Government of **Western Australia**
Department of **Transport**

Empowering a thriving community

Planning and Designing for Active Transport in WA
Safe Active Street Interim Design Guidance

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About this report

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Amendment record

This document will be reviewed and developed as part of a suite of guidelines for the planning and designing for active transport in Western Australia, to ensure its continuing relevance to the systems and processes that it describes. If you would like to provide feedback or suggest any changes to this guidance, please contact the Department of Transport at activetransport@transport.wa.gov.au

A record of contextual revisions is listed in the following table.

Page No.	Context	Revision	Date

Contents

Abbreviations

Definitions for key terms are available in the Planning and Designing for Active Transport Glossary.[i]

Abbreviation	Term
DoT	Department of Transport Western Australia
LG	Local government
LTCN	Long-term cycle network
Main Roads	Main Roads Western Australia
Austroads GTM	Austroads Guide to Traffic Management
LATM	Local area traffic management
PTA	Public Transport Authority Western Australia
SAS	Safe active street
WA	Western Australia

1. Introduction

1.1 About this guidance

This document guides the design of safe active streets (SASs) in Western Australia (WA).

SASs are active transport routes on quiet local streets where speeds have been reduced to 30 km/h to accommodate safe shared use by people walking, wheeling, riding and driving.

With lower vehicle speeds, these streets are designed to be more comfortable for riders of all ages and abilities, while also maintaining access for motor vehicles.

As part of the broader bike network, they connect people from where they live to higher order bike routes and local destinations, such as schools, railway stations, activity and neighbourhood centres, parks and other recreation spaces.

Also known as neighbourhood greenways, bike boulevards, or quiet streets, these streets have been widely adopted globally and implemented in WA to better support local bike trips, and as a way to use the existing carriageway rather than impacting more green, natural or verge spaces.

Information on the Department of Transport (DoT) SAS Pilot Program is available online.

1.2 Walking, wheeling and riding

SASs support people walking, wheeling and riding by providing dedicated infrastructure and design features that prioritise their safety and comfort.

These modes are all categorised as active travel/transport, which refers to being physically active to make journeys for a variety of purposes such as transport, exercise, fun or recreation. Walking and bike riding are the most common modes, but scootering, skating, running, paddling or using other assisted devices (such as an eScooter) are also included.

The term wheeling refers to people using wheeled mobility aids, such as wheelchairs or mobility scooters.

1.3 Relationship with other guidance

This guidance has been developed in consideration of the following documents, which should be referenced by designers:

- The long-term cycle network (LTCN)[ii] for WA and relevant local bike plans, integrated transport plans, and other regional transport strategies.
- DoT's All Ages and Abilities Contextual Guidance (Contextual Guidance),[i] which is the primary reference document for the selection and design of all ages and abilities bicycle infrastructure in WA.
- DoT's Local Area Traffic Management (LATM) guidance document,[i] which advises on incorporating the safe and efficient movement of people riding bikes into the planning and design of LATM schemes.
- Main Roads Safe Active Streets Policy and Application Guidelines (July 2023),[iii] which outlines requirements for the installation of SAS blue patches and other signage and pavement markings relevant to SASs. Main Roads is required to approve all regulatory aspects of an SAS and formal approval from DoT is required to accompany any signage and pavement marking application. Designers are encouraged to liaise early with both agencies to identify suitability and requirements.
- Main Roads Guideline Change of Stop or Give Way Priority at Four-Way and 'T' Intersections.[iv]
- Austroads Guide to Traffic Management series,[v] particularly Part 8: Local Street Management.
- Multiple Public Transport Authority (PTA) documents as referenced in Section 9.9.

2. Rationale

2.1 Streets as vital links in the bike network

SASs play an essential role in expanding the LTCN by utilising local streets more effectively.

While physically separated bike lanes and paths are vital in a comprehensive bike network, they cannot and should not be installed on every street due to space limitations, resource constraints, and the need to prioritise network connectivity and bike riding demand. Not every street serves as a key route for bike riders, hence installing extensive separated bike infrastructure on low-traffic streets may not provide substantial benefits to riders compared to focusing those facilities on key routes or corridors.

SASs integrate bike facilities and traffic calming measures into local streets, maximising existing infrastructure and providing a space-efficient solution. This approach enhances connectivity while minimising the need for separate facilities or encroachment on green and verge spaces.

2.2 SASs and LATM

LATM schemes and SASs intersect in their shared goal of creating safer and more accessible streets for all road users. There are, however, key differences between SASs and LATM schemes. Both approaches prioritise traffic calming measures to improve the safety and comfort of vulnerable road users, while also making the environment safer for people driving.

SASs are specifically designed to prioritise active travel and create bike-friendly streets, whereas LATM encompasses a broader spectrum of traffic management strategies aimed at improving overall mobility in local areas.

DoT’s LATM guidance document is the primary reference for designing for bike riding in LATM schemes.

2.3 SASs are network corridors, not spot treatments

The effectiveness of SASs as a bike facility, and as part of the broader bike network, depends on creating continuous, legible end-to-end routes through neighbourhoods to key destinations.

SASs are not intended to be implemented as isolated segments. They are not a treatment solution for difficult or constrained sections of a route that otherwise may consist of a dedicated facility, such as a shared or separated path or physically separated bike lanes. However, an SAS may incorporate sections of other infrastructure solutions where an SAS treatment is not suitable. For example, a path connection through a park to connect two segments of a broader SAS route.

While it may appeal to some designers to use an SAS as a spot treatment to address design constraints in the short-term, this can undermine the intent of SASs within the bike network.

2.4 Bike riding in mixed traffic

Bike riders of all ages and abilities can feel comfortable mixing with traffic at low speeds and volumes (see the Contextual Guidance[i] for thresholds). Beyond speed and volume, the perception and feeling of comfort for riders in mixed traffic facilities depends on various factors:

- The width of the carriageway and proximity of overtaking vehicles (particularly buses and heavy vehicles)
- The frequency of side roads, parking and loading activities that can introduce conflicts
- The surface quality, gradients, and exposure to the elements that influence the physical effort required to ride
- The clear prioritisation of bike riding through physical (e.g. signage) and psychological (e.g. street narrowing) measures.

Designers will assess the street's context and function and employ various design measures and treatments to create a low-stress active travel environment.

2.5 Riders in primary position

Understanding two key positions for bike riders on the road is crucial for designing bike-friendly infrastructure, particularly in contexts where bike riders switch between them.

The secondary position is to the left of the lane, allowing vehicles to pass, preferred by less confident riders. This position may not always be safe, however, prompting riders to move to the primary position—centered in the lane—to prevent unsafe overtaking, increase visibility, or avoid obstacles. This strategy, known as 'taking the lane,' is common at narrow points, medians and intersections, and is influenced by context, rider skill and bike type (e.g. electric bikes).

On SASs, riders are intended to take the lane and ride in primary on the carriageway. More detailed information on the riding positions is available in DoT's LATM guidance document.[i]

2.6 Design, operations and network modifications

Creating safe biking conditions on streets goes beyond geometric design. It involves a comprehensive approach, integrating design, operational and network strategies to make streets suitable for all ages and abilities.

- Design strategies, such as altering street cross-sections, can accommodate bike riders without significant impacts to motor traffic.
- Operational changes, such as speed reduction, reduce traffic stress and enhance predictability, contributing to safer active travel environments.
- Network modifications, such as filtered permeability or traffic/bus route diversion, help change the role of the street and create better conditions for active travellers without necessarily requiring dedicated space.

On SASs, while the design strategies and operational changes are essential, they may not be sufficient on their own. Modifying the network by diverting traffic away from the street or realigning bus routes can open up opportunities for better street designs.

2.7 Treatment spacing

The spacing of treatments on an SAS has been shown to significantly impact its effectiveness in slowing traffic and enhancing the safety and comfort of bike riders.

Regular treatment spacing between 80 metres (preferable) – 100 metres is a key characteristic of SASs that supports positive outcomes (Table 1).

SAS evaluation results suggest that treatment spacings are particularly important in route sections where people in cars can travel for extended lengths.

Raised intersections and/or midblock plateaus approximately every 80 metres are essential to maintaining vehicle speeds at or below 30 km/h.

Routes with minimal or longer distances between traffic calming treatments along extended lengths (more than 80 metres between speed treatments) tend not to achieve the same reduction in the 85th percentile traffic speed.

Table 1: Advantages of regular treatment spacing

Aspect	Explanation
Speed reduction	Regular spacing ensures that drivers must consistently maintain low speeds along the entire SAS.
Consistency	Consistently spaced treatments make the road environment more predictable for everyone and reduce the need for sudden manoeuvres or braking, enhancing safety.
Priority and ease	Strategically placed treatments can give bike riders (and other SAS users) clear right-of-way at intersections and crossings, ensuring riders can maintain their momentum and do not need to yield unnecessarily.
Traffic flow	Well-spaced treatments maintain a smooth flow of traffic, including bike riders. This reduces the likelihood of congestion or conflicts between different users.
Impact on behaviour	Spacing directly influences driver behaviour. Closer spacing encourages sustained lower speeds, while wider spacing can lead to drivers accelerating between measures.

3. Design requirements

3.1 Bike riding design outcomes

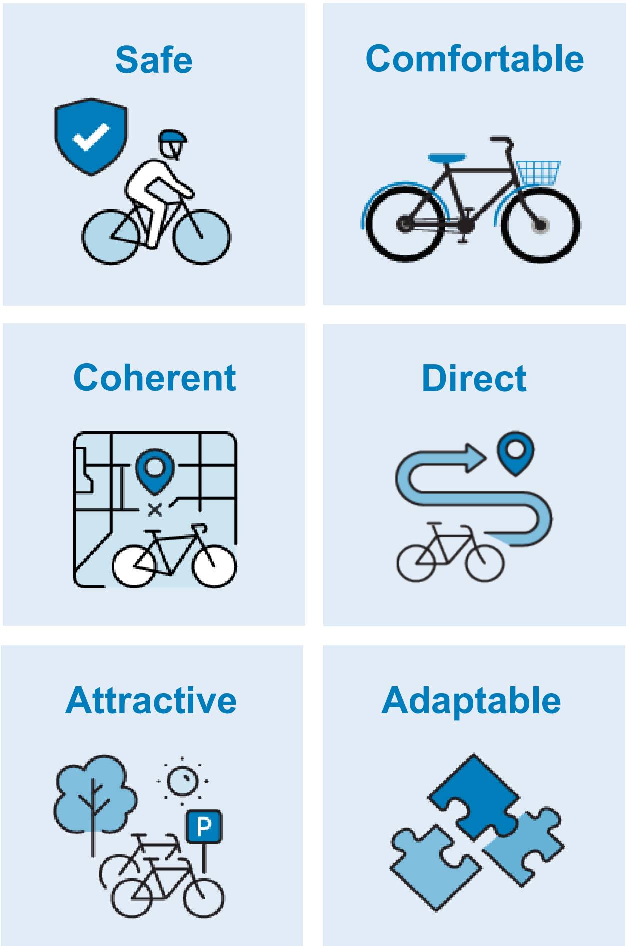
SAS projects should achieve the **six internationally-recognised outcomes** that need to be prioritised and balanced in the design of bike riding infrastructure (Figure 1).

These outcomes – also referred to as design principles or requirements – have been widely adopted and together describe what good design for bike riding should achieve.

They are important, not just for bike riders, but for all people using streets, public spaces and other public services and facilities, where provision for bike riding has the potential to improve safety and accessibility.

Refer to the Contextual Guidance[i] for more detail on the outcomes.

Figure 1: Bike riding design outcomes



3.2 Safe active street objectives

The ultimate goal of SAS projects is to use local streets to support the development of accessible, high level of service routes for active transport.

There are **five key objectives** (Table 2) to be achieved on SASs using a variety of design measures and treatments.

Table 2: SAS objectives

1.	**Create a 30 km/h operating speed** environment for vehicles along safe active streets.
2.	**Maintain vehicle volumes** at or below 1,500 per day.
3.	**Improve access** for active travel to local destinations and the broader bike network.
4.	**Address physical barriers** to active travel along the route.
5.	**Prioritise bike riding** to provide safe, uninterrupted and easy to navigate routes.

4. Route selection and key requirements

4.1 Route selection

The selection criteria in Table 3 help identify suitable routes for SASs. These criteria ensure that the routes align with the LTCN, are accessible for people of all ages and abilities, and connect to local amenities as well as the broader bike network.

Table 3: Route selection criteria

1.	**Quiet local roads** with less than 1,500 vehicles per day.
2.	User friendly – **low gradients** with good quality surface conditions.
3.	**Logical connections** to path networks and local attractors – schools, shops, recreation and parks.
4.	**Natural landscaping** with places to rest and shade that creates an enjoyable experience.
5.	**Safe and welcoming** with opportunities for community activation.

4.2 Key characteristics

There are several key characteristics or 'features' that impact the look and feel of the SAS.

Maintaining these characteristics helps to ensure a cohesive framework for SASs to:

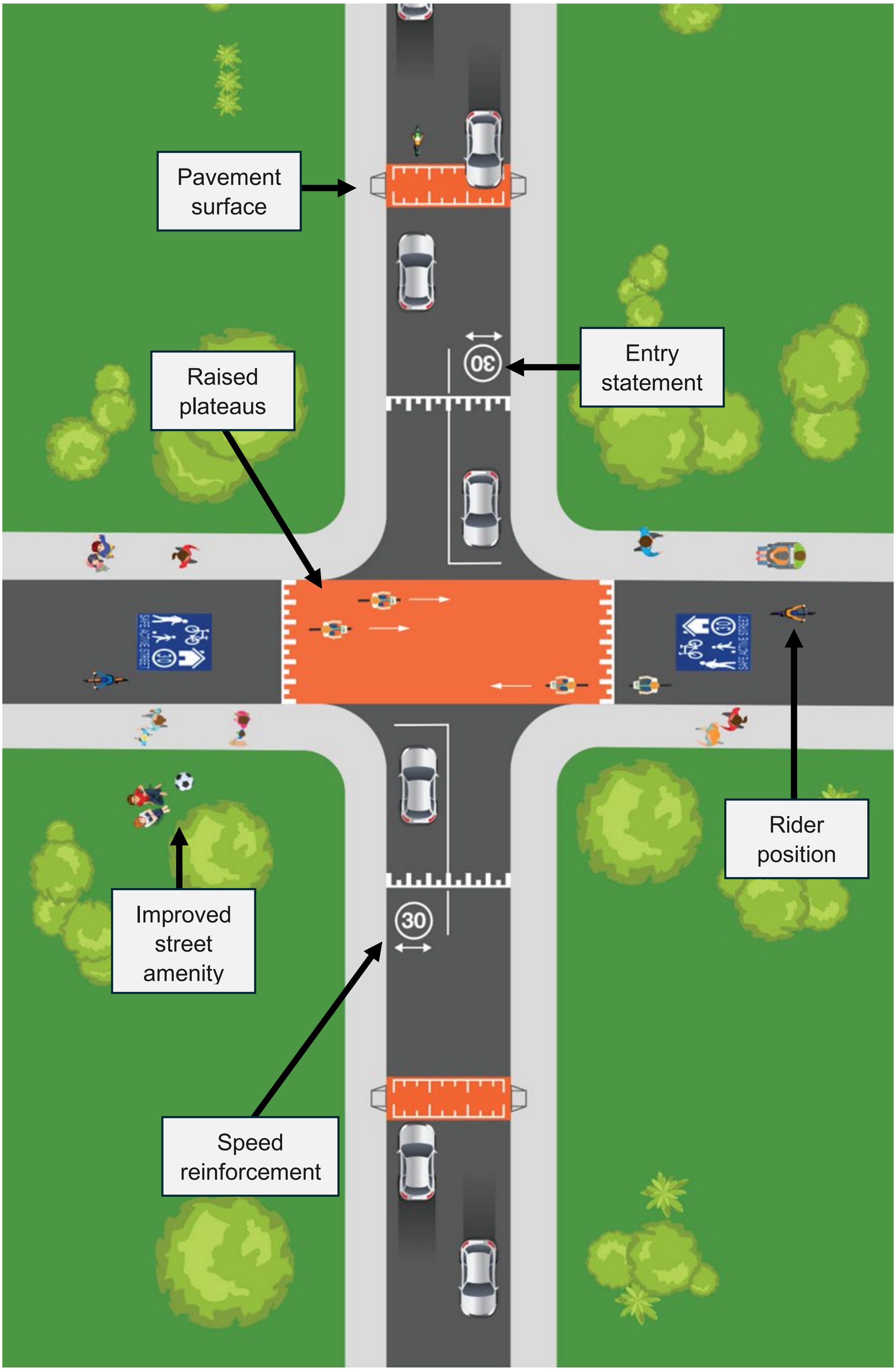
- standardise safety and usability: ensure consistent safety and usability across routes to enhance predictability for all road users;
- increase familiarity: build user confidence and encourage active travel by familiarising users with facilities; and
- improve navigation: provide consistent signage, wayfinding and treatments to aid navigation.

The key characteristics are detailed in Table 4 and some are illustrated in Figure 2.

Table 4: SAS key characteristics

Characteristic	Description
Distinctive entry threshold	Tight radii, contrasting colour surface, reduced carriageway width, raised platforms.
Entry statement	Blue patches and 30 km/h speed limit signs.
Improved street amenity	Enhanced with trees, plantings and facilities.
Restricted visibility	Lateral shifts in the carriageway limit forward visibility.
Street narrowing	Carriageway widths reduced to 4.5 – 4.8 m for two-way traffic, 3 m for one-way.
Pavement surface	Red asphalt used along the entire route or to highlight treatments.
Rider position	Riders encouraged to take the lane.
Treatment frequency	Implemented every 80 – 100 m (80 m preferred).
Speed reinforcement	30 km/h roundels to show reduced speed.
Bicycle symbols	Centred in unmarked lanes to show riders are sharing the carriageway.
Raised plateaus	On all intersection legs or internally.
Improved crossings	Prioritised crossings at regular intervals.

Figure 2: SAS illustration with characteristics



5. Design measures and treatments

5.1 Key measures and treatments

While the design of each SAS varies depending on the local context, the following measures and treatments are most commonly used:

- Single lane slow points: where approaching vehicles yield to cars or bikes already at or passing through the slow point.
- Raised platforms: at intersections.
- Street narrowing: formalised through on-street parking and landscaping.
- Priority signs: stop/give-way signs that prioritise SAS where possible.
- Traffic islands and medians: used to restrict car movements at intersections but allow full movement for active travellers.
- New crossings: added pedestrian or bicycle crossings.
- Bicycle markings: bicycle symbols in the centre of unmarked lanes to encourage lane use by riders.
- Lateral shifts: reduced sightlines by alternating on-street parking, treatments and landscaping.
- Additional amenity: enhanced attractiveness with more trip facilities, street amenities and landscaping.

5.2 Measures and treatments selection tool

Various measures are used to meet the SAS key objectives, with treatment options tailored to specific site contexts.

Some treatments address multiple objectives, while others are more targeted, as detailed in Table 5.

The Austroads Guide to Traffic Management provides a comprehensive list of LATM devices commonly used by local governments (LGs) in Australia, while the LATM scheme guidance advises on consideration of bike riders when implementing these devices.

This guidance features measures and treatments proven to prioritise and promote active travel, and therefore preferred for SASs.

If employing measures or devices not listed here, designers should demonstrate how those used are context-appropriate and achieve the key objectives.

Table 5: Measures and treatments selection tool

Measure	Treatment	Key objectives				
		1 Reduce speed	2 Limit volume	3 Improve access	4 Remove barriers	5 Prioritise bike riding
Vertical deflections	Raised pavement – intersection only	✓	✓			✓
	Raised pavement – all approaches	✓	✓			✓
	Road hump – Watts profile	✓	✓			
	Road hump – flat top plateau	✓	✓			
Horizontal deflections	Lane narrowing/kerb extensions	✓	✓			
	Slow point – single lane	✓	✓			
	Slow point – single lane angled	✓	✓			
	Slow point – two lane angled	✓	✓			
	Centre blister islands	✓	✓			
	Mid-block median treatments	✓		✓	✓	
Diversion devices	Road closures/filtered permeability	✓	✓	✓	✓	✓
	Modified T-intersections	✓	✓			✓
Signs, linemarking and other treatments	Speed limit signs/indication devices	✓		✓	✓	✓
	Pavement markings	✓		✓	✓	✓
	Decorative pavement markings	✓	✓	✓	✓	✓
	Threshold treatments/entry statement	✓	✓	✓	✓	✓
	Street signs – stop, give-way, etc.	✓	✓		✓	✓
	School zones	✓		✓	✓	
	Transition ramps	✓	✓	✓	✓	✓
	Bicycle facilities	✓	✓	✓	✓	✓
	Bus facilities	✓	✓	✓	✓	✓

6. Vertical deflections

6.1 Raised pavement – intersection only

An elevated platform confined across the apron of an intersection, ramped up from the normal street level and extended over the intersection without affecting the road markings.

Distinct in dimension and functionality from flat top road humps, where vehicles experience a pitching motion as they pass over, a raised intersection allows both sets of wheels to ascend onto the platform simultaneously.

These intersections enhance safety by slowing vehicle speeds and improving visibility.

Considerations:

- Lowers approach speeds and increases intersection visibility.
- Potentially deters through traffic via speed reduction and perception of longer travel times.
- Allows on-street parking and property access.
- Constructible from diverse materials, e.g. brick paving or architectural concrete.
- Height and material/texture adjustable for noise-speed reduction trade-offs.
- Enhanced passenger comfort on bus routes compared to standard humps.
- Decreases speeds where people walking are most likely to cross.
- May require mid-block treatment for long distances between intersections.
- Speed reduction may not match flat top road humps, but influence zone may extend longer street sections.

Refer: LATM Guidance 4.6, Austroads GTM 7.2.5

Figure 3: Raised pavement – intersection only

6.2 Raised pavement – all approaches

Similar to raised pavement – intersection only treatment, except the raised area is extended into the approaching side roads (all legs).

A raised intersection is ramped up from the normal level of the street with a platform extending into the approaching roads (all legs). These extend into the approaches by a standard car length or more (at least 6 m but typically more).

Engineering practice states this is the preferred treatment layout for intersections.

Considerations:

- Shares similar considerations with raised pavement – intersection only treatment.
- Reduces motorist confusion at ‘stop’ and ‘give-way’ lines.
- Extended speed influence due to enhanced visibility on approach.
- Provides a flat area for stopped vehicles to restart.
- Pedestrian crossings should be separate to avoid confusion and potential safety issues.
- Restricts stormwater flow along kerbs, requiring drainage installation if absent.

Refer: LATM Guidance 4.6, Austroads GTM 7.2.5

Figure 4: Raised pavement – all approaches

6.3 Road hump – Watts profile

Road humps are used to moderate vehicle speeds through the introduction of raised curved profiles extending across the carriageway.

They are typically installed in a series along the street to maintain low vehicle speeds.

The main types of road hump are the sinusoidal profile hump and the Watts profile hump.

The sinusoidal profile hump is more sympathetic to bike riders due to the shallower initial rise, while the Watts profile hump has greater effect on drivers.

Considerations:

- Reduces vehicle speeds along the entire street when used in series.
- Potentially deters through traffic and rat-running.
- Does not restrict on-street parking and least likely to impact property access and egress.
- Quieter than a rubber speed cushion installation.
- May divert traffic to nearby streets without traffic management measures.
- May only be suitable for use on relatively straight and flat streets away from intersections.
- Should be positioned so as to avoid impacting the ability of bus drivers to manoeuvre close to the kerb of a disability compliant bus stop boarding area.
- Can impact comfort of bus and emergency service vehicle operators and passengers.
- Doesn't counteract 'wide open road' effect on long straight roads.
- Minimal visual impact when constructed with similar materials as the carriageway.
- May increase vehicle noise due to braking and accelerating.

Refer: LATM Guidance 4.6, Austroads GTM 7.2.1

Figure 5: Road hump – Watts profile

6.4 Road hump – flat top plateau

A flat top road hump or raised table is a raised surface approximately 75 – 100 mm high and typically with a 2 – 6 m long platform ramped up from the normal level of the street.

The raised section (or platform) is flat instead of being curved.

Shares similar benefits and considerations with the Watts profile road hump, however, can be less comfortable for bike riders and vehicle occupants due to abrupt up and down movement.

Considerations:

- Adjustable height allows for noise-speed reduction trade-offs.
- More acceptable on bus routes due to adjustable ramp profiles.
- Larger size limits placement options without affecting property access.
- May cause confusion if placed near pedestrian thoroughfares as people might mistake them for pedestrian crossings.
- Should be positioned so as to avoid impacting the ability of bus drivers to manoeuvre close to the kerb of a disability compliant bus stop boarding area.

Refer: LATM Guidance 4.6, Austroads GTM 7.2.3

Figure 6: Flat top plateau

7. Horizontal deflections

7.1 Lane narrowing/kerb extensions

This treatment involves narrowing the trafficable carriageway to reduce speeds, improve lane delineation, and minimise pedestrian crossing distances (and therefore exposure to conflict).

Street narrowing is a key feature of SASs because reducing visibility and the space available for motor vehicles encourages people to drive more slowly.

Street narrowing can also enhance the streetscape, making the area more attractive and inviting for active travellers and residents.

Narrowing is generally done by extending the kerbs inwards or by other forms of kerb modifications (Figure 7), but it can also be achieved through the introduction of formalised on-street parking (Figure 8), medians (Figure 9) and buildouts (Figure 10).

Considerations:

- Aids in delineating and formalising parking.
- Offers landscaping opportunities.
- Can be significantly less disruptive to local traffic compared to more severe treatments.
- Suitable for bus routes and relatively little effect on emergency vehicles.
- Less effective than many other horizontal displacement devices in reducing speeds.
- May decrease available kerbside parking.
- Challenges in accommodating bicycle lanes as narrowing the road can cause squeeze points or encourage drivers to drive into bike lanes.
- Potential confusion as drivers may mistake empty kerbside parking for a traffic lane.

Refer: LATM Guidance 4.8, Austroads GTM 7.3.1

Figure 7: Lane narrowing using kerb extension

Figure 8: Lane narrowing using formalised parking

Figure 9: Lane narrowing using median

Figure 10: Narrowing at intersection using kerb extension

7.2 Slow point – single lane

These devices are designed to provide a physical and visual break-up of the continuity of the street in order to reduce vehicle speeds.

They can be used in isolation or in combination with mid-block median treatments, roundabouts, road humps, cycle lanes or other horizontal displacement devices.

In SASs, an approaching driver or bike rider must give way to anyone already at or passing through the slow point.

Considerations:

- Reduces speed near the device.
- Series installation can reduce speeds along the entire street.
- May deter through traffic and rat-running.
- Offers potential for enhancing streetscape with vegetation or amenities.
- Bicycle bypasses may be necessary.
- Potential for increased noise.
- Can impact on-street parking or property access.
- Can create a bottleneck for bike riders if not designed and maintained properly.
- Should be located without impacting bus movements, especially those that require the bus to serve a nearby disability compliant bus stop boarding area.

Refer: LATM Guidance 4.3, Austroads GTM 7.3.2

Figure 11: Single lane slow point

7.3 Slow point – single lane angled

Angled slow points are intended to reduce vehicle speeds by the creation of a short narrow section of carriageway that must be negotiated at low speed.

Angled slow points can be either two lanes, with or without an angled central median, or one lane. The effectiveness of an angled slow point is dependent on the degree to which the device is angled to the through roadway.

These are designed to provide a physical and visual break-up of the continuity of the street to reduce vehicle speeds by restricting forward visibility.

They can be used in isolation or in combination with mid-block median treatments, roundabouts, road humps or other horizontal displacement devices.

Considerations:

- Shares similar benefits and considerations with slow point – single lane treatment.
- More effective in speed reduction.
- Bicycle bypasses may be necessary.
- Less opportunity for landscaping.
- Typically not used on bus routes.

Refer: LATM Guidance 4.3, Austroads GTM 7.3.2

Figure 12: Angled single lane slow point with road hump

Figure 13: Angled single lane slow point

7.4 Slow point – two lane angled

Two-lane angled slow points are usually less effective than single lane/single lane angled slow points in controlling speeds and providing an adequate visual obstruction.

Whilst used on some SASs, they are not a preferred treatment.

Considerations:

- Shares some considerations with the slow point – single lane treatment.
- Two-way traffic is maintained resulting in less noise from vehicles stopping/starting.
- Increased reduction of on-street parking in vicinity of treatment.
- Bicycle bypasses may be necessary.
- More likely to impact property access and egress as longer in length.
- Typically not used on bus routes due to space being too tight to drive through and potential passenger discomfort when the bus moves sharply left and right.

Refer: LATM Guidance 4.2, Austroads GTM 7.3.2

Figure 14: Slow point – two lane angled

7.5 Centre blister islands

Blister islands are positioned at the centreline (median) of a street to narrow lanes, redirect traffic flow, and potentially provide a pedestrian refuge. They are commonly used where larger vehicles regularly use the route.

These islands are a variation of a slow point and often incorporate kerb extensions, particularly if the carriageway is wide.

To ensure safety, islands should be well-lit and clearly marked, with any landscaping designed to prevent sight obstruction.

Considerations:

- Well-spaced blister islands reduce street speeds.
- Potential squeeze point for bike riders – bicycle bypasses may be appropriate.
- Landscaping can enhance streetscape and diminish the 'wide open road' effect.
- Accommodate buses and commercial traffic.
- Reduces on-street parking adjacent to islands.
- May impact property access and egress.
- Unsuitable for narrow streets.
- Limited effectiveness in reducing through traffic.
- Should be located without impacting bus movements, especially those that require the bus to serve a nearby disability compliant bus stop boarding area.

Refer: LATM Guidance 4.1, Austroads GTM 7.3.3

Figure 15: Centre blister island

7.6 Mid-block median treatments

Medians can be an effective form of road narrowing, physically reducing the space available for vehicles and slowing traffic. They can also serve as pedestrian and bike rider refuges, allowing people to cross the street at more regular intervals.

Median treatments can impose significant risk to people riding in the direction of the traffic lane as motor vehicles may close-pass riders due to the narrow lane.

Although SASs are intentionally designed to encourage bike riders to take the lane (ride in primary position), realistically motor vehicles may choose to overtake in certain scenarios, such as when riders move to secondary position, ride in formalised parking, or on hilly sections.

On a well-designed SAS, medians should therefore either not be implemented over long distances (if raised) or be trafficable (flush).

Designers also need to consider that on SASs with lane widths less than 3 m, the 1 m passing rule will apply.

Considerations:

- Can provide refuge for pedestrians and bike riders crossing the street.
- Accommodate buses and commercial traffic.
- Offers landscaping opportunities.
- Can be low-cost, especially if medians are being retained.
- Can accommodate traffic control and speed indication devices.
- Can impact on-street parking.
- Raised treatments may restrict access for driveways and emergency/service vehicles.
- Extended raised medians not a desirable treatment due to safety issues.
- If medians are used, raised pedestrian refuges should be considered at crossing points.

Refer: LATM Guidance 4.7, Austroads GTM 7.3.5

Figure 16: Flush mid-block median treatment

Figure 17: Median treatments and raised pedestrian refuge

Figure 18: Median treatment and blue patch

8. Diversion devices

8.1 Road closures/filtered permeability

Road closures with filtered permeability filter out (i.e. limit/eliminate) some or all motor traffic through movements, reducing rat-running on predominately straight linear routes and grid street systems.

Filtered permeability is highly effective on long SAS routes to physically restrict through traffic while maintaining access for active travel.

Closures can be located at intersections or placed mid-block and can be full, half or diagonal closures.

Considerations:

- Reduces traffic volumes and conflict points.
- Reduces or eliminates through traffic/selected turning movements.
- Can accommodate active travel (all closures) and bus access (partial/diagonal closures).
- Offers landscaping options.
- May redirect some traffic to other local streets and/or restrict emergency vehicle access (unless they disregard controls).

Refer: LATM Guidance 4.4, Austroads GTM 7.4.1 – 7.4.3

Figure 19: Road closure with filtered permeability

Figure 20: Staggered crossing over an arterial road

8.2 Modified T-intersections

Modified T-intersections alter motor vehicle paths to slow traffic by redirecting movements, or to reassign intersection priority. They function similarly to slow points in moderating traffic speeds but at three-way intersections.

These are generally used to maintain priority for the SAS across connecting streets.

Deflection through the intersection will support speed reduction.

Considerations:

- Used to maintain or reassign priority to SASs.
- Reduce speeds down the length of the street when used in a series.
- Bicycle bypasses and/or pavement markings may be necessary.
- Can reduce through traffic and redirect motor traffic to distributor roads.
- Facilitate safe pedestrian crossing.
- Suitable for bus routes and relatively little effect on emergency vehicles.
- May decrease available kerbside parking.
- Trafficable pavement can be used to enable turning movements of larger vehicles, as shown in Figure 21.

Refer: LATM Guidance 4.5, Austroads GTM 7.4.4

Figure 21: Modified T-intersection

9. Signs, linemarking and other treatments

9.1 Speed limit signs and indication devices

Speed limit signs and indication devices indicate the maximum legal motor vehicle speed permitted under normal driving conditions on the street section or in the area where the sign is installed.

On SASs, speed signs and indication devices are used in combination with the physical features of the street to reinforce the intended speed environment.

Main Roads' requirements regarding the provision of traffic signs and pavement markings are outlined in Safe Active Streets Policy and Application Guidelines.

Considerations:

- Speed limit signs and indication devices alone require regular police enforcement to achieve compliance, hence SASs require these to be accompanied by effective physical speed-reducing measures.

Refer: LATM Guidance 4.5, Austroads GTM 7.5.1, Main Roads SAS Policy and Application Guidelines: Signs and Pavement Markings.

Figure 22: Speed limit sign

Figure 23: Street limit sign – end 30 km/hr

9.2 Pavement markings

This includes any markings, raised pavement markings, traffic domes and the like placed on the road to control traffic movements or parking.

Pavement markings play an important role in making SASs legible and recognisable.

Considerations:

- Key pavement markings on SASs include the blue patch (Figure 24), bicycle symbol with a solid triangle (Figure 25), and 30 km/h sign with arrows (Figure 26).

Refer: LATM Guidance 4.5, Main Roads SAS Policy and Application Guidelines: Signs and Pavement Markings.

Figure 24: Blue patch on SAS entry

Figure 25: Bicycle symbol with solid triangle

Figure 26: 30 km/h sign with arrows

9.3 Decorative pavement markings

Decorative pavement markings consist of differently coloured road paving materials applied to the surface of the road or footpath to simulate a coloured pavement.

These have no legal status and are not intended to be used as a traffic management tool but to influence behaviour.

For example, Figure 27 shows a treatment intended to direct children to a safe crossing point between a play space (park) and a school entry while also ensuring people riding through the space are given visual prompts to slow down.

The Main Roads Technical Note – Decorative Pavement Markings[vi] provides guidance for implementation these markings on local roads.

LGs can opt to install a variety of different coloured surface treatments, but they should be aware that they will be responsible for the installation, maintenance and upkeep of all markings/treatments.

Considerations:

- The design and the environment in which the treatment is being used needs careful review to ensure that it does not confuse or distract road users.

Refer: Main Roads Technical Note – Decorative Pavement Markings.

Figure 27: Decorative pavement markings

9.4 Threshold treatments/entry statement

Threshold treatments are coloured and/or textured road surface treatments that contrast with the adjacent roadway and alert road users to a change in environment using visual and/or tactile cues.

SAS threshold treatments, including entry statements, are used at interfaces with other streets and between different land uses, such as near schools.

SAS entry statements are designed to contrast with the road material to enhance visibility and make the street recognisable.

SASs have a distinctive blue patch gateway treatment that is applied at the start and end of all routes. Connecting side roads do not require the full gateway treatment, with a partial gateway treatment applied when a break in the SAS length is required.

Refer to the Safe Active Streets Policy and Application Guidelines for application guidance.

Considerations:

- Entry into an SAS is to be identifiable by the gateway treatment, which will be applied at the start and end of all routes.

Refer: LATM Guidance 4.11, Austroads GTM 7.5.8, Main Roads SAS Policy and Application Guidelines: Signs and Pavement Markings.

Figure 28: SAS threshold treatment

9.5 Street signs – stop, give-way, etc.

The strategic placement of signs helps in designating the SAS as a priority route for bike riders, enhancing their safety and convenience.

Stop and give-way signs, for example, are used strategically to prioritise movements on the SAS and create safer intersections.

Other signage may be appropriate in specific circumstances, such as “Bicycles Excepted” or wayfinding signage linking to other routes. Application of all regulatory signage requires approval from Main Roads.

Considerations:

- Loss of priority can deter through traffic from using a street, potentially reducing traffic volume.
- Safety may be improved with the better definition of traffic priority.
- Installation and maintenance costs are minimal.
- Speed reduction may occur within the intersection.
- Reassigning priority against driver expectations may compromise safety, making street signs ineffective as a standalone treatment.

Refer: Austroads GTM 7.5.3-7.5.4, Main Roads WA Guideline Change of Stop or Give Way Priority at Four-Way and ‘T’ Intersections.

Figure 29: Give-way sign at single lane slow point

9.6 School zones

School zones are supported on SASs to help improve safety by controlling speeds during school hours.

The zones are supported by various physical treatments such as pedestrian crossings and raised pavements for added safety and compliance.

As per the [Safe Active Streets Policy and Application Guidelines](), any SAS proposal that includes a school zone should be discussed with both DoT and Main Roads for suitable application of signs and lines before a final design is presented for approval.

Considerations:

- Increased safety for people walking and bike riding, especially school-age children.
- Drivers may ignore speed restrictions when pedestrian activity is low, especially outside school hours.
- Requires education and enforcement for understanding and compliance.
- Where a new school is being developed and an SAS route is proposed, consideration should be given to encompassing the full school area within the SAS route if appropriate, to avoid confusion between the school zone and SAS speed limits.
- Additional trip facilities and amenities will support street design measures.

Refer: Austroads GTM 7.5.7, Main Roads SAS Policy and Application Guidelines: Signs and Pavement Markings.

Figure 30: Amenity and protection in a school zone

9.7 Transition ramps

Transition ramps are specifically designed to create a smooth carriageway-to-path transition for riders.

They help show that SASs are designed to accommodate and prioritise walking, wheeling and riding as a mode of travel.

These are used at non-SAS priority intersections and roundabouts allowing riders to use designated crossing points if they do not feel comfortable travelling through the intersection in the traffic lane.

Considerations:

- Ensure that intersections are accessible to people of all abilities, including those with disability.
- Can provide audible and tactile indications (such as vibrating surfaces or push buttons with auditory signals) to help pedestrians safely navigate intersections.

Refer: LATM Guidance (throughout).

Figure 31: Transition ramp

Figure 32: Transition ramp and honeycomb decorative pavement marking

9.8 Bicycle facilities

While the SAS is itself a bicycle facility, other bicycle facilities, such as bicycle lanes or shared paths, may still be needed on an SAS despite the expectation that bike riders share the traffic lane.

As outlined in Section 2.3, an SAS may incorporate sections of other infrastructure solutions where an SAS treatment is not suitable or where riders are transition on or off the SAS (Figures 33, 34).

Key reasons for including other facilities include challenging topography and connectivity into the broader bike network.

Considerations:

- Advice on definition and selection of other bike facilities is available in the Contextual Guidance.[i]
- Safe transition for riders to and from the mixed traffic facilities is essential (see LATM Guidance).[i]
- These facilities can improve accessibility and connectivity to the broader cycle network.
- Should not be used in ways that compromise the SAS route providing end-to-end connectivity (Section 2.3).

Refer: Contextual Guidance, LATM Guidance (throughout), Austroads GTM 7.5.10

Figure 33: Bi-directional bike lane access to an underpass connecting an SAS across a rail line

Figure 34: Shared path entry into the SAS

9.9 Bus facilities and services

SASs should ideally be created away from existing or planned bus routes to avoid operational impacts for public transport as well as to minimise potential conflicts between bike riders and large vehicles.

Where an SAS is proposed on a bus route, early and sustained engagement with the PTA, including the Transperth Service Development and Transperth Bus Stop Infrastructure Branches, is required to determine route options and service impacts.

Projects being delivered by LGs that include bus facilities should be consistent with the Partnership Agreement – Bus Stop Infrastructure between WALGA and the PTA,[vii] which provides the general framework through which the planning, installation and maintenance of bus stop infrastructure on road reserves will operate throughout WA.

PTA's Bus Planning and Design Guidelines for Efficient People Movement[viii] provides information on street planning for buses.

Where bus stop locations or infrastructure is affected, the PTA will need to review and approve associated designs. Further information is provided by the PTA's Bus Stop Design Guidelines.[viii]

Operationally, Perth buses are large vehicles and have some specific design requirements, including:

- a desirable traffic running lane of 3.5 m (minimum of 3.2 m);
- a desirable minimum turning circle of 14 m (minimum of 12.5 m); and
- a minimum height clearance of 3.7 m.

These requirements are inherently less compatible with SAS design.

Considerations:

- Preference is to avoid having SAS routes on current or planned bus service routes.
- Can reduce bike rider safety and comfort.
- Limits street narrowing options.
- Improvements that enhance pedestrian crossing and footpath access to public transport infrastructure should be considered within the scope of all SAS projects.
- Should landscaping or other verge infrastructure be included within the SAS scope of works, this should avoid impacting the ability to safely alight from the bus rear doors or reduce the visibility between passenger and oncoming bus.

Refer: LATM Guidance (throughout), Austroads GTM 7.5.11, WALGA and PTA Partnership Agreement – Bus Stop Infrastructure, Bus Planning and Design Guidelines for Efficient People Movement, Bus Stop Design Guidelines.

Figure 35: Bus service and stop along an SAS

10. Appendices

10.1 List of figures

10.2 List of tables

10.3 Endnotes

[i] Active transport planning and design guidance documents available at https://www.transport.wa.gov.au/activetransport/planning-and-design-guidance.asp

[ii] Long-term cycle network for WA documents available at https://www.transport.wa.gov.au/activetransport/long-term-cycle-network.asp

[iii] Main Roads SAS Policy and Application Guidelines available in the Technical Library at https://www.mainroads.wa.gov.au/technical-commercial/technical-library/?q=%20Safe%20Active%20Streets%20Policy%20and%20Application%20Guidelines&take=50&filter=&type=&page=1&sectionFilter=731&node=

[iv] Main Roads Guideline Change of Stop or Give Way Priority at Four-Way and 'T' Intersections available in the Technical Library at https://www.mainroads.wa.gov.au/technical-commercial/technical-library?q=%20Guideline%20Change%20of%20Stop%20or%20Give%20Way%20Priority%20at%20Four%20Way%20and%20T%20Intersections&take=50&filter=&type=&page=1&sectionFilter=731&node=Road%20and%20Traffic%20Engineering,Traffic%20Management

[v] Austroads documents available at https://austroads.com.au/network-operations/network-management/guide-to-traffic-management

[vi] Main Roads Technical Note – Decorative Pavement Markings available at https://www.mainroads.wa.gov.au/technical-commercial/technical-library?q=Technical%20Note%20-%20Decorative%20Pavement%20Markings&take=50&filter=&type=&page=1&sectionFilter=731&node=Road%20and%20Traffic%20Engineering,Traffic%20Management

[vii] Partnership Agreement – Bus Stop Infrastructure between WALGA and the PTA available at https://walga.asn.au/policy-and-advocacy/our-policy-areas/infrastructure/transport/public-transport#:~:text=The%20Agreement%20defines%20the%20communication,bus%20stop%20infrastructure%20is%20upgraded

[viii] PTA guidance documents available at https://www.pta.wa.gov.au/about-us/working-with-the-pta/urban-design-and-planning-guidelines