Technical Direction

Traffic Engineering

TETD 2019/01 | RMS.19.1204 – 20 March 2019

Installation of Audio Tactile Line Marking

Summary:	Audience:
This technical direction specifies the installation requirements for audio-tactile line marking on NSW State Roads, and supersedes the Roads and Maritime Services Delineation guide Part 5 V1.6.	• Designers & Network Safety • Program, Project and Contract Managers • Industry Partners

Purpose

This technical direction provides the guidelines and requirements for installation of audio-tactile line marking (ATLM). It supersedes the Profile Linemarking section (5.2.6) of the Roads and Maritime Services *Delineation guide Part 5, V1.6*.

Background

Audio-tactile line marking (ATLM) is a thermoplastic line or similar, consisting of raised ribs at regular intervals. It can be installed on edge lines, lane lines and centre lines of any linemarked carriageway.

The purpose of ATLM is to reduce 'run-off-road' or cross carriageway crashes by providing a noise (audio) and vibratory (tactile) warning to road users who may stray due to fatigue or poor visibility due to rain or fog. It is a highly effective road safety countermeasure that is low cost and easy to install.

Driver fatigue is a significant factor in run-off-road crashes in rural areas. ATLM should be targeted for rollout on NSW rural roads particularly where there is a lack of physical measures to separate vehicles from roadside hazards or opposing traffic flow. Continuous installation of ATLM is critical to its effectiveness to mitigate crash migration.

Approvals:

Owner:	Kellee McGilvray Director Traffic Engineering Services	**Review Date:**	20/03/2022
Authorised by:	Chris Harrison	**Effective Date:**	

Summary of Changes

This technical direction includes the following revised installation requirements;

- Removes the requirement for minimum traffic volumes as a criteria for installation
- Provides alternate installation specifications
- Reduces minimum shoulder widths to 1m adjacent to ATLM
- Allows for the installation of ATLM within a minimum 200m offset from residential buildings
- Allows use of ATLM without approval from the Director Traffic Engineering Services when installation guidelines are met.

ATLM material selection for pavement surface

To maximise the performance and life of the ATLM, consideration should be given to the most appropriate material or treatment for the pavement surface and location. Examples are provided in Table 1.

ATLM should not be installed if the pavement surface is scheduled for re-surfacing or reconstruction within 3 years.

Table 1: ATLM materials for use on pavement surfaces

Pavement Surface	ATLM Preferred Material	Alternative Treatment*
P. C. Concrete	Cold Applied Plastic	Milled (Ozrumble type)
Asphalt	Thermoplastic	Milled (Ozrumble type)
Sprayed Seal	Thermoplastic	

**Please seek advice from Statewide Delivery and/or Traffic Engineering Services in regards to new products that may be suitable*

Specification for Installation

Audio Tactile Edge Lines (ATEL)

It is recommended that ATLM is installed adjacent to the outside of an edge line, as shown in Figure 1. The offset distance from the edge line is to be a maximum distance of 50mm.

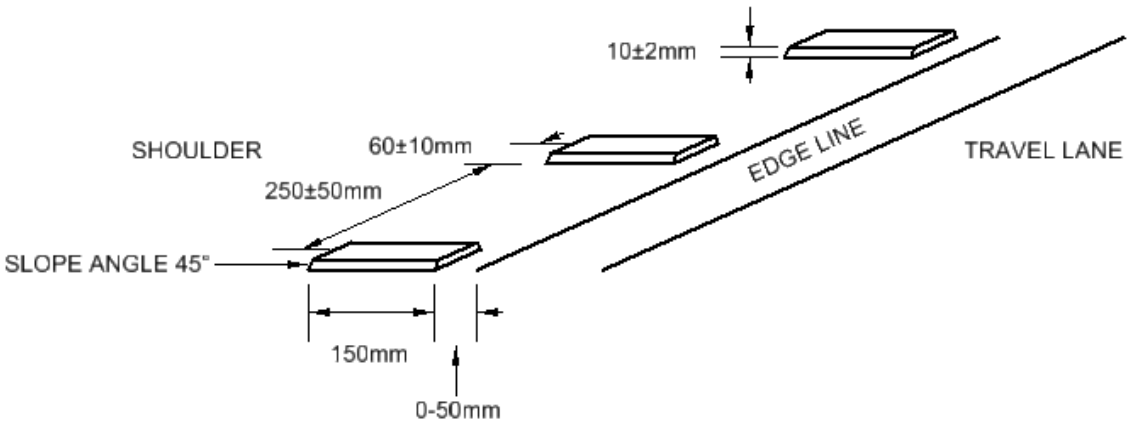

Figure 1 – Specification for installation of white ATLM raised ribs

Installation of ATLM adjacent to edge line reduces the occurrence of nuisance hits, which can;

- Improve the effective product life span and reduce maintenance requirements
- Reduce the noise levels omitted due to nuisance impacts.

The installation of raised ribs on top of an edge line may be considered where site specific conditions preclude the use of ATLM adjacent to an edge line.

Figure 2 – Examples of ATLM installation.

Left: on top of edge line (continuous).Right: adjacent to edge line (discontinuous)

On rural high speed roads, discontinuous black ATLM raised ribs may be considered as an alternate treatment. When black raised ribs are installed as part of an ATEL treatment, they are to be installed in accordance with Figure 3.

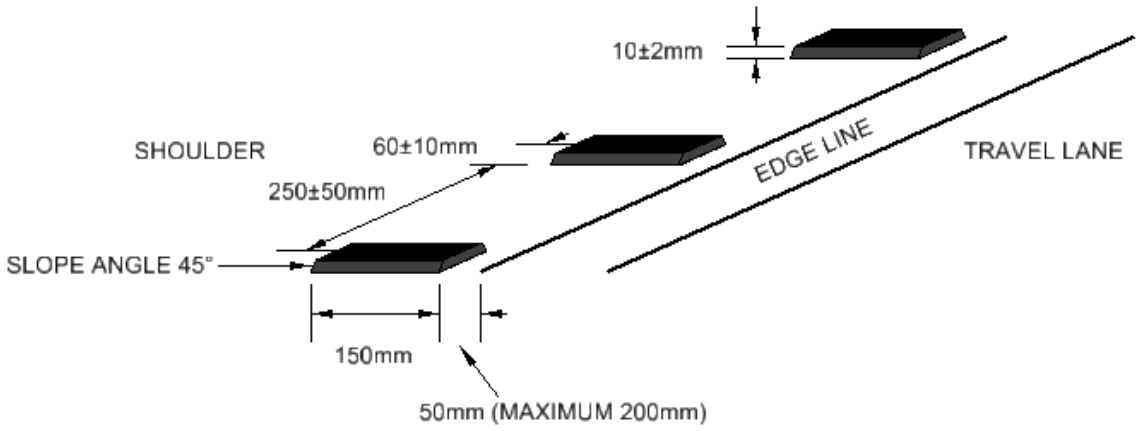

Figure 3 – Specification for installation of black ATLM raised ribs on edge lines

The offset distance of black ATLM raised ribs from the edge line can be varied, up to a maximum distance of 200mm. This is only acceptable for black ATLM raised ribs as they do not provide the same delineation function as white ATLM raised ribs. Consideration must be given to pedestrian and cyclist use of the shoulder, to ensure a safe and efficient travel path is provided.

Figure 4 Example of installed black ATLM raised ribs on edge lines on rural high speed roads

Audio Tactile Centre Lines (ATCL)

For a wide centreline treatment, discontinuous white ATLM raised ribs are to be installed adjacent to the edge line as shown in Figure 5. The use of white ATLM raised ribs provides additional delineation benefits as part of a wide centreline treatment, and is the preferred ATCL treatment.

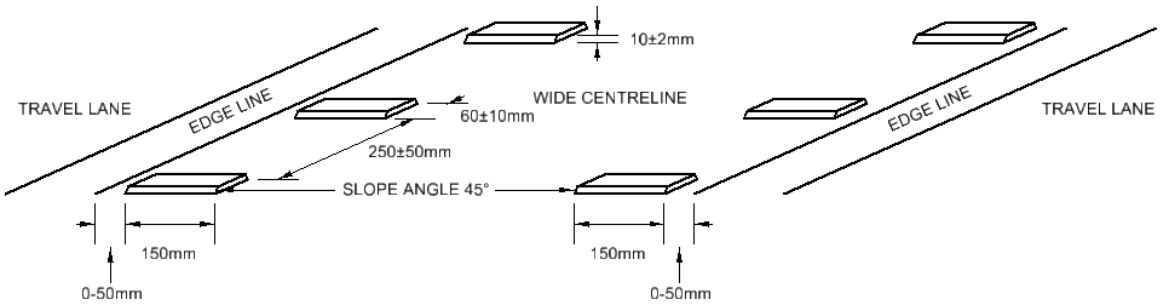

Figure 5 – White ATLM placement for wide centreline treatments

If, for project specific reasons, black ATLM raised ribs are to be installed as part of wide centreline treatment, then they are to be installed as shown in Figure 6.

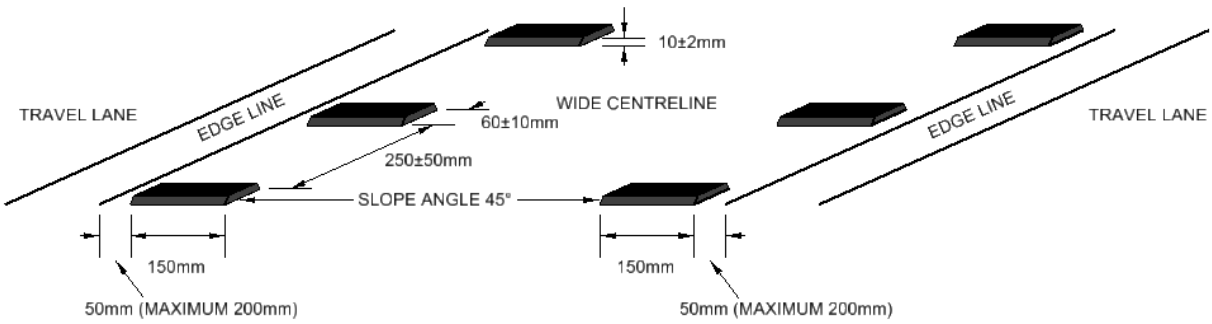

Figure 6 – Black ATLM placement for wide centreline treatments

Figure 7 – Example of black ATLM rib placement for wide centreline treatments

For standard dividing (barrier) lines (BS, BB), enhanced dividing (barrier) lines (BS1, BB1, BB2) and lane lines, white ATLM raised ribs should be installed on top of the marked lane line, and be the same width as the lane line marking, as shown in Figure 8 below.

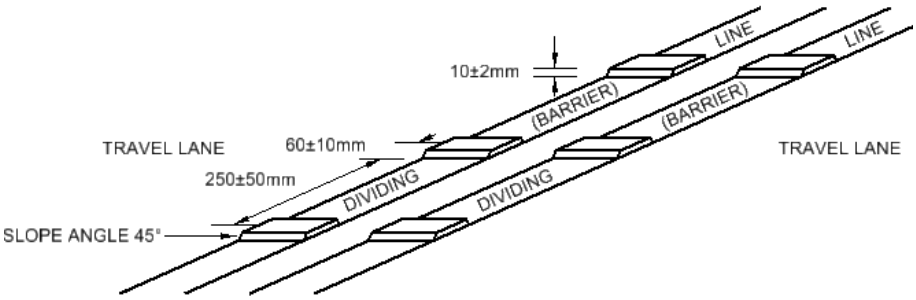

Figure 8 – White ATLM raised rib placement for standard centreline treatments

On rural high speed roads, black ATLM raised ribs can be used for standard dividing (barrier) lines (BS, BB) and enhanced dividing (barrier) lines (BS1, BB1). With this approach, the black ATLM raised ribs are placed prior to the installation of centre line markings, and are the same width as the gap between the lane line markings.

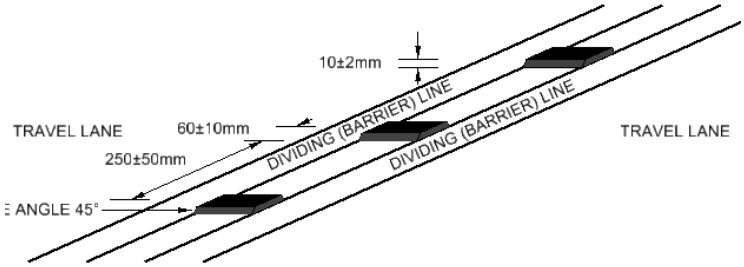

Figure 9 – Black ATLM raised rib placement for standard centreline treatments on rural high speed roads

Black ATLM raised ribs may also be suitable for installation with standard dividing (separation) lines (S1, S6). The black ATLM ribs are placed continuously prior to the installation of line marking (ie the line marking is placed over the black ATLM ribs).

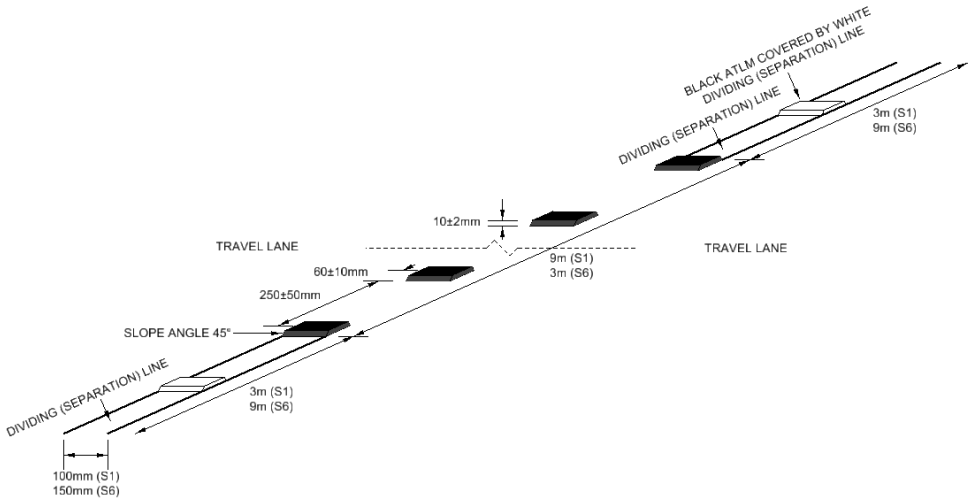

Figure 10 – Black ATLM rib placement for dividing (separation) line treatments

Installation Constraints

ATLM should not be installed where the below conditions are present:

- On the inside of small radii curves within 500m of residential properties, where there is high likelihood that vehicles may frequently traverse the ATLM and cross into the road shoulder. The likelihood will vary depending on speed zone, lane width, use of lane widening and design vehicle. A site specific assessment should be completed where ATLM is to be installed on curves with a radii of less than 450m.
- Where there is a left turn deceleration lane or other higher speed exit into driveways or access roads servicing significant traffic generating developments (ie. such as service centres).
- Where the number of access points exceeds 20 per km
- Within 50m of the approach and departure to intersections.

ATLM must be installed and maintained in accordance with the Roads and Maritime QA Specification R145 Pavement Marking (Performance Based)

Shoulder width

The minimum sealed shoulder width for installation of ATLM on edge lines is 1 m. In determining appropriate shoulder widths, consideration should be given to the following:

- Cyclists and pedestrians
- Use of barrier
- Design speed
- Road alignment
- Traffic volumes & composition
- Road cross-section
- The roadside environment.

This width requirement does not apply to right hand shoulders on one way carriageways.

Traffic volume

Given the safety benefits and cost effectiveness of ATLM as a treatment, there is no minimum traffic volume needed for installation. The decision to install is multifactorial, and considers factors such as the following:

- Crash history & characteristics
- Road cross-section
- Budget
- Access requirements
- Traffic volumes and vehicle composition.

Approval for installation & offset distance to residential buildings

When ATLM is to be installed within a 200-500m radius of a residential property, the use of ATLM should be discussed with affected residential property owners during project consultation activities, to explain the anticipated safety benefits.

Installation of ATLM in areas that provide less than a 200m offset may be considered where the frequency and severity of fatigue-related crashes are such that a continuous treatment is considered essential on safety grounds. Approval from the Director Traffic Engineering Services and Regional Director / Precinct Director is required for installations with less than a 200m offset.

Information to be submitted for consideration as part of the approval process includes:

- Site map, showing location of proposed ATLM and offset distances to residential buildings
- Crash history
- Traffic volumes and vehicle composition
- Plans of any proposed roadworks
- A description of the construction techniques used in residential buildings, in particular whether they are of lightweight construction (such as weatherboard or similar, as these are particularly susceptible to noise intrusion) or masonry construction
- Noise assessment data (if completed)
- Proposed noise mitigation measures
- Outcomes of consultation with affected property owners.

References

Delineation Section 5 Enhanced Delineation Devices (Requiring prior approval) Version 1.6, February 2015, Roads and Maritime Services, Sydney NSW.

Austroads Guide to Traffic Management Part 10: Traffic Control and Communication Devices, Second Edition, August 2016, Austroads Ltd Section 6.3.7

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