Government of **Western Australia**
Department of **Transport**
and Major Infrastructure

SAFE ACTIVE STREETS
Pilot Program

Final Evaluation Report – 2026

New look local streets boost walking and riding, reduce traffic

Acknowledgement of Country

The Department of Transport and Major Infrastructure acknowledges the Traditional Custodians of the land throughout Western Australia and pays our respects to Elders past and present.

We acknowledge the members of all Aboriginal communities, their cultures and continuing connection to Country throughout the State.

About this report

The information contained in this publication is provided in good faith and believed to be accurate at time of publication. The State shall in no way be liable for any loss sustained or incurred by anyone relying on the information.

On 1 July 2025, a reform of the structure for government services in Western Australia came into effect. The Department of Transport became the Department of Transport and Major Infrastructure.

Alternative formats

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The Department of Transport and Major Infrastructure (DTMI) worked with local governments between 2015 and 2023 to develop, trial and evaluate safe active streets.

Safe active streets use local area traffic management treatments to reduce car speeds to 30 km/h and create environments that encourage more people to walk, wheel and ride in their communities.

The Safe Active Streets Pilot Program in Western Australia was motivated by research which showed that a fear of sharing the road with motor vehicles was a key barrier to many people riding bikes more often. Local research, including a large community-wide cycling survey undertaken in 2015 by the Royal Automobile Club of WA[1] and the 2015 Auditor General's Report into Safe and Viable Cycling[2], highlighted the need for quieter and more comfortable local bicycle routes to remove barriers to active transport and the perceived lack of safety on local roads.

An evaluation plan and framework were established to test whether redesigning a street using traffic management treatments could reduce vehicle volumes and speeds, leading to increased active travel, and positive community sentiment towards the safe active street.

SAFE ACTIVE STREETS

The Safe Active Streets Pilot Program trialled unique combinations of design features that reflected local community needs and contexts, while also complementing each local government's approach to building an integrated active transport network. Extensive consultation with local governments was completed for each project. Affected community members were also consulted about route alignments and designs before projects proceeded to local council approval.

Design measures and treatments were selected to create a safe, comfortable, low speed on-road environment which can be shared by people walking, wheeling, riding and driving. Landscaping, amenity and wayfinding improvements along many of the routes were provided to benefit people moving around their local streets.

The program has led to the development of 23 safe active streets, with 11 projects constructed before completion of the pilot in 2023. Of these, nine were included in the evaluation study.

Aims of the pilot:

- Reduce motor vehicle numbers
- Reduce average and 85th percentile speeds to within acceptable operating thresholds[3]
- Increase the number of riding and walking trips made throughout the week
- Increase the number of people of all ages and abilities making local trips by riding and walking
- Influence user, resident and the wider community perceptions of safe active street routes as safe and comfortable places to walk, wheel and ride.

PILOT PROJECTS

Eight safe active street projects in Perth were included in the evaluation. One project in Geraldton was also evaluated to test the impact of a safe active street delivered in a major regional centre. The program vision sought to design and implement each safe active street as a safe route that encouraged active travel trips to local destinations such as schools, shops and recreational areas, as well as a connection to bike riding facilities and transport hubs.

Evaluated projects:

- **Bassendean** - Whitfield Street and West Road
- **Bayswater** – Leake Street and May Street
- **Belmont** - Surrey Road, Cohn Street, McGill Street, President Street and Jeffrey Street
- **Cambridge** - Ruislip Street, Northwood Street and Woolwich Street
- **Geraldton** – Railway Street
- **Melville** - Links Roads, Collier Street, Millington Street and Hope Road
- **Nedlands** – Elizabeth Street and Jenkins Avenue
- **Stirling** - Beatrice Street, Shaw Road, Stoner Street, Ambrose Street, Moorland Street and Manning Street
- **Vincent** - Shakespeare Street, Scott Street, Richmond Street and Bourke Street

DESIGN FEATURES

A combination of design measures and treatments were applied to the safe active streets. This helped to slow down vehicles, and alerted people of a shared space that is welcoming of walking, wheeling or riding.

Street treatments varied by project depending on the natural environment, local government preferences, community feedback and context. Table 1 provides a summary of the different measures and treatments applied, with visual examples provided in Figures 1-6.

Table 1: Summary of measures and treatments selectively applied across the safe active street routes

Measures	Treatments
Major entry and exit statements	• Blue road patches • Regulatory 30 km/h speed signs • Raised platforms • Restricted traffic movements
Route treatments	• 30 km/h speed signs • Changed road surface colour • Road verge planting
Vertical and horizontal deflections at intersections	• Raised intersections – all legs / all legs with median • Intersection priority changed
Vertical and horizontal deflections at mid-blocks	• Carriageway narrowing via formalised parking, buildouts or trafficable medians • Road humps
Vertical and horizontal deflections at slow points	• Single lane – angled slow point (with or without a road hump) • Double lane – angled slow point with median • Central blister island
Filtering and connections	• Connections – cut throughs across distributor roads along the route • Connections – path only connections through parks along the route • Filtered permeability – to prevent through traffic movements • Crossing treatments – e.g. rainbow crossing

Figure 1: Lane narrowing using formalised parking

Figure 2: Angled single lane slow point

Figure 3: Filtered permeability

Figure 4: Speed sign and ground patch

Figure 5: Speed signs and red coloured pavement

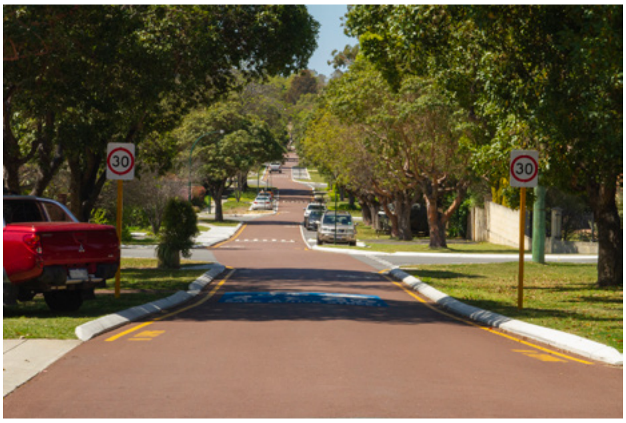


Figure 6: Speed humps

EVALUATION PROCESS

An evaluation plan was prepared, which set out in detail:

- the theory of change for the program
- an evaluation framework which focussed on a comparative impact assessment approach
- the program logic with short, medium and long-term outcomes identified
- key evaluation questions
- an outcomes measurement framework
- a matrix of data collection methods, sources and analytics that would be applied
- resources, budgets, timelines, risks and limitations, clarification of assumptions and external factors, and communications strategies.

Theory of change

The program's theory of change was that safe, attractive, shared-space streets are necessary to increase active travel in mixed-traffic environments.

To achieve this change, the theory reasoned that a reduction of the posted speed limit to 30 km/hr and physical changes (treatments) applied to the road space would compel decreases in vehicle speeds and volumes, resulting in a route with less vehicles, slower traffic and more people walking and riding. Further, when these kinds of interventions are delivered across an area, they will have a greater (network) benefit by providing people with recognisable safe route options that connect them with key destinations.

This theory was supported by a systematic rapid literature scan[5] of similar redesigned and speed-reduced urban streets delivered in other parts of the world.

Evaluation framework

The evaluation framework applied to the pilot program is illustrated in Figure 7. This evaluation focussed on the summative elements (purple boxes) of the program's implementation, as the formative elements of the program's design (blue boxes) were already considered and influenced the establishment of the Safe Active Street Program and the theory of change.

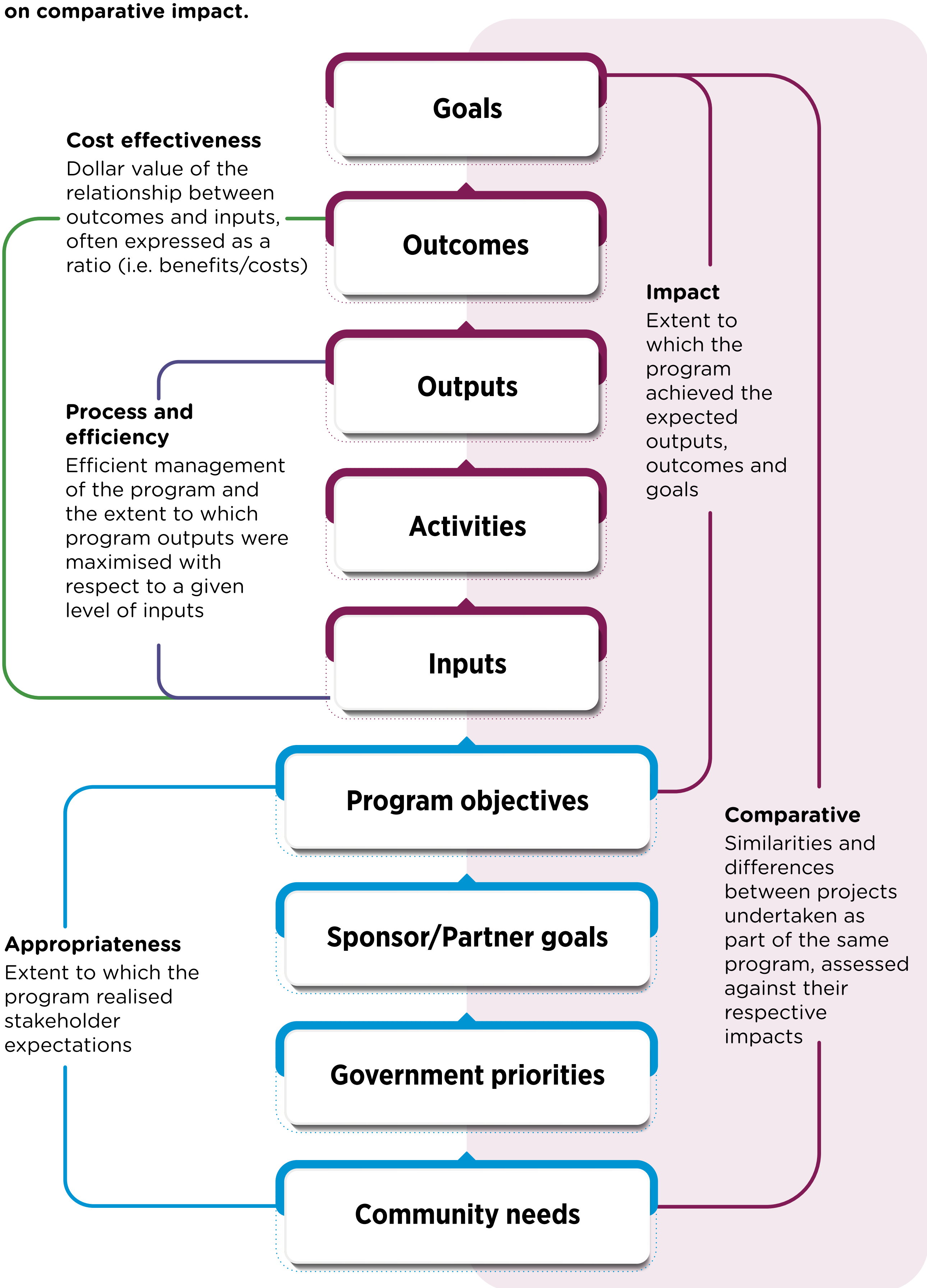
This report focusses on the program's impact and cost effectiveness, and highlights comparisons between the impacts of each project.

Comparative impact approach

Due to the differing treatments applied to each project, a comparative impact assessment approach was undertaken whereby outcomes were assessed at whole-of-program and route-specific levels.

At a program level, differences between projects could be considered and interpreted based on contextual factors and project outcomes. At project level, differences within a route could be interrogated, i.e. where design treatments changed along each route. Those project level insights are summarised in separate reports for each evaluated project.

Figure 7: Evaluation approaches identified in relation to program logic steps, and focus on comparative impact.



Data collection and analysis

The evaluation considered the overall effectiveness of the pilot program as well as each individual project. User behaviour and community sentiment impacts were measured using a before-after-control-intervention (BACI) data collection design, with appropriate 'control' routes selected near each safe active street route.

Data was collected and analysed on four key indicators of change: design scores, user behaviour, community sentiment and cost benefit (Figure 8).

Specific outcomes for each change indicator were identified and described. Targets and estimates of change were defined across user types and community segments based on previous research.

Differences within and between projects were examined using data sources and analysis methods appropriate to each key indicator identified in the evaluation framework (Table 2).

Indicators of program impact reflected a theory of change that was supported by international literature because no similar initiative had been delivered in Australia prior to the Safe Active Streets Pilot Program in WA.

Reporting

Design guidance, evaluation findings, and evaluation metric explanations have been prepared as follows:

- Safe Active Street Design Guidance
- Safe Active Streets Pilot Program Evaluation - Final Report (this document)
- Interim and Final evaluation findings per project
- Detailed 'explainers' on specific evaluation metrics or program elements

Figure 8: Data sources for each safe active street key indicator, illustrated to show theoretical interactions.

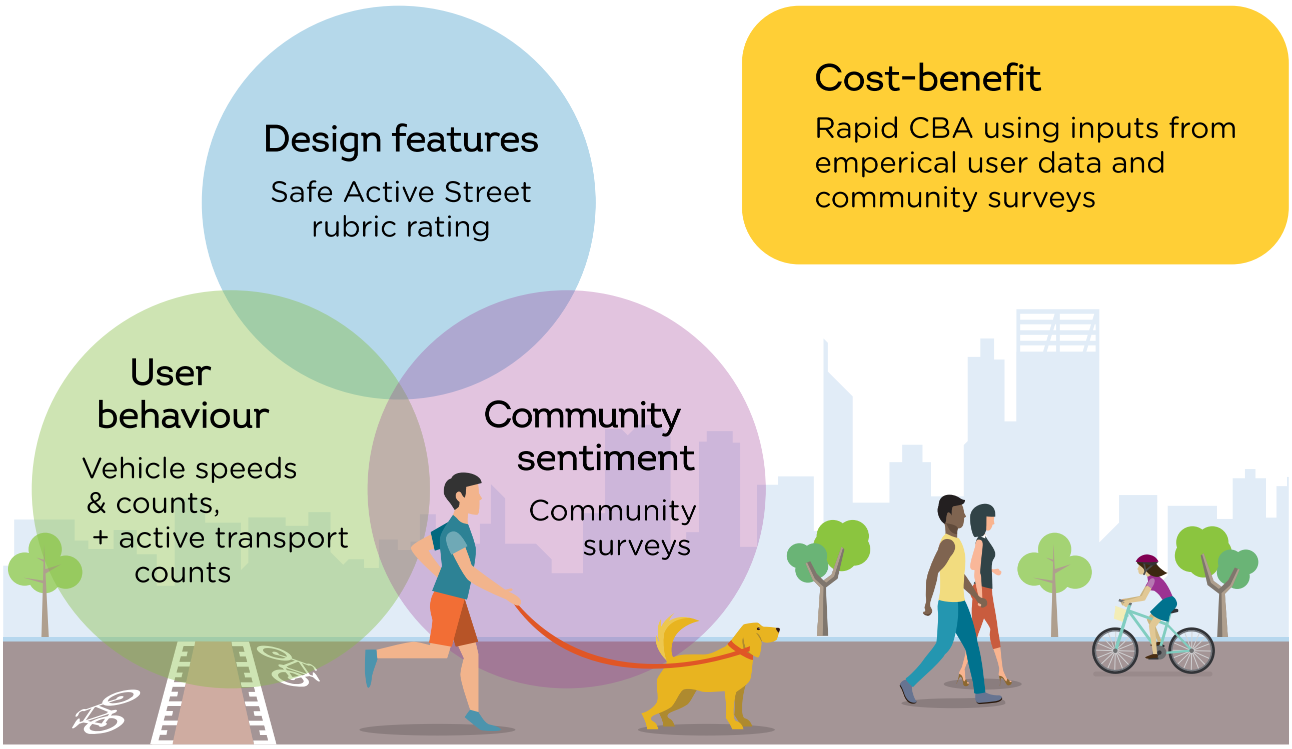


Table 2: Data sources and analysis methods for key change indicators

Key indicator	Data sources	Analysis method
Design features	• Scoring by transport engineers/ planners to capture the types and scale of treatments and supporting measures applied in each pilot project • Scoring applied per segment, per route.	• Scoring rubric and guidelines developed • Focus group scoring on each project with DTMI engineers and local government representatives • 21 criteria identified across five design categories
User behaviour	• User data was collected at consistent pre and post construction sites along safe active street intervention routes and control routes. Specifically: - Pneumatic tube counts of traffic volume and speeds - undertaken at mid-block sites along each route and segment - Video survey counts of people walking and riding - undertaken at intersections along each route and segment	• Average daily and annual change in vehicle numbers, 85th percentile speeds, pedestrians, bike riders, overall active transport • Project level and route level • Statistical significance testing • Percentage change before and after, per route, per segment, compared with neighbourhood percent change (BACI)
Community sentiment	• Surveys from community sampled via intercept and digital methods, collected from safe active street users and residents on safe active street intervention and control routes	• Percentages of sentiment, self-reported use and demographics (after construction)
Cost benefit	• Before and after walking and bike riding numbers per project were annualised and used to calibrate program and project cost-benefit calculations • Self-reported increases in use and trip purpose outcomes used to refine mode shift estimates	• A rapid economic appraisal tool was built to analyse cost to benefit relationships for each evaluated route and the program, and was calibrated using empirical project data • The tool incorporated ATAP[6] recommended parameters and values to calculate benefits and disbenefits for new and existing active transport users, road decongestion, vehicle operating costs, environmental benefits and health system savings.

FINDINGS AND INSIGHTS

The Safe Active Streets Pilot Program broadly achieved all intended objectives

Evaluation findings

Evaluation findings are summarised under the five primary aims of the program:

Aim 1: Reduce motor vehicle numbers

- Traffic volumes were reduced across all nine safe active street projects. Overall, vehicle counts across the safe active streets reduced by 20 per cent.

Aim 2: Reduce vehicle speeds

- Traffic speeds were reduced on all safe active streets. Overall, 85th percentile speeds, a measure of the speed most drivers are driving at or below, reduced by 15 per cent.
- The performance of individual projects varied; three were within an acceptable operating range, others had higher speeds, and further measures may be needed to reduce speeds.

Aim 3: Increase number of riding and walking trips

- Most projects showed an increased number of people walking and riding. Overall, walking trips increased 28 per cent and bike riding trips increased 9 per cent.
- Treated routes were compared with nearby control routes, showing that people preferred to walk or ride on the safe active streets.
- Increases in trip data was consistent with self-reported survey data, which found a net increase of 24 per cent in active transport participation among all people surveyed.

Aim 4: Increase number of local trips made by walking or riding

- Local walking and biking trips for errands and education increased by an average of 11 per cent across all safe active street projects.

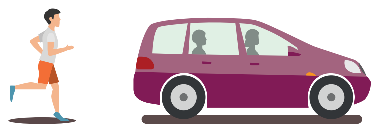
Aim 5: Influence community perceptions

- Community response to the safe active street projects varied. Overall, 47 per cent were positive about their safe active street, with 31 per cent negative and 22 per cent neutral.
- Most people (61 per cent) supported more safe active streets in their area.

The program results are discussed in this report with respect to the four key indicators of change: design scores, user behaviour, community sentiment and cost benefit.

Detailed route level results are summarised in Appendix 1, and in the final evaluation reports for each project[7].

DESIGN FEATURES



Results and recommendations

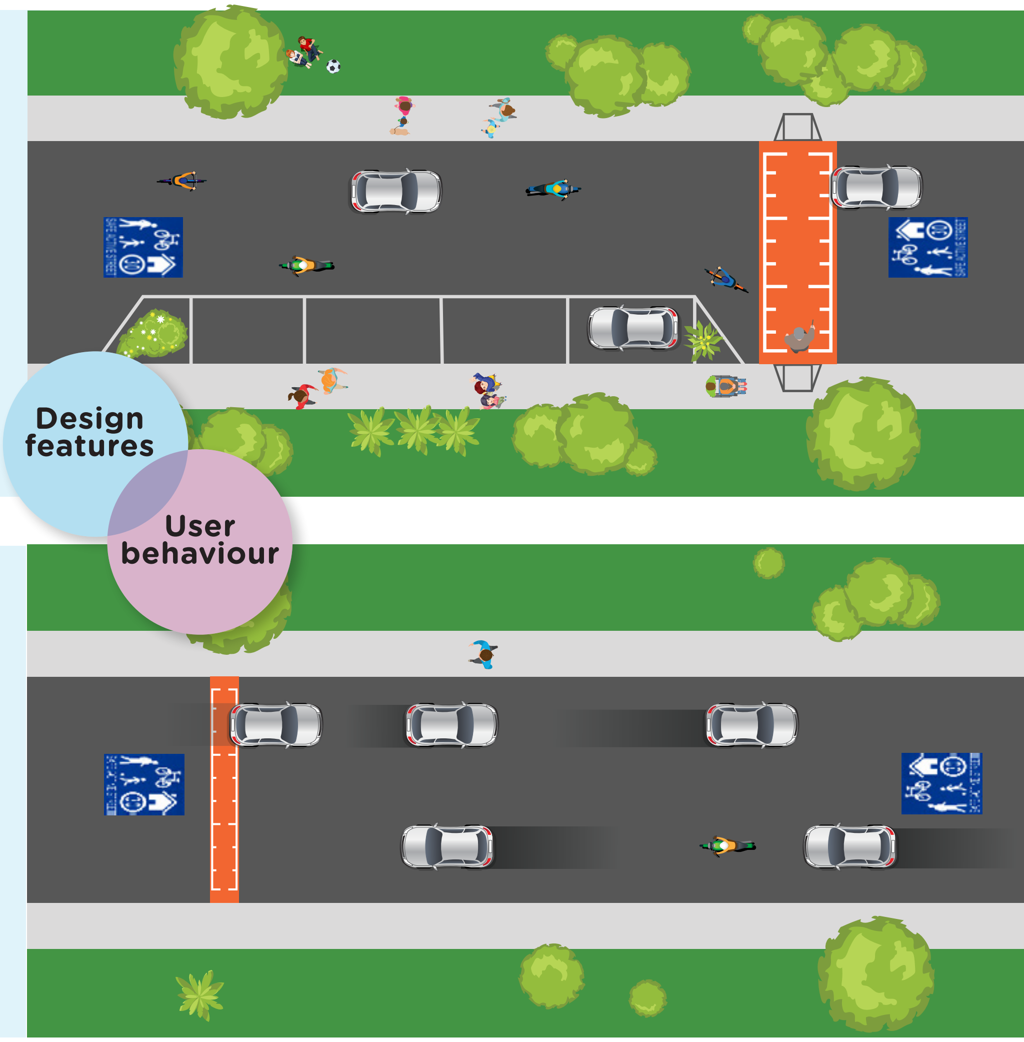
Safe active street projects used a variety of design measures and treatments. Most effective for the safety for all users was a combination of a reduced road width and vertical treatments—like raised pavements, road humps, and slow points—spaced 80–100 metres apart. These conditions changed the direction or slowed vehicles which reduced traffic volume and speed and increased walking and bike riding (Figure 9).

Design scores were compared and interpreted to estimate the most effective treatment types for vehicle speed and volume reductions, or combinations of treatments and spacing for increases in active transport.

Patterns in the relationship between design features applied and user behaviour outcomes at the project level were interpreted to determine overall program impact and identify factors that were most influential to changing driver, pedestrian or bike rider behaviour. Some of the most influential factors are summarised in the next section.

Figure 9: Combination traffic management treatments and their impact on user behaviour.

Where the total **road widths have been narrowed with treatments** less than 80-100 m apart, vehicle speeds and volumes are reduced enough for vulnerable road users to feel safe, and active transport activity increases.



Where the total **road widths have not been altered** and treatments are greater than 100 m apart, vehicle speeds and volumes do not reduce enough for vulnerable road users to feel safe, and active transport does not increase.

INFLUENTIAL DESIGN FACTORS

Six factors were most influential to changing driver, pedestrian or bike rider behaviour following a review of design scores and user behaviour from the nine evaluated safe active streets. These were:

Factor 1: Combinations of design features

Factor 2: Short distances between treatments

Factor 3: Changed priority for safe active streets combined with traffic calming

Factor 4: Road surface and amenity improvements

Factor 5: Careful use of filtered permeability

Factor 6: Carriageway narrowing and deflection treatments

Factor 1: Combinations of design features

Combinations of:

- Traffic calming (raised plateaus, road humps, slow points, or filtered permeability)
- Formalised on-street parking, alternating sides
- Active transport infrastructure and amenity treatments (improved paths and landscaping, including use of planting at slow points).

Outcomes on user behaviour

This mix correlates most strongly with reduced traffic speeds and increases in active transport, and creates a visible transformation of the streetscape, which is critical for success.

A combination of design measures and treatments creates an unfamiliar road layout, with more attention and slower vehicle speed required when driving.

Recommendation

Use a combination of design features for maximum impact.

Factor 2: Short distances between treatments

Distances between vertical and horizontal deflection treatments applied at intersections, mid-blocks, and/or slow points.

Outcomes on user behaviour

Vehicle speeds and volumes were reduced when treatments were spaced 80-100m apart.

At treatment spacings further apart, 85th percentile vehicle speeds were not reduced to within a preferred operating range.[8]

When 85th percentile speeds were not sufficiently reduced, but vehicle volumes were reduced, some severe incidents occurred between vehicles and vulnerable road users (walkers or bike riders). It is possible that these conditions contributed to 'driver complacency' where drivers overestimate their abilities and underestimate risks,[9] increasing the likelihood of higher speed vehicles crashing with vulnerable road users. For a discussion on crashes in context with individual route factors, see Safe Active Streets Final Route Reports.[6]

Recommendation

Apply combinations of vertical and horizontal deflection treatments 80 -100 metres apart.

Factor 3: Changed priority for safe active streets combined with traffic calming

Continuous priority for active transport users on the safe active street route, so active transport flow can be maintained.

Where intersection priority changes are required, signage and traffic calming measures can be applied to signal and reinforce the change.

Outcomes on user behaviour

On routes where intersection priority changes were coupled with road humps on approach and raised intersections, 85th percentile vehicle speeds on the cross-street slowed to within a preferred operating range, and active transport use of the safe active streets increased.

On routes where 85th percentile speeds on cross-streets were not sufficiently slowed and safe active street route priority was not clearly signed, some severe incidents occurred between vehicles and bike riders. See Safe Active Streets Final Route Reports[6] for more information.

Recommendation

Ensure continuous priority of the safe active street, and if priority changes are required add signage and traffic calming to the cross-street.

Factor 4: Road surface and amenity improvements

Road resurfacing is a maintenance process that involves removing the top layer of an old, damaged road and replacing it with a new surface, such as asphalt or a bitumen seal.

Outcomes on user behaviour

Road resurfacing and extensive landscaping was linked with increased walking and riding, and positive community sentiment.

Use of a red coloured road surface or intersection treatments enroute aided legibility and improved community sentiment.

Recommendation

Upgrade road surfaces and enhance street amenity enroute.

Factor 5: Careful use of filtered permeability

An alternative to raised traffic calming measures that involve adding barriers to prevent vehicle through-movements while maintaining bike and walk access along the route.

Outcomes on user behaviour

Effective for reducing vehicle speeds and volumes.

However, confusion between active transport users and vehicles can occur if intersection priority is not aligned with the safe active street route at the filtered permeability intersection points where roadways are continuous (e.g. laneway that connects onto a safe active street). In these instances, clear use of roadway markings and priority changes are necessary.

Additionally, pedestrian movement and community sentiment were reduced on routes where footpath provision was lacking on approach and at these intersections. The lack of footpath seemed to create a perceived risk of modal conflict between pedestrians and vehicles due to changed sight lines, altered visibility and uncertainty about route priority.

Recommendation

Ensure priority remains with the safe active street at all filtered permeability intersection points where the roadway is continuous.

Provide footpath options for pedestrians to have alternative choices.

Ensure clear application of line markings and wayfinding.

Factor 6: Carriageway narrowing and deflection treatments

Narrowing treatments reduce the effective width of the road using elements like curb extensions, on-street parking, or planters.

Vertical deflection treatments use changes in road level, e.g. road humps or raised intersections.

Horizontal deflection treatments use angled slow points or planters to slow down vehicles by forcing them to turn. These are more effective if narrowed to a single lane.

Outcomes on user behaviour

Routes where road widths were consistently narrowed below 5m, and a mix of vertical (e.g. road humps) and horizontal (e.g. slow points) deflections were applied at regular intervals, increased active transport use.

Routes with road widths greater than 5m without regular traffic calming features, did not reduce 85th percentile vehicle speeds, demonstrating increased driver awareness, and walking and riding activity did not increase.

When 85th percentile speeds were not sufficiently reduced, but vehicle volumes were reduced, some severe incidents occurred between vehicles and vulnerable road users (walkers or bike riders). See Safe Active Streets Final Route Reports[6] for more information.

Recommendation

Narrow the road carriageway in addition to applying a mix of vertical and horizontal deflection treatments.

Application of results into future program delivery

The Safe Active Street Design Guidance[4] summarises the range of measures that can be applied and the key factors that have been found through this pilot program to influence user behaviour positively.

These principles and guidelines will help local governments and practitioners plan and activate routes, consult with impacted communities and evaluate outcomes, whilst considering the application of design treatments and measures appropriate to their local context.

The projects conducted during the pilot program were all brownfield sites. The Safe Active Street Design Guidance developed through this trial provides insights for retrofitting brownfield sites but perhaps most importantly, guidance on how to establish a safe active street on greenfield sites at inception.

With this guidance and support from DTMI, local governments can design and implement more safe active streets.

USER BEHAVIOUR

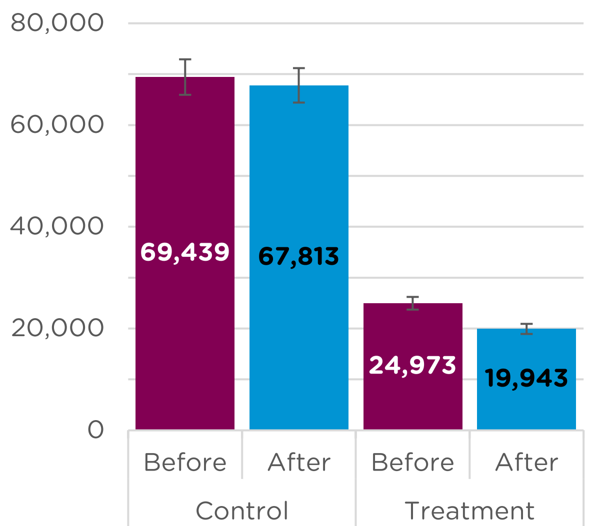
Traffic volumes

Every project showed evidence of reduced traffic vehicle counts

Vehicle counts on safe active street routes decreased 20 per cent overall.

When comparing trips occurring on safe active street routes and the control routes, there is a reduction in likelihood of people driving on safe active street routes (Figure 10). This indicates that drivers near most safe active street routes avoided using them unless they lived locally. This eased traffic stress on the safe active street and created a safer, more attractive environment for people walking, wheeling and riding.

Figure 10: Average vehicles per day combined across all safe active street routes



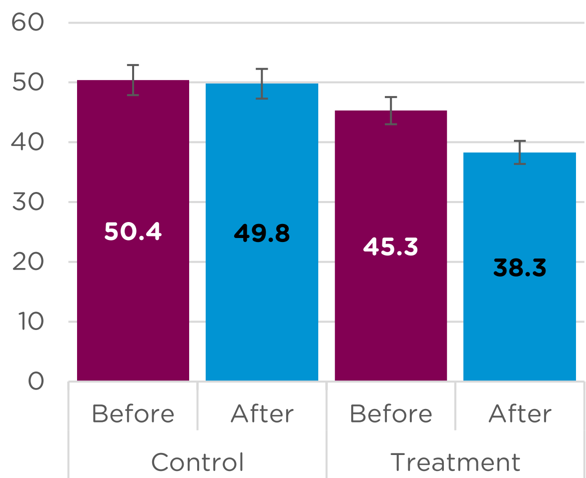
Durability and continuation of these reduced vehicle volumes over time was supported by additional post construction data collection on three safe active street routes. Bassendean, Bayswater and Nedlands, resulted in lowered traffic volumes sustained over time.

Traffic speeds

Across all routes vehicle speeds were reduced

Vehicle speeds are typically reported using the 85th percentile of the data. In aggregate, 85th percentile speeds on safe active streets reduced significantly; a change of 15 per cent (Figure 11).

Figure 11: Average 85th percentile vehicle speeds on safe active street routes.



Three of the nine routes achieved 85th percentile speeds within the acceptable operating range of ≤38.1km/h. Five routes achieved speeds within the upper bound of preferred operating speeds (38.2km/h – 40.1km/h); these routes should be closely reviewed. One route had speeds over 40.2 km/h indicating that additional interventions to reduce speed should be considered. No significant change was observed on control routes, demonstrating the benefit of physically redesigning a street to reduce speeds.[7]

Durability and continuation of these lowered speeds over time was observed on three safe active street routes: Bassendean, Bayswater and Nedlands, where data were collected more than once after construction. The data showed that lower speeds were stable or declined further over time.

Bike riding and walking

Most projects showed increased numbers of people walking and riding along safe active street routes

Significant changes in walking (+28 per cent) and bike riding (+9 per cent) were observed in aggregate, with variation at route level. Compared to control routes adjacent to each safe active street project, there is evidence of a preference for walking and bike riding on the safe active street by new and existing users.

Durability and continuation of these increased active transport behaviours over time was shown by additional post construction data collection on three safe active street routes: Bassendean, Bayswater and Nedlands, where bike riding and walking counts increased over time (Figures 12 and 13).

Figure 12: Average bike riders per day on safe active street routes combined

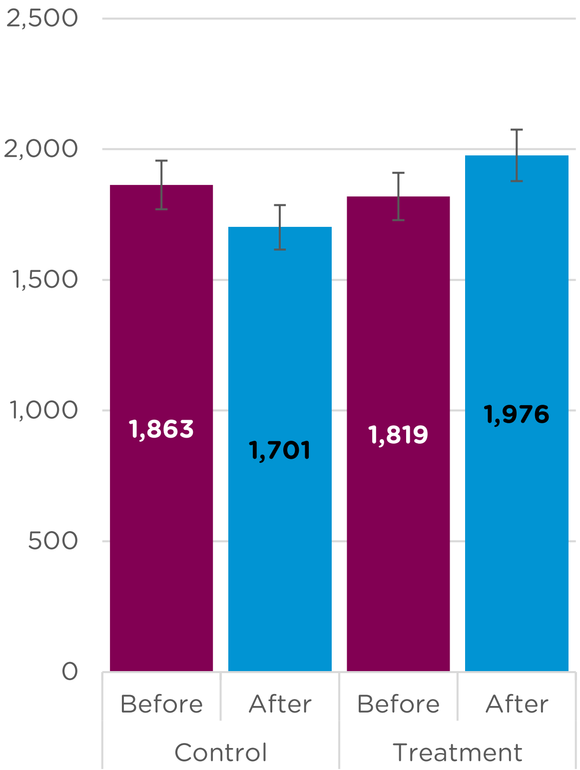
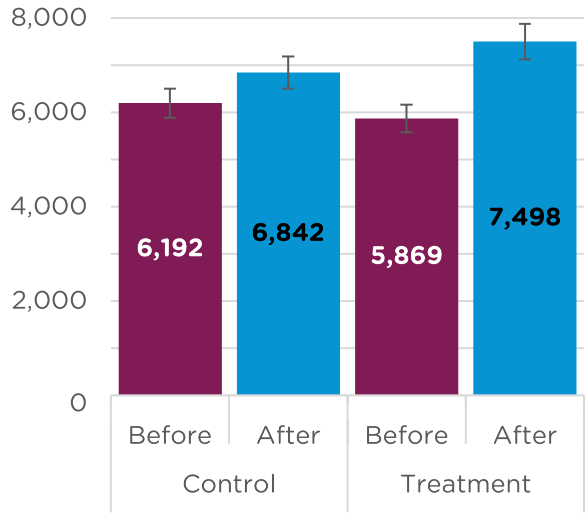
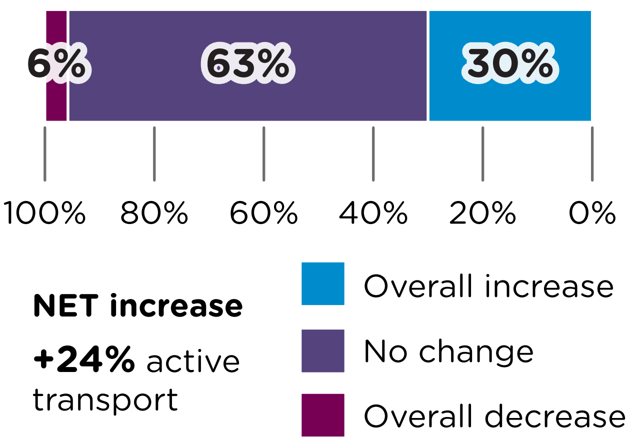


Figure 13: Average pedestrians per day on safe active street routes combined



These numerical increases in trip data were consistent with self-reported survey data, which found a net increase of 24 per cent in active transport participation among all people surveyed (Figure 14).

Figure 14: Change in active transport participation on the safe active street routes, based on survey data with users and residents.



COMMUNITY SENTIMENT

Community sentiment towards the safe active street projects was broadly positive at 47 per cent overall. Around 22 per cent of respondents were neutral towards the projects (Figure 15).

There was some association between duration since route completion and community sentiment. For example, the Geraldton surveys were undertaken less than six months after project completion and scored low for community sentiment. People were generally more positive about projects where surveys occurred much longer after construction. This suggests that as experience using safe active streets grew so did positive sentiment. More positive sentiment was identified for projects where surveys occurred a relatively long time after construction. It may be that as experience using the safe active street route grew so did positive sentiment.

Community sentiment did not always reflect how the project performed against program objectives. A comparison of community survey responses to vehicle and active travel movements showed some inconsistencies.

For example, Stirling Safe Active Street scored low for community sentiment, which could be because the Moorland Street segment treatments created some confusion and mixed feelings among the local community. Although vehicle numbers reduced substantially, pedestrian movements also dropped after construction, yet bike riding activity increased. Other segments along the route in Stirling were simpler to navigate and saw increases in walking, wheeling and riding. Overall, this suggests that careful selection of design treatments using DTMI's recommended design guidance is critical to the success of a safe active street, and consistent navigation and wayfinding for active transport users across an entire route.

Overall, there was evidence of increased trips during the week and an increase in the variety of trip purposes across all ages across most projects.

Encouragingly, 33 per cent of those people who said they would ride more if they felt more comfortable, indicated they were using the safe active street route more often after changes were made through the program.

Promisingly, over 60 per cent of all community respondents supported the implementation of more safe active streets in their neighbourhoods (Figure 16).

Figure 15: Community sentiment toward safe active streets (all projects combined)

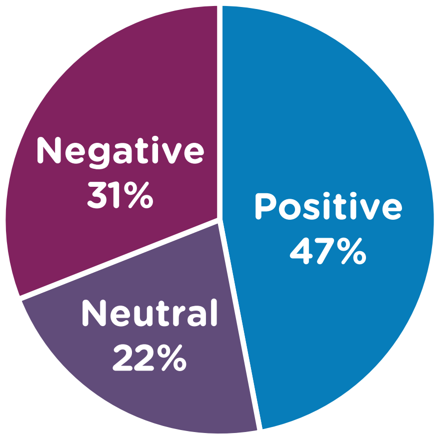
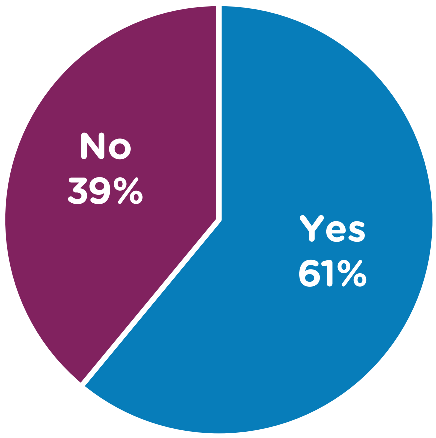


Figure 16: Community support for more safe active streets in the neighbourhood (all projects combined)



What people liked:

- Slowing down of traffic
- Access to key places they need to go
- Aesthetic features which add to making the route shadier and cooler.

What people didn't like:

- Narrow road – difficult for larger vehicles to navigate and some bike riders felt unsafe, e.g. where cars approach from both directions.
- Traffic activity:
  - lots of cars on the route reduced visibility
  - concerns about unpredictable driver behaviour
  - illegal parking around schools at peak times discouraged walking and riding.
- Confusion about who had right of way.

Often what people disliked most about their SAS route were the elements that made them most effective overall for reduced vehicle volumes and speeds, increased use by walkers and riders of all ages and abilities, and improved road safety outcomes.

Community sentiment did not always reflect how well projects performed on the other metrics (see Appendix 1).

· Routes that had positive sentiment did not always have the desired outcomes (e.g. Belmont)

· Routes that were considered by the community to be ineffective in many cases had very effective outcomes (e.g. Nedlands)

COST EFFECTIVENESS AND COMMUNITY BENEFITS

The safe active street pilot projects received State Government funding for planning, design, consultation, construction, activation and evaluation. A total of $18 million in funding over eight years realised the construction of eleven projects and 31 km of safe active street routes. Additional funding was provided to some projects by the local government, or via collaboration with other state agencies. The nine evaluated projects in the pilot program added to 26.3 km and a combined cost of $20.3 million, funded mostly by the State.

A rapid economic appraisal, calibrated using empirical data from each of the nine evaluated projects, determined an overall benefit cost ratio (BCR) of 1.6 and a net present value of $10 million, as assessed over a standard 30-year appraisal period.

A BCR above 1 is considered a good return on investment to the State and community, and the net present value (NPV) represents the economic value of that return on investment.

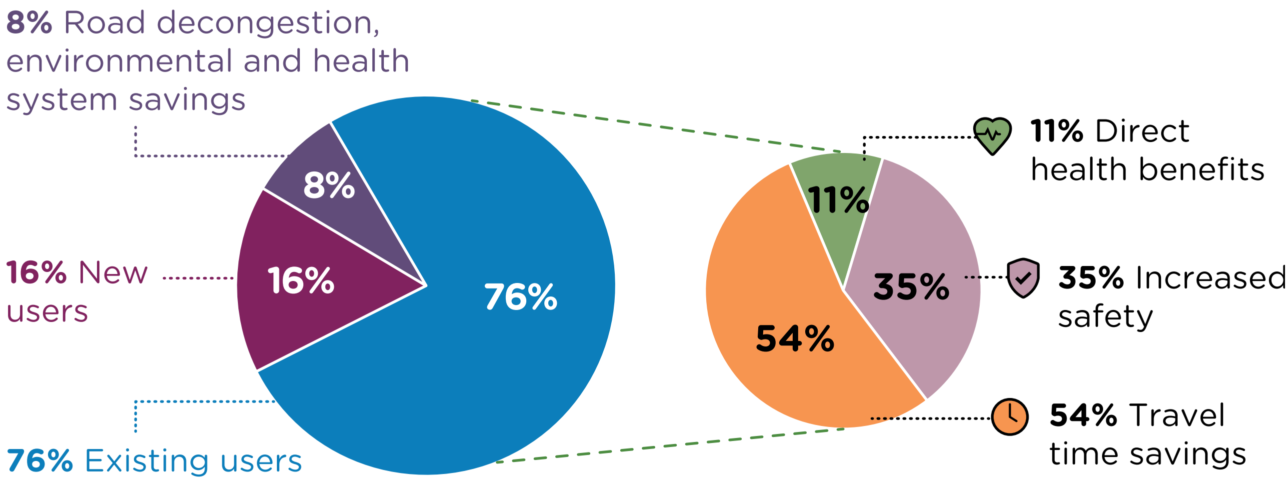
These results for the SAS pilot program represent a strong positive economic outcome. A breakdown of the benefits is provided in Figure 17 and can be understood as follows:

- 76 per cent of benefits and 16 per cent of benefits are to existing and new users respectively, with the remaining benefits split across road decongestion, vehicle operating cost savings, environmental benefits and health system savings.
- Most benefits come from travel time savings, increased safety and direct health benefits for existing and new users

Critical drivers of benefit realisation across the projects are:

- route selection – key attractors along and at either end of the route, e.g. activity centres, shops, recreational areas, schools, stations
- design features – narrowed road widths and treatments 80-100 m apart
- cost per km – projects between $600,000 and $1.2 million / km were likely to yield a BCR above 1 (if the above two points were also applied).

Figure 17: Breakdown of benefits from the Safe Active Streets Pilot Program



Rapid appraisal tool

A rapid economic appraisal tool was built to analyse the cost to benefit relationship for the program and each of the nine evaluated routes. Economic impacts were calculated using ATAP M4 functions (see ATAP Guidelines M4: Active Travel, p17 - Table 1)[2], which are mainly based on the multiplication of a monetised unit value ('parameter') by a relevant operational input derived from the improvement (number of trips, kilometres travelled, time taken, etcetera).

To calibrate the tool, empirical data for each safe active street project was used including, walking and bike riding trips before and after construction, length of each route, and post construction community survey data of self-reported increases in active transport use for short local transport trips and longer commute trips.

The rapid appraisal tool did not include analysis of all other potential benefits, e.g. social or place benefits.[10] If a full economic appraisal were undertaken, the program and individual SAS routes would likely score higher for their overall return on investment due to the provision of increased amenity, vegetation, access, reduced noise, and improved air quality on most of the SAS routes. This should be considered when reviewing the rough breakdown of BCRs from each of the nine SAS routes, as provided in Appendix 1.

LESSONS LEARNED

The Safe Active Streets Pilot Program saw an overall positive impact from the delivery of local area traffic management treatments and lowered speed limits. Comparison of route level results, however, found varying impacts across the key indicators, which provide important information to learn from for future delivery of safe active streets. Route level summary data is provided in Appendix 1.

The most notable differences in outcomes at the route level came from the following:

1. The three routes (Belmont, Geraldton and Melville) that for different reasons achieved BCRs of less than 1, indicating a loss in investment.
2. Three routes (Vincent, Stirling and Cambridge) achieved BCRs above 2, indicating a high return on investment, even though two of these routes observed mixed results for overall active transport use.
3. The route (Stirling) that saw the largest decrease in vehicle numbers along the route also saw a large loss in pedestrian movement.
4. The route (Nedlands) that saw overall positive outcomes on all indicators received one of the lowest community sentiment scores towards the completed route.

A summary of the factors that influenced these results is summarised below. The nuances of these route differences are explored in safe active street pilot project route reports with more information provided about differences in design application and user outcomes across the segments within each route.

Notable route-level outcomes and learning opportunities

Outcome 1: BCRs <1

Design could have been simplified

- Melville Safe Active Street:
  - Too high cost per km, and more design changes than necessary to achieve desired outcomes. This outcome should be taken with caution however, because if social and place benefits were appraised, this route would likely achieve a BCR above 1 due to the addition of amenity, vegetation and a small parklet enroute

Design required additional measures

- Belmont Safe Active Street:
  - Too little cost per km, and insufficient design changes to achieve desired outcomes (Figure 10).

Route selection could have been enhanced

- Geraldton SAS:
  - Insufficient base active transport movement and not enough key attractors along and at either end of the route. The Geraldton SAS was the only regional location included in the pilot program, however, and if social and place benefits were appraised, this route would likely achieve a BCR above 1 due to the improved access, equity and amenity provided by the route.

Lessons learned

Critical drivers of benefit realisation for a safe active street are:

- Route selection
- Design features
- Cost per km

Outcome 2: BCRs >2

Effective route selection

- Vincent, Stirling and Cambridge SASs
  - Three routes achieved BCRs greater than 2, indicating high return on investment. Stirling and Cambridge SASs achieved a return on investment despite experiencing mixed results, with losses and gains in either pedestrian or bike riding activity.
  - This outcome was influenced by the higher number of existing walkers and riders using the routes, meaning that improvements to existing users' travel times, safety and health led to higher overall benefit outcomes from the rapid appraisal tool (see figues 20 and 21). Therefore, if design features were improved on Stirling and Cambridge to further encourage walking or riding, benefit outcomes could have been even higher.
  - These outcomes further demonstrate importance of route selection, design features and cost per kilometre.

Lessons learned

Critical drivers of benefit realisation for a safe active street are:

- Route selection
- Design features
- Cost per km

Outcome 3: Decrease in vehicles and decrease in pedestrians

Overly complicated design

- Stirling Safe Active Street:
  - Several existing sites of filtered permeability to prevent through traffic movements were enhanced along the middle section of the route in addition to the existing grid-like intersection design. No footpath existed or was provided. Inconsistent line markings and route priority changes were applied.
  - This combination of treatment application and existing urban form created driver confusion and avoidance of the route. However, the filtered permeability enhancements including inconsistent use of line markings, lack of safe active street route priority and deficient footpath options, created blind spots and increased perceived risk of dangerous interactions between pedestrians, vehicles and bike riders, which resulted in reduced pedestrian use of the route.

Lessons learned

The importance of a balanced design for shared use of the safe active street by all users.

Outcome 4: Positive user outcomes and BCR>1, and negative community sentiment

Opportunity to enhance community engagement

- Nedlands Safe Active Street:
  - This route scored second lowest for community sentiment, with only 30% positive support for the safe active street.
  - This route was evaluated twice post construction for user behaviour (vehicles, pedestrians, bike riders) and at each period there were clear indications of reduced vehicle use and speeds, and increased walking and bike riding on weekdays and weekends – especially on Elizabeth Street near the primary school and local shopping district. There was also evidence of increased vehicle use on the adjacent distributor road, indicating a change in vehicle travel preferences.
  - Low community sentiment post construction combined with positive route outcomes, could indicate a dissonance between community understanding of the route's design intention and community use of the route.

Lessons learned

The importance of applying ACE (Activation, Consultation, Evaluation) principles throughout project planning, delivery and post construction.[11]

EVALUATION CHALLENGES

Evaluation of the Safe Active Streets Pilot Program required significant time to undertake all parts of the work and prepare reports. Due to the unique project contexts and combinations of design treatments, careful evaluation planning was undertaken to design an innovative approach that ensured comparability of insights across projects. Keeping stakeholders informed and engaged was a priority during the project delivery and evaluation.

Projects were delivered in stages over an eight-year period, with data collection and analysis that continued after project completion. Differences in context, design features and stakeholder engagement across the nine evaluated safe active streets provided a complex landscape for analysis and comparison of impacts and costs.

The SAS pilot program evaluation was highly complex, yet it led to the creation of an innovative methodological framework, tailored analytical approaches and purpose built metrics. The resulting insights generated through this rigorously designed and systematically executed evaluation constitute a substantial contribution to the field and establish a precedent with global relevance.

INSIGHTS

The Safe Active Streets Pilot Program has generated a rich array of insights worthy of application across multiple settings; the overall program insights are below.

Theory of change supported

- Combining comprehensive physical interventions with a posted speed limit of 30 km/hr:
  - Increases active travel (walking and cycling).
  - Reduces vehicle volumes and speeds, making streets safer for all users.

Effective design features identified

- Road width narrowing and traffic calming treatments spaced every 80–100 metres:
  - These measures physically slow vehicles and change vehicle direction, leading to:
    - Lower traffic volumes and speeds.
    - Increased bike riding and walking.

Critical drivers of benefit realisation determined

- **Route selection:** Must connect key attractors (activity centres, shops, schools, stations, recreation areas).
- **Design features:** Narrowed road widths and treatments 80–100 metres apart.
- **Cost efficiency:** Projects costing $600,000–$1.2 million per km likely achieve BCR > 1, if above conditions are met.

Application of ACE principles is essential

The activation, consultation and evaluation (ACE) principals are:

- **Activation:** Built infrastructure reflects social needs and the desires of people who will use it.
- **Consultation:** Engagement integrated throughout the project lifecycle is a form of activation and enables community consultation.
- **Evaluation:** Impact measured against anticipated outcomes.

These insights provide a robust basis for further implementation of safe active streets by local governments, to create safer connections between key places for all people in their community.

PROGRAM SUMMARY

The SAS Pilot Program was successful in trialling a new approach to road safety and active transport on suburban streets. The program has attracted wide-reaching national and international interest, and the SAS concept is being taken up by local authorities in WA and interstate.

APPENDIX: ROUTE LEVEL SUMMARY

The following table and figures (18-21) summarise results observed at each individual safe active street route. Across all projects, vehicle traffic and speeds generally decreased, with some exceptions, and most locations saw an increase in walking and cycling.

Table 3: Summary of the changes for each key indicator before and after construction of each safe active street route*

	User behaviour	User behaviour	User behaviour	User behaviour	Design features	Community sentiment	Delivery cost per km (millions)†	Benefit cost ratios
Safe active street route	**Average daily vehicle counts**	**Assessed 85th percentile vehicle speeds‡**	**Average bike riders per day**	**Average pedestrians per day**	**Design score range (0 = low intervention, 5 = high intervention)§**	**Positive community sentiment towards the safe active street**		**(<1, 1-2, >2)¶**
Bassendean	- 41	Acceptable	+41	+223	1.97	59%	$0.69	1-2
Bayswater	- 91	Upper bound	+90	+37	2.62	58%	$0.61	1-2
Belmont	- 105	Not Acceptable	-211	*	1.41	59%	$0.46	<1
Cambridge	- 829	Upper bound	-23	+83	1.4	*	$0.50	>2
Geraldton	- 384	Upper bound	+43	+34	2.38	28%	$0.90	<1
Melville	- 111	Acceptable	+29	+248	2.38	53%	$2.72	<1
Nedlands	- 1010	Upper bound	+19	+251	2.07	30%	$1.10	1-2
Stirling	- 2146	Acceptable	+96	-260	1.76	40%	$0.62	>2
Vincent	- 178	Upper bound	+73	+723	2.65	54%	$0.77	>2

* Belmont pedestrian data was not collected pre-construction. Cambridge sentiment data was not collected due to delays in construction leading to the safe active street not being completed before the survey sampling period.

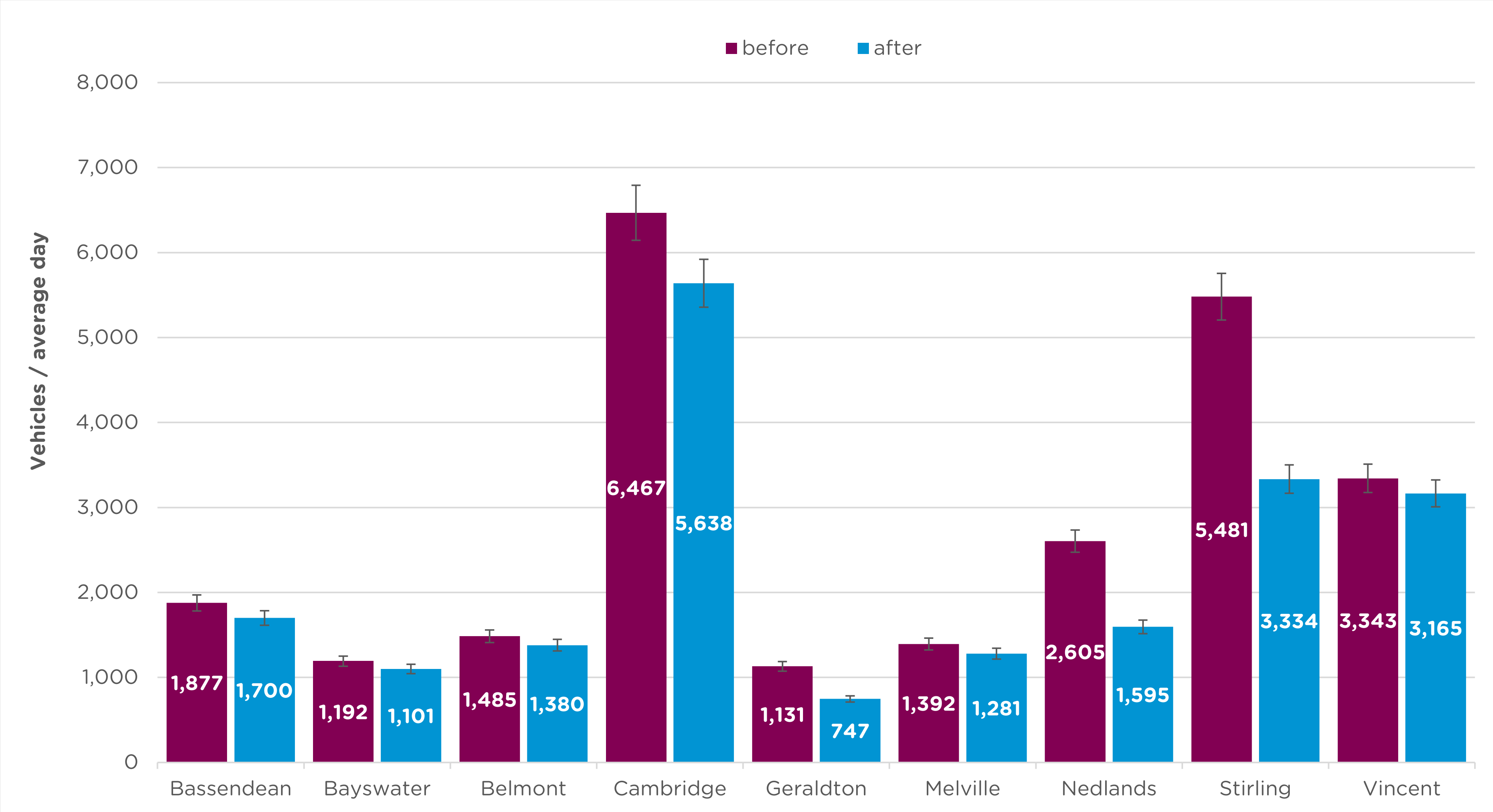
† Cost per km for Bayswater and Belmont safe active streets includes cost of underpasses constructed enroute.

‡ For detail on 85th percentile speed assessment, see Explainer: Assessing safe operating speeds on 30km/hr streets using 85th percentile speed thresholds.

§ Average across route segments. See route-level summaries for segment design scores

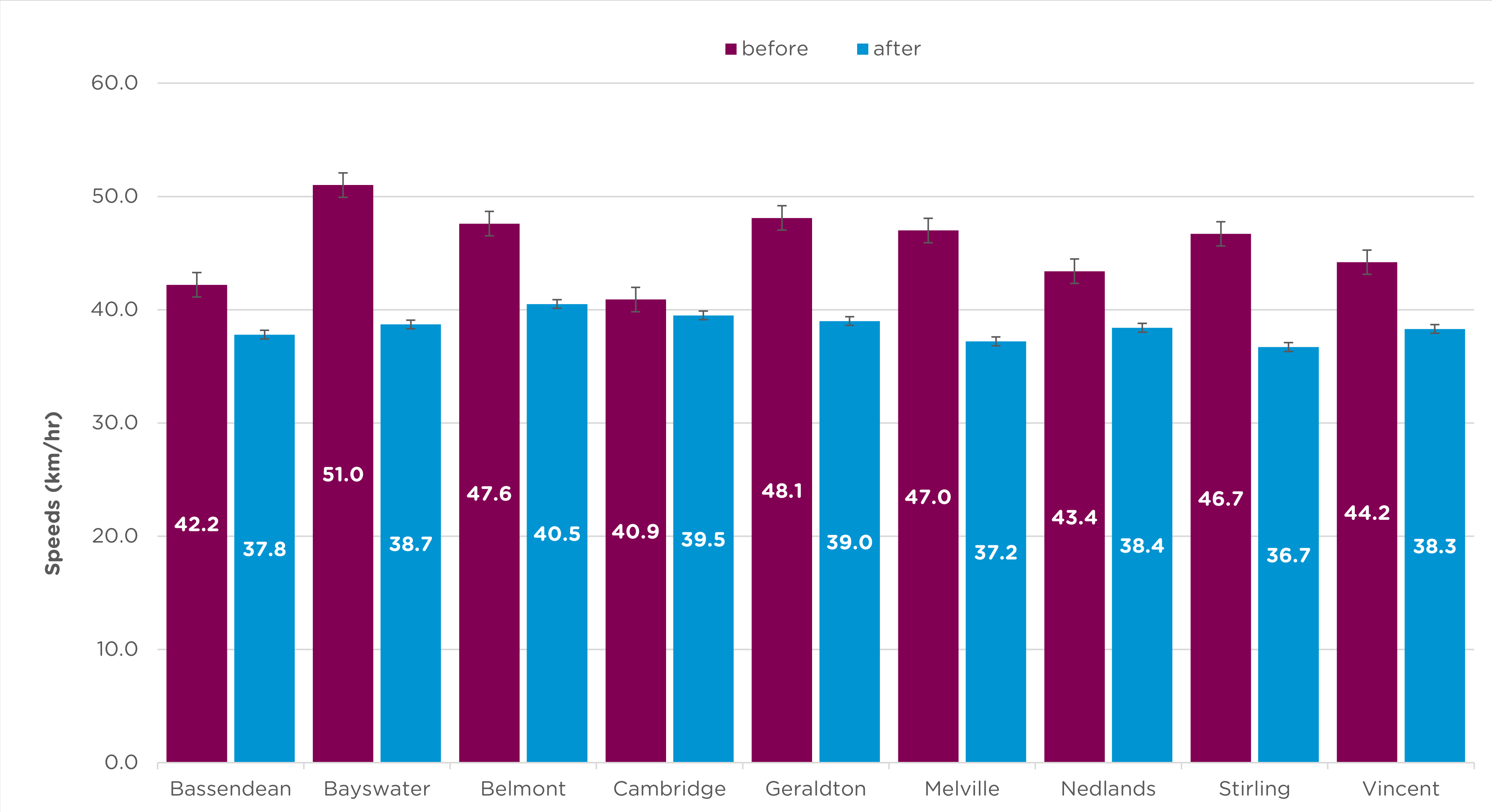
¶ Note, benefit-cost ratios of 1 indicate a neutral return on investment. Thus, a BCR<1 would be a loss in investment, 1-2 is a good return, and >2 is a strong return on investment to the State and community.

Figure 18: Average vehicle trips per day on safe active street routes



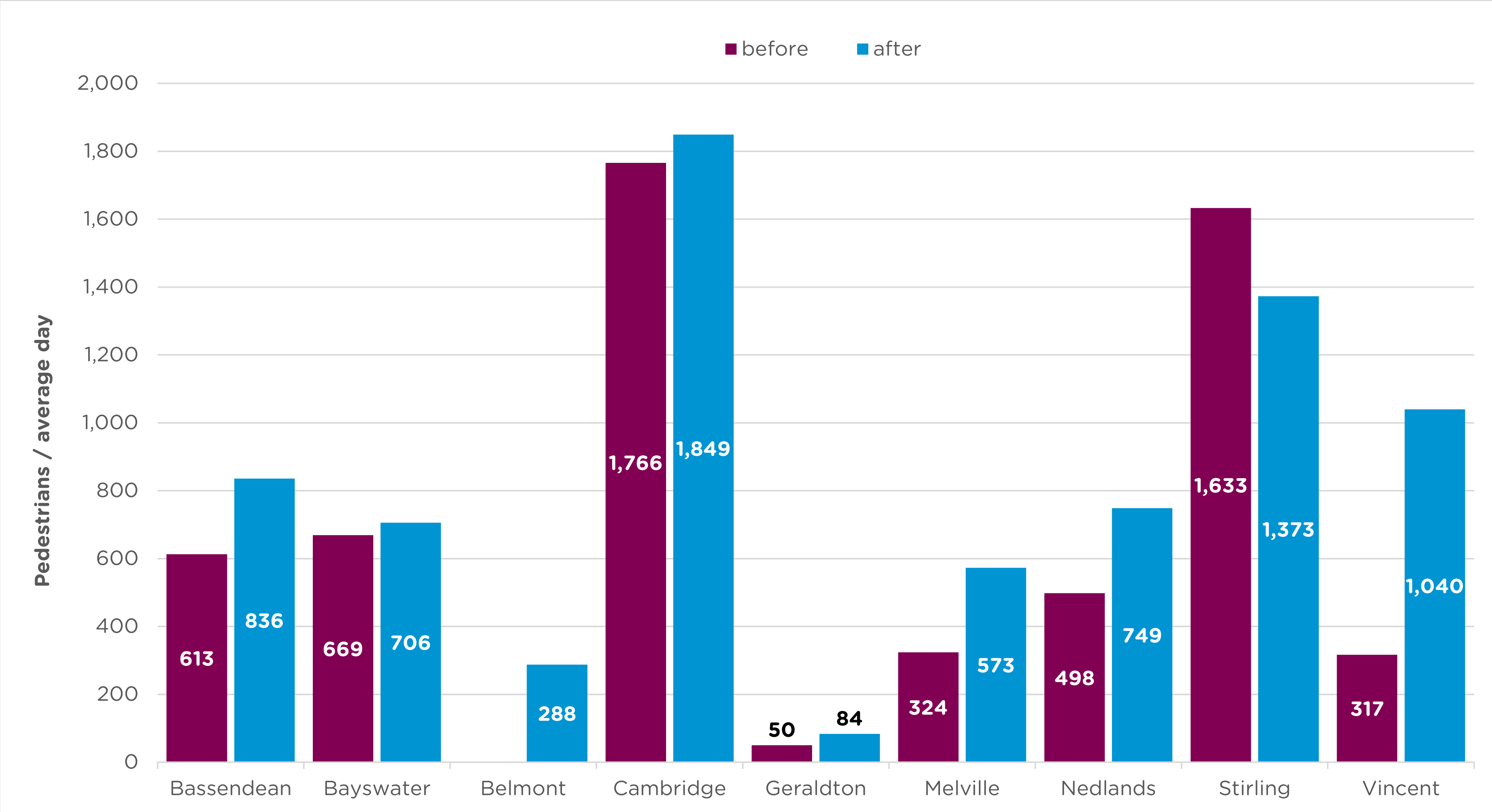
*Average daily counts calculated over an entire seven day period, with weekday and weekend samples represented proportionally in the data

Figure 19: Average daily 85th percentile speeds on safe active street routes



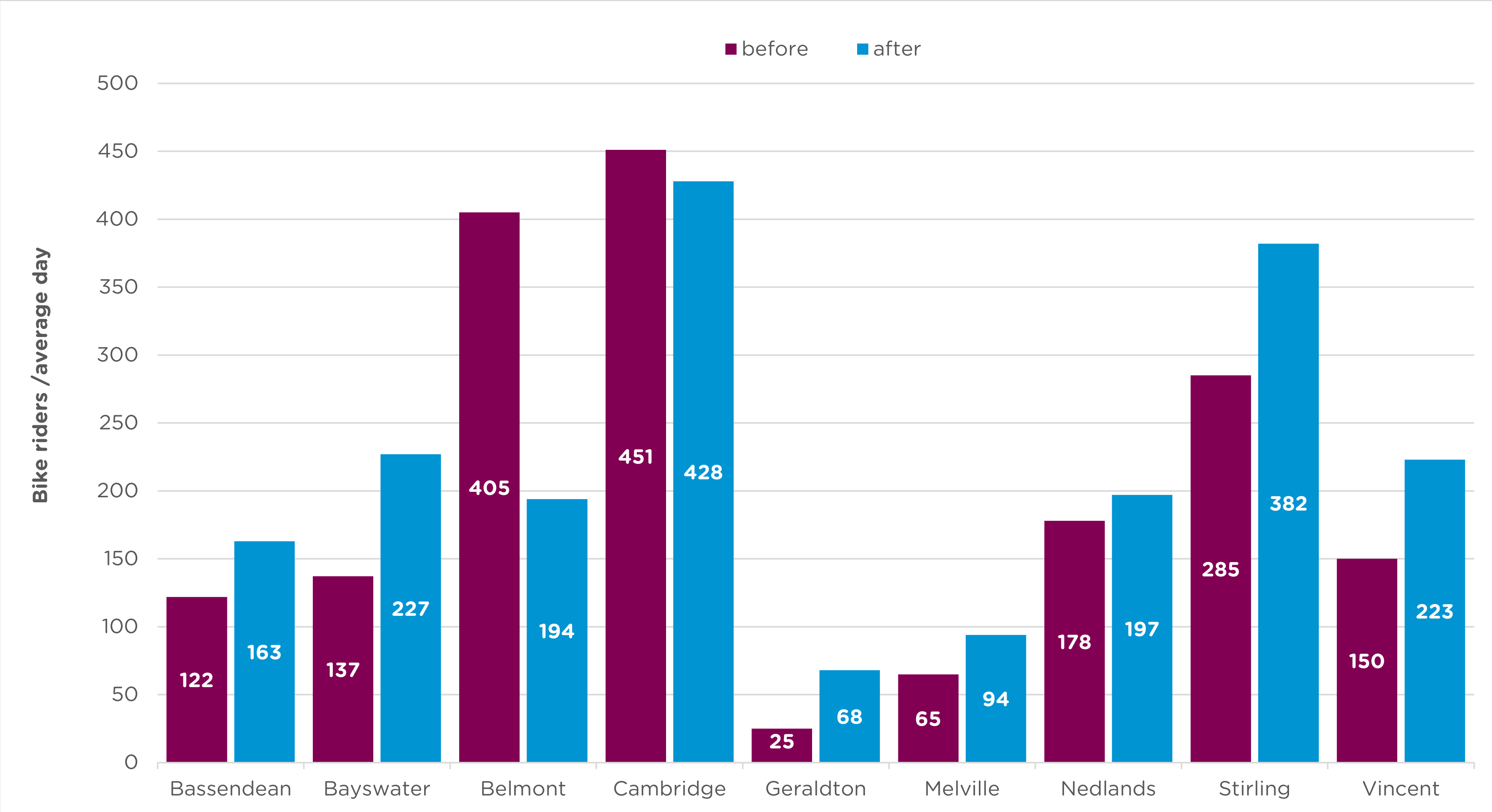
*Average daily counts calculated over an entire seven day period,
with weekday and weekend samples represented proportionally in the data.

Figure 20: Average pedestrians per day on safe active street routes



*Average daily counts calculated over an entire seven day period,
with weekday and weekend samples represented proportionally in the data.

Figure 21: Average bike riders per day on safe active street routes



*Average daily counts calculated over an entire seven day period,
with weekday and weekend samples represented proportionally in the data.

ENDNOTES

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2 Office of the Auditor General, Western Australia, 2015. *Western Australian Auditor General's Report: Safe and Viable Cycling in the Perth Metropolitan Area*. Perth, WA.

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