Abstract

This guide describes the user interface of the tool, including:
- how to access the tool
- the types of facilities that can and cannot be assessed
- computer requirements
- a quick-start guide to using the tool
- a description of the usability features
- inputs and outputs relating to each section of the tool
- known issues and troubleshooting.

2020 tool updates, detailed in Appendix D, include economic evaluation updates, revision of the expected crash reduction factors, and implementation of the ATAP guidelines within the tool.

Keywords
pedestrian crossing, pedestrian facility, walkability, raised platforms, kerb extensions, median refuges, zebra crossings, signals, grade separation, project assessment, user guide

About Austroads
Austroads is the peak organisation of Australasian road transport and traffic agencies.

Austroads’ purpose is to support our member organisations to deliver an improved Australasian road transport network. To succeed in this task, we undertake leading-edge road and transport research which underpins our input to policy development and published guidance on the design, construction and management of the road network and its associated infrastructure.

Austroads provides a collective approach that delivers value for money, encourages shared knowledge and drives consistency for road users.

Austroads is governed by a Board consisting of senior executive representatives from each of its eleven member organisations:
- Transport for NSW
- Department of Transport Victoria
- Queensland Department of Transport and Main Roads
- Main Roads Western Australia
- Department of Planning, Transport and Infrastructure South Australia
- Department of State Growth Tasmania
- Department of Infrastructure, Planning and Logistics Northern Territory
- Transport Canberra and City Services Directorate, Australian Capital Territory
- Department of Infrastructure, Transport, Regional Development and Communications
- Australian Local Government Association
- New Zealand Transport Agency.

The Australasian Pedestrian Crossing Facility Selection Web Tool (“the tool”) is a free web service provided by Austroads and is intended to assist practitioners in selecting an appropriate pedestrian crossing facility for a certain location. The tool is based on literature, analytical and behavioural research coupled with a number of mathematical models. As with all mathematical models care must be taken to understand input limitations and background assumptions when interpreting the outputs. The tool does not replace professional engineering or planning advice and neither Austroads nor Abley Transportation Consultants Limited accept any responsibility regarding the tool. While we have endeavoured to ensure the information output by the tool is appropriate, we make no representations or warranties of any kind about the completeness, accuracy, reliability, suitability or availability with respect to the outputs. Any reliance you place on such information is strictly at your own risk and it is your responsibility to check all information output by the tool.

This report has been prepared for Austroads as part of its work to promote improved Australian and New Zealand transport outcomes by providing expert technical input on road and road transport issues. Individual road agencies will determine their response to this report following consideration of their legislative or administrative arrangements, available funding, as well as local circumstances and priorities. Austroads believes this publication to be correct at the time of printing and does not accept responsibility for any consequences arising from the use of information herein. Readers should rely on their own skill and judgement to apply information to particular issues.
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1. Introduction

This user guide describes the operation and outputs of the Australasian Pedestrian Crossing Facility Selection Web Tool located at https://austroads.com.au/network-operations/network-management/pedestrian-facility-selection-tool. The tool is the product of Austroads research project NS 1912 and is fully documented in the research report AP-R472-15 Development of the Australasian Pedestrian Crossing Facility Selection Web Tool. Chapter 6 of the research report fully describes the mathematical models underlying the tool, including all equations, assumptions, default values and sources of information used in the tool.

This guide describes the user interface of the tool, including:
- how to access the tool
- the types of facilities that can and cannot be assessed
- computer requirements
- a quick-start guide to using the tool
- a description of the usability features
- inputs and outputs relating to each section of the tool
- known issues and troubleshooting.

Updates

The user guide has been updated to reflect changes embodied in various updates to the tool. Specific details of each update are included in the appendices.

Help within this document

This guide includes both help tips (corresponding to the help tips available in the tool) and warnings.

Accessing the tool


Users should review the information contained on that page, which includes sign-up for an Austroads mailing list regarding the tool and recorded webinars describing use of the tool. The tool is accessed by clicking the Access the tool link near the top of the page.
Types of facilities

The tool allows the facility types indicated in the following table to be assessed:

<table>
<thead>
<tr>
<th>Crossing aids</th>
<th>Control type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Uncontrolled</td>
</tr>
<tr>
<td>No facility</td>
<td>Yes</td>
</tr>
<tr>
<td>Platform</td>
<td>Yes</td>
</tr>
<tr>
<td>Kerb extensions</td>
<td>Yes</td>
</tr>
<tr>
<td>Median refuge</td>
<td>Yes</td>
</tr>
<tr>
<td>Platform and kerb extensions</td>
<td>Yes</td>
</tr>
<tr>
<td>Kerb extensions with median refuge</td>
<td>Yes</td>
</tr>
<tr>
<td>Grade separation</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The tool cannot be used to assess crossings in locations with more than two lanes in any direction, signals or grade separation are recommended for wider corridors.

Situations where an existing median (either painted or raised) is currently used by pedestrians can be assessed by the tool, reducing crossing times and sight distances for no facility and signals assessments. However, the user must apply on-site observation or engineering judgment as to whether this is appropriate (consideration should be given to sensitive pedestrians, particularly if the width is less than one metre or the median is raised). Restrictions are placed upon the types of facilities that are allowed in such situations.

The tool allows the existing facility at the site to be specified, against which the financial benefits of the proposed facilities are compared.

It is not appropriate to use this tool to assess school crossings, for which criteria other than economic suitability and pedestrian level of service may apply.

The following facility variations can also be assessed by the tool:

- **Puffin signals**: the default signal type assessed by the tool, in which all pedestrian green phases are associated with pedestrians actually crossing.

- **Wombat crossing (Australia)**: treat as Zebra with platform or Zebra with platform and kerb extensions and adjust posted/approach speed if required. This is now explicitly highlighted in the tool when an Australian jurisdiction is selected.

Computer requirements

- A modern web browser (such as Internet Explorer 10 or newer) is recommended
- Monitor resolution should be set to 1366x768 or higher
- JavaScript must be enabled in web browser settings (it is enabled by default in all web browsers but may be disabled through settings or if certain extensions are installed, such as NoScript)

See Troubleshooting section of this document.

¹ In the situation where there is an existing median, Signals with kerb extensions is treated as Signals with kerb extensions and median refuge
2. Quick-start Guide

1. Help tips are available for most inputs. To display, hover your mouse over the help icon.

2. This Quick-start guide can be viewed at any time in the tool by clicking Help > Quick-start guide in the top bar.

3. Gather your inputs – if going on site print a copy of the Site information collection form (PDF) that is available through the tool page. A detailed list of required inputs is provided in this User Guide.

4. Open the tool on a desktop computer using a modern web browser (such as Internet Explorer 10 or newer) with JavaScript enabled in your browser settings.

5. Enter the project name, location and date of assessment.

6. Enter the site information and use the existing facility dropdown to test crossing upgrades in situations where there is an existing facility at the site.

7. Enter crash information, physical/environmental and operational inputs. Note that the tool cannot be used to assess crossings in locations with more than two lanes in any direction, signals or grade separation are recommended for wider corridors. The assessment requires that all inputs relating to the site and facilities have been entered.

8. To review the model parameters, click on the show/hide link.

9. Click the Calculate feasibility button. This will present the feasible facilities table, showing which facilities are appropriate for the site based upon the inputs entered.

10. Enter the design inputs for the facilities to be evaluated.

11. Include or exclude facilities from the assessment by checking or unchecking the boxes in the column Show in final output? Non-feasible facilities can be included in the final facility assessment but these will only be listed and no assessment outputs will be shown.

12. Click the Calculate assessment button to display the outputs for each facility including delays, crash rate, sight distances, pedestrian Level of Service and economic evaluation.

13. Additional comments or observations can be entered in the Notes.

14. To print use the Print button in the top bar. The page may be set to landscape orientation if content does not fit correctly.

15. Inputs and tool configuration can be exported to CSV file and then loaded back into the tool at a later date.
3. Usability Features

Help tips

Additional information is available for some inputs and can be viewed by hovering the mouse cursor over the help icon: 

All help tips contained in the tool are also shown in this user guide

Error checking

Invalid inputs will be highlighted in red when a calculation is run that requires these inputs.

Site information collection form

This printable form, which is hosted through the tool page, is designed to act as a checklist and template for collecting relevant on-site information.

Site characteristics

Below the site layout diagram an output box displays:

- exposed crossing distance
- estimated pedestrian crossing time (exposed)
- total peak hourly vehicle flow

Automatic calculation

Once the calculation is complete the user can check the Automatically calculate when inputs are updated? checkbox, after which the tool will automatically recalculate and then update outputs if any inputs to the tool are changed.

This option should be unchecked before making large changes, otherwise the page may produce a large number of dialog boxes relating to inputs that are now invalid.

Notes

The notes text area below the Facility assessment table can be used to record additional information or observations about the site.

Printing

A record of the specific inputs and outputs relating to a given assessment can be created by printing the page. Due to the width of the tool the page may be printed in Landscape orientation. To attain an electronic copy the page can be printed to PDF (this may require the installation of a print to PDF driver).
Exporting to CSV file

The specific inputs relating to a given assessment can be saved electronically as a CSV file and loaded at a later time, during the same or a subsequent session. To save inputs click the Export CSV file button located at the bottom of the page. Note that the file name is automatically generated by the tool but can be updated using the text box to the left of the Export button. The file will be saved to the default download location specified in the web browser options (this is a browser security setting, it is not possible to browse for an alternate location). It is recommended that users back up their files as appropriate.

Loading a saved CSV file

To load inputs from a previously saved assessment, click Choose File at the top of the page and navigate to the location of the desired CSV file. Once selected, click Load and the values will be imported into the tool. The tool will warn if the file was saved with an older version of the tool, to highlight potential compatibility issues, and if there are erroneous values.

Clearing inputs

Inputs can be cleared by:

- clicking the Reset all Fields button located at the bottom of the page
- refreshing the page in your browser (some browsers may require you to hold the Shift key while clicking the refresh button to properly clear all fields).
4. Inputs

The **Project details** area of the page allows the user to enter optional information stating the name and location of the project, as well as the option/assessment number and date of assessment.

⚠️ All other tool inputs are **required** for the assessment

❓ Inputs that are underlined in this user guide may be hidden in some situations. If an input is currently hidden it is not required for the assessment

Site information

High level information describing the site.

- **Jurisdiction**: Selecting the location allows the tool to be populated with the corresponding economic factors, including years of economic assessment, discount rate, update factors and value of delay appropriate to that location. Changing the jurisdiction will prompt for confirmation, to avoid accidental changes. If an Australian jurisdiction is selected the tool will show a dismissible alert box describing how Wombat crossings may be assessed using the tool.

- **Midblock or intersection?**: Specifies if the crossing is situated at a midblock or intersection location.

  🤔 Midblock location if more than 50 metres from an intersection

- **Existing facility**: Many pedestrian crossing assessments are in fact upgrades of existing facilities. In situations where a facility already exists at the site the **existing facility** option can be used to allow upgrades to be assessed. The default selection is “No facility”. The existing facility is used in the financial assessment of savings and BCR.

  🤔 Used for savings and BCR calculation in the facility assessment. Parameters for the existing facility must be entered in Feasible facilities table (even if it is not suitable for the site).

Crash information

- **Use crash model or crash history?**: The tool includes a pedestrian crash prediction model, although crash history data should be used if possible. If **model** is selected the other crash inputs do not need to be entered. A significant deviation between modelled and historical crashes for a given site may indicate that crashes are underreported.

  🤔 Crash model should be used if data is unavailable or it is suspected that crashes are underreported

- **Years of crash history**: Number of years for which crash history is known.

- **Number of pedestrian injury crashes**: Reported pedestrian injury crashes over crash period specified above.
Physical/operational variables

Inputs that describe the physical site and the operational characteristics of the site. Peak demand times as referred to below relate to peak times for the specific mode. Consequently, pedestrian volumes should be measured at the times of greatest pedestrian activity, and peak vehicle volumes should be measured at the times of greatest vehicle flow.

- **Number of traffic directions:** One or two. At intersections this only includes flow directions of the road being crossed, not the additional flows of entering traffic. The value does not include cycle lanes. Multi-part crossings (i.e. signalised intersections with slip lanes or two-stage signalised crossings) may need to be assessed in separate analyses.

- **Centre treatment:** No treatment, Painted median or Raised median. Specifies the type of median present at the crossing.

- **Median width:** Width of median in metres.

- **Median acts as refuge:** whether pedestrians are currently using the existing median as a refuge.

  Apply on-site observations to determine if pedestrians are currently using the existing median as a refuge. If ‘Yes’ the tool will split the ‘no facility’ crossing into two stages and if ‘No’ the tool ignores the median when assessing ‘no facility’.

- **Parking/shoulder:** Specifies if the road being crossed has vehicle parking or a road shoulder.

  Option applies to both sides of the road. If no parking exists the user is advised to apply caution when assessing the suitability of kerb extensions.

- **Pedestrian visibility:** Distance in metres that pedestrians can see/be seen, affects the Pedestrian Level of Service.

  Should be the lowest (worst) value of all directions.

- **Posted speed limit:** Speed limit defined at the crossing location. This includes reduced speed areas that may be implemented to facilitate pedestrians crossing. The maximum of posted speed and approach speed is used as part of the feasibility assessment for some facilities.

  There is a risk that in extreme cases whereby the posted speed is significantly greater than the approach speed, some suitable options may be precluded from consideration. It is recommended that users be cognisant of the operational speed environment and may need to modify the posted speed down if it is does not suitably reflect the speed environment.

- **Safe and Appropriate speed** (New Zealand only): used as the “do minimum” speed for calculating delays/disbenefits for vehicle occupants which is a requirement from the NZ Transport Agency 2018 Economic Evaluation Manual (EEM) and defaults to 20 kph but should be reviewed considered by the user.

  The Safe and Appropriate Speed for a pedestrian environment

- **Approach speed (85th percentile):** 85th percentile value of measured vehicle approach speeds at the site.
• **Traffic volume (AADT):** Average annual daily traffic (AADT) volume at the crossing location.

  Summed AADT of all traffic lanes under analysis; should be derived from traffic counts or estimates

• **Peak sensitive pedestrian volume:** The number of sensitive pedestrians using the facility in peak pedestrian demand hour.

  Average value from five surveyed pedestrian peak periods. Sensitive pedestrians include: elderly, vision and mobility impaired, and pedestrians under 12 years of age

• **Peak non-sensitive pedestrian volume:** The number of non-sensitive pedestrians using the facility in peak pedestrian demand hour.

  Average value from five surveyed pedestrian peak periods

• **Estimated daily pedestrian volume:** Typical daily pedestrian volume including sensitive and non-sensitive users.

  Should be derived from pedestrian surveys

• **Average vehicle occupancy:** The average number of occupants in each vehicle; default value 1.3 persons/vehicle in all jurisdictions.

  This value may vary significantly in some situations, for example, on public transport corridors

• **Degree of pedestrian/turning vehicle conflict:** Estimate of the degree of conflict between pedestrians and turning vehicles, classified as High or Low.

  A high volume of turning vehicles can affect pedestrian perception of safety

### Directional variables

Inputs for each traffic direction at the site

• **Flow:** The flow direction as shown in the site layout diagram.

  Directions are for illustrative purposes only

• **Flow type:** Determination of vehicle flow status in traffic direction as either *interrupted* or *uninterrupted*.

  Interrupted: if within 500m of traffic signal or similar device which interrupts flow and there is little scope for additional traffic to enter the stream and fill the gaps

• **Peak vehicle volume:** The vehicle peak hourly traffic volume at the crossing location.

  Average value in this direction from five surveyed vehicle peak periods
• **Traffic lanes**: Number of vehicle lanes.

   Excludes cycle lanes. Note that the tool cannot be used to assess crossings in locations with more than two lanes in any direction. Signals or grade separation are recommended for corridors with more than two lanes in any direction.

• **Crossing distance**: Crossing distance in metres.

   Distance from where pedestrian is first exposed to traffic to where pedestrian is clear of passing traffic stream in this direction; in many cases this is the carriageway width less kerbside parking

**Layout diagram**

A schematic diagram of the site layout; allows checking of general input parameters that relate to the site.

**Site characteristics**

These intermediate outputs display some derived characteristics for the site. Exposed crossing distance is the sum of crossing distance in each direction plus the median width, if the pedestrian is exposed to traffic. If the pedestrian is able to use an existing median as a refuge the exposed distance is reduced. The total peak hourly vehicle flow is the sum for all flows under analysis. The estimated pedestrian crossing time is calculated from the total crossing distance divided by the weighted average walking speed (determined by sensitive/non-sensitive walking speeds and peak hourly pedestrian volumes).

**Model parameters**

• **Walk speed of average sensitive pedestrians**: Average walk speed in metres per second; default value 1.0 m/s.

• **Walk speed of average non-sensitive pedestrians**: Average walk speed in metres per second; default value 1.2 m/s.

• **Average cost of pedestrian crashes**: The average cost per pedestrian crash, as is appropriate for the country/state under analysis and speed environment (maximum of posted or 85th percentile approach speed).

• **Value of delay**: The value of vehicle occupant and pedestrian travel time in $/hour as is appropriate for the country/state under analysis.

   Applies to both pedestrians and vehicle drivers/passengers

• **Pedestrian conversion factor**: This value estimates the average daily pedestrian delay across the entire day from the peak hour pedestrian delay; default value 0.6. For example, if peak pedestrian delay is 30s, the average daily pedestrian delay would be calculated to be 18s. If considered necessary by the user, there may be value in evaluating peak and off-peak conditions separately and then carefully aggregating results.

• **Vehicle conversion factor**: This value estimates the average daily vehicle delay across the entire day from the peak hour pedestrian delay; default value 0.4. For example, if peak vehicle delay is 30s, the average daily pedestrian delay would be calculated to be 12s. If considered necessary by the user, there may be value in evaluating peak and off-peak conditions separately and then carefully aggregating results.
Economic assessment parameters

- **Evaluation days per annum**: The number of days per year considered in the assessment.
- **Project lifetime**: Total number of years included in the economic analysis; default value determined by the discounting procedures for the jurisdiction under analysis.
- **Discount rate**: The discount rate applied within the economic analysis; default value determined by the discounting procedures for the jurisdiction under analysis.

Economic update factors

Update factors account for the change in expense from the base date of a published value to the present date. New Zealand update factors are released annually by the NZ Transport Agency. In the absence of any information pertaining to Australian settings the factors are all assumed to have a value of 1.0 when assessing Australian facilities.

⚠️ Applicable for New Zealand evaluations; values default to 1.0 in Australian settings

Expected crash reduction factors


⚠️ Values may be negative (indicating an increase in crashes) or zero
5. Feasibility

The tool uses the above inputs to determine which facilities are appropriate candidates for the site. A description of the facility feasibility process is contained in the full report and can also be viewed by clicking the Click here to view a description of the facility feasibility process link beside the Calculate feasibility button.

The feasibility calculation will output the feasible facilities table, which displays each possible facility, its overall suitability for the site and a list of the reasons why it is unfeasible or only feasible under certain conditions at the site.

The feasible facilities table allows the user to enter as-built facility parameters, and construction and maintenance costs. It also provides the user with the ability to show/hide facilities in the final assessment.

Suitable for site?

This column displays the output of the feasibility assessment. Yes indicates that the facility is appropriate for the site. Maybe, May require approval and Only as part of total CBD Traffic Management plan indicate that care should be taken in interpreting the outputs of the tool for these facilities. No indicates that the facility is not appropriate for the site. The tool will shade table rows and disable inputs of those facilities deemed inappropriate for the site unless the facility is the existing facility at the site (in which case its information must be entered so that BCR can be calculated).

The tool lists the specific reasons why certain facilities are determined as unfeasible (or only feasible under conditions). Facilities which are combinations of other facilities, such as zebra with median refuge (which is a combination of zebra only and median refuge) will indicate if one or more of the parent facilities is not (or may not be) feasible at the site.

Built parameters

Built parameters must be specified for all facilities to be assessed in the final output, the existing facility, and all facilities from which another facility is derived; for example, to assess zebra with median refuge (which is a combination of zebra only and median refuge) information must be entered for both zebra only and median refuge.

Platform

- **Vehicle negotiation speed**: The speed at which vehicles will negotiate the raised platform in kilometres per hour. The tool will raise an error message if this speed is greater than or equal to the average vehicle approach speed (which is estimated as 91% of the 85th percentile vehicle approach speed).

Kerb extensions

- **Total crossing distance**: Crossing distance in metres after facility has been installed.

> Total crossing distance (all directions) from where pedestrian is first exposed to traffic to where pedestrian is clear of traffic streams
Median refuge

- **Direction 1 and 2 crossing distance and median width**: Crossing distance and median width in metres after facility has been installed.
  - Distance from where pedestrian is first exposed to traffic to where pedestrian is clear of passing traffic stream in this direction
  - Austroads guidelines specify that median refuge width should not be less than 1.8 metres, values smaller than this cannot be entered

Kerb extensions with median refuge

- **Direction 1 and 2 crossing distance and median width**: Crossing distance and median width in metres after facility has been installed.
  - Distance from where pedestrian is first exposed to traffic to where pedestrian is clear of passing traffic stream in this direction
  - Austroads guidelines specify that median refuge width should not be less than 1.8 metres, values smaller than this cannot be entered

Zebra crossing facilities

No user inputs are required for **zebra only** crossings. For derived facilities, such as **zebra with kerb extensions**, valid information must be entered for the major facility (for example **kerb extensions**). Zebra with platform and Zebra with platform and kerb extensions facilities include the following help tip to indicate that they can be used to assess Wombat crossings:

- Functionally similar to a Wombat crossing (Australia)

Signals

The web tool performs a simplified analysis for signalised pedestrian crossings, and makes assumptions around pedestrian and vehicle arrival rates, delay probability and timing effects. To perform a thorough assessment, particularly for more complex situations, the analysis of pedestrian and vehicle delays at signals should be conducted using specialised intersection modelling software such as SIDRA. The inputs required for signals depend on the location (midblock or intersection) and signal control methodology (if pedestrian phase is activated by call button).

- **Signals activated by pedestrian call button?** Only applies to midblock locations and is used to specify whether the phase is activated by button. Note that puffin/intelligent signals will reduce vehicle delays through pedestrians crossing non-compliantly, resulting in pedestrian phase cancellation. To assess this effect users could perform sensitivity testing with regard to vehicle delays by reducing pedestrian flows.
  - If signals are linked to adjacent intersection signals the phase is not considered to be activated by the button. Note that green time in the following calculations refer to effective green time (i.e. time where the green man and flashing red man is displayed)
If the signals are activated by the pedestrian call button the following inputs are required:

- **Delay before green pedestrian phase**: Delay between pedestrian pushing button and receiving green signal in seconds.

  ![Delay between pedestrian pushing button and receiving green signal](image)

- **Pedestrian walk + clearance time**: Time allocated for pedestrians to cross plus clearance time in seconds.

- **Pedestrian platoon size**: Assessment of pedestrian arrival clustering will be higher in busier locations.

  ![Average size of pedestrian platoons](image)

If the signals are located at an intersection, or are not activated by the pedestrian call button, the following inputs are required:

- **Cycle time**: Average signal cycle time in seconds.

- **Percent of time in green pedestrian phase**: Percent of cycle time that is green pedestrian phase. This is the effective green time so includes time where a flashing red man is displayed but not time where a steady red man is displayed, since the model assumes that pedestrians comply with signals.

### Construction cost

The construction cost must be entered for each of the facilities to be assessed, except for the existing facility.

### Annual maintenance cost

The annual maintenance cost may be entered for each of the facilities to be assessed including the existing facility, as it is incorporated into the BCR evaluation. It will default to $0.

### Show in final output?

The checkbox can be used to:

- Hide facilities that are feasible from the final output, if, for example, they are not to be considered at the site for other reasons

- List non-feasible facilities as such in the final output
6. Assessment

The tool uses all the above inputs to perform the assessment. Technical information regarding all calculations, assumptions and limitations is contained in the full report.

After clicking “Calculate assessment” the tool will display the facility assessment tables, which list the selected facilities, with suitability, delay, safety, sight distances, pedestrian level of service, and economic outputs. The facility selected above as the existing facility is used as the base facility for comparison and is listed in the top row of the output tables with baseline information. The saving, benefit and Benefit Cost Ratio calculations are relative to the existing facility, using parameters that have been entered in the Feasible facilities table.

Suitable for site?

This column replicates the suitability determination from the feasible facilities table, but not the reasons. Facilities that are not feasible for the site will be displayed in a shaded row, and no outputs will be shown (unless the facility is the existing facility at the site).

Pedestrian delay

The sum of pedestrian queuing delay and confirmation time when using the facility, in seconds.

Vehicle delay

The delay experienced by vehicles resulting from the facility or pedestrians crossing, in seconds.

Additional vehicle delay as a result of pedestrians using the facility or increased travel time from negotiating raised platforms (equals zero at intersection signals)

Predicted crash rate

Pedestrian injury crashes per year

Sight distance

- **Minimum Crossing Sight Distance (CSD)**

Minimum Crossing Sight Distance (CSD): calculated on the basis of sensitive pedestrian walking speed, using the 85th percentile vehicle approach speed for all facilities

- **Minimum Approach Sight Distance (ASD)**

Minimum Approach Sight Distance (ASD): calculated without accounting for road gradient, using the 85th percentile vehicle approach speed for all facilities, reaction time 1.5 seconds, coefficient of deceleration is 0.36
• **Minimum Safe Intersection Sight Distance (SISD)**

Minimum Safe Intersection Sight Distance (SISD): calculated without accounting for road gradient, using the 85th percentile vehicle approach speed for all facilities, decision time 4.5 seconds, coefficient of deceleration is 0.36

**Pedestrian walkability**

• **Perceived delay**: The perception of delay as experienced by the pedestrians using the facility.

Perception of crossing without having to wait: **A**: Very good … **F**: Very bad

• **Perceived safety**: The perception of safety as experienced by the pedestrians using the facility.

Perception of safety from vehicle danger: **A**: Very good … **F**: Very bad

• **Pedestrian LOS**: Walkability based pedestrian level of service, as experienced by the pedestrians using the facility.

Perception that crossing is walking friendly: **A**: Very good … **F**: Very bad

**Economic outputs**

• **Pedestrian delay cost**: Net present value over project lifetime of pedestrian delay at the facility.

Net present value (NPV) over project lifetime

• **Pedestrian delay saving**: Net present value over project lifetime of pedestrian delay savings, relative to the existing facility.

Saving with facility compared to existing facility. Net present value (NPV) over project lifetime

• **Vehicle delay cost**: Net present value over project lifetime of vehicle delay at the facility, including travel time and vehicle operating costs when negotiating raised platforms.

Product of additional vehicle delay as a result of pedestrians using the facility or increased travel time from negotiating raised platforms (equals zero at intersection signals). Includes Vehicle Operating Costs due to slowing at facilities with platforms. Net present value (NPV) over project lifetime.

• **Vehicle delay saving**: Net present value over project lifetime of vehicle delay savings at the facility, relative to the existing facility, including travel time and vehicle operating costs when negotiating raised platforms.

Saving with facility compared to existing facility. Net present value (NPV) over project lifetime

• **Crash cost**: Net present value over project lifetime of pedestrian crash cost.

Net present value (NPV) over project lifetime
• **Safety saving**: Net present value over project lifetime of safety savings, relative to the existing facility.

  Saving with facility compared to existing facility. Net present value (NPV) over project lifetime.

• **Total benefits**: Net present value over project lifetime of sum of benefits less sum of costs at the facility.

  Total benefits = (Pedestrian delay saving) + (Vehicle delay saving) + (Safety saving). Net present value (NPV) over project lifetime.

• **BCR**: Overall benefit cost ratio calculated for the facility, assumes construction in current financial year.

  Benefit Cost Ratio (BCR) = (Total benefits + Net Present Value of Existing Facility Maintenance cost) / (Construction cost + Net Present Value of Maintenance cost). Assumes construction in current financial year, does not include health benefits or attractiveness.
7. Troubleshooting

<table>
<thead>
<tr>
<th>Issue</th>
<th>Affects</th>
<th>Severity</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error message “JavaScript must be enabled in your web browser settings” is displayed at the top of the page</td>
<td>Internet Explorer</td>
<td>Critical</td>
<td>Click ‘Allow blocked content’ in the box at the bottom of the screen. This option disappears after a short amount of time so the page may have to be refreshed.</td>
</tr>
<tr>
<td></td>
<td>All browsers</td>
<td>Critical</td>
<td>Check your browser extensions, disable script blocking extensions such as NoScript (or add the tool to trusted pages for the extension).</td>
</tr>
<tr>
<td>Webpage content strangely laid out, tool may not work</td>
<td>Internet Explorer</td>
<td>Critical</td>
<td>Ensure you are using Internet Explorer <strong>version 10 or higher.</strong> If using a higher version of Internet Explorer the browser may be forcing the page to be rendered as if you are using an older version. To override this press the F12 key, then under Emulation &gt; Mode &gt; Document mode select <strong>Edge</strong>. You must keep the Emulation pane open while you use the tool (although it can be resized).</td>
</tr>
<tr>
<td></td>
<td>Other browsers</td>
<td>Critical</td>
<td>Ensure you are using a modern desktop web browser that is up to date. Check with your internal IT provider that firewalls or security settings are not blocking some parts of the website. If problems persist, try accessing the website from a computer on a different network (i.e. not at work).</td>
</tr>
</tbody>
</table>
8. Example Use of the Tool

The images below provide a fully-populated example of the tool in operation. The inputs and parameters shown, including facility costs, are shown for indicative purposes only. They should not be assumed as default values unless stated otherwise in this document, nor should they be included in assessments in lieu of site-specific data inputs.
Australasian Pedestrian Facility Selection Tool [V2.2]: User Guide

Modal parameters
- Walk speed of average sensitive pedestrians: 1 m/s
- Walk speed of average non-sensitive pedestrians: 1.2 m/s
- Average cost of pedestrian crashes: $23,329
- Value of delay: $2,977
- Expected crash reduction factor: 0.6
- Vehicle conversion factor: 0.4

Economic assessment parameters
- Evaluation days per annum: 250
- Project lifetime: 30 years
- Discount rate: 7%

Economic update factors
- Base date: June 2010
- Update factor to current date: 1
- Travel time costs/savings
  - June 2010: 1
- Vehicle operating costs/savings
  - June 2010: 1
- Crash costs/savings
  - June 2010: 1

Expected crash reduction factors

<table>
<thead>
<tr>
<th>Platform</th>
<th>Kerb extensions</th>
<th>Median refuge</th>
<th>Kerb extensions with median refuge</th>
<th>Zebra only</th>
<th>Zebra with platform</th>
<th>Zebra with kerb extensions</th>
<th>Zebra with platform and kerb extensions</th>
<th>Zebra with median refuge</th>
<th>Zebra with kerb extensions and median refuge</th>
<th>Signals</th>
<th>Signals with kerb extensions</th>
<th>Grade separation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Platform</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Kerb extensions</td>
<td></td>
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<tr>
<td>Median refuge</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Calculate feasibility

Automatically calculate when inputs are updated?

Feasible facilities

<table>
<thead>
<tr>
<th>Suitable for site?</th>
<th>Built parameters</th>
<th>Construction cost</th>
<th>Annual maintenance cost</th>
<th>Show in final output?</th>
</tr>
</thead>
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<tr>
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<td>No parameters</td>
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<td>$0</td>
<td>✓</td>
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<tr>
<td>Kerb extensions</td>
<td></td>
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</tr>
<tr>
<td>Median refuge</td>
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<td>$45,000</td>
<td>$500</td>
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</tr>
<tr>
<td>Facility Type</td>
<td>Suitability</td>
<td>Reason for Inapplicability</td>
<td>Equations/Parameters</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
<td>----------------------------</td>
<td>----------------------</td>
<td></td>
</tr>
<tr>
<td>Kerb extensions with median refuge</td>
<td>Yes</td>
<td></td>
<td>Direction 1 crossing distance: 3.0 metres</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Median refuge width: 2.0 metres</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Direction 2 crossing distance: 3.0 metres</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$ 57000 $ 1000</td>
<td></td>
</tr>
<tr>
<td>Zebra only</td>
<td>No</td>
<td>Intersection location Not appropriate without median refuge</td>
<td>No parameters</td>
<td></td>
</tr>
<tr>
<td>Zebra with platform</td>
<td>No</td>
<td>Zebra not suitable Platform not suitable</td>
<td>Applies vehicle negotiation speed from Platforms above</td>
<td></td>
</tr>
<tr>
<td>Zebra with kerb extensions</td>
<td>No</td>
<td>Zebra not suitable Kerb extensions not suitable</td>
<td>Applies total crossing distance from Kerb extensions above</td>
<td></td>
</tr>
<tr>
<td>Zebra with platform and kerb extensions</td>
<td>No</td>
<td>Zebra not suitable Platform not suitable Kerb extensions not suitable</td>
<td>Applies vehicle negotiation speed from Platforms and total crossing distance from Kerb extensions above</td>
<td></td>
</tr>
<tr>
<td>Zebra with median refuge</td>
<td>No</td>
<td>Zebra not suitable</td>
<td>Applies distances and refuge width from Median refuge above</td>
<td></td>
</tr>
<tr>
<td>Zebra with kerb extensions and median refuge</td>
<td>No</td>
<td>Zebra not suitable</td>
<td>Applies distances and refuge width from Kerb extensions with median refuge above</td>
<td></td>
</tr>
<tr>
<td>Signals</td>
<td>Yes</td>
<td></td>
<td>Cycle time: 120 seconds</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Percent of time in green pedestrian phase: 15 %</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$ 94000 $ 7000</td>
<td></td>
</tr>
<tr>
<td>Signals with kerb extensions</td>
<td>Yes</td>
<td></td>
<td>Applies parameters from Signals above, plus:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Direction 1 crossing distance: 3.8 metres</td>
<td></td>
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<tr>
<td></td>
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<td></td>
<td>Median width: 2.8 metres</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Direction 2 crossing distance: 3.8 metres</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$ 105001 $ 8000</td>
<td></td>
</tr>
<tr>
<td>Grade separation</td>
<td>No</td>
<td>Intersection location</td>
<td>No parameters</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>
## Facility assessment

<table>
<thead>
<tr>
<th>Facility</th>
<th>Suitable for site</th>
<th>Pedestrian delay</th>
<th>Vehicle delay</th>
<th>Predicted crash rate</th>
<th>CSD</th>
<th>ASD</th>
<th>SISD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerb extensions</td>
<td>No</td>
<td>44 sec</td>
<td>0 sec</td>
<td>0.03 /year</td>
<td>159</td>
<td>56</td>
<td>102</td>
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<tr>
<td>No facility</td>
<td>N/A</td>
<td>55 sec</td>
<td>0 sec</td>
<td>0.05 /year</td>
<td>173</td>
<td>56</td>
<td>102</td>
</tr>
<tr>
<td>Platform</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median refuge</td>
<td>Yes</td>
<td>12 sec</td>
<td>0 sec</td>
<td>0.02 /year</td>
<td>66</td>
<td>56</td>
<td>102</td>
</tr>
<tr>
<td>Kerb extensions with median refuge</td>
<td>Yes</td>
<td>11 sec</td>
<td>0 sec</td>
<td>0.02 /year</td>
<td>58</td>
<td>56</td>
<td>102</td>
</tr>
<tr>
<td>Zebra only</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Signals</td>
<td>Yes</td>
<td>44 sec</td>
<td>0 sec</td>
<td>0.03 /year</td>
<td>173</td>
<td>56</td>
<td>102</td>
</tr>
<tr>
<td>Signals with kerb extensions</td>
<td>Yes</td>
<td>44 sec</td>
<td>0 sec</td>
<td>0.03 /year</td>
<td>58</td>
<td>56</td>
<td>102</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Facility</th>
<th>Perceived delay</th>
<th>Perceived safety</th>
<th>Pedestrian LOS</th>
<th>Pedestrian delay cost</th>
<th>Pedestrian delay saving</th>
<th>Vehicle delay cost</th>
<th>Vehicle delay saving</th>
<th>Crash cost</th>
<th>Safety saving</th>
<th>Total benefits</th>
<th>BCR</th>
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<tbody>
<tr>
<td>Kerb extensions</td>
<td>E</td>
<td>F</td>
<td>F</td>
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<td>$ 0</td>
<td>$ 95,000</td>
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<tr>
<td>No facility</td>
<td>E</td>
<td>F</td>
<td>F</td>
<td>$ 110,000</td>
<td>- $ 22,000</td>
<td>$ 0</td>
<td>$ 147,000</td>
<td>- $ 74,000</td>
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<tr>
<td>Platform</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median refuge</td>
<td>B</td>
<td>D</td>
<td>D</td>
<td>$ 24,000</td>
<td>$ 64,000</td>
<td>$ 0</td>
<td>$ 65,000</td>
<td>$ 94,000</td>
<td>1.9</td>
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</tr>
<tr>
<td>Kerb extensions with median refuge</td>
<td>B</td>
<td>D</td>
<td>C</td>
<td>$ 21,000</td>
<td>$ 66,000</td>
<td>$ 0</td>
<td>$ 65,000</td>
<td>$ 97,000</td>
<td>1.4</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signals</td>
<td>C</td>
<td>B</td>
<td>B</td>
<td>$ 89,000</td>
<td>- $ 2,000</td>
<td>$ 0</td>
<td>$ 81,000</td>
<td>$ 13,000</td>
<td>0.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signals with kerb extensions</td>
<td>C</td>
<td>B</td>
<td>B</td>
<td>$ 89,000</td>
<td>- $ 2,000</td>
<td>$ 0</td>
<td>$ 81,000</td>
<td>$ 13,000</td>
<td>0.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes**

- **Suitable for site** indicates whether the facility is suitable for installation.
- **Pedestrian delay** refers to the time taken by pedestrians to cross.
- **Vehicle delay** represents the time delay for vehicles.
- **Predicted crash rate** estimates the number of crashes expected.
- **CSD**, **ASD**, and **SISD** are metrics related to pedestrian safety and infrastructure design.
Appendix A Australasian Pedestrian Facility Selection Tool Economic Evaluation Update

A.1 Introduction

This appendix documents updates made to the economic appraisal within the Australasian Pedestrian Facility Selection Tool (the Tool). The existing Tool and corresponding economic appraisal methodologies are compared and changes made to the Tool are documented. These changes take effect with version 1.3.0 of the Tool which was uploaded to replace version 1.2.0 on the Austroads server on 23 March 2017.


A.2 ATAP guidance

The ATAP guidance documents are available online from https://atap.gov.au/ and provide practitioners with a methodology to undertake cost and benefit appraisal (CBA) to support investment. Two levels of appraisal are recommended; rapid appraisal and detailed appraisal. Document F3 Options Generation Assessment states that rapid appraisal is generally valid for projects with values less than or equal to $15 million. It is considered that the majority of pedestrian crossing facilities considered in the tool are of an appropriate magnitude to be appraised using the rapid methodology. Rapid appraisal requires the valuation of benefits that are easily monetised and comprise a large portion (greater than 10%) of all benefits only.

Document M4 Active Travel provides active transport specific guidance and benefit values. Other more general benefit values and methodologies are provided in document T2 Cost Benefit Analysis and document PV2 Road Parameter Values. Document M4 suggests the following benefits for inclusion in active transport CBA, and it is noted that not all of these benefits are relevant for pedestrian crossing facilities:

- Health
- Vehicle operating costs
- Parking
- Travel time
- Change in crash risk
- Noise reduction
- Air pollution reduction
- Congestion reduction
- Relevant aspects of the existing CBA methodology for Australian jurisdictions within the Tool and the updated ATAP guidance are compared in Table A1.
Table A 1: Comparison of the Tool with EEM 2016

<table>
<thead>
<tr>
<th>Existing Austroads Tool</th>
<th>ATAP Guidance</th>
<th>ATAP Ref</th>
</tr>
</thead>
</table>
| Denominator vs numerator in BCR calculation                  | Numerator contains benefits and disbenefits to users of the transport system and monetised externalities. All costs to transport agency and other authorised parties in the denominator. Defined as National BCR (BCRN) in New Zealand guidance. | Two options provided:  
  - BCR1: Current calculation  
  - BCR2 (preferred): Numerator contains benefits and disbenefits to users of the transport system and monetised externalities less operating costs. Denominator contains expenditure required before the facility is operational. | T2       |
| Expected crash reduction factors                            | Crash reduction factors by facility type taken from New Zealand guidance.                                                                        | M4       |
| Pedestrian crash cost                                       | Based on NSW and Austroads guidance dependent on speed.                                                                                         | PV2      |
| Value of delay                                              | Based on NSW and Austroads guidance.                                                                                                             | PV2      |
| Vehicle Occupancy                                           | Default value of 1.2 assumed                                                                                                                     | PV2      |
| Vehicle Operating Cost                                      | Not included                                                                                                                                  | PV2      |
| Project lifetime                                            | Default value is 30 years                                                                                                                        | T2       |
| Discount rate                                               | Default value is 7%                                                                                                                            | T2       |
| Net Present Value                                           | Not calculated however all necessary values provided in outputs.                                                                               | T2       |
| First Year Rate of Return                                   | Not calculated                                                                                                                                | T2       |

Based on ATAP the existing methodology for calculating the benefit cost ratio (BCR1) is satisfactory, especially for the purposes of the tool to allow comparison between options. Alternative values for key benefit unit values are provided in ATAP and have been updated in the Tool.

### A.3 EEM update

Since the initial release of the Tool, an updated (2016) version of the EEM has been published by the NZ Transport Agency to replace the corresponding 2013 version. The following section reviews changes between the original EEM used in the development of the Tool and the updated version of the EEM. The review was limited to sections of the EEM which were used to inform the original development of the Tool. Key updates are shown in Table A 2.
Table A 2: Key EEM Updates

<table>
<thead>
<tr>
<th>Existing Austroads Tool</th>
<th>EEM Update</th>
<th>EEM Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected crash reduction factors</td>
<td>Values taken from 2016 EEM.</td>
<td>Crash Estimate Compendium</td>
</tr>
<tr>
<td></td>
<td>Some updated factors by facility type provided for use in New Zealand</td>
<td></td>
</tr>
<tr>
<td></td>
<td>based on international research including a correction to the reduction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>factor for platforms which has</td>
<td></td>
</tr>
<tr>
<td>Pedestrian crash cost</td>
<td>Values taken from 2016 EEM.</td>
<td>EEM Appendix 6</td>
</tr>
<tr>
<td></td>
<td>Updated value.</td>
<td></td>
</tr>
<tr>
<td>Vehicle Occupancy</td>
<td>Default value of 1.2 assumed</td>
<td>EEM Appendix 2</td>
</tr>
<tr>
<td></td>
<td>Values vary by travel purpose in Table A2.4.</td>
<td></td>
</tr>
<tr>
<td>Vehicle Operating Costs</td>
<td>Values taken from 2016 EEM.</td>
<td>EEM Appendix 3</td>
</tr>
<tr>
<td></td>
<td>Updated values for speed change cycles are provided.</td>
<td></td>
</tr>
<tr>
<td>Economic update factors</td>
<td>Values taken from 2016 EEM.</td>
<td>EEM Update Factors A12.3</td>
</tr>
<tr>
<td></td>
<td>Updated factors to adjust to July 2016.</td>
<td></td>
</tr>
</tbody>
</table>

A.4 Further considerations

This section considers benefits and additional analysis of pedestrian facilities that are not included in the Tool currently but are often considered in active transport economic appraisal and could be add-ons for future versions of the tool. Key considerations proposed are:

- Health benefits
- Pedestrian amenity
- Operating cost
- Base case definition
- Sensitivity testing

Health benefits

Generally health benefits comprise the largest single benefit of active transport facilities. Not all pedestrian crossing facilities will produce health benefits, however if the crossing reduces severance in the pedestrian network the health benefits could be significant. This may be particularly relevant outside schools for example where providing or upgrading a crossing may encourage parents to allow their children to walk to school.

In order to apply this calculation users would need to enter ‘before’ and ‘after’ daily pedestrian volumes into the tool. The ‘after’ volumes may differ by facility type. Where numbers are not anticipated to change no health benefits would be generated.

The New Zealand Simplified Procedure 11 for walking and cycling activities (SP11) addresses this situation through multiplying the increased pedestrian demand by the average walking trip length to estimate health benefits, see SP11 worksheet 5, section 4 for ‘improvements at hazardous sites’. Detailed guidance is provided in ATAP document M4 for valuing the health benefits of active transport facilities.
Pedestrian amenity

Amenity benefits are listed as ‘non-monetised benefits’ in the ATAP guidance (see document T2, Pg 14). In the New Zealand guidance amenity benefits for cycle route facilities are partially valued through applying relative attractiveness factors (ranging from 1 – 2) time and using travel time savings to approximate amenity.

Relative attractiveness of the various facility options is already quantified in the pedestrian LOS score. It may be possible to monetise this for inclusion in the cost benefit analysis.

Facility operating cost

Currently the facility operating cost is not included in the CBA. The methodology for including the operating cost in the BCR is the key difference between BCR1 and BCR2. A simple methodology for including operating cost in the Tool could be to approximate annual operating cost as a percentage of the construction cost that differs by facility type.

Base case definition

The tool currently assumes that the base case for all analyses is ‘no crossing facility’. Definition of the base case is one of the initial steps listed in ATAP for CBA. Inclusion of the ability to define a different base scenario would make the tool more flexible for a range of applications.

For example if the existing scenario includes a zebra crossing with high pedestrian demand the vehicles will experience delay savings if the crossing is upgraded to signals. Exclusion of the zebra in the base case does not allow these savings to be measured.

Sensitivity testing

Sensitivity testing is required in both the ATAP and New Zealand EEM guidance for funding applications. In order to make the tool more directly applicable for this purpose a sensitivity testing option could be included. This would require the user to specify the variables to be tested and value ranges.

A.5 Implemented Changes

Table A 3 shows the implemented changes to the Tool considering the review of both ATAP and the EEM as well as the original research.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Changes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Vehicle Occupancy</td>
<td>Updated to 1.3 persons/vehicle for all jurisdictions</td>
<td>This value represents a compromise between the values stipulated in the EEM and ATAP guidelines. One value was retained for all jurisdictions to remain consistent with the original Tool methodology</td>
</tr>
<tr>
<td>Average cost of pedestrian crashes</td>
<td>NZ - Updated to match Table A6.5 in the EEM&lt;br&gt;Australian jurisdictions – updated using Table 20 in ATAP with crash type breakdowns in Table A10 of the Guide to Project Evaluation Part 4: Project Evaluation Data</td>
<td></td>
</tr>
<tr>
<td>Vehicle operating costs</td>
<td>Updated to match Table A5.37 in the EEM for all jurisdictions.</td>
<td>Australian values unavailable so NZ values have been used for all jurisdictions.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Changes</td>
<td>Comments</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Value of delay</td>
<td>NZ – No change</td>
<td>Australian value was calculated based on the same split of private to business travel used in the original research.</td>
</tr>
<tr>
<td></td>
<td>Australian jurisdictions – updated to $29.77/hour using figures in Section PV2 of ATAP</td>
<td></td>
</tr>
<tr>
<td>Economic update factors</td>
<td>NZ – Vehicle operating cost update factor changed to 1.0 and July 2015 based on Table A5.37 in the EEM</td>
<td></td>
</tr>
<tr>
<td>Crash reduction factor – platform</td>
<td>NZ – updated to 20% based on Table 36 in the Crash Estimate Compendium¹</td>
<td>Australian jurisdictions – updated to 30% based on Table 21 of ATAP. The highest reduction factor.</td>
</tr>
<tr>
<td>Crash reduction factor – median refuge</td>
<td>NZ – updated to 15% if kerbside parking is present or 45% if no kerbside parking is present based on Table 36 in the Crash Estimate Compendium. Australian jurisdictions – updated to 56% based on Table 21 of ATAP.</td>
<td>The highest reduction factor of kerb extensions with median refuge was taken for Australian jurisdictions.</td>
</tr>
<tr>
<td>Crash reduction factor – kerb extensions with median refuge</td>
<td>NZ – updated to 45% based on Table 36 in the Crash Estimate Compendium. Australian jurisdictions – updated to 56% based on Table 21 of ATAP.</td>
<td>The highest reduction factor of zebra and platform was taken for NZ and Australian jurisdictions.</td>
</tr>
<tr>
<td>Crash reduction factor – Zebra with platform</td>
<td>NZ – updated to 20% based on Table 36 in the Crash Estimate Compendium. Australian jurisdictions – updated to 30% based on Table 21 of ATAP.</td>
<td>The highest reduction factor of zebra and platform was taken for NZ and Australian jurisdictions.</td>
</tr>
<tr>
<td>Crash reduction factor – Zebra with platform and kerb extensions</td>
<td>Updated to 35% for all jurisdictions based on Table 36 in the Crash Estimate Compendium.</td>
<td>The highest reduction factor of zebra, platform and kerb extensions was taken for NZ and Australian jurisdictions. Australian values unavailable so NZ values have been used for all jurisdictions.</td>
</tr>
<tr>
<td>Crash reduction factor – Zebra with median refuge</td>
<td>NZ – Updated to 15% if kerbside parking is present or 45% is no kerbside parking is present based on Table 36 in the Crash Estimate Compendium. Australian jurisdictions – updated to 56% based on Table 21 of ATAP.</td>
<td>The highest reduction factor of zebra and kerb extensions was taken for NZ and Australian jurisdictions.</td>
</tr>
<tr>
<td>Crash reduction factor – Zebra with kerb extensions with median refuge</td>
<td>NZ – updated to 45% based on Table 36 in the Crash Estimate Compendium. Australian jurisdictions – updated to 56% based on Table 21 of ATAP.</td>
<td>The highest reduction factor of zebra, kerb extensions with median refuge was taken for NZ and Australian jurisdictions.</td>
</tr>
<tr>
<td>Crash reduction factor – Grade separation</td>
<td>NZ – updated to 85% based on Table 36 in the Crash Estimate Compendium. Australian jurisdictions – updated to 86% based on Table 21 of ATAP.</td>
<td>The highest reduction factor of zebra, kerb extensions with median refuge was taken for NZ and Australian jurisdictions.</td>
</tr>
</tbody>
</table>
A.6 Save and load functionality

A plugin for the current web application was developed that allows users to save their input values and settings from the tool and restore the values later during the same or a subsequent session.

The plugin allows users to save their inputs from the form to a comma-separated value (CSV) file. This is accomplished using JavaScript and HTML. By tagging all the input fields with a unique identifier, a data dump of all the values with their associated input identifications is exported. This data is then written to a CSV file and made available for download. The user is allowed to define a unique file name and the resultant CSV file is saved to the user’s default downloads folder.

To load a CSV file, the user accesses the website, clicks the “choose file” button, browses to the file and then loads it to the website. The upload function checks for appropriate selections on the form and fills in values from the CSV accordingly.
Appendix B Australasian Pedestrian Facility Selection Tool version 2.0.0 Update

B.1 Introduction

This appendix documents updates made to the Australasian Pedestrian Facility Selection Tool (the Tool). These changes take effect with version 2.0.0 of the Tool which was uploaded to replace version 1.3.0 on the Austroads server in April 2018.

B.2 Visual style enhancements

The appearance of the tool has been updated, with the following major differences:

- More legible font
- Version number included in page title
- Improved icons and colours
- Better use of horizontal screen width
- Improved display of units ($, %, etc.) on inputs
- Improved cross-browser performance of help tips and page alert/confirmation dialogues
- Incorporated disclaimer and quick-start guide into tool landing screen

B.3 Improved save/load function

The updated save/load system:

- Incorporates version checking, will warn if loading data saved by an older version of the tool. Testing has not revealed breaking compatibility issues with versions prior to 2.0.0 but it is possible that future versions may break compatibility with older versions.
- Includes information regarding which parts of the tool were visible when the file was saved:
  - Model parameters
  - Feasible facilities
  - Facility assessment
- “Show in final output” selections are now correctly saved and loaded

B.4 Maintenance costs

The feasible facilities table now includes a field for maintenance costs, which will default to $0 for each facility. If set, the maintenance cost will be incorporated into the BCR figure as part of the facility assessment, along with the maintenance cost of the existing facility.
B.5 Crossing upgrades

As many crossing installations are upgrades to existing facilities the tool now incorporates the option for the user to specify the existing facility at the site. Information regarding the existing facility must be entered in the feasible facilities table, even if the existing facility is determined not to be suitable for the site (as the data is used in the assessment economic calculation).

The existing facility is presented as the top row of the two facility assessment tables, and is incorporated into the savings, benefits and BCR figures of the other facilities. Additionally:

- **Vehicle delay saving** field has been added to the facility assessment table
- Construction cost input is disabled for the existing facility
- BCR calculation incorporates the maintenance cost of the existing facility as a benefit (where the maintenance cost of the tested facility is a cost).

B.6 Wombat crossings

A “Wombat crossing” is a type of pedestrian crossing in Australia that consists of a zebra crossing on a platform or a zebra crossing on a platform with kerb extensions.

The update has added the following two features:

- When an Australian jurisdiction is selected in the tool a dismissible information alert is displayed to indicate how a Wombat crossing can be assessed within the tool
- Help tips have been added to the zebra with platform and zebra with platform and kerb extensions rows in the feasible facilities table to highlight that these are functionally similar to Wombat crossings.

B.7 Summary of unfeasibility

The feasible facilities table now includes a list of reasons why certain facilities are determined to be unfeasible (or only feasible under certain conditions). The user can view diagrams of the facility feasibility process through the link on the tool page.

Facilities which are combinations of other facilities, such as zebra with median refuge (which is a combination of zebra only and median refuge) will indicate if one of the component facilities is not, or may not be, feasible at the site.

B.8 Multi-lane crossings

Comment added to tool (quick-start guide and help tips): “Note that the tool cannot be used to assess crossings in locations with more than two lanes in any direction, signals or grade separation are recommended for wider corridors”.

B.9 Assessing crossing facilities with existing medians

In situations where a raised/painted median exists and is used by pedestrians (even though it has no formal protection) the tool can assess “no facility” to account for this reduced delay and Crossing Sight Distance (CSD). In these situations, Kerb Extensions, Platforms and Zebras are no longer determined to be suitable without a formal Median Refuge. CSD for Signals calculated to account for the existing median, as with no facility. Inputs for Signals with Kerb extensions account for existing median, if present, affecting the CSD. The change included the addition of a centre treatment type (painted/raised), a new dropdown menu in the Physical/environmental variables section, additional feasibility criteria and further help tips.
B.10 Zebra crossing pedestrian delays

Confirmation delay at pedestrian crossings was formerly set at a constant five seconds. The tool now determines this delay on the basis of traffic volumes: \(0.311 + 0.004 \times \text{Average hourly two-way traffic volume}\) (reference: https://ir.canterbury.ac.nz/handle/10092/9197) with a maximum value of seven seconds.

B.11 Site information collection form

A printable PDF form, hosted by the tool, has been developed as a checklist and template to assist in collecting tool data during site visits.

B.12 Support moved to ticket-based system

Support requests through the tool are now sent to a ticket-based support system, which improves the traceability of the support process.
Appendix C  Australasian Pedestrian Facility Selection Tool version 2.1.0 Update

C.1 Introduction

This appendix documents updates made to the Australasian Pedestrian Facility Selection Tool (the Tool). These changes take effect with version 2.1.0 of the Tool which was uploaded to replace version 2.0.3 on the Austroads server in November 2018.

C.2 Design and minor updates

The design and layout of the site includes the following change to improve user experience:

- Rationalised design and improved consistency
- Improved website accessibility
- Clarified how to determine peak volume times in tool help tips and user guide
- Enhanced help tips in Request help form and for determining Peak Volume times
- Fixed bugs with erroring inputs not being highlighted in some instances, Crossing Sight Distance calculations returning invalid values and vehicle delays being incorrectly calculated for zebra with platform and kerb extensions

C.3 Economic update factors

To incorporate periodic updates to the NZTA EEM economic update factors the tool now includes values adjusted to July 2017 from EEM Table 12.2. The changes are outlined in Table C 1.

Table C 1: Economic update factor changes

<table>
<thead>
<tr>
<th>Variable</th>
<th>Base date</th>
<th>Previous value</th>
<th>Updated value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel time costs/savings</td>
<td>July 2002</td>
<td>1.45</td>
<td>1.47</td>
</tr>
<tr>
<td>Vehicle operating costs/savings</td>
<td>July 2015</td>
<td>0.98</td>
<td>1.00</td>
</tr>
<tr>
<td>Crash costs/savings</td>
<td>July 2015</td>
<td>1.03</td>
<td>1.04</td>
</tr>
</tbody>
</table>

C.4 Expected crash reduction factors

Recent Australasian research into the safety of raised platforms has provided updated expected crash reduction factor values for platforms, zebra crossings on platforms and zebra crossings on platforms with kerb extensions as per: http://acrs.org.au/files/papers/arsc/2016/Makwasha%2000036%20EA.pdf

The changes are outlined in Table C 2.

---

Table C 2: Crash reduction factor updates

<table>
<thead>
<tr>
<th>Variable</th>
<th>Previous value</th>
<th>Updated value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Australian jurisdictions</td>
<td>New Zealand</td>
</tr>
<tr>
<td>Platform</td>
<td>30%</td>
<td>20%</td>
</tr>
<tr>
<td>Zebra with platform</td>
<td>30%</td>
<td>20%</td>
</tr>
<tr>
<td>Zebra with platform and kerb extensions</td>
<td>35%</td>
<td></td>
</tr>
</tbody>
</table>

C.5 Safe and appropriate speed

An input for Safe and Appropriate Speed has been added to the tool for New Zealand assessments. The new input is used as the “do minimum” speed for calculating delays/disbenefits for vehicle occupants and has been included to conform with section 2.7 of the NZ Transport Agency 2018 Economic Evaluation Manual (EEM).  

Appendix D Australasian Pedestrian Facility Selection Tool version 2.2.0 Update

D.1 Introduction

This appendix documents updates made to the Australasian Pedestrian Facility Selection Tool (the Tool). These changes take effect with version 2.2.0 of the Tool which was uploaded to replace version 2.1.4 on the Austroads server in June 2020.

D.2 Economic update factors

To incorporate periodic updates to the NZTA Economic Evaluation Manual (EEM) economic update factors, the tool now includes values adjusted to July 2019 from EEM Table 12.2ª. The changes are outlined in Table D 1.

Table D 1: Economic update factor changes

<table>
<thead>
<tr>
<th>Variable</th>
<th>Base date</th>
<th>Previous value</th>
<th>Updated value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel time costs/savings</td>
<td>July 2002</td>
<td>1.47</td>
<td>1.54</td>
</tr>
<tr>
<td>Vehicle operating costs/savings</td>
<td>July 2015</td>
<td>1.00</td>
<td>1.10</td>
</tr>
<tr>
<td>Crash costs/savings</td>
<td>July 2015</td>
<td>1.04</td>
<td>1.09</td>
</tr>
</tbody>
</table>

D.3 Expected crash reduction factors


The changes taken from Table 38 of the Crash Estimation Compendium are outlined in Table D 2 and applied only to the New Zealand jurisdiction.

Table D 2: New Zealand crash reduction factor updates

<table>
<thead>
<tr>
<th>Variable</th>
<th>Previous value</th>
<th>Updated value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platform</td>
<td>47%</td>
<td>20%</td>
</tr>
<tr>
<td>Kerb extensions</td>
<td>35%</td>
<td>35%</td>
</tr>
<tr>
<td>Median refuge</td>
<td>15%</td>
<td>15% if parking and 45% if no parking</td>
</tr>
<tr>
<td>Kerb extensions with median refuge</td>
<td>45%</td>
<td>45% if parking and 65% if no parking</td>
</tr>
<tr>
<td>Zebra</td>
<td>-28%</td>
<td>0%</td>
</tr>
<tr>
<td>Zebra with platform</td>
<td>63%</td>
<td>20%</td>
</tr>
</tbody>
</table>

### D.4 ATAP procedures

Engagement has been undertaken with the Australian Transport Assessment & Planning (ATAP) Guidelines Steering Committee to seek feedback on the implementation of the ATAP guidelines within the tool.

Two changes were agreed following this engagement as follows:

1. A note has been added to the tool for Australian jurisdictions as follows “It is recommended that practitioners follow the three tiered ‘Options generation and assessment’ process outlined at https://www.atap.gov.au/framework/options-generation-assessment/3-options-assessment of which the Cost Benefit Assessment is only one consideration.” This is presented as an alert panel when an Australian jurisdiction is selected, as with Wombat crossings.

2. A more detailed assessment of the value of time is included, to facilitate Australian jurisdictions whereby assessments are performed on the basis of the split of private travel, business travel and heavy vehicles as is consistent with Table 12 of the ATAP PV2. The model now accepts separate “value of delay” parameters for both pedestrians and vehicles. For New Zealand jurisdictions these parameters default to the same value, while in Australia the default values assumed in the model are consistent with the ATAP W4 Active Travel example and are 80% private travel, 15% business travel, and 5% heavy vehicles = $31.34 per hour for road travel, and 100% private travel = $14.99 per hour for active travellers (the previous value applied to both modes was a 2010 value of time of $29.77). Practitioners are encouraged to adjust these values to reflect the local environment. These values can be adjusted by selecting the model parameters link. A screen capture of the updated model parameters section of the page is shown below.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Previous value</th>
<th>Updated value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zebra with kerb extensions</td>
<td>35%</td>
<td>35%</td>
</tr>
<tr>
<td><strong>Zebra with platform and kerb extensions</strong></td>
<td>63%</td>
<td>63%</td>
</tr>
<tr>
<td>Zebra with median refuge</td>
<td>15%</td>
<td>15% if parking and 45% if no parking</td>
</tr>
<tr>
<td>Zebra with kerb extensions and median refuge</td>
<td>45%</td>
<td>45% if parking and 65% if no parking</td>
</tr>
<tr>
<td><strong>Signals</strong></td>
<td>45%</td>
<td>45%</td>
</tr>
<tr>
<td><strong>Signals with kerb extensions</strong></td>
<td>45%</td>
<td>45%</td>
</tr>
<tr>
<td>Grade separation</td>
<td>85%</td>
<td>85%</td>
</tr>
</tbody>
</table>