TOWARDS A STATE GOVERNMENT TRANSPORT NOISE POLICY

• Effects of Noise on Humans

• Development of State Government Policy
  – Draft State Planning Policy on Transport Noise
  – EPA Preliminary Draft Guidance No. 14
Effects of Noise on Humans
Effect of Noise on Humans

**NOISE AND NERVES**

Noise causes stress hormone release -
- Adrenaline and noradrenaline - “fight or flight”
- Cortisol - “defeat”

**Self-regulation of stress response**

- Control - not annoyed
- Inability to self-regulate - aggression or learned helplessness
Effect of Noise on Humans

NON-AUDITORY PHYSIOLOGICAL EFFECTS

Noise, stress hormones and blood pressure linked

Pathways to possible -

- heart disease - sufficient evidence for causal link
- mental illness - studies unclear, may cause stress
- immune disorders - limited evidence
- low birth weight - limited evidence

Trend: noise → hypertension → heart disease above -

65dBAeq (day)
55dBAeq (night)
Effect of Noise on Humans

**NOISE AND PERFORMANCE**

Noise → cortisol → reduced performance

Good evidence of effects on complex tasks

Demonstrated in Munich Airport study (ICBEN 1998)

RANCH Study preliminary results show effects on -
  - reading comprehension
  - conceptual recall
  - information recall
  - recognition in long term memory and prospective memory
Effect of Noise on Humans

**EFFECTS OF NOISE ON SLEEP**

Noise disturbs sleep → awakenings and changes of sleep state
Affects mood, performance and perceived well-being
Reported sleep quality and complaints are poor indicators
Habituation - partial only
Long term health - need to know more about sleep, what to measure

Dose-response relationships

- “good” sleep <10-15 events/night at max of 45dB(A)
- “critical load” 6 events/night at max of 60dB(A)
Effect of Noise on Humans

COMMUNITY RESPONSE TO NOISE

Complaints a poor indicator of annoyance

Large annoyance studies used for considering noise criteria

Miedema’s analysis of % Highly Annoyed -

<table>
<thead>
<tr>
<th>L_{DN} [dB(A)]</th>
<th>Road %</th>
<th>Rail %</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>55</td>
<td>8%</td>
<td>5%</td>
</tr>
<tr>
<td>60</td>
<td>13%</td>
<td>8%</td>
</tr>
<tr>
<td>65</td>
<td>20%</td>
<td>11%</td>
</tr>
</tbody>
</table>
Effect of Noise on Humans

FACTORS AFFECTING RESPONSE TO NOISE

Objective

Level of noise

Emergence above ambient

Nature, duration, how often it occurs

Characteristics – tonality, modulation, impulsiveness (eg train horn)

Time of day or week
Effect of Noise on Humans

FACTORS AFFECTING RESPONSE TO NOISE

Subjective
Activity of receiver and state of health /mind
Attitude to noise source or noise emitter
Information content of source, recognition (fear, familiarity)
Controllability of the source or the received level
Community expectations, especially when change occurs!
Transport noise policy in WA

**FACTORS INFLUENCING NOISE POLICY**

**People**
Health, amenity, sleep, performance

**Precedent**
Policies adopted in WA and other countries/States

**Practicability**
Cost, technical availability of solutions to meet targets

**Politics**
Political will amongst politicians and agencies
Transport noise policy in WA

SOME DEVELOPMENTS

1980’s
- Main roads noise policy
- Westrail noise policy

1998
- EPA preliminary draft Guidance 14 – Road and Rail Transportation Noise

2005
- Draft State Planning Policy – Transport Noise
Transport noise policy in WA

**DRAFT STATE PLANNING POLICY**

**Whole–of–Government WG under WAPC**
Transport, Planning, Main Roads, Westrail, Environment

**Scope**
- New or upgraded road and rail infrastructure
- Planning for new noise-sensitive developments
- Not retrospective
- Doesn’t address ground vibration

**Objectives**
- Minimise noise impacts of roads and railways
- Establish criteria for consistent assessment
- Identify proposals needing noise mitigation
- Avoid adverse effects on corridors
Transport noise policy in WA

DRAFT STATE PLANNING POLICY - PROCESS

Study of precedents
ERM report on other policies
Recommended noise level criteria

Study into practicability
Lloyd Acoustics examined recommended criteria against a series of road and rail scenarios

Draft policy
Released for public comment in 2005
Still being finalised
## Transport noise policy in WA – Draft SPP Criteria

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Exposure Level 1 (Target)</th>
<th>Exposure Level 2 (Conditionally acceptable)</th>
<th>Exposure Level 3 (Unacceptable new projects)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day (6am – 10pm)</td>
<td>$L_{Aeq} &lt; 55\text{dB}(A)$</td>
<td>$L_{Aeq} 55\text{-}60\text{dB}(A)$</td>
<td>$L_{Aeq} &gt; 60\text{dB}(A)$</td>
</tr>
<tr>
<td>Night (10pm – 6am)</td>
<td>$L_{Aeq} &lt; 50\text{dB}(A)$</td>
<td>$L_{Aeq} 50\text{-}55\text{dB}(A)$</td>
<td>$L_{Aeq} &gt; 55\text{dB}(A)$</td>
</tr>
</tbody>
</table>
Transport noise policy in WA

DRAFT STATE PLANNING POLICY - COMMENT

Criteria
- \( L_{Aeq} \) (average) levels deal well with long term health issues
- Good balance between amenity and practicability issues
- Also include max noise level criteria for small numbers of train movements to deal with sleep disturbance issues (under discussion)

Planning measures
- Draft SPP contains a range of practical planning measures
- Also producing Guidelines for Implementation – good
- Implementation needs to be made simple enough that it will be applied
Transport noise policy in WA

*DRAFT SPP – IMPLICATIONS FOR RAIL*

**SPP designed for planning not operations**
- Affects new developments near railways – protects corridor
- Affects design of new or upgraded railways
- Doesn’t affect rail operations on existing railways

**EPA will use it**
- EPA has been using draft SPP criteria for Part IV assessments
- Example: South-West Metro Railway
Transport noise policy in WA

WHERE ARE WE AT?

SPP nearly there

We have done the work (People, Precedents, Practicability)
Political issues – eg. housing affordability
Needs finalisation and Guidelines
DPI aim to get it to WAPC by November

EPA Guidance 14

EPA has been using Guidance 14 to assess impacts of proposed road and rail traffic increases on existing corridors (not covered by SPP)
Revision planned for 2008
Transport noise policy in WA

ARE WE GOING “TOWARDS” A STATE GOVERNMENT TRANSPORT NOISE POLICY?

YES – SLOWLY!