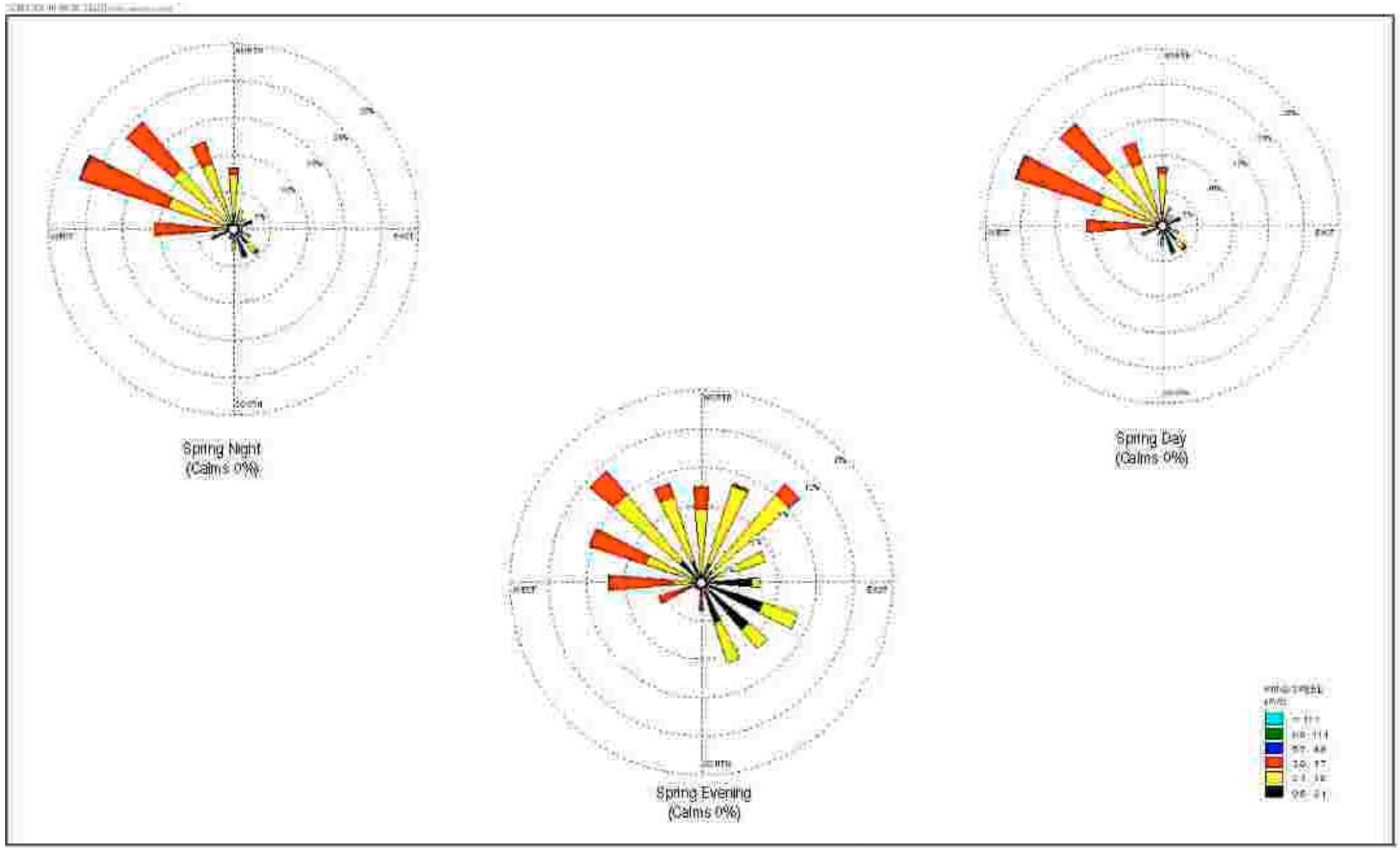
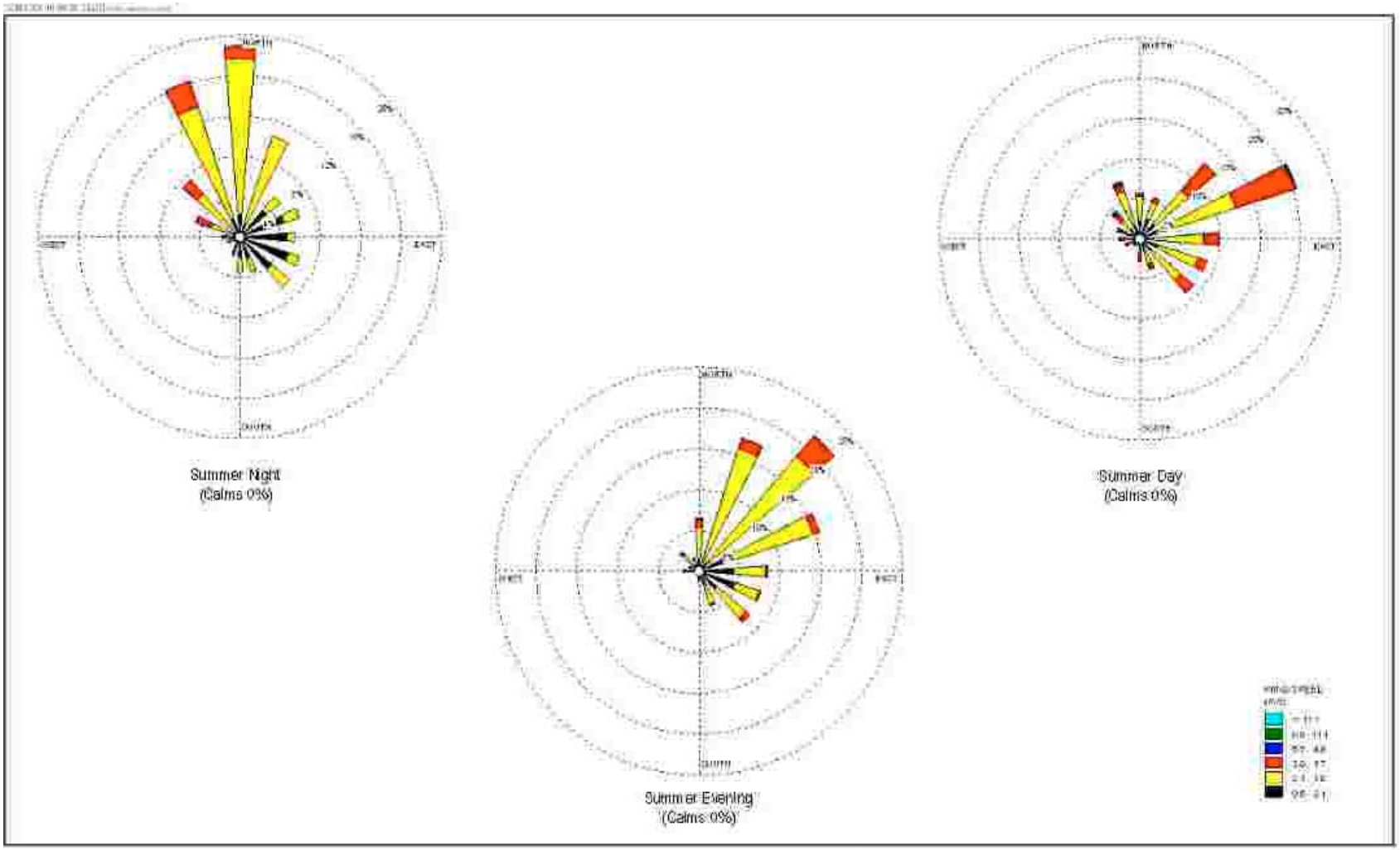
# ATTACHMENT 2: WIND ROSES



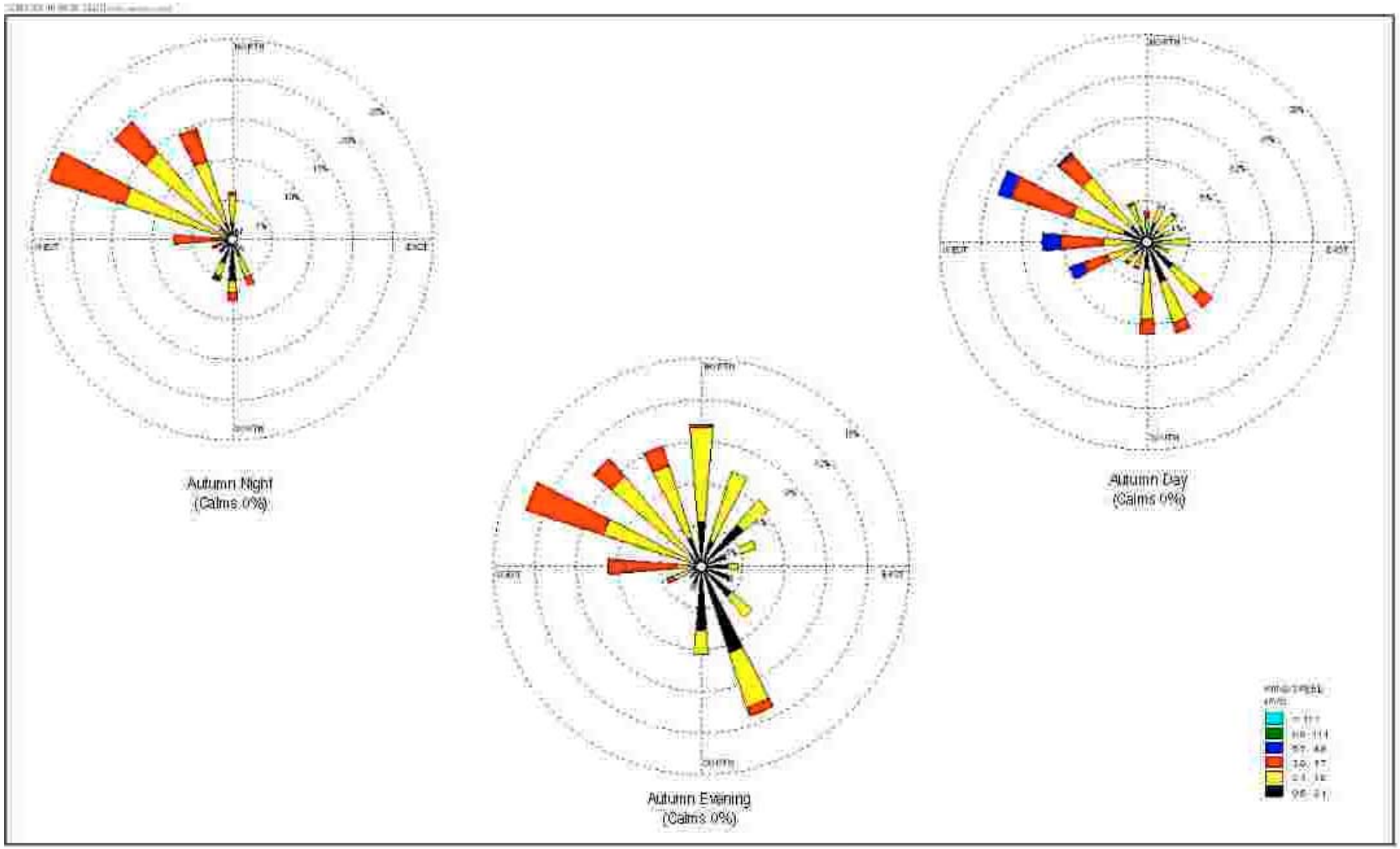

ENSR | AECOM

**Figure 5** Windroses Spring Night, Day and Evening
Lucas Energy Pty Limited



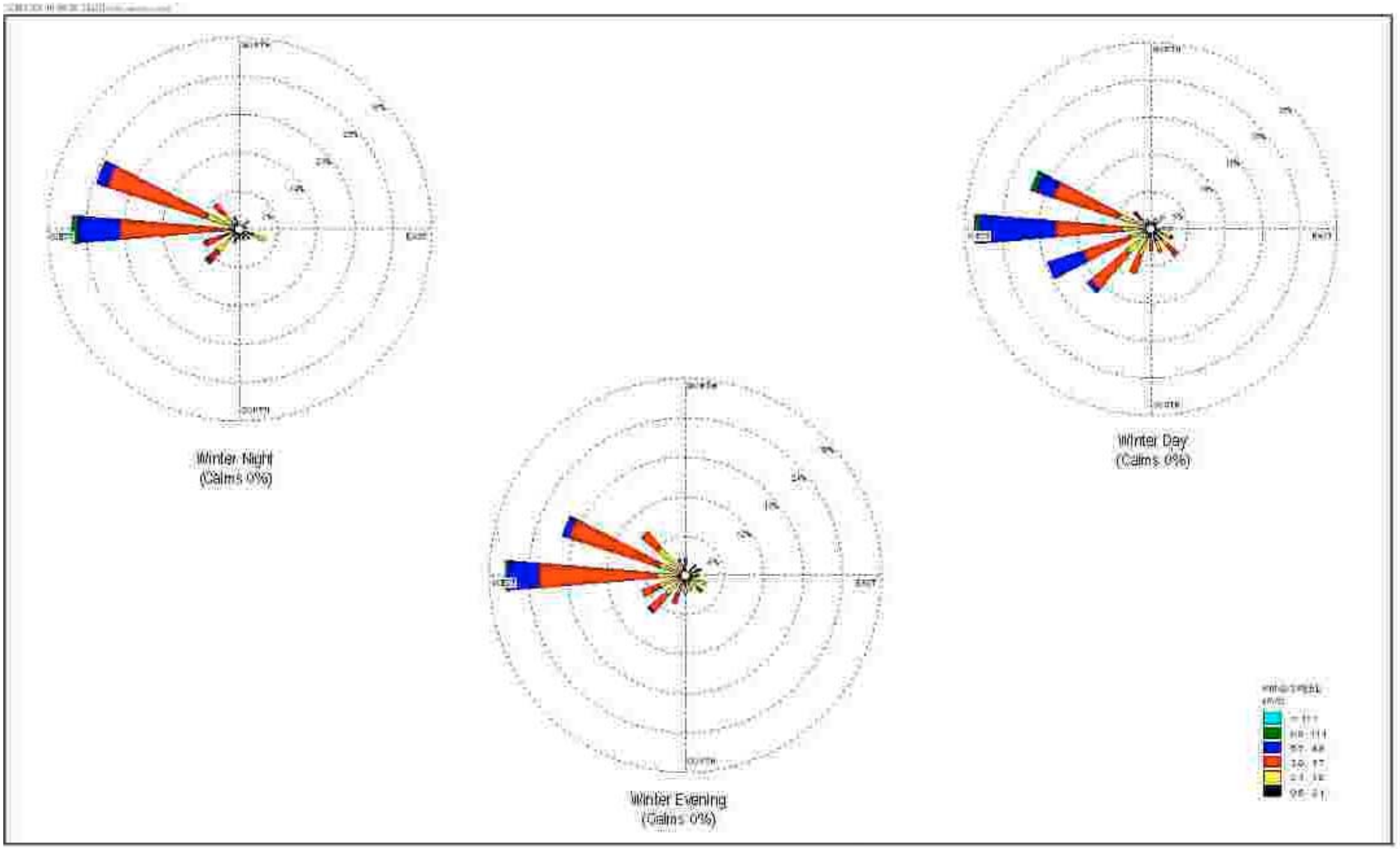

ENSR | AECOM

**Figure 2** Windroses Summer, Night, Day and Evening
Lucas Energy Pty Limited




ENSR | AECOM

**Figure 3** Windroses Autumn Night, Day and Evening
Lucas Energy Pty Limited



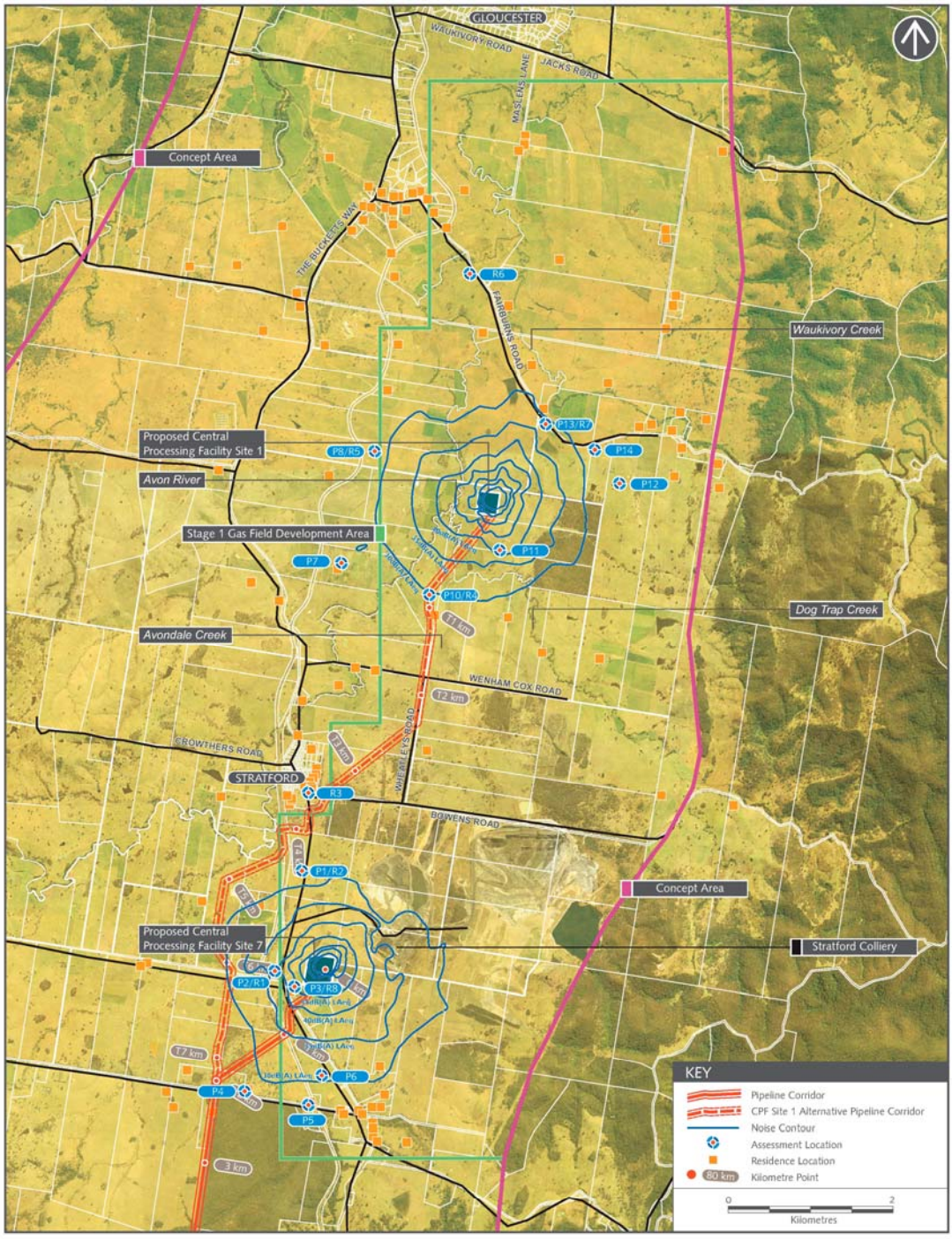

ENSR | AECOM

**Figure 4** Windroses Winter Night, Day and Evening
Lucas Energy Pty Limited

# ATTACHMENT 3: STABILITY CLASS DATA

| Summer | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Class** | **A** | **B** | **C** | **D** | **E** | **F** | **Total** |
| **Night %** | 0.0 | 0.0 | 0.0 | 44.3 | 40.4 | 15.3 | 100.0 |
| **Day %** | 4.5 | 21.9 | 39.8 | 33.8 | 0.0 | 0.0 | 100.0 |
| **Evening %** | 0.0 | 0.0 | 0.0 | 43.3 | 33.9 | 22.8 | 100.0 |
| **Total for Season (Night, Day, Evening) %** | 2.3 | 10.9 | 19.9 | 38.9 | 19.1 | 8.9 | 100.0 |
| **Autumn** | | | | | | | |
| **Class** | **A** | **B** | **C** | **D** | **E** | **F** | **Total** |
| **Night %** | 0.0 | 0.0 | 0.0 | 36.1 | 45.9 | 17.9 | 100.0 |
| **Day %** | 0.4 | 12.0 | 34.0 | 52.0 | 0.9 | 0.8 | 100.0 |
| **Evening %** | 0.0 | 0.0 | 0.0 | 32.3 | 40.8 | 26.9 | 100.0 |
| **Total for Season (Night, Day, Evening) %** | 0.2 | 6.0 | 17.0 | 43.4 | 22.6 | 10.9 | 100.0 |
| **Winter** | | | | | | | |
| **Class** | **A** | **B** | **C** | **D** | **E** | **F** | **Total** |
| **Night %** | 0.0 | 0.0 | 0.0 | 48.1 | 45.7 | 6.3 | 100.0 |
| **Day %** | 0.1 | 5.4 | 22.0 | 67.9 | 3.7 | 0.8 | 100.0 |
| **Evening %** | 0.0 | 0.0 | 0.0 | 35.1 | 52.4 | 12.5 | 100.0 |
| **Total for Season (Night, Day, Evening) %** | 0.0 | 2.7 | 11.0 | 55.8 | 25.8 | 4.6 | 100.0 |
| **Spring** | | | | | | | |
| **Class** | **A** | **B** | **C** | **D** | **E** | **F** | **Total** |
| **Night %** | 0.0 | 0.0 | 0.0 | 35.7 | 43.4 | 20.9 | 100.0 |
| **Day %** | 6.1 | 22.3 | 34.3 | 37.3 | 0.0 | 0.0 | 100.0 |
| **Evening %** | 0.0 | 0.0 | 0.0 | 38.2 | 34.6 | 27.2 | 100.0 |
| **Total for Season (Night, Day, Evening) %** | 3.1 | 11.1 | 17.2 | 36.9 | 20.2 | 11.5 | 100.0 |

# ATTACHMENT 4: CPF (SITES 1 and 7) NOISE CONTOUR PLOT (CALM)



# ATTACHMENT 5: HDS NOISE CONTOUR PLOT (CALM)


AECOM

NOISE CONTOURS - HEXHAM DELIVERY STATION

# ATTACHMENT 6: TERMS AND DEFINITIONS

**A-Weighted:** See

**Adverse weather**: Weather effects that enhance noise (that is, wind and temperature inversion) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more that 30% of the nights in winter).

**Ambient noise:** The all-encompassing noise associated within a given environment. It is the composite of sounds from many sources, both near and far.

**Assessment background level** (ABL): The single figure background level representing each assessment period day, evening and night (that is, three assessment background levels are determined for each 24-h period of the monitoring period). Its determination is by the tenth percentile method.

**Assessment period:** The period in a day over which assessments are made: day (0700-0800h), evening (1800 to 2200h) or night (2200 to 0700h).

**Background Noise:** The underlying level of noise present in the ambient noise, excluding the noise source under extraneous noise is removed. This is described using the $L_{A90}$ descriptor.

**Cumulative noise level**: Refers to the total level of noise from all sources.

**Day:** The period between 0700 and 1800hrs (Monday-Saturday) and 0800-1800 (Sunday and Public Holidays).

**dB:** Abbreviation for decibel-a unit of sound measurement. Given sound pressure to a reference pressure.

**dBA:** Unit used to measure "A-weighted" sound pressure levels. A-weighting is an adjustment made to sound level measurement to approximate the response of the human ear.

A change of 1 or  in the level of a sound is difficult to detect, whilst a 3 to 5 change corresponds to a small but noticeable change in loudness. A 10 change corresponds to an approximate doubling or halving in loudness.

The table below lists examples of typical noise levels.

| Sound Pressure Level () | Typical Source | Subjective Evaluation |
|---|---|---|
| 130 | Threshold of pain | Intolerable |
| 120<br>110 | Heavy rock concert<br>Grinding on steel | Very noisy |
| 100<br>90 | Loud car hone at 3m<br>Construction site with pneumatic hammering | Noisy |
| 80<br>70 | Kerbside of busy street<br>Loud radio or TV | Loud |
| 60<br>50 | Department store<br>General Office | Moderate to quiet |
| 40<br>30 | Inside private office<br>Inside bedroom | Quiet to very quite |
| 20 | Unoccupied recording studio | Almost silent |

**Default parameters:** In assessing meteorological enhancement of noise, refers to set values for weather parameters, such as wind speeds and temperature gradients, to be used in predicting source noise levels.

**Equivalent Continuous Noise Levels:** The level of noise equivalent to the energy average of noise levels occurring over a measurement period.

**Evening:** Refers to the period between 1800-2200hrs.

# ATTACHMENT 6: TERMS AND DEFINITIONS

**Extraneous Noise:** Noise resulting from activities that are not typical of the area. Atypical activities may include construction, and traffic generated by holiday periods and by special events such as concerts or sporting events. Normal daily traffic is not considered to be extraneous.

**Feasible and reasonable measures:** Feasibility relates to engineering considerations and what is practical to build; reasonableness relates to the application of judgement in arriving at a decision, taking into account the following factors:

- noise mitigation benefits (amount of noise reduction provided, number of people protected)
- cost of mitigation (cost of mitigation versus benefits provided)
- community views (aesthetic impacts and community wishes)
- noise levels for affected land uses (existing and future levels, and changes in noise levels).

**Fluctuating Noise:** Noise that varies continuously and to an appreciable extent over the period of observation.

**Greenfield site:** Undeveloped land.

**Impulsive Noise:** Noise having a high peak of short duration, or a sequence of such peaks. A sequence of such peaks. A sequence of such impulses in rapid succession is termed 'repetitive impulsive noise'.

**Intrusive Noise:** refers to noise that intrudes above the background level by more than 5 decibels.

**$L_{A10}$:** The A-weighted sound pressure level that is exceeded for 10% of the time over which a given sound is measured.
This is considered to represent the average maximum noise level.

**$L_{A90}$:** The A-weighted sound pressure level that is exceeded for 90% of the time over which a given sound is measured.
This is considered to represent the background noise.

**$L_{Aeq}$:** The equivalent continuous noise level – the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

**Long-term annoyance:** Prolonged annoyance over months and years.

**Median**: The middle value in a number of values sorted in ascending or descending order. Hence, for an odd number of values, the value of the median is simply the middle value. If there is an even number of values the median is the arithmetic average of the two middle values.

**Meteorological conditions**: wind and temperature inversion conditions.

**Most-affected locations(s):** Locations that experience (or will experience) offensive noise from the noise source under consideration. In determining these locations, one needs to consider existing background levels, exact noise source locations(s), distance from source (or proposed source) to receiver, and any shielding between source and receiver.

**Night:** The period between 2200 and 0700 (Monday-Saturday) and 2200-0800 (Sunday and Public Holidays)

# ATTACHMENT 6: TERMS AND DEFINITIONS

**Negotiated agreement:** An agreement involving the negotiation of an achievable noise limit in cases where the project specific noise levels cannot be met. The agreement is negotiated between the proponent and the DEC or the proponent and the community. Such an agreement is reached through balancing the merits of a development, the feasibility and reasonableness of available mitigation measures and the noise impacts produced.

**Noise criteria:** The general set of non-mandatory noise level targets for protecting against intrusive noise (for example, background noise plus 5dB) and loss of amenity (for example, noise levels for various land uses).

**Rating Background Level (RBL):** the overall single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period (as opposed to over each 24-h period used for the assessment background level). This is the level used for assessment purposed. It is defined as the median value of:

- all the day assessment background levels over the monitoring period for the day
- all the evening assessment background levels over the monitoring period for the evening; or
- all the night assessment background levels over the

**Non-mandatory:** With reference to the proposed policy, means not required by legislation. The proposed policy specifies criteria to be strived for, but the legislation does not make these criteria compulsory. However, the policy will be used as a guide to setting statutory (legally enforceable) limits for licences and consents.

**Performed-based goals**: Goals specified in terms of the outcomes/performance to be achieved, but not in terms of the means of achieving them.

**Receiver:** The noise-sensitive land at which noise from a development can be heard.

**Stationary noise sources:** Sources that do not generally move from place to place, eg. industrial or commercial sources. In general, these include:

*Individual stationary sources such as:*

- heating, ventilating and air conditioning (HVAC) equipment,
- rotating machinery,
- impacting mechanical sources,
- other mechanical equipment and machinery such as conveyors.

*Mobile sources confined to particular location such as draglines and haul trucks.*

*Facilities, usually comprising many sources of sound, including:*

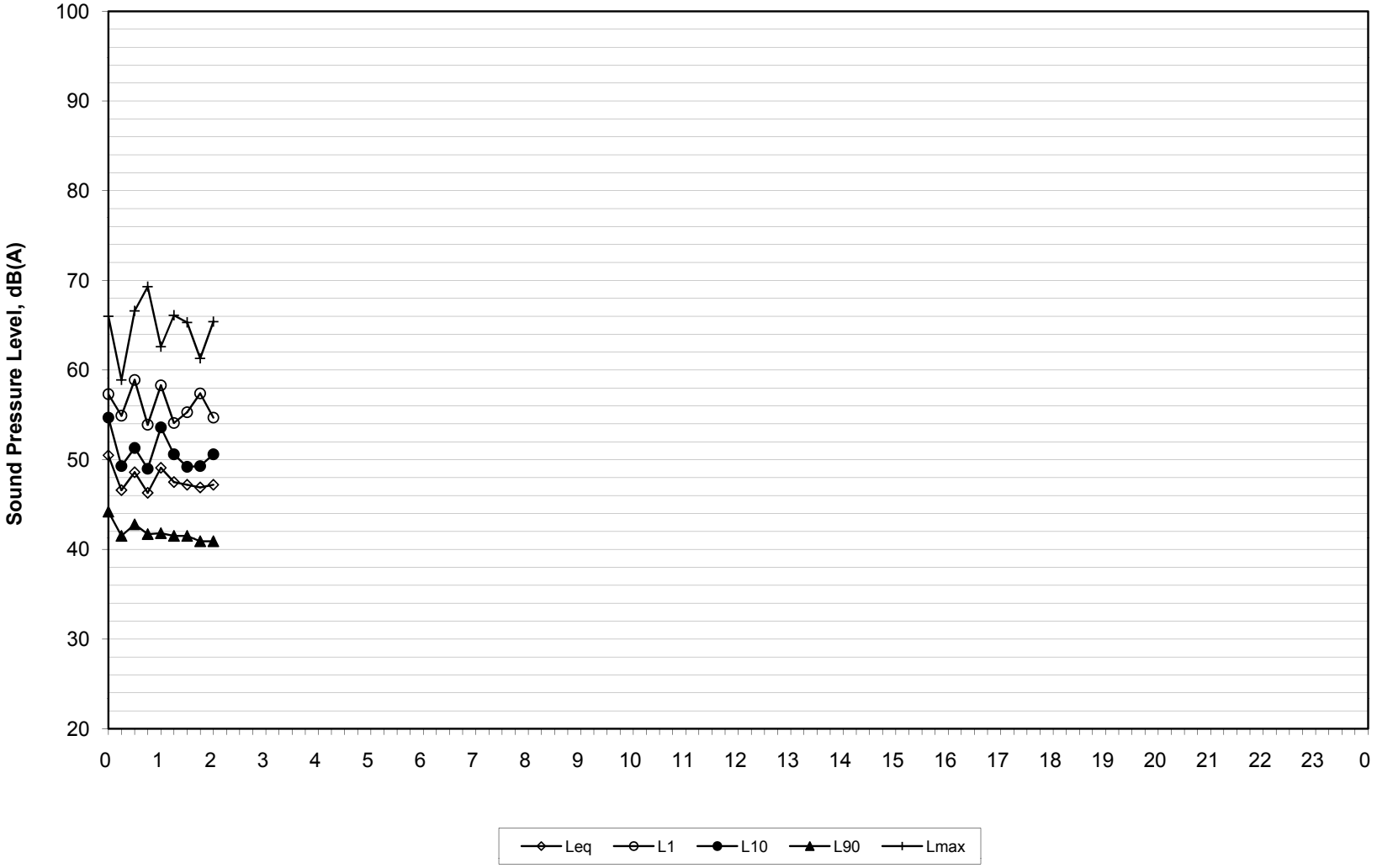
- industrial premises,
- extractive industries,
- commercial premises,
- warehousing facilities,
- maintenance and repair facilities.

(In this case, the stationary source is understood to encompass all the activities taking place within the property boundary of the facility).

**Temperature inversion:** An atmospheric condition where temperature increases with height above the ground.

# Ambient Sound Pressure Levels

**Tuesday, 30 June 2009**




Reference Measurement Location
R10