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**Australian Government**

**Department of Infrastructure, Transport,  
Regional Development, Communications and the Arts**

# **Hearing Augmentation Working Group – Research Paper**

**February 2025**



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## Executive summary

This report presents the findings of the Hearing Augmentation working group (the working group), established by the Australian Government (the Government) through the reforms to the Disability Standards for Accessible Public Transport 2002 (Transport Standards). The working group undertook a holistic review of current and emerging hearing augmentation technologies and its potential use in public transport settings.

The working group considered:

- The benefits and challenges of current and emerging assistive listening technologies
- Testing and maintenance of hearing loops
- Coverage of hearing loops
- Appropriate signage to indicate hearing loop availability
- Retrofitting of hearing loops and Bluetooth receivers into existing infrastructure
- The transition toward more widespread use of new technologies
- Public awareness of the different assistive listening technologies available

Working group membership consisted of:

- Department of Infrastructure, Transport, Regional Development, Communications and the Arts, Commonwealth (Chair)
- Deafness Forum Australia
- Guide Dogs Australia
- Department of Transport and Main Roads, Queensland
- Transport for NSW
- Department of Transport and Planning, Victoria
- Department of Infrastructure and Transport, South Australia
- Public Transport Authority, Western Australia
- Bus Industry Confederation

## Findings

The working group made a number of findings for consideration by the Australian Government, and recommended these findings be addressed through updated guidance for operators and providers and considered in future statutory reviews of the Transport Standards.

1. The telecoil is currently the most common hearing augmentation technology and is effective when used and maintained correctly.
2. Operators and providers should aim to maximise the coverage of hearing augmentation systems, where feasible exceeding the 10% coverage requirement included in the Transport Standards. In some public transport settings, it may be unfeasible to deploy hearing augmentation systems to cover more than the 10% of the conveyance or premises – particular when retrofitting existing assets and due to electrical interference. However, 10% coverage should only be considered sufficient when there is adequate signage, no interference and the hearing loop system is maintained and in a suitable location for use by passengers. In future statutory reviews, increases to coverage requirements should be considered to align the Transport Standards with the NCC and the Premises Standards.
3. Assistive listening systems require testing for interference from other electromagnetic sources prior to deployment and should be maintained every 6-12 months to ensure the system continues to meet the requirements of the Transport Standards.
4. Information about the services available to passengers, including the forms of assistive listening systems used and coverage areas, should be available to passengers in multiple formats, such as online and through captioning, to support journey planning. This will be particularly important to facilitate a smooth transition into the use of new hearing augmentation technologies.

5. Passengers should be informed through appropriate signage on the availability of hearing augmentation systems. Signage should incorporate Braille and tactile lettering so that information is accessible to people with intersecting disabilities, designed in accordance with the recommendations of the Braille working group. The location and design of signage and maps should be determined through consultation and user-testing. Coverage areas should be clearly marked with clear lines on the floor and signs on the wall.
6. New assistive listening technologies may offer convenient and cost-effective ways to provide information in the future. Public transport operators and providers are encouraged to trial these technologies in collaboration with users, and if appropriate, install new technology in tandem with induction loop hearing augmentation systems.
7. The Australian Government should consider the viability of new technologies in future statutory reviews of the Transport Standards, including appropriate coverage requirements.
8. Operators and providers should ensure they continue to maintain infrastructure for older assistive listening systems while newer technologies are gradually integrated. Providing information in a range of accessible formats will be integral to supporting this transition.
9. Prescriptive standards for hearing augmentation systems may provide greater clarity to designers of public transport assets on how to make sure their final products are accessible.
10. Designers may consider incorporating emerging technology into their systems using equivalent access provisions under the Transport Standards, so long as an equivalent standard of amenity, availability, comfort, convenience, dignity, price and safety is maintained. Equivalent access processes would not need to be undertaken if new technologies were implemented in addition to existing hearing loops.

The working group also recommended the Australian Government consider the viability of setting prescriptive standards for emerging technologies in future statutory reviews of the Transport Standards, including minimum coverage requirements appropriate for these technologies.

## Background

### Legislative context

Section 26.1 of the Disability Standards for Accessible Public Transport 2002 (Transport Standards) covers hearing augmentation systems installed in public transport infrastructure and premises, except premises to which the Disability (Access to Premises — Buildings) Standards 2010 (Premises Standards) apply. Section 26.2 of the Transport Standards covers hearing augmentation systems on conveyances. Both sections require that hearing augmentation systems cover at least 10% of the total area of the enclosed space, and that signage is in place indicating the existence and coverage area of the hearing augmentation system. Section 26.2 also requires that people who are deaf or have a hearing impairment must be able to receive a message equivalent to the message received by people without a hearing impairment.

### Reforms to the Transport Standards

In 2019, the Australian Government commenced a reform process to modernise the Transport Standards. Public consultation to support the reforms was held from 2021-2022. The purpose of public consultation was to learn more about the context in which discrimination is likely to occur for people with disability and gather a broad range of stakeholder views on the merits of the proposed policy options, including associated impacts, costs and benefits, and the extent to which each option would achieve the intended outcome.

Through the reform process, options were considered to expand the requirements for hearing augmentation systems in Section 26.1 and 26.2 of the Transport Standards. Consultation found the provision of information in multiple formats, including through assistive listening systems, is essential. Responses from the disability

sector were unanimous in supporting reform to improve the coverage of hearing augmentation systems across public transport operating environments to provide equitable access to information for passengers with telecoil equipped hearing aids. However, submissions from industry and government raised concerns regarding the feasibility of the proposed requirements across public transport operating environments due to interference from electromagnetic sources such as overhead power lines. Multiple submissions also questioned whether the proposed requirements aligned with contemporary best practice for assistive listening systems, and suggested alternative solutions may deliver a greater net benefit to people with disability.

The Hearing Augmentation working group was established to conduct further research to determine potential pathways forward.

## Feedback from the reform process

Below is a summary of key feedback received through public consultations in response to the Consultation Regulation Impact Statement for the reforms to the Transport Standards. These findings formed the foundation of the working group's project plan.

### **Induction hearing loop systems may no longer be the preferred communication method**

Many submissions noted that while increasing the coverage of hearing loop systems in infrastructure and premises will benefit some customers, there may be better alternatives to induction loop technology. Submissions noted that emerging digital solutions may necessitate consideration of whether modern hearing aids are compatible with proposed systems. Submissions from industry noted that in their experience very few passengers use hearing augmentation systems to receive information and that many modern hearing aids do not have the ability to connect to the systems. Submissions also noted that overly prescriptive requirements could limit innovation and future opportunities to digitise hearing augmentation through emerging solutions, which should be considered in the broader modernisation of the Transport Standards.

### **100 per cent coverage may not be possible and other assistive listening systems may be more suitable for use in a public transport environment**

Several submissions noted that although greater coverage of hearing augmentation systems would benefit some passengers, a number of submissions outlined challenges with providing uninterrupted 100 per cent coverage of an area covered by a public address system. While spatial targets were preferred by some stakeholders as they provided the necessary certainty to people with disability, other stakeholders noted environmental and operational constraints which may impact compliance, such as the potential for electrical currents common in public transport infrastructure locations and that hearing augmentation is exceedingly difficult to implement in aircraft.

Submissions noted it is important that flexibility remains in recognition of the constraints in specific contexts such as operational heavy rail environments. These submissions noted that the presence of strong electric currents makes installing large-scale hearing loops technically challenging and prohibitively expensive. These submissions also advocated that coverage should be based on customer journey stages and functional zones, rather than arbitrary targets. However, submissions also noted that any site-specific constraints can be addressed through equivalent access or unjustifiable hardship provisions.

## Information in multiple formats may be required to provide equitable access to people who are deaf or hearing impaired

Noting the limitations raised in submissions, many stakeholders highlighted the importance of signage to designate areas with hearing augmentation coverage. Submissions also highlighted the important role of other technologies in providing equivalent messaging, such as passenger information displays.

## Where relevant, requirements should align with the Premises Standards and Australian Standards

Submissions noted the importance of considering alignment with all aspects of the Premises Standards and the most recent Australian Standard. Any revised options should be suited to public transport operating environments.

# Findings of the working group

## Current technology

The working group noted the most common hearing augmentation technology used today is the telecoil hearing loop system. A telecoil, also known as a t-coil, is a small coil inside the hearing aid that picks up sounds directly from compatible phones and hearing loops<sup>1</sup>. The system works by using a wire loop which generates a magnetic field which is picked up by the telecoil in the hearing aid<sup>2</sup>. Telecoils in behind ear hearing aids have been in use since the 1980s and are used in theatres, auditoriums, public transport conveyances and premises and other public spaces.

The working group highlighted hearing loops work well when installed properly, are adequately signed and users understand how to use the technology. However, members of the working group also highlighted a number of issues with this technology, such as interference impacting the user experience, poor signage and a lack of maintenance. The working group also noted that increasingly, modern hearing aids may not be fitted with telecoil systems – further limiting the usage of hearing loop systems.

## Summary

- The telecoil is currently the most common hearing augmentation technology and is effective when used and maintained correctly.

## Coverage, electromagnetic interference and maintenance

The Transport Standards currently require that where a sound amplification system is provided, it should cover at least 10% of the total area of the enclosed space. The working group discussed the importance of hearing augmentation systems covering the maximum practicable area, noting the Disability (Access to Premises – Buildings) Standards 2010 requires at least 80% of the floor area of an applicable room be served

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<sup>1</sup> [Connectivity features of hearing aids | Australian Government Department of Health and Aged Care](#)

<sup>2</sup> [Hearing Loops and Telecoils - Deafness Forum Australia](#)

by an induction loop, and suggested the Australian Government consider increasing coverage requirements in the Transport Standards.

The working group discussed how electromagnetic interference from other sources can reduce the effectiveness of telecoil hearing loops. Interference introduces a distracting and unpleasant ‘static’ sound which distorts the announcements and worsens the user experience. Interference may be stronger in different locations, for example on a train station platform. Sources of interference may include:

- Power lines
- Power stations
- Mains power
- Components of zero emission conveyances
- Certain types of lightbulbs

The working group noted that in public transport settings, the presence of electromagnetic interference can limit the effectiveness of induction loop systems. The working group noted that this issue is more likely to affect existing assets, including older rollingstock and premises – and may be less of an issue in new assets due to advances in design and technology.

The working group noted that due to electrical interference, in some public transport settings it may be unfeasible to deploy hearing augmentation systems to cover more than the 10% of the conveyance or premises. The working group agreed that this issue is particularly relevant when retrofitting existing assets, and may be less of an issue for new assets. The working group emphasised, however, that 10% coverage should only be considered sufficient when there is adequate signage outlining coverage areas, no interference and the hearing loop system is maintained and in a suitable location for use by passengers. The working group agreed that where possible, operators and providers should always aim to maximise the coverage of hearing augmentation systems beyond the 10% coverage requirements, and that this is already standard practice in the construction of new assets in some jurisdictions. The working group noted the National Construction Code (NCC) and the Premises Standards require 80% coverage of a hearing loop system, suggested the benefit of achieving this level of coverage should be emphasised, and recommended in future statutory reviews of the Transport Standards that increases to coverage requirements should be considered to align the Transport Standards with the NCC and the Premises Standards.

The working group noted the importance of hearing loop systems being installed in areas of high-patronage, including emergency meeting points, waiting areas, airport gates and ticket booths. At locations where ticket booths have safety screens installed, the hearing loop system should also be supported by a sound transfer system.

The working group emphasised the importance of operators and providers conducting user-testing before installing hearing loops or other assistive listening systems and continuing to test every 6-12 months to ensure there is limited interference and that the system continues to meet the requirements of the Transport Standards.

## Summary

- Operators and providers should aim to maximise the coverage of hearing augmentation systems, where feasible exceeding the 10% coverage requirement included in the Transport Standards. In some public transport settings it may be unfeasible to deploy hearing augmentation systems to cover more than the 10% of the conveyance or premises – particular when retrofitting existing assets and due to electrical interference. However, 10% coverage should only be considered sufficient when there is adequate signage, no interference and the hearing loop system is maintained and in a suitable location for use by passengers. In future statutory reviews, increases to coverage requirements should be considered to align the Transport Standards with the NCC and the Premises Standards.

- Assistive listening systems require testing for interference from other electromagnetic sources prior to deployment and should be maintained every 6-12 months to ensure the system continues to meet the requirements of the Transport Standards.

## Effective signage and the provision of information in multiple formats

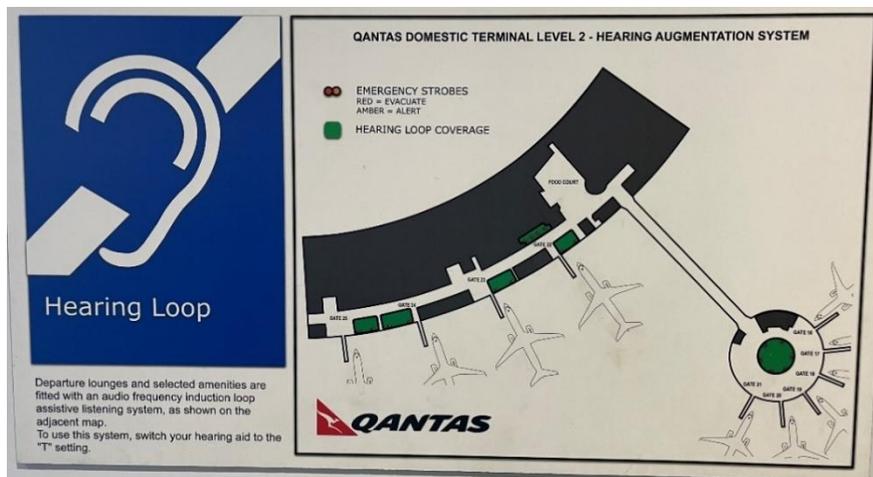
The working group agreed that appropriate signage is necessary for hearing loop users to know where there is hearing loop coverage in a public transport precinct or concourse area. Coverage areas should be clearly marked with markings on the floor and signs on the wall, and signage should also indicate whether users need to switch on their telecoil to access the hearing loop and increase overall awareness of the existence of the hearing loop. The working group noted that if emerging forms of technology such as Auracast are deployed, operators and providers should ensure that signage clearly indicates what forms of systems are available, and provide instructional information to passengers to support usage.

For example, the Victorian Department of Transport and Planning have installed signage at South Yarra train station showing which areas have hearing loop coverage (Figure 1). Similar signage is also used at Brisbane Airport to inform users which sections of the departure gate area are equipped with a hearing augmentation system (Figure 2).

Figure 1: Hearing loop map at South Yarra train station



Figure 2: Hearing loop map at Brisbane Airport



The working group emphasised the importance of information being available in multiple formats to cater for people with intersecting disabilities, such as people with both hearing and vision impairments. For example, communication of where there is hearing loop coverage should include braille signage, and information should be available online to support journey planning. The working group also agreed that passengers would benefit from captioning on visual displays of audio announcements, including notifications of planned and unplanned disruptions.

The working group agreed that the location and design of signage and maps should be determined through co-design and user-testing with passengers, including people who read braille and tactile lettering. The working group also noted the need to develop guidance material about the recommended location of signage to provide clarity to operators and providers. The working group noted the importance of signs complying with the Transport Standards requirements with regards to placement, font, size, letter height and luminance contrast, and be provided in a consistent format where possible. Members noted the importance of the design of hearing augmentation signage aligning with the recommendations of the Braille working group, also convened by the Australian Government to undertake further work agreed through the reform process.

## Summary

- Information about the services available to passengers, including the forms of assistive listening systems used and coverage areas, should be available to passengers in multiple formats, such as online and through captioning, to support journey planning. This will be particularly important to facilitate a smooth transition into the use of new hearing augmentation technologies.
- Passengers should be informed through appropriate signage on the availability of hearing augmentation systems. Signage should incorporate Braille and tactile lettering so that information is accessible to people with intersecting disabilities, designed in accordance with the recommendations of the Braille working group. The location and design of signage and maps should be determined through consultation and user-testing. Coverage areas should be clearly marked with clear lines on the floor and signs on the wall.

## Emerging technology

The market for hearing aids is expanding to offer multiple new technologies that support assistive listening systems, including technologies incorporating Bluetooth, WIFI and interfaces with mobile phones. Working group members provided advice on emerging technologies currently being tested in early trial phases, both in Australia and overseas, and the different ways they work, such as:

- Web based apps which use QR codes that users can scan to access text-based information as well as audio via their mobile phone<sup>3</sup>
- Audio from a transmitter broadcast via Bluetooth to users' headphones, earbuds or hearing aids<sup>4</sup>

Working group members outlined that new technologies may offer a more convenient way for users to access travel information, and may be cheaper and easier for operators and providers to incorporate into their information sharing and assistive listening systems compared to telecoil hearing loops. Working group members also noted for some technology, such as Bluetooth, it may be easier and cheaper to retrofit these

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<sup>3</sup> For example: [Flight announcements take off with PStream - Issuu](#)

<sup>4</sup> For example: [Auracast - For Assistive Listening | Bluetooth® Technology Website](#)

new hearing augmentation systems into existing infrastructure than to install hearing loops. For example, installing a hearing loop may require renovation of a building, while installing Bluetooth transmitters may be less disruptive.

These forms of technology are still in the early stages of development and trials, but could form a valuable component of assistive listening systems used in public transport settings moving forward. The working group highlighted that operators and providers should be encouraged to collaborate with users to trial these systems across their networks and if appropriate, install new technology in tandem with induction loop hearing augmentation systems. Members noted the potential for operators and providers to also use equivalent access provisions in collaboration with people with disability to incorporate emerging assistive listening technologies into their assistive listening systems. Equivalent access is discussed further on page 11 of this report.

## Summary

- New assistive listening technologies may offer convenient and cost-effective ways to provide information in the future. Public transport operators and providers are encouraged to trial these technologies in collaboration with users, and if appropriate, install new technology in tandem with induction loop hearing augmentation systems, or use equivalent access provisions in collaboration with people with disability to incorporate emerging assistive listening technologies into their assistive listening systems.
- The Australian Government should consider the viability of new technologies in future statutory reviews of the Transport Standards, including minimum coverage requirements.

## Balancing current and emerging technology

While new and emerging technologies are entering the market and becoming more common, the working group emphasised that infrastructure for telecoils must continue to be maintained. Members of the working group noted that while the telecoil appears to be being phased out of new hearing aids, current telecoil users still need access to public infrastructure that supports their hearing aid technology. For this reason, designers of hearing augmentation systems should balance the incorporation of current and emerging technology.

The progressive rollout of new assistive listening technologies will take some time. In the interim, it is important that passengers who use a hearing aid can access audio announcements using a technology that is compatible with their hearing aid. This may require operators and providers to ensure multiple technologies (i.e. both hearing loops and other emerging technology systems) are available simultaneously. Providing information in multiple formats will be integral to supporting this transition.

The working group noted that this position is consistent with the views of international bodies including the European Federation of Hard of Hearing People, who have called for a balanced approach that integrates promotion of both technologies to maintain accessibility across various settings. Further information is available in their position statement [here](#).

## Summary

- Operators and providers should ensure they continue to maintain infrastructure for older assistive listening systems while newer technologies are gradually integrated. Providing information in a range of accessible formats will be integral to supporting this transition.

## Equivalent access provisions

The current requirements for hearing augmentation systems in the Transport Standards are prescriptive and reference Australian Standards. While this approach offers certainty to designers of public transport assets, it may not facilitate future innovations or technologies that may improve accessibility and/or the user-experience.

The working group discussed the merit of a technology-agnostic approach to ensure flexibility and the ability to accommodate future technologies. It is important, however, that no users are left behind as new technology is implemented.

One potential solution discussed by the working group was maintaining the prescriptive standard and providing additional guidance to operators and providers for using equivalent access solutions to comply with the Transport Standards. Section 33.3 of the Transport Standards provides for the use of methods, equipment or facilities that provide an alternative means of access to a public transport service, provided it maintains an equivalent standard of amenity, availability, comfort, convenience, dignity, price and safety. Implementation of equivalent access solutions requires consultation and co-design with affected user groups, including people with disability, in line with section 33.4 of the Transport Standards. The implementation of equivalent access solutions may help facilitate the implementation of emerging technologies in a way that is appropriate and practical for users.

The Australian Human Rights Commission has produced guidelines to provide clear and practical assistance to facilitate compliance with the Transport Standards through the use of equivalent access. Further information is available [here](#).

### Summary

- Prescriptive standards for hearing augmentation systems may provide greater clarity to designers of public transport assets on how to make sure their final products are accessible.
- Designers may still incorporate emerging technology into their systems using equivalent access provisions under the Transport Standards, so long as an equivalent standard of amenity, availability, comfort, convenience, dignity, price and safety is maintained. Equivalent access processes would not need to be undertaken if new technologies were implemented in addition to existing hearing loops that meet the requirements of the Transport Standards.

## Next steps

The Secretariat will present these findings and recommendations to the National Accessible Transport Steering Committee for consideration.