

# Treating pedestrian and turning vehicle conflicts at signalised intersections

The following table provides a brief overview of the treatments and their appropriateness in certain road environments.

**Table 1: Overview of treatments and their use in certain road environments**

Road Use Classification (including SmartRoads Road Use Hierarchy categories)	Treatments to eliminate pedestrian and turning vehicle conflicts at signalised intersections				
	Grade separation of pedestrian crossing	Scramble crossing	Exclusive pedestrian phase	Fully controlled turns	Dwell on walk
Preferred traffic route					
Tram priority route					
Bus priority route					
Pedestrian priority area (or network)					
Bicycle priority route					
Traffic route					
Freight route					
Collector road (without specific traffic priority)					
Local road (without specific traffic priority)					

**KEY:**



Appropriate



May be appropriate



Unlikely to be appropriate

**Table 2: Overview of treatments and their use in certain road environments**

Road Use Classification (including SmartRoads Road Use Hierarchy categories)	Treatments to reduce pedestrian and turning vehicle conflicts at signalised intersections			
	Early start green for pedestrians	Partially controlled right and left turns with red arrow drop out	Split phasing	Right turn prohibition
Preferred traffic route	●	●	●	●
Tram priority route	●	●	●	●
Bus priority route	●	●	●	●
Pedestrian priority area (or network)	●	●	●	●
Bicycle priority route	●	●	●	●
Traffic route	●	●	●	●
Freight route	●	●	●	●
Collector road (without specific traffic priority)	●	●	●	●
Local road (without specific traffic priority)	●	●	●	●

**KEY:**



Appropriate



May be appropriate



Unlikely to be appropriate

## Grade separation of pedestrian crossing



Pedestrian overpass Maroondah Highway, Ringwood

### Brief description

Full grade separation of pedestrians, above or below an intersection, eliminates the conflict between motorists and pedestrians at a signalised intersection. A pedestrian overpass or underpass allows pedestrians to cross the road independently of the traffic signals.

### Potential locations

- At intersections within pedestrian priority areas as defined in the VicRoads SmartRoads strategy.
- Within central activities areas (including hospital and university campuses) where pedestrian volumes are significant in all directions of the intersection.
- Where an at-grade crossing is not desirable or where it is preferred that pedestrians be able to cross the intersection at any time.
- Where the intersection is located between public transport nodes (e.g. a connection between a railway station and a bus interchange).
- Where pedestrian paths or desire lines already take them over or under the road (e.g., at an elevated railway station).

### Considerations

- The geometry of the overpass / underpass will appropriately cater for the expected volume of pedestrians (and cyclists).
- The impact on travel times for users of the grade separated facility - they will not be favourable where the walking distance is more than 50 percent greater than the at-grade distance.
- The land acquisition that may be required in order to build the structure – including provision of land for ramps and other supporting bridge or tunnel structures.
- Provision of Disability Discrimination Act (DDA) compliant infrastructure – refer to Australian standards AS 1428.4 series. This includes providing ramps and possibly lifts that are accessible by all users.
- Whether design of the infrastructure leads to the creation of an environment that is 'unsafe' or 'unwelcoming' for pedestrians or other users.

### Pros

- Pedestrians are fully separated from other transport modes – no conflicts with vehicles at road level.
- Pedestrians can cross the intersection at any time without being delayed by traffic signals.
- The treatment can become a landmark for the local area through a prominent design.

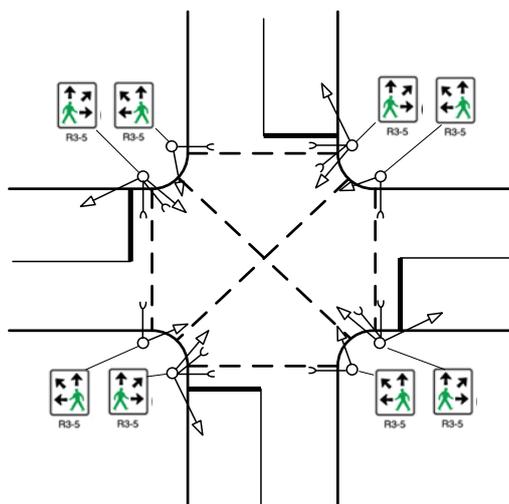
### Cons

- High cost in provision of infrastructure (overpass or underpass).
- Potential increase in pedestrian travel time.
- Poorly designed infrastructure may create an environment that is unwelcoming to pedestrians or cause other safety issues (e.g. rock throwing).
- High cost in the event of land acquisition.

### Further reading

- Austroads Guide to Road Design Part 4: Intersections and Crossings – General.

## Scramble Crossing



Scramble crossing layout showing signs and lantern placement

### Brief description

A scramble crossing involves an exclusive pedestrian signal phase being provided at an intersection to allow pedestrians to cross to any leg of the intersection in any direction. This type of crossing may be appropriate in locations where each corner has a high pedestrian volume.

### Potential locations

- At intersections within pedestrian priority areas as defined in the VicRoads SmartRoads strategy, where pedestrian volumes are high and there is a demand for the ability to cross in any direction.
- Within central activities areas where it is desired to give pedestrians the highest priority over other traffic modes.
- Where the intersection is located between public transport nodes (e.g. a connection between a railway station and a bus interchange).
- Where there are high numbers of particularly vulnerable pedestrians – children, disabled or older people.
- Other locations where it would be beneficial to allow pedestrians to cross to any point of the intersection and the regular perpendicular crossing arrangement is insufficient.
- Where the desired crossing line for pedestrians is predominately in the diagonal direction.

### Considerations

- The geometry of the intersection needs to allow pedestrians to cross safely to any part of the intersection.
- Kerb ramps need to be wider than at a standard intersection to cater for the various movements across the intersection.
- Additional delays to trams, buses and other road users may occur due to the prolonged pedestrian phase - appropriate cycle lengths need to be determined to balance the requirements.

### Supporting treatments

- Raised platform on approach.
- Raised intersection / pedestrian crossing

### Pros

- Pedestrians are given an exclusive signal phase; virtually eliminating conflicts with turning vehicles.
- Pedestrians can cross in all directions eliminating the need to wait for multiple phases in order to negotiate the intersection.

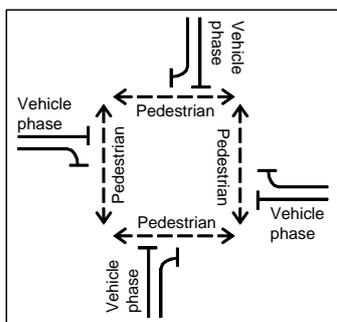
### Cons

- Increased wait times for vehicles and other road users (e.g. trams) through longer pedestrian phase (resulting in reduced intersection capacity)
- May not be appropriate at extremely wide intersections where a diagonal crossing may take a significant time to complete, impacting on overall efficiency of the intersection.

### Further reading

- Austroads Guide to Traffic Management Part 10 (2016) Section 8.8.2.
- Australian Standards AS 1742.14 (2014) Clause 6.2.2.

## Exclusive Pedestrian Phase



Phasing diagram for an exclusive pedestrian phase - all vehicle phases are red

### Brief description

All pedestrian crossings are simultaneously given a green phase and all vehicle approach legs are given a red phase until the conclusion of the pedestrian phase. After the completion of the exclusive pedestrian phase, the pedestrian signal will become red while the vehicle phase begins.

This is similar to a scramble crossing except that pedestrians are permitted only to cross in perpendicular directions to the roadway instead of in any direction.

### Potential locations

- At intersections within pedestrian priority areas as defined in the VicRoads SmartRoads strategy.
- Within central activities areas where pedestrian volumes are significant in all directions of the intersection and a scramble crossing is deemed undesirable (e.g. the geometry of the intersection prevents a diagonal crossing to be made safely or in a timely manner).
- Where the intersection is located between public transport nodes (e.g. between a railway station and a bus interchange) and priority is to be given to pedestrians crossing at an intersection between these nodes.
- Where pedestrian priority is only beneficial at certain times of the day, allowing an exclusive pedestrian phase to be activated during those.
- At locations with a high level of conflict between turning vehicles and pedestrians where either mode is significantly delayed by one another.
- Where there are high numbers of particularly vulnerable pedestrians – children, disabled or older people.

### Considerations

- Potential for increased wait times for pedestrians as pedestrians are only allowed to cross during the exclusive pedestrian phase.
- The number of crossings able to be completed in one phase – whether there is a need to allow more time for pedestrians to complete two or more crossing movements.

### Supporting treatments

- Raised platform on approach / raised intersection / pedestrian crossing
- Puffin crossing.

### Pros

- Virtually eliminates the conflict between turning vehicles and pedestrians through the exclusive pedestrian signal phase – all vehicle movements are stopped.
- Pedestrians can cross in all perpendicular directions at the intersection.
- Allows all pedestrians to clear the intersection simultaneously. This is useful in high pedestrian areas or where there are high volumes of turning vehicles (high potential for conflict).

### Cons

- Potential increase in intersection cycle times (to cater for a longer pedestrian phase), may reduce intersection throughput for other modes.
- May not be appropriate at extremely wide intersections where a crossing may take a significant amount of time to complete.
- Potential issue of pedestrians crossing against a red pedestrian signal when the parallel vehicle phase is green.

### Further reading

- Austroads Guide to Traffic Management Part 10 (2016)
- VicRoads Supplement to Austroads Guide to Traffic Management Part 10

## Fully Controlled Right and Left Turns



Fully controlled right turn (Waverley Road / Huntingdale Road intersection, Mount Waverley)

### Brief description

Fully controlling turns at an intersection will remove the conflict between turning vehicles and crossing pedestrians as the vehicle turn phase will be separate to the pedestrian phase.

### Potential locations

- At intersections within pedestrian priority areas as defined in the VicRoads SmartRoads strategy.
- Within central activities areas including hospital and university campuses where pedestrian volumes are significant.
- At intersections with multiple turn lanes.
- At intersections with a history of crashes between turning vehicles and pedestrians.
- At intersections with a high number of turning heavy vehicles.
- Where there are high numbers of disabled or older pedestrians.
- Where intersection geometry allows high speed turning movements.

### Considerations

- Additional delays to public transport modes – e.g. where buses are delayed by traffic turning left or the bus route requires a left turn at the intersection.
- Reduced intersection throughput due to increased waiting time - appropriate cycle lengths need to be determined.
- Where the left turn is fully controlled, the potential negative perception from drivers while waiting to turn at times when there are no pedestrians crossing.
- Sufficient vehicle storage capacity is required in the turn lane or bay to cater for turning vehicles.
- Auto-introduction of the pedestrian phase.
- Late introduction of the pedestrian phase where there is sufficient remaining time for a crossing to be made.

### Supporting treatments

- Raised platform on approach.
- Raised intersection / pedestrian crossing.
- Puffin crossing.

### Pros

- Virtually eliminates the conflict between turning vehicles and pedestrians as vehicles have a separate turning phase.
- The pedestrian movement can be as long as the vehicle through movement (i.e. 'run with green') phase.

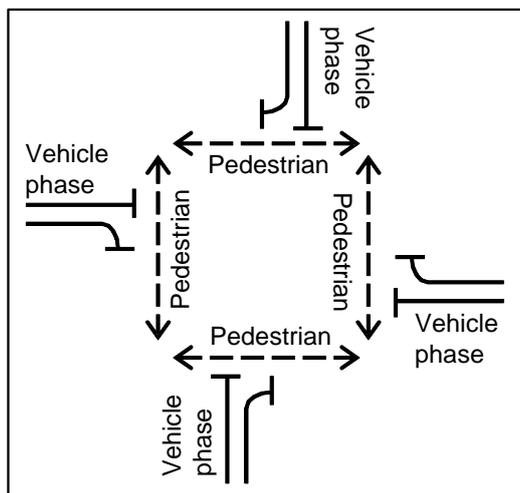
### Cons

- Increased intersection cycle times, may reduce intersection throughput for other modes.
- Increased wait times for turning vehicles.
- Potential delays to public transport modes, especially if they are trapped behind vehicles waiting to turn.
- Increased queuing in the through lanes where there are short turn lanes with limited storage capacity.

### Further reading

- Austroads Guide to Traffic Management Part 9 (2014) Section 7.3.3.
- Austroads Guide to Traffic Management Part 10 (2016).
- VicRoads Supplement to Austroads Guide to Traffic Management Parts 9 and 10.

### Dwell on Walk (vehicle 'rest on red')



Phasing diagram for dwell on walk – showing when dwell on walk is active

#### Brief description

In situations where pedestrian priority is required, the traffic signal can dwell on the pedestrian walk green until a vehicle is detected. The vehicle phase is generally short and the pedestrian phase would normally be called in automatically at the end of the vehicle phase.

The pedestrian phase would usually not operate during the vehicle phase. This treatment may be used in conjunction with a scramble crossing.

#### Potential locations

- At intersections within pedestrian priority areas as defined in the VicRoads SmartRoads strategy.
- Within central activities areas where pedestrian volumes are significant.
- During periods when vehicle traffic volumes are low or not a priority (e.g. at night).

#### Considerations

- Significant delays to all vehicles during the pedestrian phase as all approaching vehicles are required to stop.
- Adequate clearance times are required for the vehicle phases.
- Additional delays to public transport modes.
- When the pedestrian phase operates separately to the vehicle phase, there is a risk of pedestrians crossing against the red pedestrian signal during the vehicle phase.
- Operation times (e.g. at night only).
- Noise emitted by audio tactiles, which may become an issue for nearby residents (the length of time and/or volume of the tone may need to be adjusted if issues arise).

#### Supporting treatments

- Raised platform on approach.
- Raised intersection / pedestrian crossing.

#### Pros

- Pedestrians always have priority at a signalised intersection.
- Pedestrians are usually given an exclusive signal phase, no conflicts with turning vehicles.
- May be used in conjunction with a scramble crossing.

#### Cons

- Significant delays to all vehicles during the pedestrian phase as all vehicles are required to stop.
- Delays to public transport modes.

#### Further reading

- Austroads Guide to Traffic Management Part 9 (2014).
- VicRoads Supplement to Austroads Guide to Traffic Management Part 9 (2015).

<b>Early start green for pedestrians (late start for vehicles)</b>	
<b>Brief description</b>	
<p>This treatment involves the pedestrian phase starting prior to parallel vehicle phases (including any turn phases). This allows pedestrians to establish themselves on the crossing before turning traffic reaches the crossing (the point of conflict), thus increasing the prominence of pedestrians on the crossing and reducing the chance of a collision.</p>	
<b>Potential locations</b>	<ul style="list-style-type: none"> <li>• At intersections within pedestrian priority areas as defined in the VicRoads SmartRoads strategy.</li> <li>• Within central activities areas where pedestrian volumes are significant.</li> <li>• Where the presence of crossing pedestrians is unexpected.</li> <li>• At intersections with multiple turn lanes (and partially controlled turn phases).</li> <li>• At intersections with a history of crashes between turning vehicles and pedestrians.</li> <li>• At intersections with a high number of turning vehicles where it is not desirable to fully control the turn (e.g. allow the left turn to occur simultaneously with the through vehicle phase).</li> </ul>
<b>Considerations</b>	<ul style="list-style-type: none"> <li>• Conflict remains between turning vehicles and pedestrians albeit delayed (more likely to occur later in the phase).</li> <li>• Depending on how early the pedestrian phase starts, delays to public transport modes where these modes operate from a shared lane that allows through and turning traffic and use the same signal displays as other vehicles.</li> <li>• Whether additional lanterns are required to allow other modes to start simultaneously with the early start for pedestrians (e.g. allow an early start also for bicycles).</li> <li>• Auto-introduction of the pedestrian phase at locations with a constant volume of crossing pedestrians.</li> <li>• May not be appropriate at hook turn intersections where there is the potential of a collision between vehicles completing the hook turn and pedestrians on the perpendicular crossing.</li> </ul>
<b>Supporting treatments</b>	<ul style="list-style-type: none"> <li>• Raised platform on approach.</li> <li>• Raised intersection / pedestrian crossing.</li> <li>• Puffin crossing.</li> <li>• Signage</li> </ul>
<b>Pros</b>	<ul style="list-style-type: none"> <li>• Allows pedestrians to establish themselves on the crossing before turning vehicles</li> <li>• Reduces the incidence and severity of collisions between pedestrians and vehicles. Minimal delays to vehicles compared with 'elimination' treatments</li> </ul>
<b>Cons</b>	<ul style="list-style-type: none"> <li>• A conflict remains between turning vehicles and pedestrians (albeit delayed).</li> <li>• Additional delays to public transport modes – e.g. trams where the tram tracks are shared with the right turn lane or buses delayed by turning vehicles</li> <li>• Slightly reduced intersection throughput due to increased waiting time.</li> </ul>
<b>Further reading</b>	<ul style="list-style-type: none"> <li>• Austroads Guide to Traffic Management Part 9 (2014) Section 7.</li> <li>• VicRoads Supplement to Austroads Guide to Traffic Management Part 9 (2015).</li> </ul>

## Partially Controlled Right and Left Turns ('red arrow drop out')



Partially controlled left turn ('red arrow drop out' operation) (Carlisle Street / Nepean Highway, St Kilda)

### Brief description

Partially controlled turns, also known as 'red arrow drop out' operation, provides a red period to vehicles during which the pedestrian movement can be established before the filter right turn and left turn movement commences. The intention is that pedestrians can establish themselves on the crossing before turning vehicles reach the crossing.

### Potential locations

- At intersections within pedestrian priority areas as defined in the VicRoads SmartRoads strategy.
  - Within central activities areas where pedestrian volumes are significant.
  - Where the presence of crossing pedestrians is unexpected.
  - At intersections with a history of crashes between turning vehicles and pedestrians, where it is not desirable to introduce an early start for pedestrians.
- At intersections with a high number of turning vehicles where it is not desirable to fully control the turn (e.g. allow the left turn to occur simultaneously with the through vehicle phase).

### Considerations

- Additional delays to trams may occur where the tram tracks are shared with the right turn lane (usually mitigated through tram priority signalling).
- Additional delays to buses may occur – e.g. where buses are delayed by traffic turning left or the bus route requires a left turn at the intersection.
- Slightly reduced intersection vehicle throughput may occur due to increased waiting times.
- Auto and/or late introduction of the pedestrian phase.

### Supporting treatments

- Raised platform on approach.
- Raised intersection / pedestrian crossing.
- Signage.

### Pros

- Allows pedestrians to establish themselves on the crossing before turning vehicles (at the start of the phase) making them more prominent to drivers.
- Vehicle through phase may still occur with the pedestrian phase.

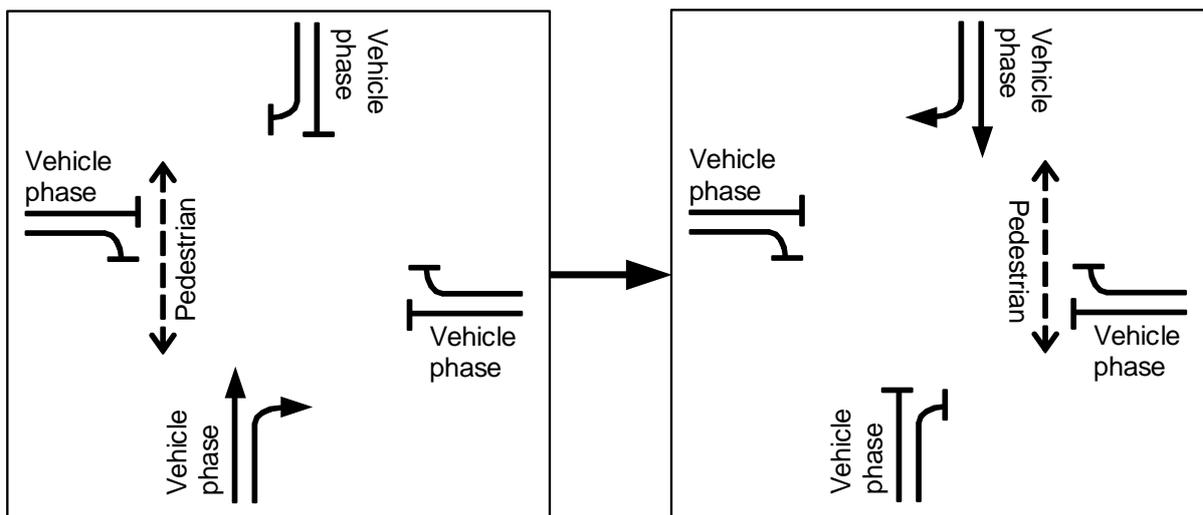
### Cons

- A conflict remains between turning vehicles and pedestrians (albeit delayed).
- Possible additional delays to public transport modes – e.g. buses delayed by turning vehicles
- Slightly reduced intersection throughput (predominately the turn movement) due to increased waiting times.

### Further reading

- Austroads Guide to Traffic Management Part 9 (2014).
- VicRoads Supplement to Austroads Guide to Traffic Management Part 9 (2015).

### Split Phasing



Split phasing operation – showing two of the phases where the right turn does not conflict with pedestrians

#### Brief description

Split phasing operation allocates separate phases to opposing approaches at the intersection. The vehicle through and turning movements from each approach operate simultaneously. Right turn movements are unopposed under this phasing. The pedestrian phase is also split – the closest parallel crossing to the carriageway with the active green vehicle phase also receives a green pedestrian signal.

#### Potential locations

- At intersections within pedestrian priority areas as defined in the VicRoads SmartRoads strategy.
- Within central activities areas where pedestrian volumes are unbalanced, i.e. one side of the intersection has a higher volume of pedestrians than the other.
- At intersections with a history of crashes between right turning vehicles and pedestrians.
- At intersections where the traffic volume on one approach leg is unbalanced (e.g. higher than on the other legs).

#### Considerations

- A conflict remains between left turning vehicles and pedestrians (unless turn is controlled).
- Additional delays to public transport modes.
  - Delays to trams may occur where the tram tracks are shared with the right turn lane (usually mitigated through tram priority signalling).
- Sufficient vehicle storage capacity is required in the turn lane or bay to cater for turning vehicles.
- Intersection vehicle throughput may be reduced due to increased waiting and cycle times.
- Auto and/or late introduction of the pedestrian phase.

#### Supporting treatments

- Raised platform on approach.
- Raised intersection / pedestrian crossing.
- Puffin crossing.
- Signage.

#### Pros

- Virtually eliminates the conflict between right turning vehicles and pedestrians as vehicles have a separate turning phase.
- The pedestrian movement can be as long as the vehicle through movement phase.
- Can be applied to left and right turn movements.

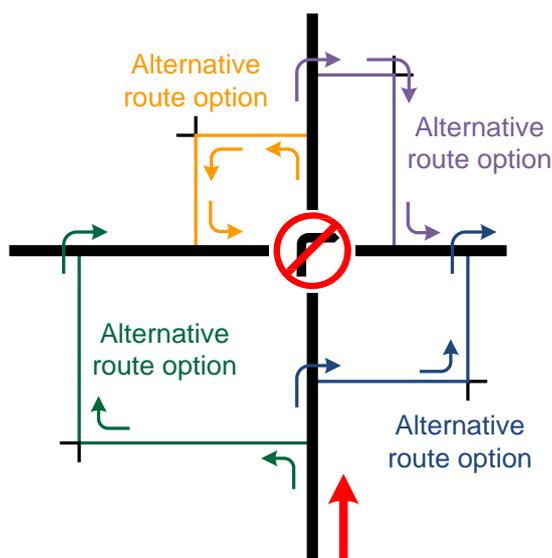
#### Cons

- Increased intersection cycle times, overall possible reduction in intersection throughput.
- Potential increase in wait time for the vehicle through movements.

#### Further reading

- Austroads Guide to Traffic Management Part 9 (2014) Section 7.3.3.
- VicRoads Supplement to Austroads Guide to Traffic Management Part 9 (2015).

## Prohibiting Right Turns



Options for alternative routes to cater for the prohibited right turn

### Brief description

Prohibiting rights turns at an intersection will eliminate conflicts between right turning vehicles and crossing pedestrians.

An alternative location or arrangement will be needed to cater for drivers who wish to travel in the direction of the prohibited right turn. Examples include making a series of left turns at alternative intersections that lead back to the intended road into which the right turn was prohibited.

### Potential locations

- At intersections with a history of crashes between right turning vehicle and pedestrians.
- At intersections where prohibiting the right turn would have operational benefits (e.g. through traffic requires the longest cycle time possible).
- Within pedestrian priority areas as defined in the VicRoads SmartRoads strategy.

### Considerations

- A safe alternative route to compensate for the right turn ban – a series of roads near the intersection would be required if it is desired to allow vehicles to travel in the direction of that right turn (including connecting back to that road).
- Moving vehicles to an alternative route may result in conflicts with pedestrians on the alternative route.
- Whether a hook turn operation would be a feasible alternative to fully banning the right turn.
- Operation times for the right turn ban.
- Enforcement of the right turn ban at the intersection may be required.
- Signing of the right turn ban.
- Preventing vehicles from U-turning beyond the intersection.

### Supporting treatments

- Raised platform on approach.
- Puffin crossing.

### Pros

- Virtually eliminates the conflict between right turning vehicles and pedestrians.
- Increases vehicle through movement throughput through the intersection.
- May be used in conjunction with a scramble crossing.
- Potentially shorter waiting times for pedestrians due to removal of vehicle right turn phase.

### Cons

- Requires a series of other roads to compensate for the right turn ban at the intersection (e.g. a grid road network that vehicles can use to access the intersecting road).
- Increase in travel time for 'right turning' traffic taking the detour.
- Where a substitute route is not provided, increase in traffic on other nearby roads as drivers find an alternative way to connect to the road with the turn ban.

## Raised Crossing Treatment



Raised platform approach to the intersection of Surfcoast Highway and Kidman Avenue, Belmont



Raised pedestrian crossing at Lennox Street / Elizabeth Street intersection, Richmond

### Brief description

There are three main types of raised treatments available to be used at intersections. The intention is to reduce vehicle speeds through and/or before the intersection, thus reducing pedestrian serious injury in the event of a collision. These treatments can be used in conjunction with one another:

- **Raised platform on approach to the intersection**  
This treatment involves placing a raised platform on the vehicle approach to the intersection.
- **Raised intersection**  
This treatment involves placing a raised platform at the intersection itself.
- **Raised pedestrian crossing**  
The pedestrian crossing may be placed on a raised platform of similar design to flat top road humps as a way to elevate the prominence of the crossing to vehicles

### Potential locations

- Where it is desirable to raise the profile of crossing pedestrians.
- Where vehicle speeds before or through the intersection are unacceptably high, however careful consideration is required when using raised platforms on high speed roads.
- Where the presence of crossing pedestrians is unexpected.
- At intersections with a high history of crashes between turning vehicle and pedestrians.

### Considerations

- The approach speed to the intersection – vehicles should be able to cross the raised platform safely.
- The design of the raised platform should have the ability to slow down vehicles to an appropriate operating speed (which, in many situations, is below 40 km/h).
- The design of the raised platform needs to accommodate heavy vehicles (e.g. buses).
- Although the raised platform has the ability to assist in slowing down vehicles, there is still the possibility of a collision at speed between a vehicle and pedestrian.
- Appropriate drainage to reduce vehicle and pedestrian slip hazard.

### Use with elimination / reduction treatments

- Intersections with partially controlled turns or early start for pedestrians.
- Fully controlled left and/or right turns.
- Scramble crossing.
- Dwell on walk.
- Exclusive pedestrian phase.
- Split phasing.

### Pros

- Raises the prominence of the pedestrian crossing and/or of the intersection.
- Aids in the slowing down of vehicles before the intersection and/or through the intersection.

### Cons

- Although the raised platform assists in slowing down vehicles, there is still the possibility of a collision between a vehicle and pedestrian.

## Warning messages



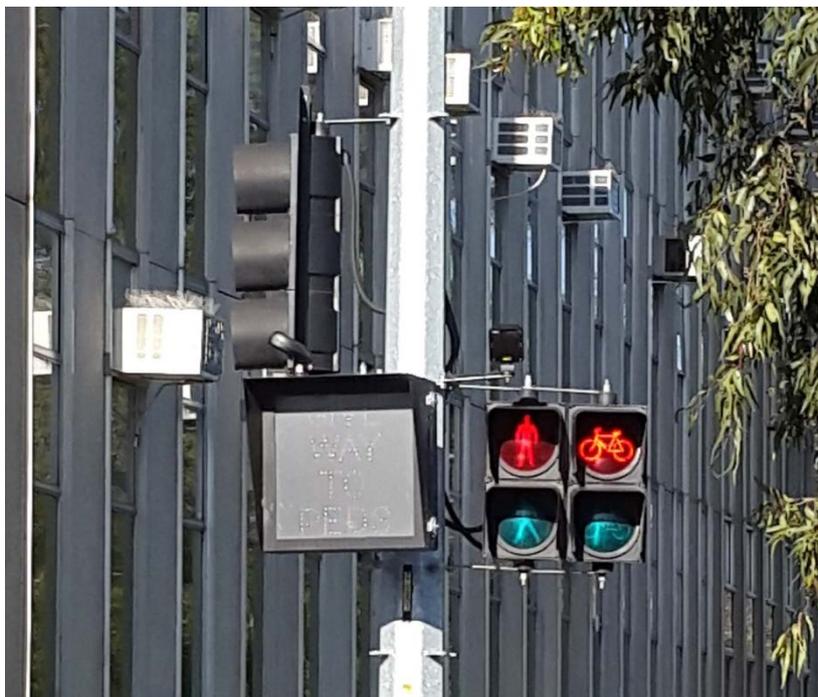
'GIVE WAY TO PEDESTRIANS' LED display

### Brief description

The use of a flashing 'GIVE WAY TO PEDS' sign may be considered as a supporting treatment at an intersection to warn turning motorists of pedestrians on the crossing. The sign dynamically triggers whenever the pedestrian movement is activated - the benefit being to increase motorist awareness of an active pedestrian movement.

<b>Potential locations</b>	<ul style="list-style-type: none"> <li>• Turning traffic experiences an unexpected conflict with a signalised pedestrian movement.</li> <li>• Turning vehicles are observed not giving way to pedestrians.</li> <li>• At intersections with a history of crashes between turning vehicles and pedestrians.</li> <li>• Where a static version of the sign (sign R2-10) does not provide sufficient conspicuity.</li> </ul>
<b>Considerations</b>	<ul style="list-style-type: none"> <li>• The electronic sign only warns motorists of pedestrians – there is a possibility that the message may be missed by turning vehicles.</li> <li>• The cost of installation and maintenance.</li> <li>• For crossings that involve a bicycle lantern (e.g. if the crossing is along a shared path), consideration can be made to include 'AND CYCLISTS' in the sign.</li> </ul>
<b>Use with elimination / reduction treatments</b>	<ul style="list-style-type: none"> <li>• Intersections with partially controlled turns.</li> <li>• Intersections with early start for pedestrians or late start for turning vehicles.</li> <li>• Intersections with split phasing.</li> </ul>
<b>Pros</b>	<ul style="list-style-type: none"> <li>• Raises prominence of the crossing through the flashing message.</li> <li>• May aid in the slowing down of vehicles across the crossing.</li> </ul>
<b>Cons</b>	<ul style="list-style-type: none"> <li>• Although the electronic sign has the ability to raise the awareness of crossing pedestrians, there is still the possibility of a collision between a vehicle and pedestrian.</li> </ul>
<b>Further reading</b>	<ul style="list-style-type: none"> <li>• Austroads Guide to Traffic Management Part 10 (2016) Section 8.8.2.</li> <li>• Australian Standards AS 1742.14 (2014) Clause 6.1.2.</li> </ul>

## Puffin crossing



Puffin detector located above pedestrian signal

### Brief description

The puffin crossing, where pedestrian presence on the crossing is detected and crossing timings adjust accordingly in real time, may be installed in high pedestrian areas to cater for high crossing volumes.

As a puffin crossing uses a detector to determine when pedestrians are present, this treatment is generally not appropriate for scramble crossings due to the potential size of the crossing.

Balancing the need of vehicular traffic with pedestrian traffic will need to be considered. Signal timings (including the extension of the pedestrian phase) will need to be adjusted and monitored accordingly.

<b>Potential locations</b>	<ul style="list-style-type: none"> <li>• At intersections where a variable crossing time is desired.</li> <li>• At intersections with a high pedestrian volume, and where pedestrians are to be given priority.</li> </ul>
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<b>Considerations</b>	<ul style="list-style-type: none"> <li>• Amount of extension time available for the pedestrian phase.</li> <li>• Where necessary, capping the maximum crossing time.</li> <li>• Interference from other modes, whereby the detector inadvertently extends the pedestrian phase due to detecting an 'object' and considering it a pedestrian.</li> </ul>
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<b>Use with elimination / reduction treatments</b>	<ul style="list-style-type: none"> <li>• Intersections with early start for pedestrians or late start for turning vehicles.</li> <li>• Intersections with fully controlled turns.</li> <li>• Intersections where turns are banned.</li> </ul>
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<b>Pros</b>	<ul style="list-style-type: none"> <li>• Extends the pedestrian phase to suit the current crossing volume.</li> <li>• Longer crossing times, especially helpful for more vulnerable pedestrians (including those with a mobility impairment and older and child pedestrians).</li> <li>• Ability for early termination of the pedestrian phase when all pedestrians have completed their crossing, thus increasing the available throughput for other modes.</li> </ul>
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<b>Cons</b>	<ul style="list-style-type: none"> <li>• May reduce intersection throughput for other modes if the pedestrian phase is of a significant length.</li> <li>• Increased wait time for vehicles and other road users through a longer pedestrian phase.</li> </ul>
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<b>Further reading</b>	<ul style="list-style-type: none"> <li>• Austroads Guide to Traffic Management Part 9 (2014) Section 7.9.</li> </ul>
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<b>Extension of pedestrian phase</b>	
<b>Brief description</b>	
The pedestrian phase may be extended through manual programming of the traffic signal.	
<b>Potential locations</b>	<ul style="list-style-type: none"> <li>• At intersections where a varied crossing time is desired.</li> <li>• At intersections with a high pedestrian volume, and where pedestrians are to be given priority.</li> </ul>
<b>Considerations</b>	<ul style="list-style-type: none"> <li>• Amount of extension time available for the pedestrian phase.</li> <li>• Where necessary, capping the maximum crossing time.</li> <li>• Noise emitted by audio tactiles, which may become an issue for nearby residents (the length of time and/or volume of the tone may need to be adjusted if issues arise).</li> </ul>
<b>Use with elimination / reduction treatments</b>	<ul style="list-style-type: none"> <li>• Intersections with partially controlled turns.</li> <li>• Intersections with early start for pedestrians or late start for turning vehicles.</li> </ul>
<b>Pros</b>	<ul style="list-style-type: none"> <li>• Extends the pedestrian phase to suit the crossing volume.</li> <li>• Longer crossing times, especially helpful for more vulnerable pedestrians (including those with a mobility impairment).</li> </ul>
<b>Cons</b>	<ul style="list-style-type: none"> <li>• The timing is usually fixed and does not change based on crossing volume.</li> <li>• May reduce intersection throughput for other modes if the pedestrian phase is of a significant length.</li> <li>• Increased wait time for vehicles and other road users through a longer pedestrian phase.</li> </ul>