LINDSAY MCINTYRE

DIRECTOR
KSG ACOUSTICS

ROCK AND ROLL AIN'T NOISE POLLUTION

B-SIDE OF 'HELLS BELLS' BY AC/DC AND FINAL TRACK ON THE 1980 RELEASE 'BACK IN BLACK'

If…

- You've consulted adequately with the Local Authority
- You've carried out sufficient neighbour notification
- The event is appropriately laid out
- There's a well-designed proportionate sound system
- You have a robust noise management plan

Managing sound in the live environment

- Role of acoustic consultants
- The Code of Practice for Concerts
- Setting appropriate off-site Music Noise Levels
- Low frequency sound limits
- PA design
- Stage orientation
- Engaging artists
- Noise management plans
- Sound management techniques
- Working to improve

Role of acoustic consultants

- Liaison between Promotor / Production and Local Authority
- Feasibility of proposed sites for outdoor events
- Consultation with Environmental Health / attendance at SAG or Multi Agency meetings
- Early negotiation of off-site noise Licence requirements
- Production of Noise Management Plan
- Input to PA design (in-house PA)
- Liaison with Artist audio technicians in advance of the show
- Propagation tests and monitoring of amplified sound on and off site
- Investigation of complaints to Production / helping Environmental Health address complaints
- Production of debrief report

The Code of Practice for Concerts

- Contains guidelines for setting off-site Music Noise Limits
- 15 minute averages (LAeq,15min) determined by location and frequency of outdoor events
- Based on old data (1980s!)
- Technology has progressed significantly
- Still useful method and principles remain relevant
- Overhaul has been attempted, however agreement is difficult to secure between all parties
- No obligation to stick to COP guidelines – anything agreeable to all parties can be negotiated

Setting appropriate off-site Music Noise Limits

- Frequency of events at the venue
- Proximity of residential or other noise sensitive dwellings
- Hours of amplified sound
- Previous history of justifiable complaint / new ‘untested’ event
- Balance between residential amenity and production / artistic needs is essential – some sites may not be suitable
- If the Council is minded to grant a Licence, there must be an acceptance of some adverse effects in the local community although these should be mitigated in so far as is reasonably practicable

Low frequency sound limits

Footnote in the CoP references low frequency sound in 63Hz and 125Hz octave band centres

The footnotes were based on a study of low frequency sound from pop concerts which concluded that:

The 'A' weighted criterion can underestimate annoyance at greater distances from the venue (in excess of 2km) as the mid to high frequency energy is quickly attenuated with respect to low frequency and the expectation of people living some distance from the event being that the concert should be inaudible.

Sound pressure levels in excess of 80dB in the 63Hz or the 125Hz octave bands recorded in excess of 2km from the concert, are likely to give rise to complaints of low frequency noise. Levels below 70dB are likely to be acceptable at this distance or further away.

A 2004 review in the Acoustics Bulletin notes *According to discussions with the members of the Noise Council, it was never the intention that the low frequency notes shown in the Code of Practice were to be used as the basis for Licence conditions*.

Typically for rock / pop music the 63Hz content will be 10-15dB above the A-weighted FOH level. For EDM, this may be 15-20dB and may include even lower frequency content. Professional infrasound subs can reproduce down to around 25Hz

Some Licences do feature LF conditions, but these can be hard to enforce. Our preference is an advisory note or off-Licence agreement to gather data

PA design

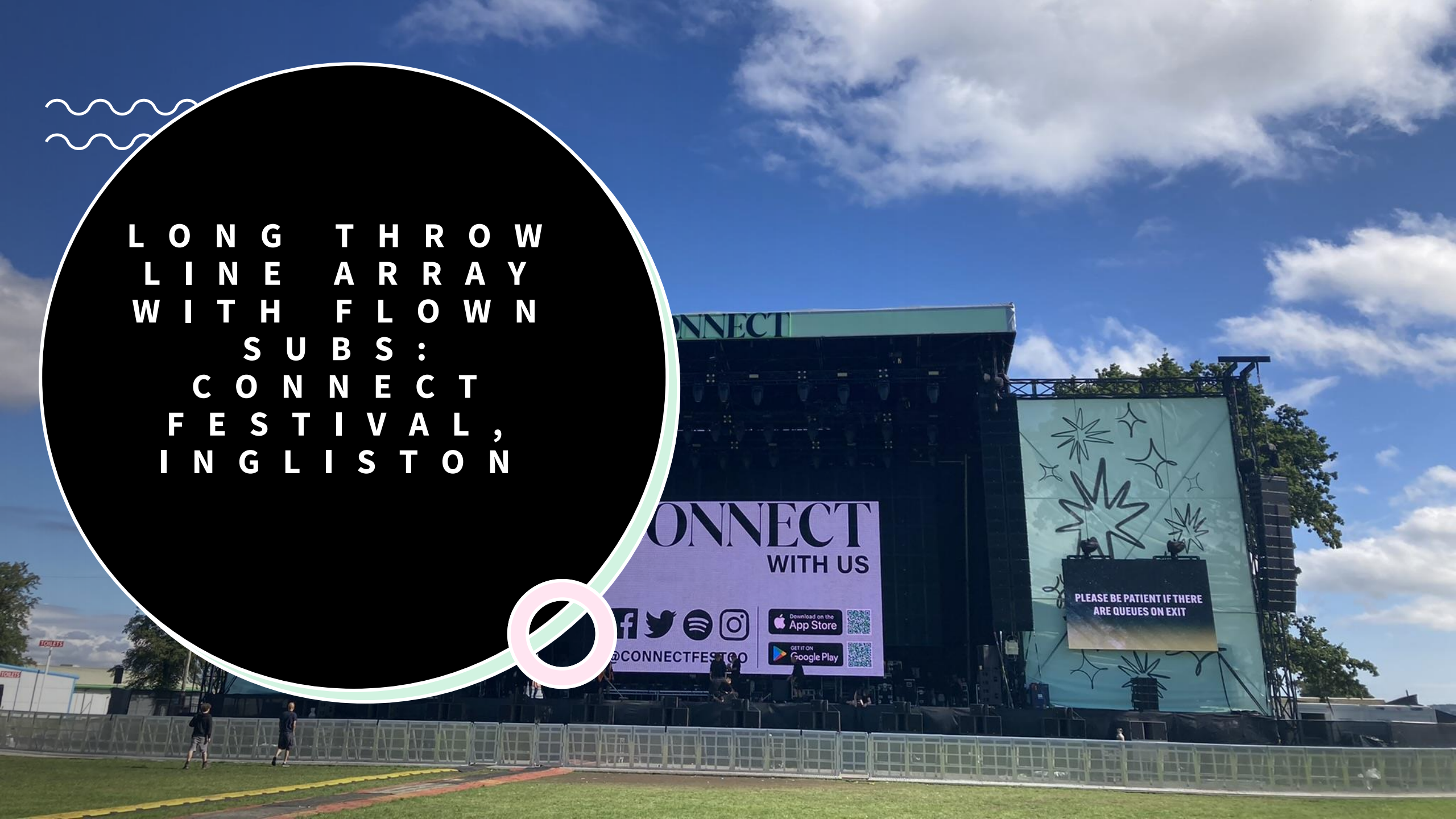
- PA technology is constantly improving
- However, PA must be appropriately designed and commensurate to the scale of the event
- Systems may be line array or point source
- Boxes may be flown or ground stacked
- Delays and outfills may feature
- Frequency range can be 25Hz to 18kHz with cross-over around 60Hz from tops to subs
- Main providers include L’Acoustics, d&b Audioteknik, Martin Audio, Meyer Sound and, more recently, Danley Systems
- PA selection may be driven by requirements of a particular headline artist however cost is key as well
- Headline tours may tour their own PA, or Production may provide it
- Consideration of off-site levels in design is vital to optimise FOH levels and minimise turning down during sets
- Workshops during event planning brings all considerations to the table

FLOWN LINE ARRAY: THE XX SWG3

FLOWN LINE ARRAY AND DELAYS: PHIL COLLINS, BRISBANE

GROUND STACKED SUBS AND TOPS: RIVERSIDE FESTIVAL, GLASGOW

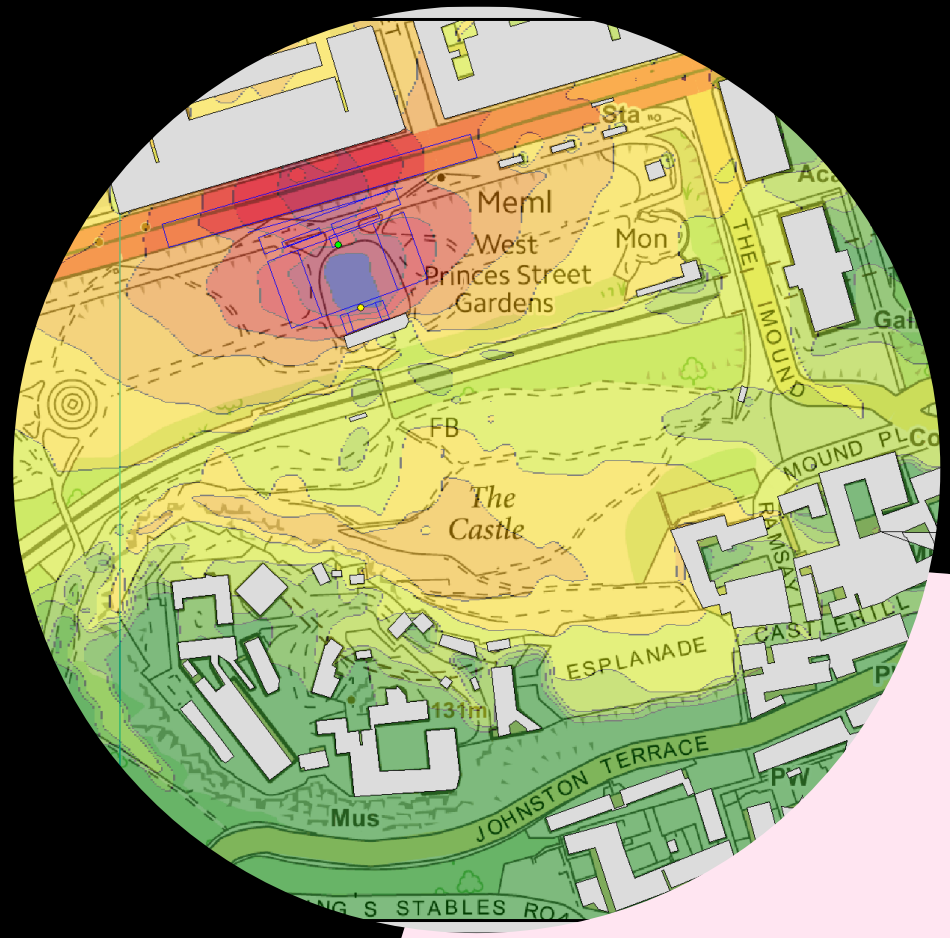
GROUND STACKED SMALL LINE ARRAY QUEEN'S PARK GLASGOW



LONG THROW LINE ARRAY WITH FLOWN SUBS: CONNECT FESTIVAL, INGLISTON

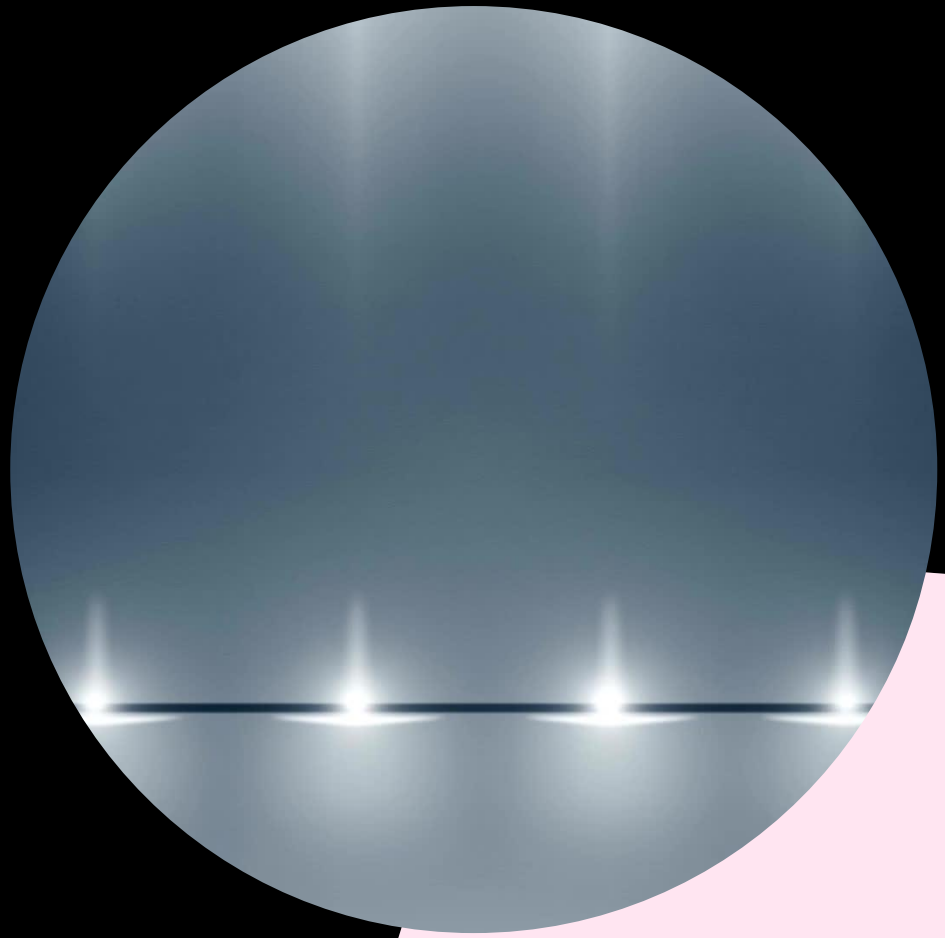
SOUNDPLAN 3D MODELLING

- SoundPLAN is the only 3D environmental noise modelling software that integrates PA technical design with sound propagation over distance
- Only directly compatible with d&b Arraycalc programme
- Uses ISO9613-2 propagation calculation prediction; air temperature and humidity are matched to Arraycalc parameters
- Prediction is under neutral meteorological conditions
- Ideal would be to have a library of PA to compare performance – discussions continue about use of Common Loudspeaker Format files
- Other PA manufacturers have software for in-room prediction or in direct sound model space only but none can be integrated with environmental modelling software at this time



Stage orientation

- Many different stage designs but stage and PA have to be compatible (also lighting)
- Long throw PA can cause issues in front of the stage (large audience areas, line array flown flat and high)
- Some bands have very high stage levels of sound – this cannot be controlled or managed and can cause issues behind the stage
- Low frequency sound can be high behind the stage – PA designers should be asked to minimise this in design (cardioid / end fire)
- Flown subs may also feature and may lead to hard to control low frequency in front of the stage, depending on design
- May be better to have stage parallel to receptors
- Balance of considerations – production have to prioritise audience safety and transit between live areas and accessibility to BOH
- Design workshop can help to bring all considerations to the table



Other physical interventions

- Hay bales
- Steel shield and other barriers
- Containers and trucks
- Sound absorbent quilts

Engaging artists and their technical team

IT’S ESSENTIAL THAT ARTISTS AND THEIR REPRESENTATIVES UNDERSTAND THE NATURE OF THE EVENT AND ANY CONSTRAINTS BEFORE SIGNING UP

THEY MUST ALSO KNOW THE PA SPECIFICATION (FRONT OF HOUSE, MONITORS AND BACKLINE) AND NOISE MANAGEMENT MEASURES THAT WILL BE LIVE

SOME ARTISTS TOUR THEIR OWN PA AND OTHERS WILL USE IN-HOUSE FACILITIES

SOME EVENTS ARE A MIXTURE OF BOTH

THE PRODUCTION PACK MUST INCLUDE CLEAR INSTRUCTIONS ON NOISE MANAGEMENT AND CONSULTANTS SHOULD CONTACT HEADLINER FRONT-OF-HOUSE ENGINEERS BEFORE THE EVENT TO DISCUSS

Noise Management Plans

THESE SHOULD BE DRAFTED AT AN EARLY PLANNING STAGE WITH LOCAL AUTHORITY CONSULTATION VITAL

THEY SHOULD BE WRITTEN IN THE CONTEXT OF INDICATIVE OFF-SITE LIMITS. THESE SHOULD BE AGREED WITH THE LOCAL AUTHORITY PRIOR TO SUBMISSION

MAY CONTAIN PREDICTIONS OF OFF-SITE MUSIC NOISE LEVELS BUT THE IN-SITU LEVELS WILL VARY DEPENDING ON ON-THE-DAY FACTORS

MAY FLAG THE NEED FOR ADDITIONAL MEASURES TO REDUCE ADVERSE EFFECTS IN SO FAR AS IS REASONABLY PRACTICABLE

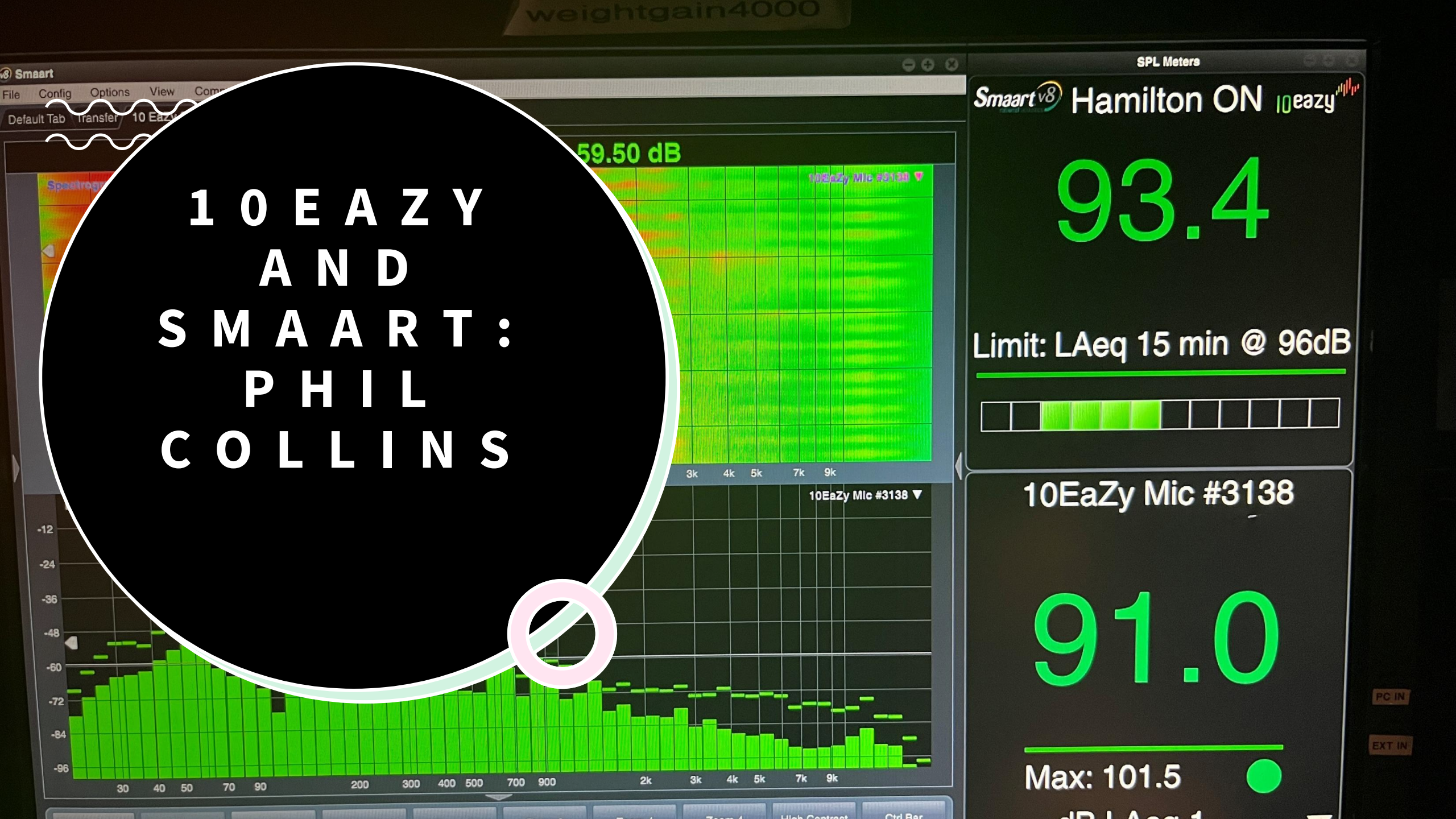
MUST SET OUT PLAN FOR PROPAGATION TESTS AND ON- / OFF-SITE MONITORING

MUST COMMIT TO COMMUNITY ENGAGEMENT AND SET OUT MEANS OF COMMUNICATION AND PLAN FOR COMPLAINTS

MAY ALSO CONSIDER LOAD-IN AND LOAD-OUT, CUSTOMER INGRESS AND EGRESS ETC.

Sound management techniques

- Ensure incoming tours know what the restrictions are and how they will be exercised
- Daily correlation tests – air temperature and humidity effects / meteorology
- Real-time comms between off-site and FOH
- Evidence gathering off-site – routine measurements and audio capture
- 10Eazy and other sound level management software
- Level setting for headliners and creating build
- Listening fatigue and in-house sound engineers
- Carrot and stick – all FOH engineers are different!
- Dealing with side-of-stage or atypical mix positions


10EAZY AND SMAART: PHIL COLLINS
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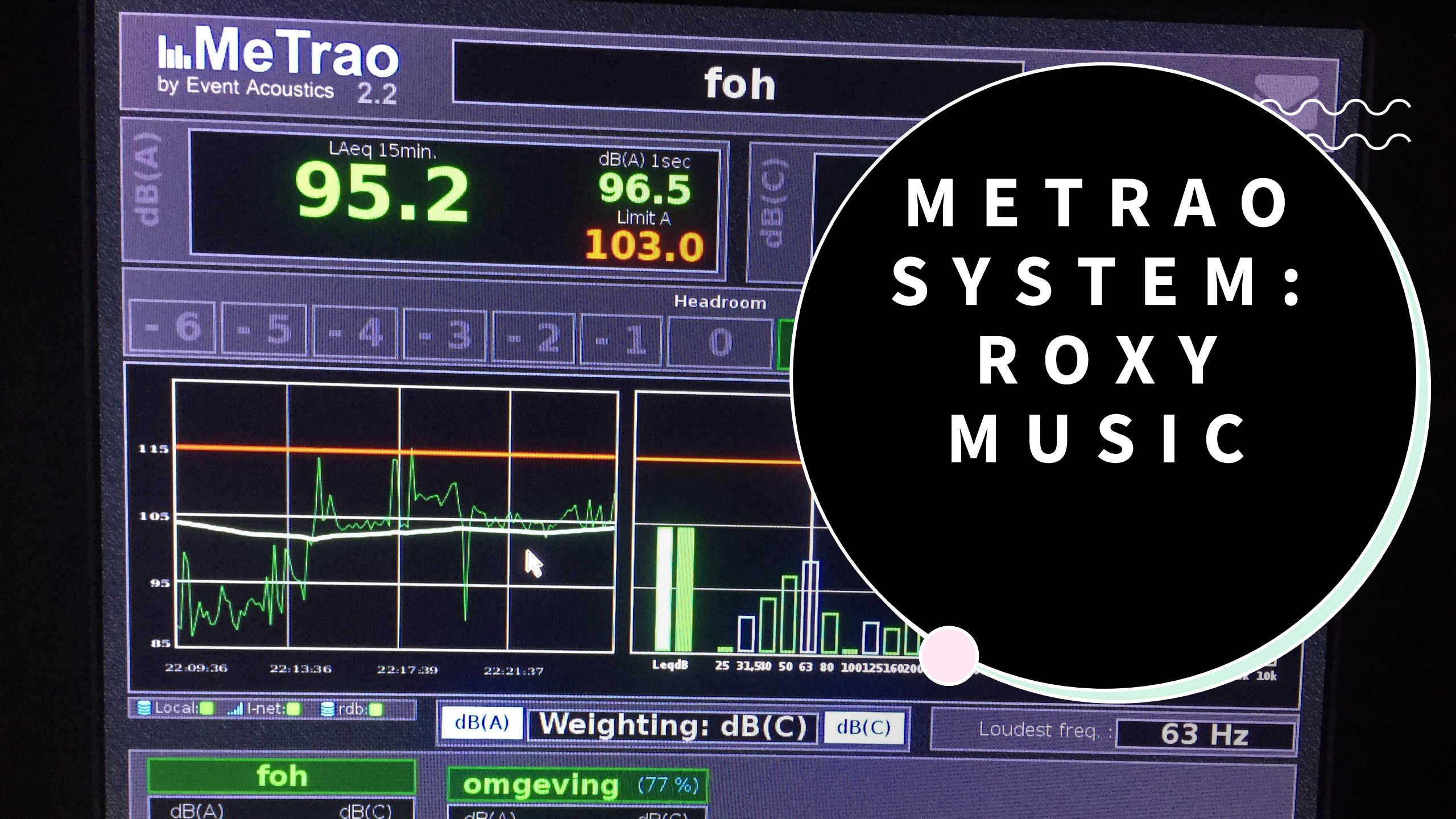
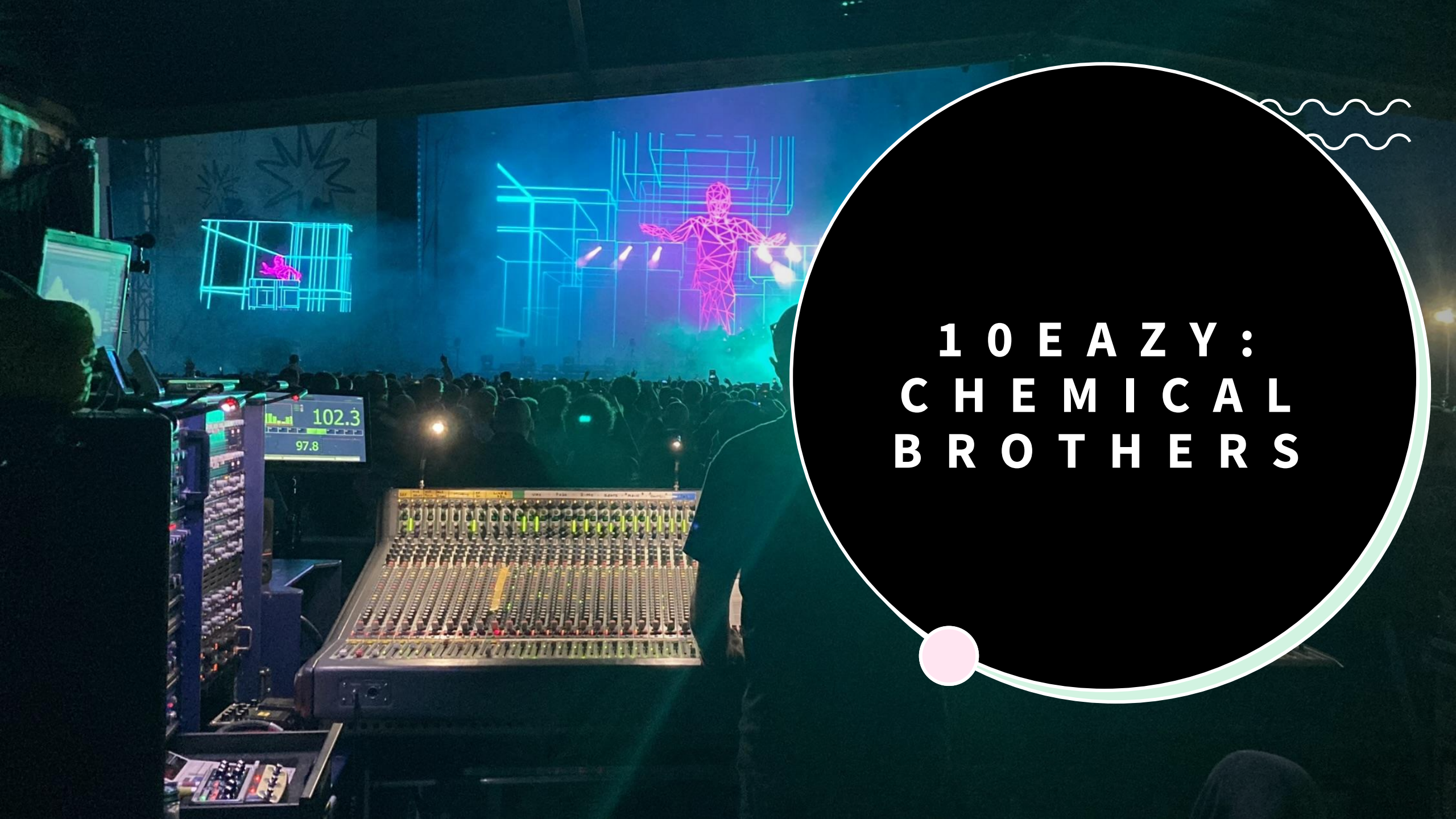


METRAO SYSTEM: ROXY MUSIC



10EAZY: CHEMICAL BROTHERS

Typical show days – complaints procedure

Complaints can come from Production channels (phone, email, socials) or via Environmental Health

If complaint received, off-site consultant to attend location and take a measurement against the agreed off-site limits

Measurement may be short or, if close to agreed limits, over a 15 minute period. In some cases, listening exercise is sufficient

Audio capture facilities can be useful to assess data after the event

Real-time feedback to be provided from off-site to on-site Consultant

FOH consultant to warn systems engineer that this is underway, if levels are close to limit

Off site consultant to feed back to FOH consultant and Production

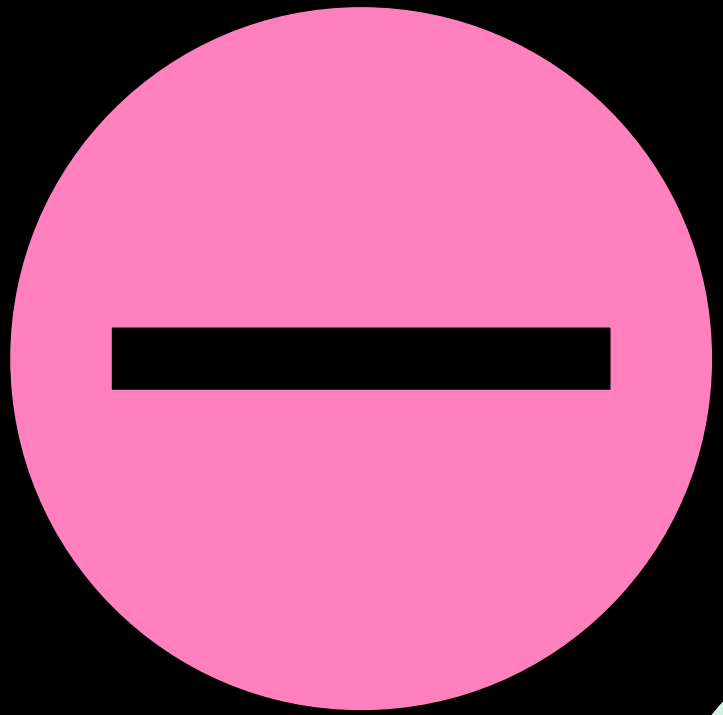
If a breach is imminent or occurring FOH consultant to give clear instruction to systems engineer (e.g. reduce overall levels / low frequency content / vocals etc.)

Adjustment for FOH limit may be necessary if conditions have changed

Systems engineer will ask FOH engineer to comply with request

Check outcome off-site and feed back

IF NO ACTION IS TAKEN, ISSUE ESCALATED TO THE LICENCE HOLDER FOR A DECISION



Working to improve

- New events aren’t necessarily going to get it right first time
- New events can also attract more adverse comment until residents feel comfortable with it
- A few complaints shouldn’t be interpreted as a failure!
- The success of an event needs to be considered in the round
- Debrief meetings are vital after events to discuss what went well and what could be improved
- Residents' groups should also be consulted before subsequent events to ensure they feel involved and empowered
- Events are a team endeavour and rely on constructive working between Local Authority, Promotors and Community to make them a success!

LINDSAY MCINTYRE
KSG ACOUSTICS
LINDSAY@KSGACOUSTICS.CO.UK