.0	33.5	44.8
06/08/2020 14:10	44.9	62.3	34.9	45.2
06/08/2020 14:25	50.8	71.8	34.8	48.3
06/08/2020 16:21	51.1	70.7	37.9	52.0
06/08/2020 16:36	50.0	69.8	38.6	47.8
06/08/2020 16:51	42.2	60.9	35.8	42.5
06/08/2020 17:06	43.7	65.0	34.5	43.4
Overall (Daytime)	**50.7**	**78.2**	**35.2**	**46.4**
Start Time	**$L_{Aeq,T}$**	**L_{AFmax}**	**L_{A10}**	**L_{A90}**
07/08/2020 00:40	41.9	63.9	25.1	33.5
07/08/2020 00:55	51.9	78.4	24.6	36.7
07/08/2020 02:07	38.7	51.3	36.4	40.2
07/08/2020 02:22	39.0	42.1	35.8	40.7
Overall (Daytime)	**46.7**	**78.4**	**30.5**	**37.8**

Appendix 9.3 – Noise Contour Plot

Table 11.3-1 Daytime Unmitigated Operational Noise Contour Plot

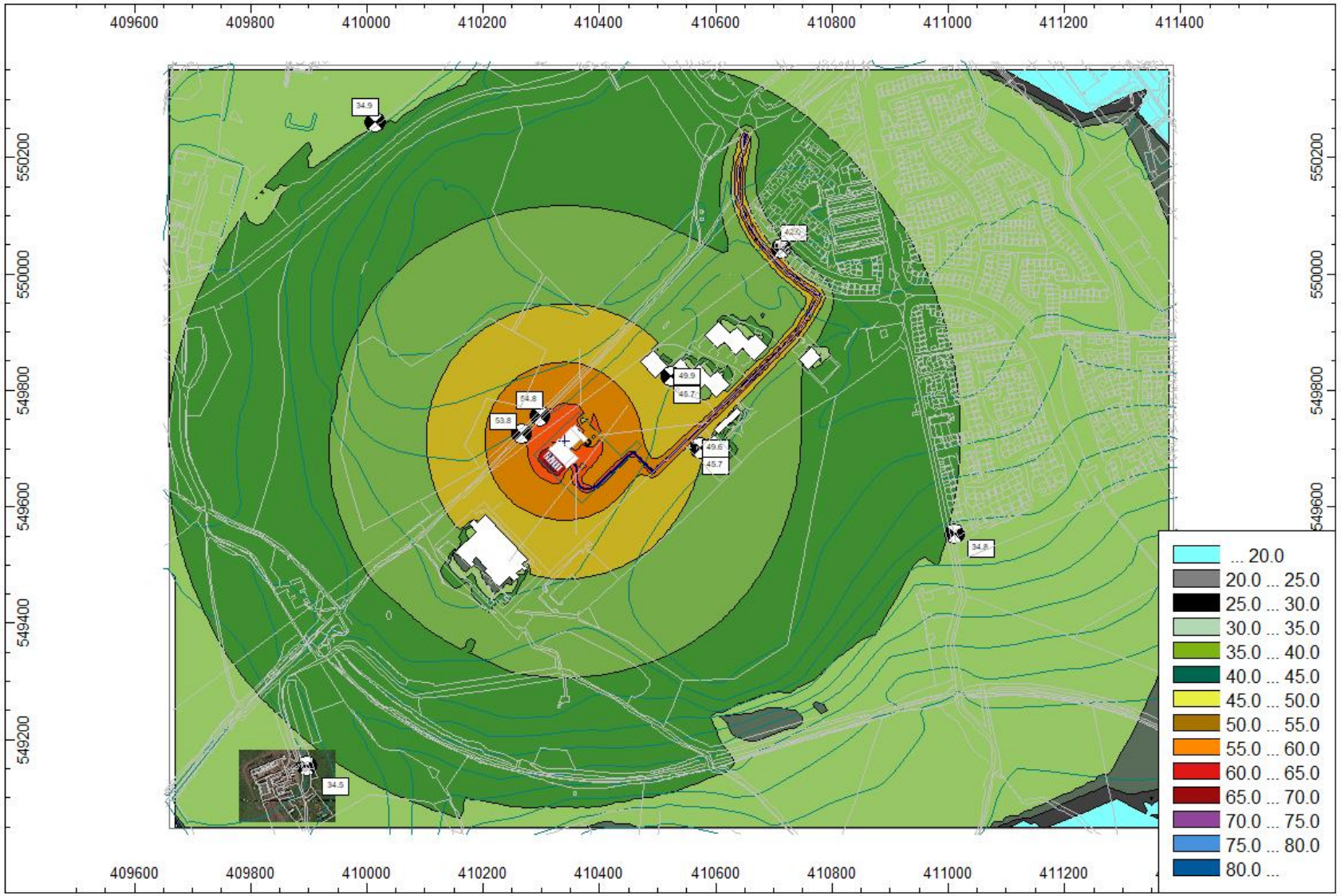

Table 11.3-2 Night-time Unmitigated Operational Noise Contour Plot

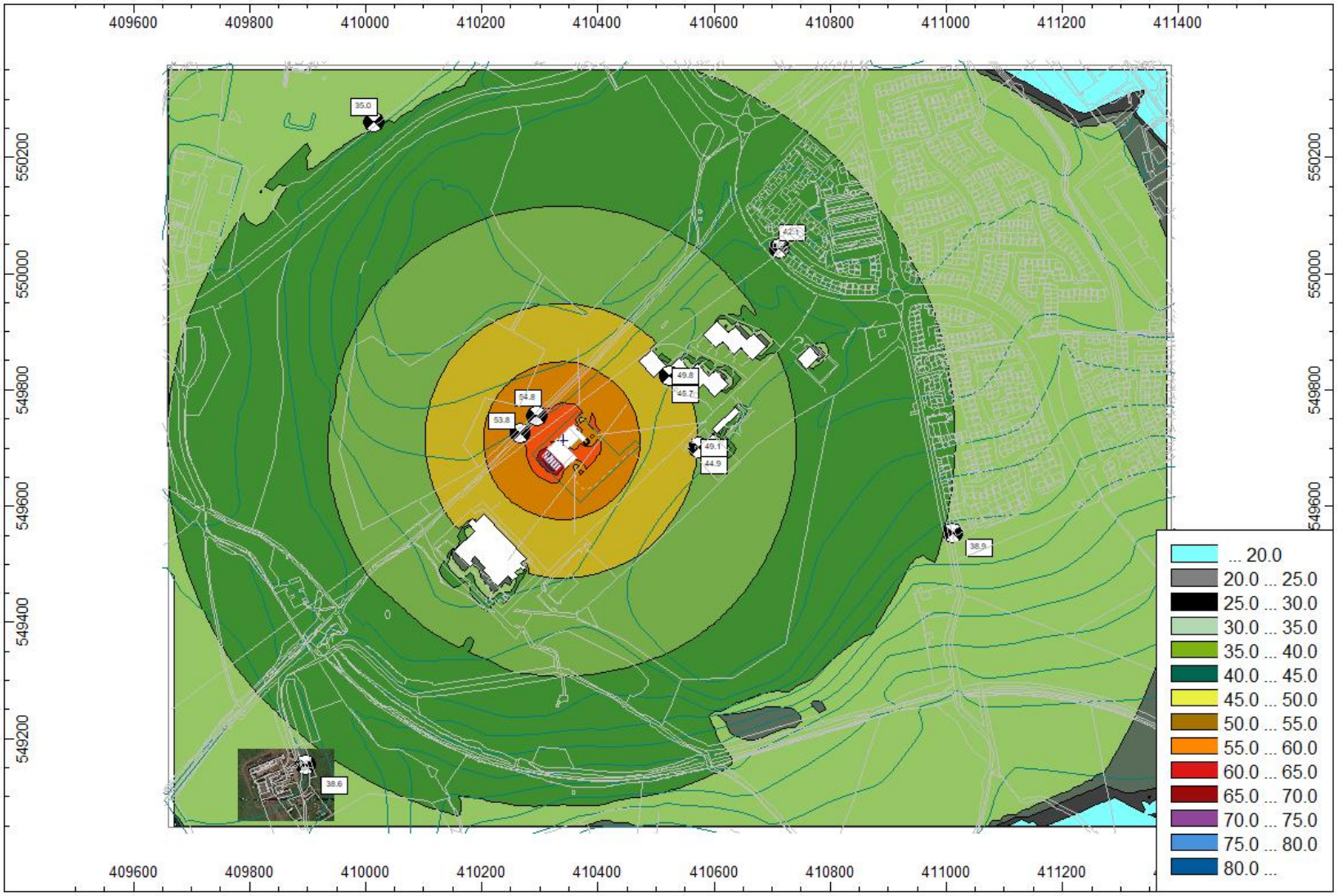

Table 11.3-3 Day-time Mitigated Operational Noise Contour Plot

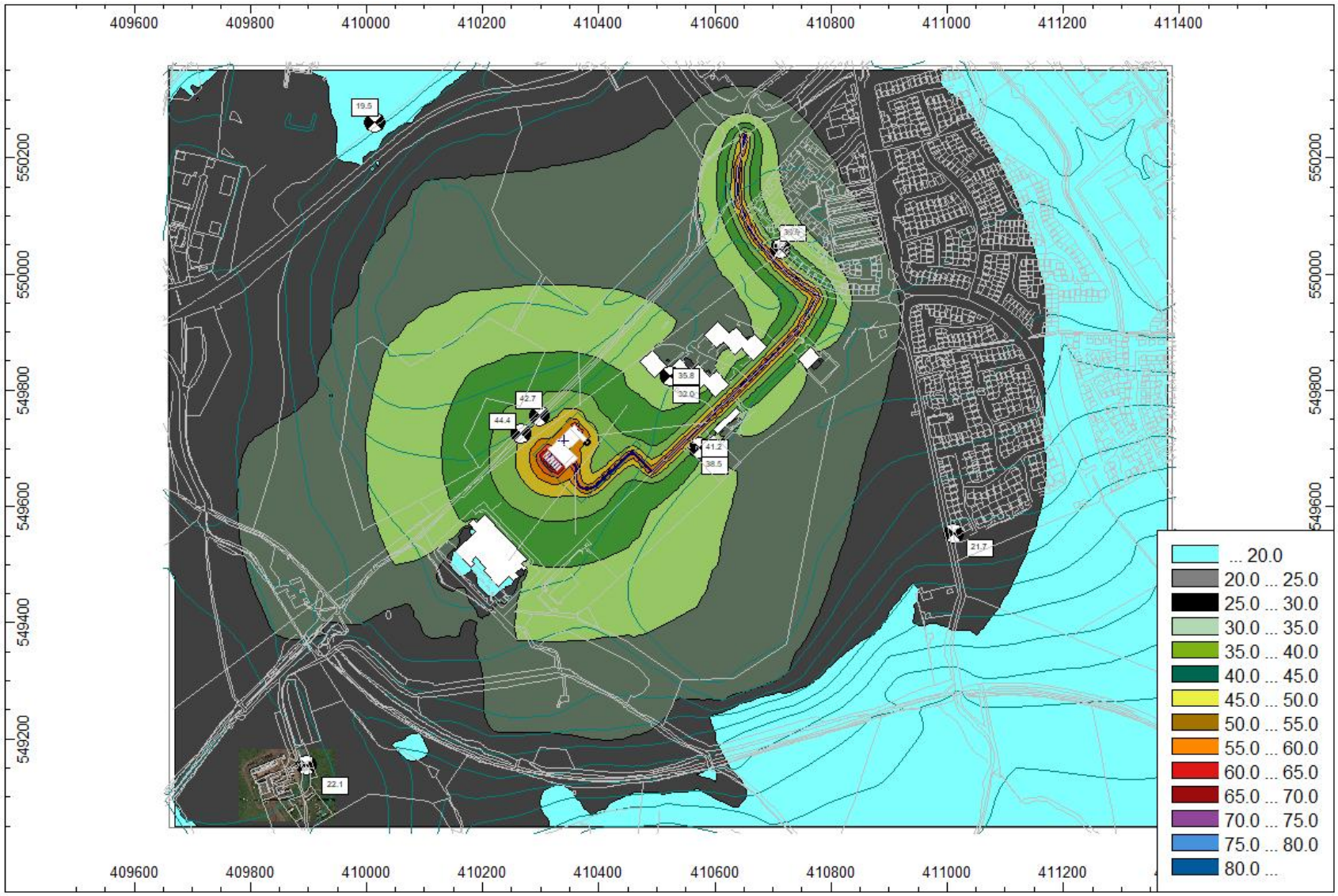

Table 11.3-4 Night-time Mitigated Operational Noise Contour Plot