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From Standards to Practice: Evaluating Accessibility Infrastructure in Sydney Suburb

Zhiyang Huang

School of Civil and Environmental Engineering, University of New South Wales, Sydney NSW 2033, New South Wales, Australia.

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***Corresponding author:** Zhiyang Huang, School of Civil and Environmental Engineering, University of New South Wales, Sydney NSW 2033, New South Wales, Australia.

Abstract

This study evaluates the accessibility performance of the Maroubra Senior Citizens Centre, a key public facility serving elderly and local residents in the Randwick Local Government Area. A field inspection was conducted focusing on three critical infrastructure elements: a pedestrian ramp, a stairway, and tactile ground surface indicators (TGSIs). The assessment was undertaken in accordance with Australian Standard AS 1428.1:2021—*Design for access and mobility*, AS/NZS 1428.4.1:2009, the Disability (Access to Premises – Buildings) Standards 2010, the Disability Discrimination Act 1992, and the National Construction Code. Findings reveal that while most infrastructure elements complied with the minimum regulatory thresholds, several deficiencies were identified, including inadequate TGSI depth, insufficient setback from the main travel path, and lack of routine cleaning at key locations such as ramps and stairs. These shortcomings pose potential safety risks for elderly users and people with vision impairments. Recommendations are provided to improve compliance and enhance the overall inclusivity, safety, and equity of the Centre's built environment.

Keywords

Accessibility; Universal Design; Pedestrian Ramp; Stairway; Tactile Ground Surface Indicators (TGSIs); AS 1428.1:2021; Disability Standards; Inclusive Infrastructure; Elderly Users; Urban Equity

1. Introduction of Accessibility

1.1 Background

Accessibility is a foundational pillar of urban liveability, especially in ageing societies and increasingly diverse cities like Sydney. National statistics show that by 2066, older Australians (aged 65 and above) may constitute up to 23% of the population, while over 18% currently live with some form of disability [1, 2]. These demographic trends underscore the urgent need for inclusive design in public infrastructure, not only to facilitate physical access but also to promote autonomy, dignity, and social inclusion for all users. As public infrastructure plays a vital role in supporting everyday mobility, mental well-being, and community engagement, ensuring it is equitably designed and maintained is essential for advancing transport justice and civic equity [3].

1.2 Aim

This chapter evaluates the accessibility performance of the Maroubra Senior Citizens Centre, a key public facility within the Randwick LGA serving predominantly older adults. Selected for its community significance and alignment with the project's liveability focus, the site was assessed through qualitative fieldwork and compliance comparison against AS 1428.1:2021, the Disability (Access to Premises – Buildings) Standards 2010, and the National

Construction Code. The aim is to assess whether core infrastructure elements—such as the ramp, stairway, and tactile ground surface indicators (TGSIs)—meet national accessibility standards and to identify retrofit opportunities based on universal design principles. By linking real-world audit findings with legal and technical benchmarks, this chapter highlights how built environment quality impacts vulnerable users' mobility and contributes to broader goals of urban equity and ageing-in-place [4].

2. Relevant Documentation of Accessibility

Accessibility in Maroubra is assessed with reference to four key documents: AS 1428.1:2021, AS/NZS 1428.4.1:2009, the Disability (Access to Premises – Buildings) Standards 2010, and the Disability Discrimination Act 1992. These documents jointly define Australia's legal and technical framework for inclusive infrastructure. While AS 1428.1:2021 provides core design standards for new building work, AS/NZS 1428.4.1:2009 offers detailed specifications for tactile ground surface indicators (TGSIs). The Premises Standards legally enforce the AS 1428 series under the DDA, ensuring consistency and compliance across built environments [5-7].

For access ramps, AS 1428.1:2021 mandates a maximum gradient of 1:14, a clear width of at least 1000 mm, and landings of ≥1200 mm. Dual handrails are required. The Premises Standards 2010 (Clause D3.3) gives these provisions statutory authority, while AS/NZS 1428.4.1:2009 requires warning TGSIs at ramp thresholds unless specifically exempt. Under the DDA (Section 23), failure to provide accessible ramps may constitute unlawful discrimination.

Stairway design is addressed by AS 1428.1:2021, which specifies riser and tread dimensions, nosing limits, handrail continuity, and luminance contrast. Clause D3.3 of the Premises Standards again mandates compliance with this technical standard. TGSI placement on stairs is governed by AS/NZS 1428.4.1:2009, which requires warning indicators on both landings to alert users to height changes. The DDA affirms the obligation to ensure stairs are not barriers to access.

Tactile ground surface indicators (TGSIs) are regulated by AS/NZS 1428.4.1:2009 Sections 2.2–2.6, which define their required spacing, contrast, and placement. Warning TGSIs must be installed 300 mm from the hazard edge, spanning 600–800 mm in depth, with ⩾30% luminance contrast. Directional TGSIs must follow the travel path to aid navigation. These are required by AS 1428.1:2021 and enforced under Clause D3.8 of the Premises Standards. The DDA supports their provision as essential for equitable access, particularly for people with vision impairments.

3. Selected Infrastructure of Accessibility

This section evaluates three key accessibility elements at the Maroubra Senior Citizens Centre: the ramp, stairway, and tactile ground surface indicators (TGSIs). Located at 6 Alma Road, this public facility serves elderly and local residents. A site visit was conducted at 11:00 AM on 03/08/2025 under light rain. The audit followed national standards, including AS 1428.1:2021, AS/NZS 1428.4.1:2009, Premises Standards 2010, and the DDA 1992. Equipment such as digital slope gauges, callipers, and high-resolution cameras ensured accurate measurements [8].

Figure 1 below illustrates both the geographic location of the Maroubra Senior Citizens Centre within the eastern suburbs of Sydney and the general spatial layout of the three key accessibility features—the ramp, stairway, and tactile ground surface indicators (TGSIs)—as integrated within the main entry area of the Centre. Each of these components is analysed in the following subsections with reference to relevant design standards and supported by annotated photographs from the field.

Figure 1. Location and layout of the Maroubra Senior Citizens Centre: (a) Address within Sydney; (b) Front elevation of the place; (c) Side elevation of the place (Source for Google Map).

3.1 A concrete ramp

The main wheelchair-accessible ramp is located to the left of the building entrance. It features a 4° slope, mid-landing (1700 mm × 2360 mm), 1180 mm clear width, and dual handrails at 900 mm height. Handrails extend 380 mm for safety. A yellow TGSI panel (1070 mm wide × 570 mm deep) is installed 320 mm from the base.

3.2 An external stairway

Positioned right of the main entrance, the stairway comprises seven steps, each 175 mm high and 250 mm deep. The overall width is 2100 mm, with continuous handrails (900 mm high, 480 mm extensions). Nosing projects 60 mm at 90° angles. A TGSI panel (1885 mm wide × 570 mm deep) is located 300 mm from the bottom step.

3.3 Tactile ground surface indicators

TGSIs are installed at the top and bottom of both the ramp and stairway, helping vision-impaired users detect level changes. Panels are yellow with domed studs (35 mm base, 25 mm top, 3 mm high, 50 mm spaced). Installed perpendicular to travel, their setback distances are 300 mm (stairs) and 320 mm (ramp). While all panels exceed 1000 mm in width, their depth of 570 mm is slightly below the AS standard (600 mm).

4. Compliance Summary of Accessibility

4.1 Compliance evaluation for ramp

The ramp generally complied with AS 1428.1:2021 and AS/NZS 1428.4.1:2009, meeting key criteria such as a 4° slope, 1180 mm clear width, generous landings, and dual handrails with 380 mm extensions (refer to Table 1). However, the TGSI panel at the base measured only 570 mm in depth and had a setback of just 250 mm—both falling short of the required 600 mm and ≥900 mm, respectively. Debris observed near the landing also reduced TGSI visibility, underscoring the importance of regular maintenance alongside technical compliance.

Table 1. Summary of Compliance for the Ramp

Category	Design Requirement	Measurement	Compliance
Ramp	Ramp Slope: ⩽1:14	4°	Yes
	Ramp Width: ⩾1000 mm	1180 mm	Yes
Handrails	Height: 865 – 1000 mm	900 mm	Yes
	Rails on Both Sides	satisfied	Yes
	Extension: ⩾300 mm	380 mm	Yes
	Ends Return: 180°	satisfied	Yes
	Parallel to Surface	satisfied	Yes
Landings	Landing Length: ⩾1200 mm	1700 mm	Yes
	Landings Width: ⩾1540 mm	2360 mm	Yes
	Landings Interval: ⩽9000 mm	2000 mm	Yes
	Slope of the Landing: ⩽1:50	2°	Yes
Ramp TGSIs	TGSI Width: ⩾1000 mm	1070 mm	Yes
	TGSI Setback from Edge: 300 – 600 mm	320 mm	Yes
	TGSI Depth: ⩾600 mm	570	No

4.2 Compliance evaluation for the stairway

The stairway was assessed against AS 1428.1:2021 and AS/NZS 1428.4.1:2009, demonstrating strong compliance with riser height (175 mm), tread depth (250 mm), and a width exceeding 2100 mm. Handrails were continuous on both sides at 900 mm height, with 480 mm extensions and 180° returns. Nosing design included a 60 mm contrast strip, 90° intersection, and no overhang, meeting safety and visibility standards. Landings were provided at both

ends, as required. Full measurements and compliance details are shown in Table 3.5.2.1. However, the TGSI panel depth (570 mm) and setback (250 mm) both fell short of the required minimums (600 mm and ≥900 mm, respectively), potentially reducing detectability. Site debris further obscured the TGSI during the visit, highlighting maintenance as a key factor for ongoing accessibility.

4.3 Compliance evaluation for tactile ground surface indicators

Four TGSI panels—located at the top and bottom of the ramp and stairway—were assessed against AS/NZS 1428.4.1:2009 for stud dimensions, layout, contrast, and placement. All individual tactile studs met required specifications: 35 mm base diameter, 25 mm top, 3 mm height, and 50 mm spacing. Panels were uniformly arranged, perpendicular to travel, and had high-contrast yellow surfaces. However, all panels recorded a depth of 570 mm, falling short of the 600 mm minimum. While minor, this may reduce hazard detection time for vision-impaired users. Additionally, two panels were partially obstructed by debris during the site visit, posing tactile and slip hazards.

5. Conclusions and Recommendations of Accessibility

The accessibility audit of the Maroubra Senior Citizens Centre found strong overall compliance with AS 1428.1:2021 and AS/NZS 1428.4.1:2009 across core features such as ramp gradient, stair dimensions, and handrail design. However, several minor but critical issues were identified—most notably, all TGSI panels failed to meet the minimum required depth (600 mm) and setback distance (≥900 mm), potentially reducing early hazard detection for vision-impaired users. In addition, site observations revealed accumulated debris obscuring TGSI panels, highlighting the importance of maintenance in sustaining safe and equitable access beyond initial design compliance.

To enhance accessibility, four targeted improvements are proposed: (1) extend TGSI panels to a compliant depth and reposition them to meet minimum setback standards [7]; (2) implement a regular cleaning and maintenance regime to maintain surface traction and visual contrast [9]; (3) install directional TGSIs to improve wayfinding and navigation for users with low vision;[5] and (4) introduce high-contrast visual signage to complement tactile cues and support multi-sensory accessibility [6]. Together, these actions will ensure the Centre offers safe, dignified, and inclusive access for all community members [7].

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