

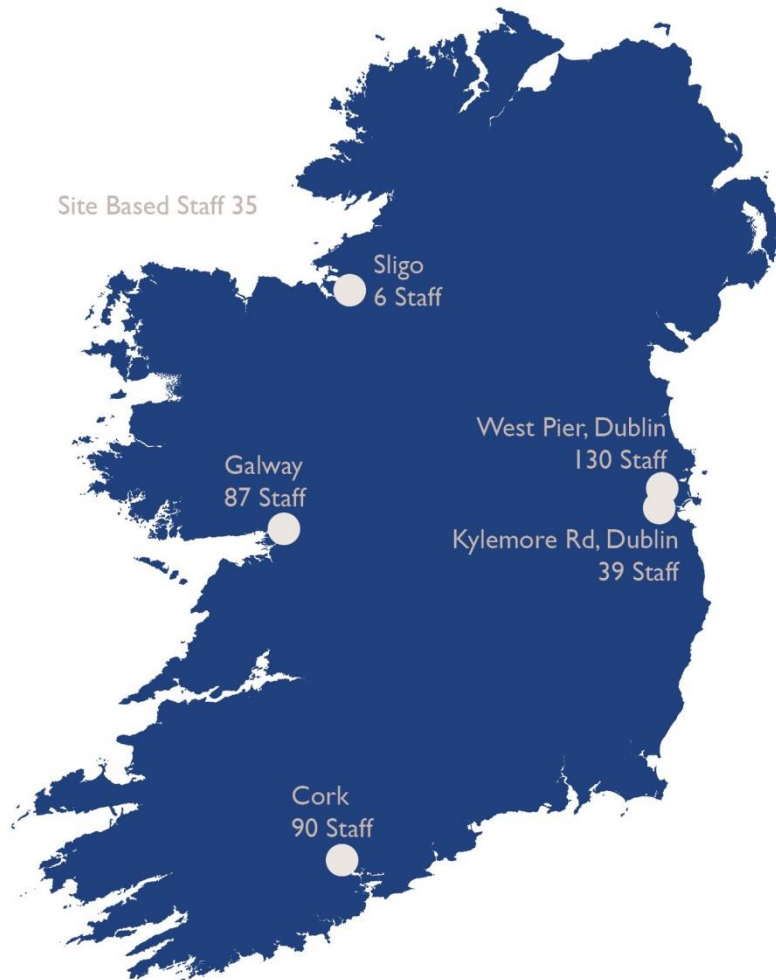


RPS

Executing Wind Farm Noise Monitoring Campaigns

Eugene McKeown

22nd March 2018



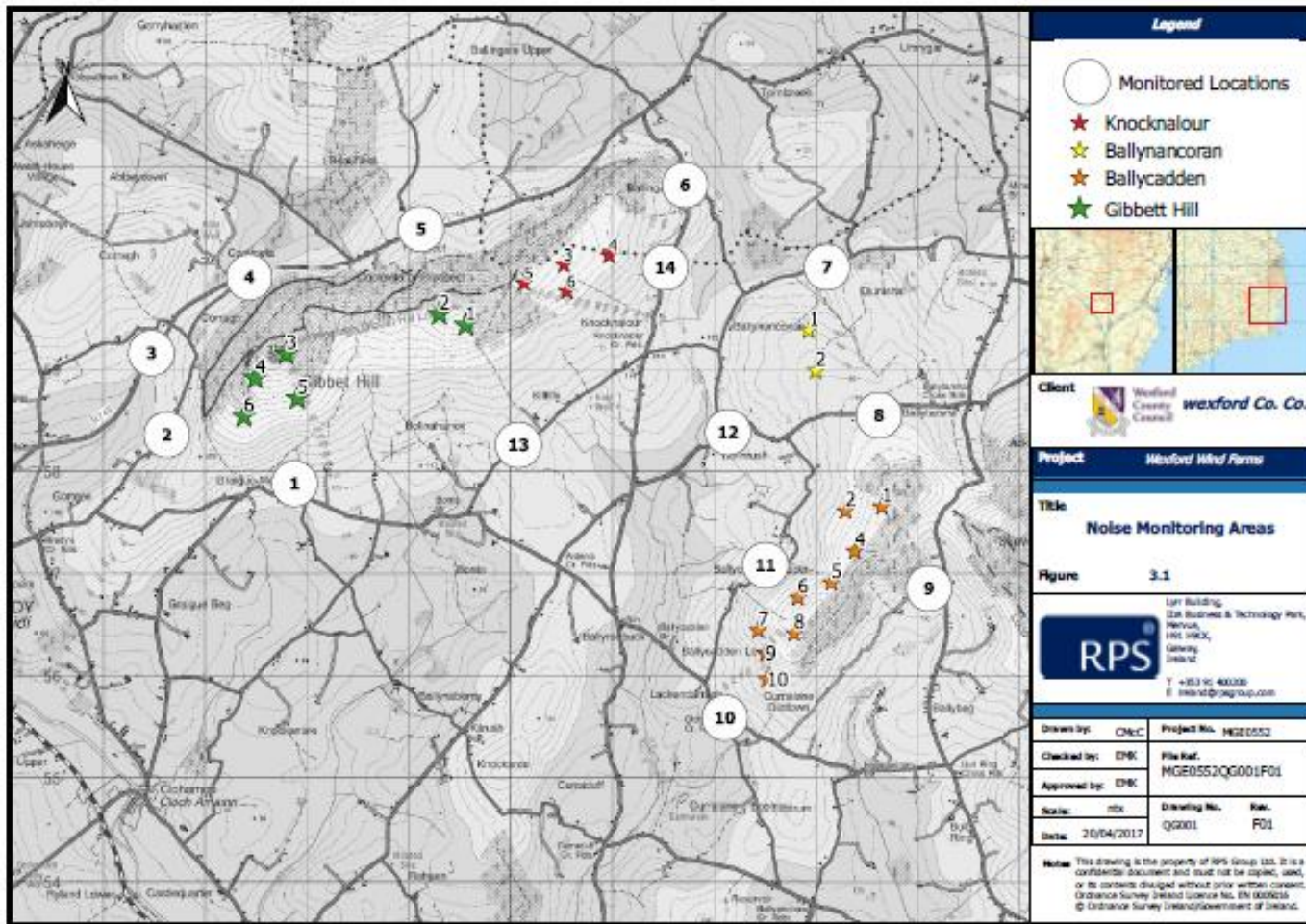
Republic of Ireland Offices

- 400 staff countrywide
 - Multidisciplinary
- Acoustics
 - RoI 4 + support
 - NI 3 + support
 - UK 12 + support
- Environmental Noise
- Underwater Noise
- Wind Farms
 - Hornsea
 - Gunfleet Sands

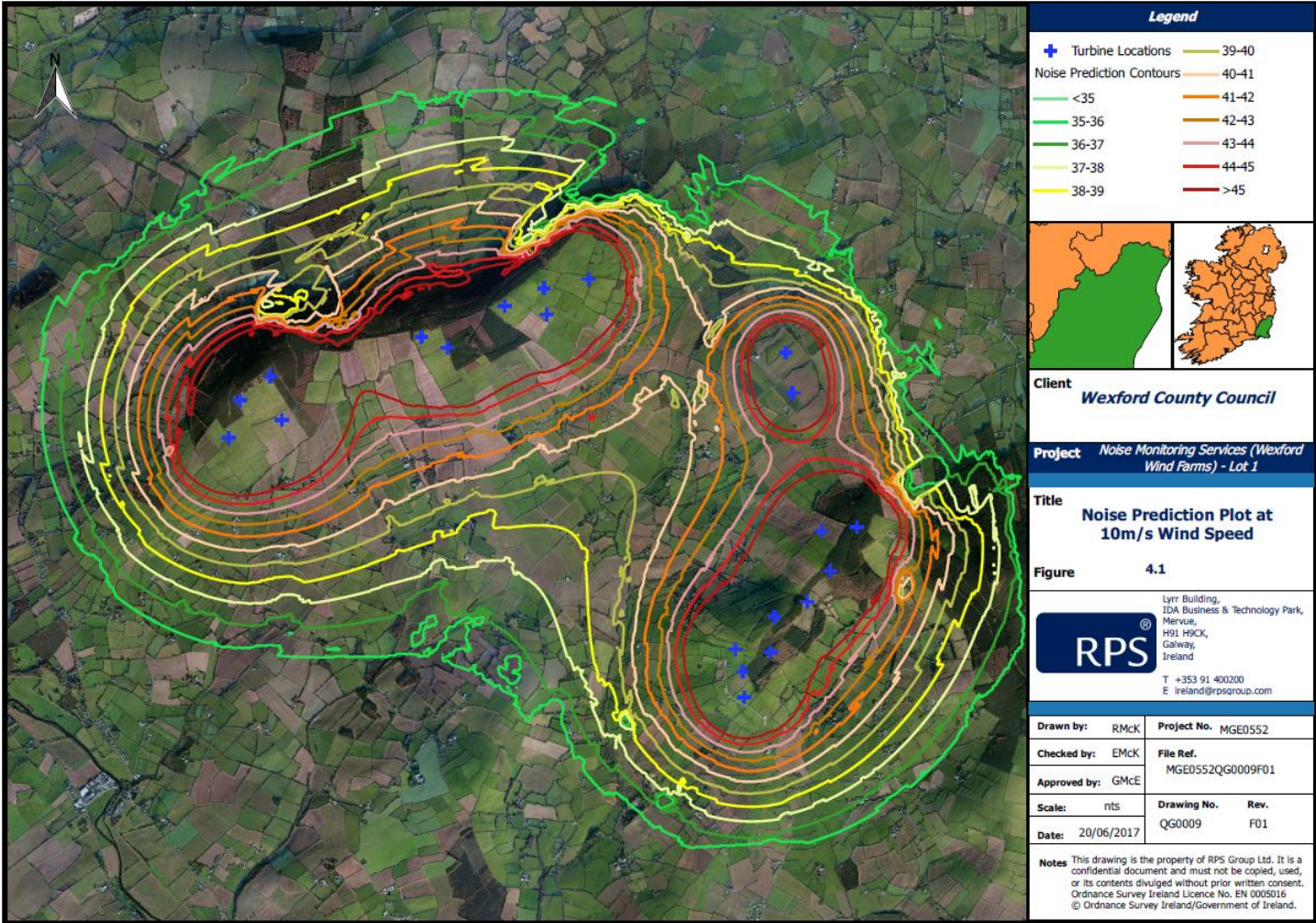
- Eugene McKeown, BE, LLB, MSc, Chartered Eng.
 - Wind farm noise monitoring & modelling > 25 projects
 - Oweninny
 - Lisheen
 - Grid Infrastructure – 8 projects
 - Donegal 110 kV
 - Laois Kilkenny 400kV/110kV
 - National noise model for wind turbines (2016)
 - Wexford Co. Co. monitoring
 - 4 wind farms (2016)
 - 2 wind farms (2018)

1. Compliance with planning conditions and or predicted sound levels at noise sensitive locations as per the planning submitted EIS,
2. Compliance with the Dept. of Environment, Community and Local Government, Wind Energy Development Guidelines 2006, in so far as they relate to noise standards,
3. Comment on the sound with regard to noise standards in each of the following;
 - i. UK and other countries with well developed wind energy infrastructure and regulations
 - ii. WHO noise limits for night-time noise
 - iii. Presence of tones, low frequencies, amplitude modulation.
 - iv. On the likelihood of noise nuisance as per Section 108 of the EPA Act No. 7 of 1992

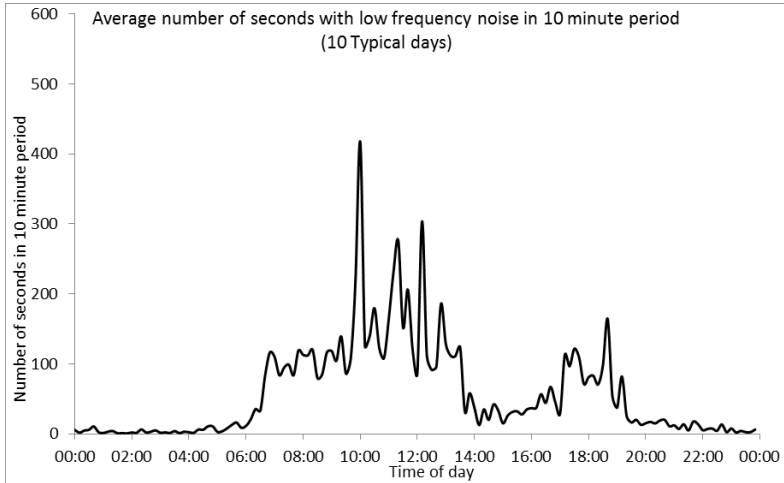
Monitoring Locations



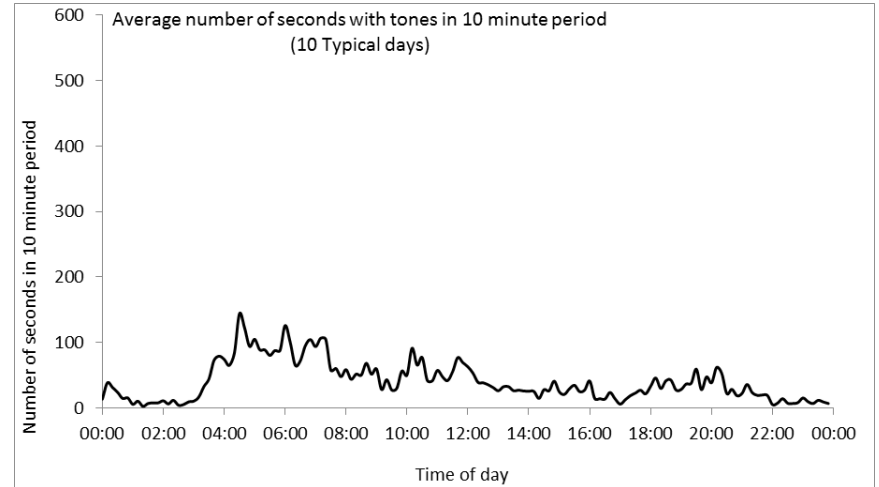
- Total data collected
 - 5 weeks at 13 sites
 - 24 hour monitoring & recording
 - 15 weeks at 3 sites
 - 24 hour monitoring
 - 6 hours recording
 - 3 weeks at 13 sites
 - 24 hour monitoring
 - 6 hours recording
- 3 Terabytes of data
- 2.8 years time equivalent
- New UK Guidelines published on AM during the survey
- First time a survey of this scale was undertaken
- Combined noise model of wind farms developed

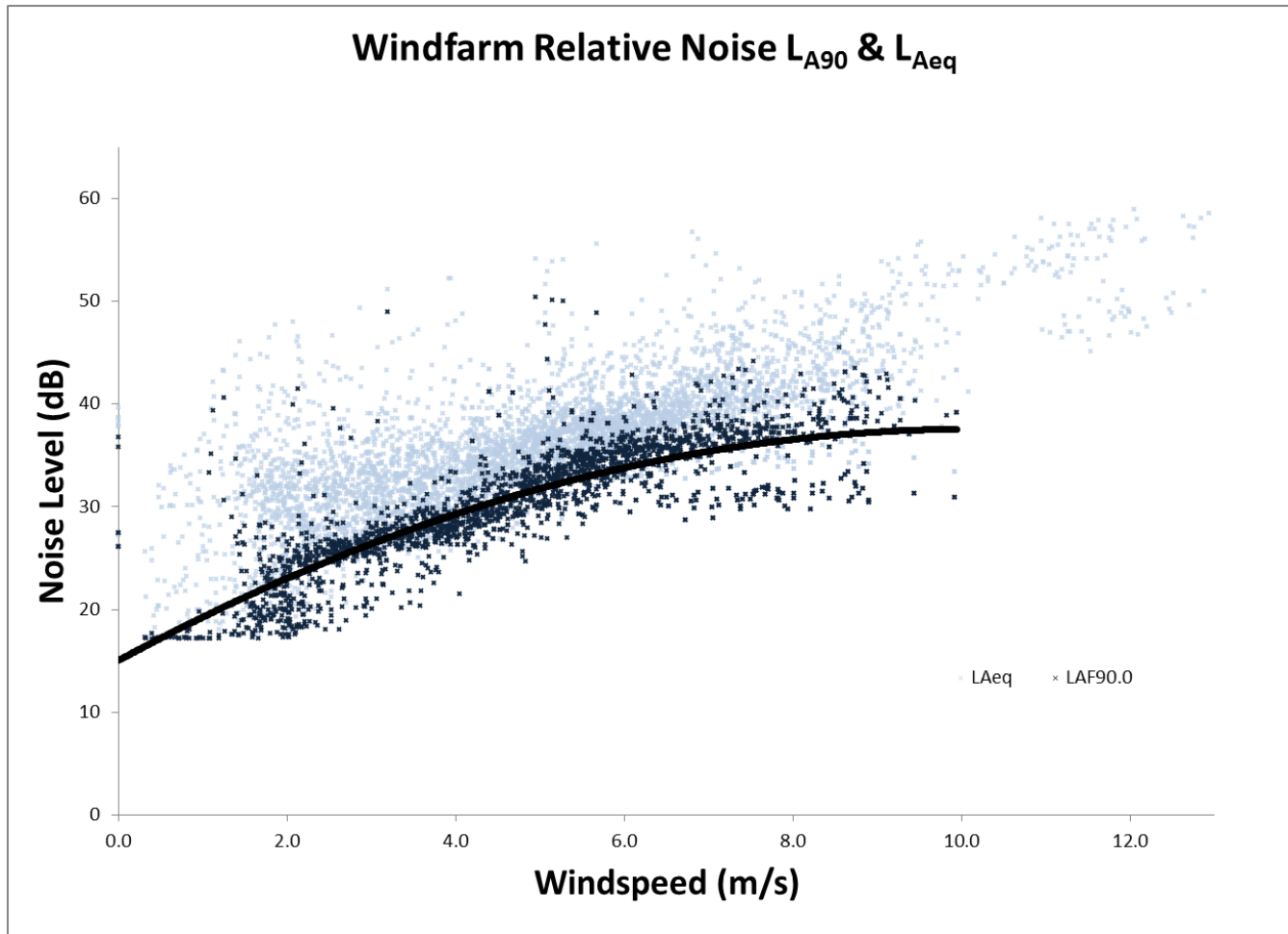


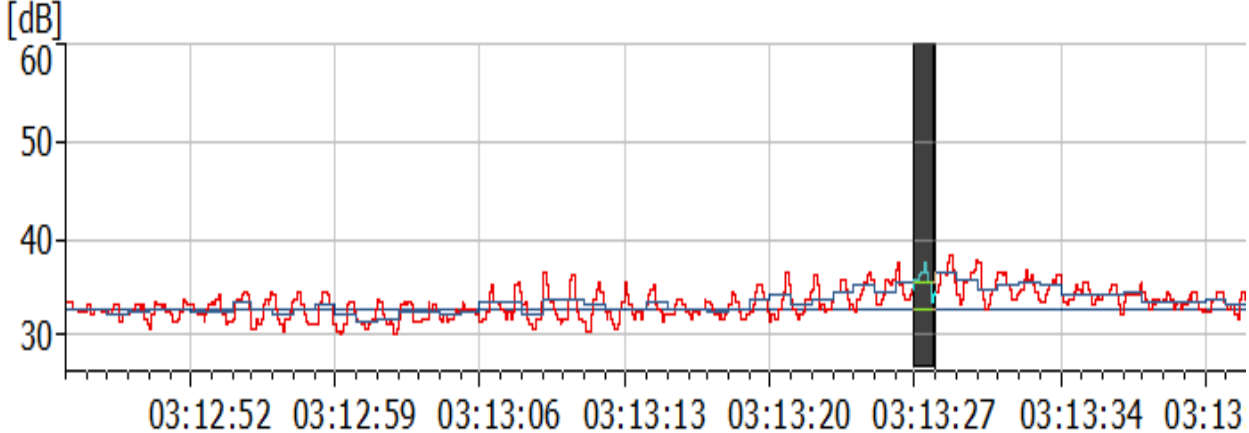
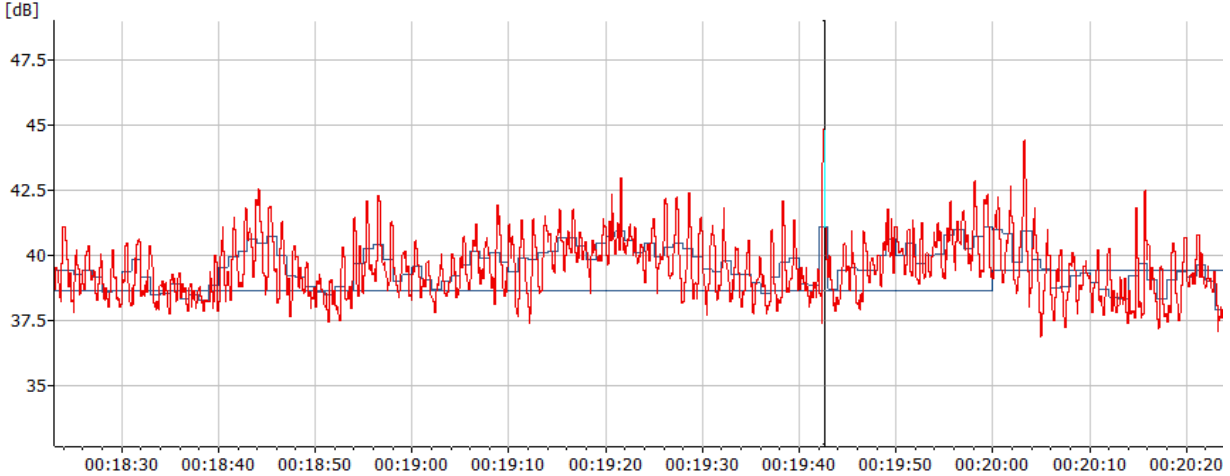
Low Frequency Noise



Tonal Noise



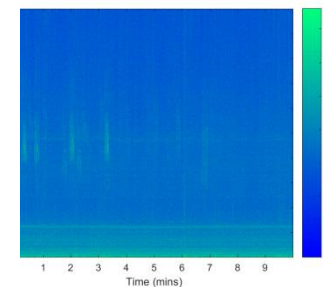
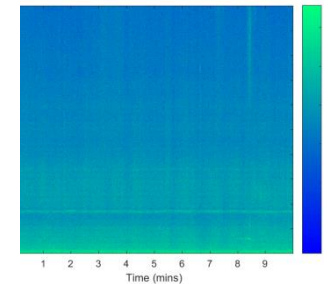
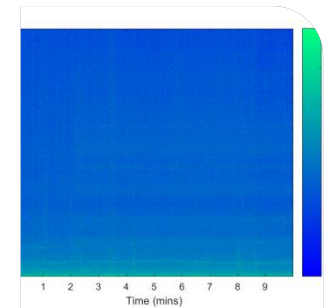




RPS

Data Processing

- Bruel & Kjaer MPS
 - Standard data extraction
 - L_{Aeq} , L_{A90} , Third Octave Levels
- Excel
 - ETSU Curves
 - Tonal analysis
- Matlab
 - Amplitude Modulation (IoA Method)



- Planning Conditions
 - Substantially compliant
- 2006 Guidelines
 - Substantially compliant
- WHO Limits
 - Substantially compliant
 - Range 31.6-40.1 dB(A)
 - Mean 36 dB(A)
- Tonal Noise
 - Limited detections
- Low Frequency
 - Limited detections
- Amplitude Modulation
 - Excessive AM detected to varying degrees

Competent experts

- The introduction to the EIAR should include a list of the experts who have contributed to an EIAR, showing which parts of the EIAR they have worked on, their qualifications, experience and any other relevant credentials. This facilitates an assessment of the competency in the team who have prepared the EIAR*.

Monitoring

- It may be appropriate, where relevant, to propose monitoring to take place after consent is granted in order to demonstrate that the project in practice conforms to the predictions made during the EIA*.

*EPA Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports

- Names and Addresses
 - Audio Recordings
 - Data Protection Requirements
 - Why are you holding it?
 - How did you obtain it?
 - Why was it originally gathered?
 - How long will you retain it?
 - How secure is it, both in terms of encryption and accessibility?
 - Do you ever share it with third parties and on what basis might you do so?
 - ‘freely given, specific, informed and unambiguous.’
 - ISO 27001 Information Security Management Systems
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