Overview

• Who we are
• What we do
• Acoustics + Rail
  • Stations
  • Fixed facilities
  • Rail operations
  • Construction
  • Community engagement
  • Accreditations
WSP Acoustics

- Part of world's largest Acoustics Engineering team 150+ staff worldwide - across Australia 22+ staff
- Team includes local and global experience:
  - Sydney Metro Northwest
  - Dandenong to Caulfield Level Crossing Removal
  - Newcastle, Gold Coast and Sydney Light Rail
  - Inland Rail
  - TfNSW New Intercity Fleet
- Integral element of the wider WSP consultants as part of specialist disciplines:
  - Acoustics
  - Vision and lighting
  - Fire Engineering
  - Technology Systems
  - Security
Acoustic engineering

Acoustics = noise, sound and vibration

Environmental

- Noise and vibration control (external)
- Development Applications and EIS
- Noise Mapping
- Construction noise and vibration
- OH&S
- Noise and vibration emission compliance
- Environmental mitigation design (barriers, rail and road designs)
Acoustic engineering

Buildings

- Noise and vibration control (internal)
- Sound insulation
- Acoustic separation
- Room acoustics
- Façade specification and natural ventilation
- Building services noise and vibration control
- Performance and critical audio spaces
- PA System design (with AV)
- Speech intelligibility and privacy
- Structural noise and vibration
- Re-radiated noise
Rail infrastructure acoustics

- Station design
- Fixed facilities
- Rail operations
- Construction
- Community engagement
- Accreditation
Station design

• Mechanical services noise
• PA system design – balancing intelligibility with noise spill
• Room acoustics – reverberation, noise ingress control
• Station vibration – control rail vibration into station
• Other use types within station – administration offices, control rooms, ticket offices, sensitive spaces
• User experience – fit for purpose and comfortable acoustic environment
Fixed facilities

- Maintenance facilities and stabling yards
- Level crossings
- Power infrastructure (cabling and substations)
- Tunnel ventilation and portals
Rail operations

Above ground

- Traction engine, exhaust and casing (for non-electric vehicles)
- On-board services noise
- Aerodynamic noise
- Bunching/shunting noise
- Brake noise
- Wheel/rail interaction noise and vibration
- Structure-borne vibration and re-radiated noise
Rail operations

Below ground

Key
1 source
2 propagation:
  2a body waves (compression, shear)
  2b surface waves (e.g. Rayleigh, Love)
  2c interface waves (e.g. Stoneley)
3 receiver (vibration, re-radiated noise)
4 water table

NOTE The components of the system comprising source, propagation and receiver are interdependent.
Construction

- Temporary high noise and vibration generation
  - Airborne and groundborne noise
  - Ground vibration
- Often undertaken at night
- Focus on management of issues, not necessarily meeting limits
- Noise and vibration measurements
- Determination of safe working distances for vibration limits
- Site audits of noise generating equipment
Community engagement

- A key consideration on rail projects
- Having an engaged community enables projects to run better and with more predictable outcomes
- Engaging the community early provides them with sufficient time to consider proposal
- Allow for feedback into design from community engagement
- Getting the communication strategy right
- Up-stream assessment methods
Accreditations

• Green Star
  • PA systems
  • Ambient noise levels
  • Reverberation time
  • Acoustic separation
• Infrastructure Sustainability Council of Australia
  • Credits available for:
    • Operational noise
    • Operational vibration
    • Construction noise
    • Construction vibration
Thank you