Government of Western Australia
Department of Transport
and Major Infrastructure

Empowering a thriving community

CAMBRIDGE SAFE ACTIVE STREET

Final Route-Level Evaluation Report

Acknowledgement of Country

The Department of Transport and Major Infrastructure acknowledges the Traditional Custodians of the land throughout Western Australia and pay 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.

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SAFE ACTIVE STREETS PILOT PROGRAM

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

SASs 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.

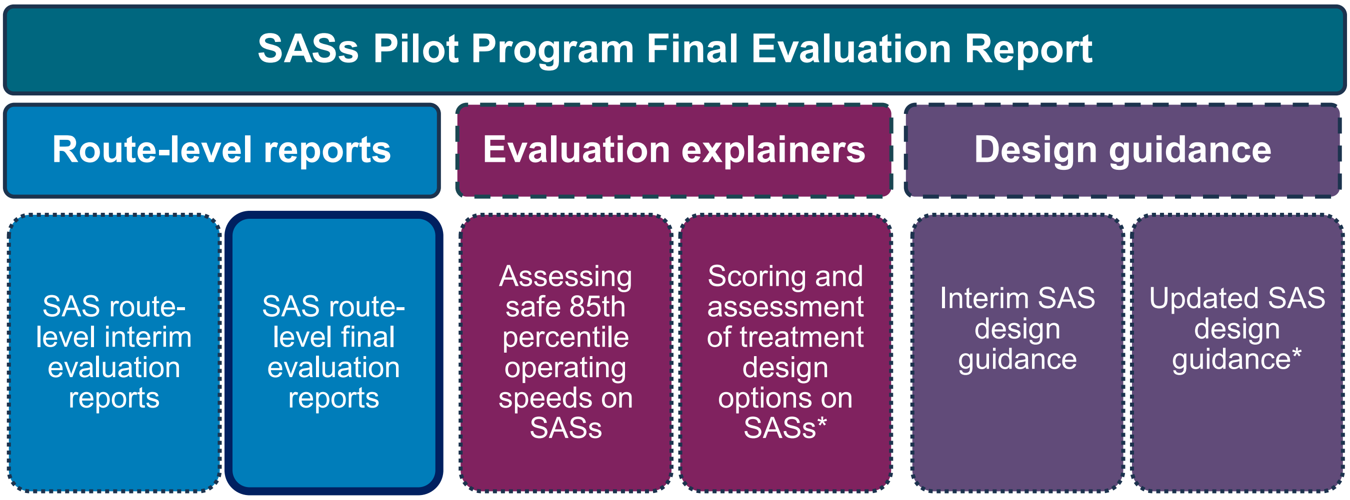
The SASs Pilot Program in Western Australia (WA) was motivated by research which showed that a fear of sharing the road with motor vehicles was a key barrier to many people riding bikes more often. Local research, including a large community-wide cycling survey undertaken in 2015 by the Royal Automobile 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 SAS.

Evaluation document suite

This document forms part of the SASs Pilot Program Evaluation. It provides a summary of results across three key change indicators for one of the nine evaluated projects, and a discussion of how the route performed overall.

The results outlined in this final route-level report should be read in conjunction with the SASs Pilot Program Final Evaluation Report,[3] and other supporting material including methodology explainers and SASs design guidelines.



Suite of interrelated documents to be read in conjunction with the Cambridge SAS final route-level report

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[1] RAC – WA, 2015. RAC Cycling Survey: 2015. Royal Automobile Club of WA, Perth, WA.
[2] OAG – WA, 2015. Western Australian Auditor General's Report: Safe and Viable Cycling in the Perth Metropolitan Area. Office of the Auditor General, Perth, WA.
[3] DTMI, 2026. Safe Active Streets Pilot Program – Final Evaluation Report. Prepared by the Department of Transport and Major Infrastructure. Perth, WA.
* Document to come.

TOWN OF CAMBRIDGE SAFE ACTIVE STREET

Executive summary

The 4.4 km Ruislip Street SAS route provides an east-west link between Leederville Train Station and Bus Port and The Boulevard. Consultation, design and delivery spanned four and a half years between 2020 and 2024.

This SAS route generated a mix of positive and negative outcomes.

Design treatment changes that influenced vehicle volume reductions on the SAS contributed to some positive road safety outcomes across the route, including increases in walking along the SAS and reduced crash incidents.

Variation in the reduction of fastest speeds along the route indicate further interventions could be applied to bring speeds closer to safe system thresholds. Reductions were observed in bike riding activity, although riding rates were relatively better than the surrounding area – both likely affected by wider system patterns.

Key project insights

Overall, the design treatments applied on the Cambridge (Ruislip Street) SAS were moderately successful in achieving the program objectives.

After construction, reductions in vehicle volumes were larger than the reductions observed on control streets. There was a minor decrease in overall 85th percentile speeds compared to baseline levels, which decreased to within an upper bound of the preferred operating range. Nevertheless, there was a wide degree of variation across the route, indicating there were large proportions of vehicles not observing the lowered speeds, nor sufficiently impacted by the changed street conditions.

The SAS saw increases in pedestrian activity, with declines observed on control streets. However, bike riding activity reduced on the SAS, with the decline similarly reflected on the control streets suggesting the influence of external factors. The Cambridge SAS was first sampled in December 2020, which was a year that saw large increases in bike riding across the whole Perth metropolitan area associated with COVID-19 related disruptions.

Post construction sampling was undertaken in December 2023, and the reduction in bike riding activity across the whole SAS route was consistent with the decline in bike riding observed across the Perth network in 2023 – a period of correction which left baseline bike riding rates higher than pre-COVID levels. For more information see DTMI's 'Making Tracks' reports.[4]

The completed SAS route experienced no crash incidents enroute, from a base of four bike related incidents in previous years. The reduced rate of crash incidents for bike riders on the SAS may indicate increased safety for bike riders, but additional years of data should be reviewed.

Community sentiment could not be collected for the Cambridge SAS due to delays in the project construction timeline pushing out into 2023 – after the survey sampling period had concluded. This highlights the importance of incorporating activation, consultation and evaluation (ACE) principles[5] throughout all phases of project planning, design, delivery and post construction review.

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[4] DTMI. 2025. Evaluation, Monitoring and Reporting: Making Tracks report series. Department of Transport and Major Infrastructure, WA.
[5] DTMI, 2023. WA Bicycle Network Grants Program: WABN Grants Program Resources - Activation, Consultation and Evaluation (ACE) Guidance. Department of Transport and Major Infrastructure. Perth, WA.

Project recommendations

Recommendations to improve outcomes on this SAS project, informed by insights summarised in the SASs Pilot Program Final Evaluation Report, include:

- Lowering 85th percentile speeds consistently across all segments of the route to within the preferred operating range, by considering additional road treatments as required.
- Applying vertical or horizontal deflection treatments 80-100 m apart for maximum benefit realisation and consistent reduction of unsafe speeds.
- Incorporating ACE principles throughout all phases of project planning, design, delivery and post construction review.

Program insights

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

The SASs Pilot Program Final Evaluation Report detailed the rich array of insights generated through the pilot program, which provide context and relevance to the following individual project key insights and recommendations.

Theory of change supported

- Combining comprehensive physical interventions with a posted speed limit of 30 km/h: increases active travel (walking and bike riding).
- 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 m: 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 form a direct or indirect connection to key attractors (activity centres, shops, schools, stations, recreation areas) and form part of the long-term cycle network (LTCN).
- Design features: narrowed road widths and treatments 80–100 m apart.
- Cost efficiency: projects costing $600,000 – $1.2 million per km likely achieve a benefit cost ratio (BCR) >1, if the above conditions are met.

Application of ACE principles is essential

- 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.

Application of results into future program delivery

The SAS Design Guidance[6] 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.

[6] DTMI, 2025. Planning and Designing for Active Transport: Safe active street design guidance. Prepared by the Department of Transport and Major Infrastructure. Perth, WA.

PROJECT OVERVIEW

The 4.4 km Ruislip Street SAS route provides an east-west link between Leederville Train Station and Bus Port and The Boulevard.

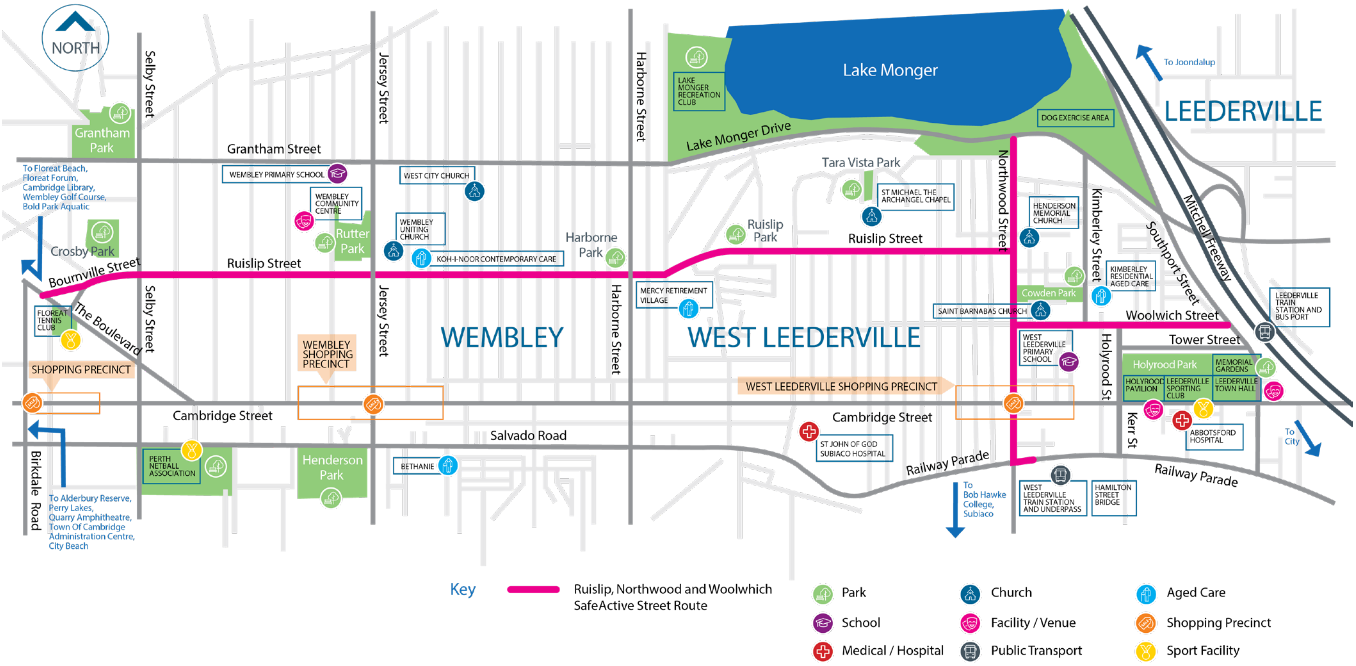
The route provides local connections to Floreat Park Primary School and Floreat Forum Shopping Centre, and a north-south link between Lake Monger and West Leederville Town Centre.

The route follows Ruislip Street through to Northwood Street and Woolwich Street, with enroute destinations including Wembley Primary School, West Leederville Primary School and Mercy Retirement Village.

Town of Cambridge SAS project map

Key route destinations

- Floreat Tennis Club
- Crosby Park
- Wembley Primary School
- Rutter Park
- Wembley Uniting Church
- Koh-N-Noor Contemporary Care
- Harborne Park
- Mercy Retirement Village
- Ruislip Park
- St Michael Archangel Church
- Lake Monger
- Henderson Memorial Church
- St Barnabas Church
- Cowden Park
- West Leederville Primary School
- Kimberley Residential Aged Care
- West Leederville Train Station and underpass
- Leederville Train Station and Bus Port



Cambridge SAS route map[7]

[7] Cambridge SAS route map used with permission from the Town of Cambridge. Retrieved and adapted from https://www.cambridge.wa.gov.au/Community/Infrastructure-Works-Projects/Ruislip-Safe-Active-Street-Evaluation

Unique design features

- Raised plateaus
- Flat top road humps
- Safer crossing points
- Formalised parking
- Central islands with SAS line marking
- Kerbing and drainage works
- Buildouts with trees and plantings
- Central median

Timelines

Delivery

- Community consultation: 2020
- Construction: June 2022-May 2023
- Lines and signs completion: October 2023
- Official opening: March 2024

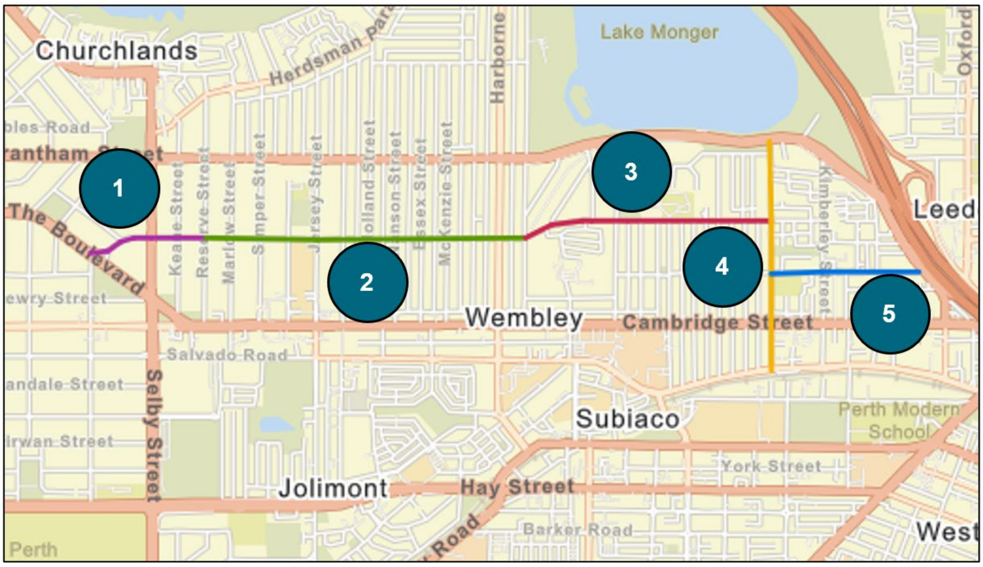
Evaluation:[8]

- Pre-construction data collection (user behaviour): December 2020
- Post-construction data collection (user behaviour): December 2023
- Final evaluation report: 2026

Segments

For monitoring and analysis, the SAS was split into 'segments' based on differences in form of the existing route and treatments applied during delivery of the SAS. This route was separated into segments as follows:

1. Ruislip Street (West of Reserve Street)
2. Ruislip Street (Reserve Street to Gregory Street)
3. Ruislip Street (Gregory Street to Northwood Street)
4. Northwood Street (Lake Monger Drive to Railway Parade)
5. Woolwich Street (East of Northwood Street)



Map of the Cambridge SAS route showing 'segments' used for data analysis

[8] Note: Between data collection periods, city-wide travel patterns were disrupted by COVID-19 lockdowns. The post-construction SAS data collection periods, however, were chosen because [DTMI's network monitoring] indicated they were much less affected by these disruptions. Any remaining impacts are expected to have influenced both the treatment (SAS) and control streets equally.

WHY WE COLLECT DATA

Evaluating a project by collecting data on people's behaviour and sentiment helps us to determine:

- whether the aims of a project have been achieved
- what combinations of interventions were most effective
- whether further improvements could still be made to improve outcomes.

These insights help to guide infrastructure investment in local communities that support the growth of active transport.

SASs Pilot Program

The SASs 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.

Nine SAS projects, including this one, were included in the evaluation study. For more information on the evaluation methodology, theory of change, and overall program insights see the SASs Pilot Program Final Evaluation Report.

Project aims

The following aims were investigated for each project included in the evaluation study, and results were compared across projects to derive program level insights that could lead to improvements in design guidelines and future SAS delivery.

1. Reduce motor vehicle numbers
2. Reduce 85th percentile speeds to within acceptable operating thresholds[9]
3. Increase the number of riding and walking trips made throughout the week
4. Increase the number of people of all ages and abilities making local trips by riding and walking
5. Influence user, resident and wider community perceptions of SAS routes as safe and comfortable places to walk, wheel and ride.

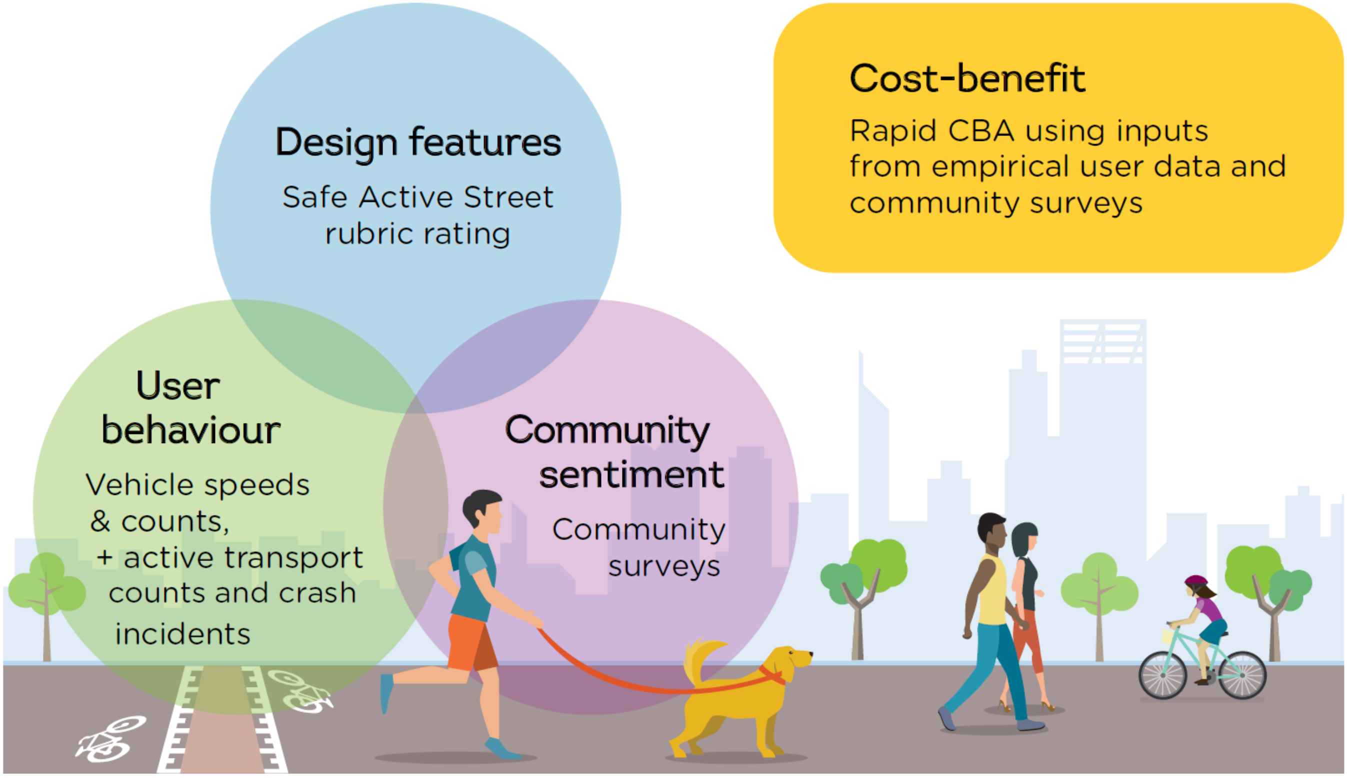
Evaluation framework

A comparative impact evaluation methodology was developed to collect and analyse data on three key change indicators for each SAS:

- **Design features** – scores to quantitatively differentiate between the types and scale of features, treatments and supporting measures applied to the route.
- **User behaviour** – vehicle counts and speeds (using pneumatic tube surveys), and active travel counts (using video surveys), collected pre- and post-construction. Small samples of available crash data were reviewed and discussed at the project level only, to aid interpretations of other data.
- **Community sentiment**[10] – qualitative data on sentiment and perceptions, collected via community, resident and user surveys post-construction.

[9] DTMI, 2026. Planning and Designing for Active Transport: Explainers - Assessing 85th percentile speeds on safe active streets. Prepared by the Department of Transport and Major Infrastructure. Perth, WA.
[10] Community sentiment was not collected for the Cambridge SAS due to delays in the project construction timeline pushing out into 2023, after the survey sampling period had concluded.

At the program level, the evaluation framework included a fourth key indicator: cost benefit. The [SASs Pilot Program Final Evaluation Report] includes discussion of outputs from a cost benefit analysis conducted on data from each of the nine evaluated projects and provides a summary of the factors that influenced whether a project received a BCR >1, indicating a positive return on investment.



Data sources for each safe active street key indicator, illustrated to show theoretical interactions

OUTCOMES

Design features

Evaluation of the design features applied on each SAS route was a complex task due to the wide range of measures and treatments available, which could be chosen to influence different unique, yet complementary effects on user behaviour and community sentiment.

Assessment rubric

To assess the types and scale of treatments and supporting measures applied in each pilot project, a consistent scoring rubric and guidelines were developed for the SASs Pilot Program, which required a group of invited transport engineers and planners to agree on scores during focus group sessions.

Twenty-one criteria were identified across five design categories:

1. Active transport infrastructure
2. Connectivity
3. Traffic calming
4. Parking bay infrastructure
5. Placemaking and legibility.

Through facilitated consultation, design scores (0-4) were determined, where scores reflected the degree of improvement applied for each criterion per route segment assessed. Total average scores per route segment and category (grouping of criterion) could then be interpreted as:

<1 = minimal improvements	1-2 = moderate improvements	2-3 = major improvements	>3 = substantial improvements

Results

Table 1 provides a breakdown of scores per route segment and design category.

Overall, the route averaged a design score of 1.4, indicating only moderate improvement was achieved across the whole route.

- The overall route score was brought up by moderate improvements to 'connectivity', with connections to several local and district key destinations.
  - This was variable across the route with higher 'connectivity' scores on segments 4 and 5, closest to the district destinations of Leederville Station and the Mitchell Freeway Principal Shared Path.
  - The SASs Pilot Program Final Evaluation Report determined route selection is a critical driver of benefit realisation, with direct influences on current and latent demand.
- Design scores for 'traffic calming' and 'parking bay infrastructure' were minimal to moderate, with a lot of variation between segments.
  - This is reflected by lack of continuity in carriageway narrowing treatments, such as formalised parking, and the application of single-sided horizontal deflections that left trafficable widths large enough for drivers to navigate at unsafe speeds while forcing people walking, wheeling or riding to share the lane. Recommendations on carriageway and horizontal treatment width have been determined from outcomes of the pilot program and will be included in the updated SAS design guidance.
  - The use of a trafficable central median was unique to the Cambridge SAS and was applied on segments 1 and 3, with minimal impact on vehicle speeds:

    - Segment 1 is shorter by comparison and includes a cut through intersection with the distributor road, Selby Street. Vehicle speeds were low on this segment before construction but did not decline further after construction.
    - Segment 3, however, is 1.08 km long with trafficable central median applied consistently. This length of the route saw the highest vehicle speeds, with increases in the 85th percentile speeds post construction, suggesting trafficable central medians were not sufficient to reduce carriageway width and compel drivers to slow down. This finding is discussed further in the results for user behaviour.
  - Segments 2 and 3 applied major improvements to 'traffic calming' and 'parking bay infrastructure', and this corresponded with the largest decreases in vehicle volumes observed on the route. However, vehicle speeds were not sufficiently reduced on these segments, likely because carriageway width was not effectively reduced and treatment spacing was too far apart.
  - The SASs Pilot Program Final Evaluation Report determined consistent use of formalised 'parking bay infrastructure' had a traffic calming effect by narrowing the road carriageway and should be considered as a supportive design feature for the goal of reducing traffic volumes and speeds.
- Design scores for 'placemaking and legibility' were moderate, due mostly to the lack of consistent use of red pavement colour other than at intersections or road humps.
- Design scores for 'active transport infrastructure' were very low, with minimal upgrades to crossings and footpaths.

Table 1: Design scores per category, segment and overall for the Cambridge SAS route*

Segment	Active transport infrastructure	Connectivity	Traffic calming	Parking bay infrastructure	Place-making and legibility	Total*
Segment 1: Ruislip St (west of Reserve St)	0.75	1.33	1.14	0	1.6	**1.1**
Segment 2: Ruislip St (Reserve St to Gregory St)	0.5	1.67	2.86	2.5	2.4	**2.1**
Segment 3: Ruislip St (Gregory St to Northwood St)	0.25	1.33	3	2	2.2	**1.95**
Segment 4: Northwood St (Lake Monger Dr to Railway Pde)	0	2.67	0.86	0	1.2	**0.95**
Segment 5: Woolwich St (east of Northwood St)	0	3	0.57	0	1.2	**0.9**
Overall average route score	**0.3**	**2**	**1.69**	**0.9**	**1.72**	**1.4**

*Total average scores per segment and category can be interpreted as: <1 = minimal improvements, 1-2 = moderate improvements, 2-3 = major improvements, >3 = substantial improvements.

Examples of applied design treatments

Connections – cut throughs at intersection with distributor road

Intersection showing SAS priority

Carriageway narrowing – trafficable median

Speed advisory sign in median – adjacent to local park

Single-sided horizontal deflection

Road hump and blue patch at entry point

User behaviour

Evaluation of user behaviour followed a comparative impact approach, with before-after, control-intervention (BACI) data collection design.

Data collection design

A BACI data collection design was applied to differentiate between the effects of interventions applied on the treatment route and changes that may have occurred ‘naturally’ in the surrounding area.

Data was collected before construction at carefully selected sites on the SAS (treatment) and at comparative sites on similar nearby streets (control) and repeated at the same sites after construction at consistent times of the year to minimise influence of seasonal variation.

With a BACI design, traffic and movement flow on control streets did not need to match with treatment streets, and an appropriate an analysis of change (odds ratio) was determined.

Odds ratio analysis

To assess changes in counts of vehicles, walkers and bike riders on the treatment compared to control routes, a statistical measure of probability was applied known as an ‘odds ratio’, which compares the odds of an outcome occurring in one group to the odds of it occurring in another group (regardless of differences in raw counts across groups).

Odds ratios were used to estimate whether the outcomes observed on the SAS route were likely attributable to the SAS, unlikely attributable, or consistent with trends observed on the control streets.

Scores range from 0-2 and sometimes higher, with scores >1 indicating higher odds of the treatment influencing the outcome and scores <1 indicating decreased odds. It is common, however, that during interpreation of results, a middle range is determined that indicates a neutral or indeterminate result. During analysis of the SAS user behaviour data, a middle range of 0.93 and 1.08 was determined as neutral change or change on the SAS that was consistent with trends observed on the control routes.

Assessing 85th percentile speeds

It was not suitable to apply odds ratios for 85th percentile speeds because the posted speeds were intentionally reduced on the SAS route. Instead, a method was developed specifically to assess the effectiveness of the lowered speed limits and changed street conditions of SAS routes on driving behaviour, through which DTMI identified an acceptable operating range and upper bound for 85th percentile speeds. For more information, see the supporting document: Assessing Safe Operating Speeds on 30 km/h Streets.

Calculating average daily results

Vehicle counts and speeds were detected across 14 consecutive days, including weekdays and weekends, at consistent seasonal and temporal periods before and after SAS construction. Active transport counts were detected across three weekdays and one weekend day, at consistent seasonal and temporal periods before and after SAS construction.

Data collection periods were carefully selected to avoid local area events, public holidays and school holiday periods. If collection technology failed, samples were repeated immediately.

Calculations of average daily results were undertaken by:

i. averaging the available weekday and weekend data per collection period
ii. applying weightings for the number of weekday and weekend days per week
iii. adding the result to determine average weekly activity
iv. dividing by seven to achieve an average daily estimate.

This method was applied to achieve consistency across the available dataset, and smooth out any day-of-the-week fluctuations that may have occurred. In this way, data between control and treatment sites, and across SAS locations could be compared consistently.

Vehicles

Method

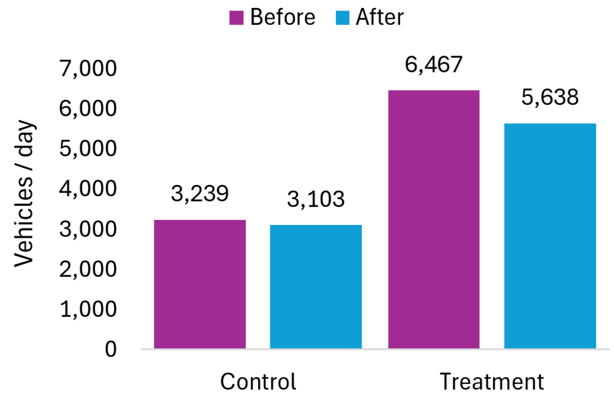
Pneumatic tube counters were used to detect vehicle traffic volumes and speeds. They were placed at strategically selected midblock locations on the SAS route (treatment) and comparable locations on adjacent streets (control). Depending on segment length, between 1 - 4 counters were placed on each.

Results

Vehicle volumes - overall

- Vehicle counts reduced on both the treatment route (-13 per cent) and control streets (-4 per cent), with a larger proportional decrease on the treatment route.
  - This suggested that the 'traffic calming' applied, such as intersection plateaus, speeds humps and narrow slow points, were effective in discouraging vehicles from using the route.
- Comparing changes on the treatment and control routes, the odds ratio generated a score of 1.09, **indicating the SAS was likely responsible for the decreases observed enroute**. As this score is marginally above the neutral odds ratio range, further monitoring would be suitable to determine if treatment route vehicle counts remain lower than baseline figures.

Figure 1: Cambridge – average daily vehicles



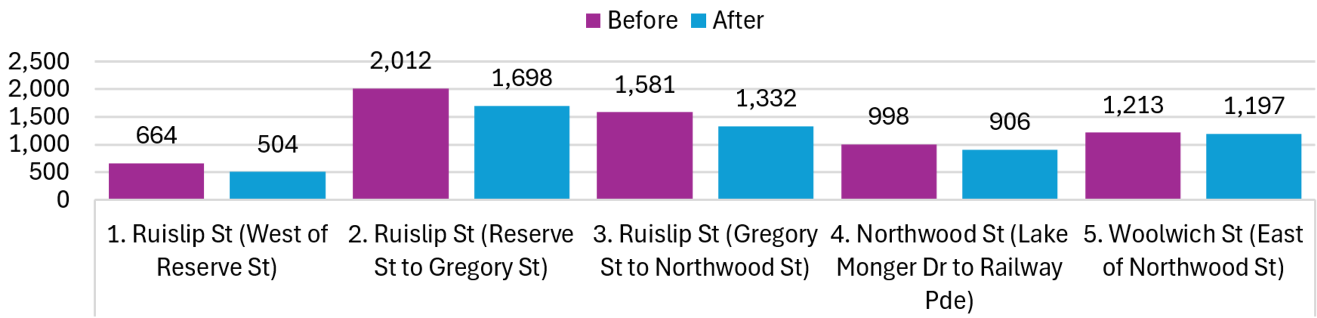
Vehicle volumes on the SAS decreased to a relatively larger proportion than control streets.

The odds ratio indicated the decrease in vehicle volumes on the SAS route after construction was likely attributable to the SAS when compared with trends on control streets.

Vehicle volumes – segment comparison

- Vehicle counts reduced on all segments.
  - The largest reduction was observed on segment 1 (-24 per cent), related to the blocking of a side road entrance from The Boulevard onto the SAS route and creation of a cul-de-sac with shared path connection. Another connection from The Boulevard remained, however, not blocking entry.
  - Large reductions were also observed on segments 2 (-16 per cent) and 3 (-16 per cent), which achieved the highest design scores for 'traffic calming' and 'parking bay infrastructure'.
  - Segments 4 and 5 saw fewer reductions in vehicle use, possibly because these locations were utilised by local residents and through traffic moving between Lake Monger and West Leederville Train Station and shopping district.

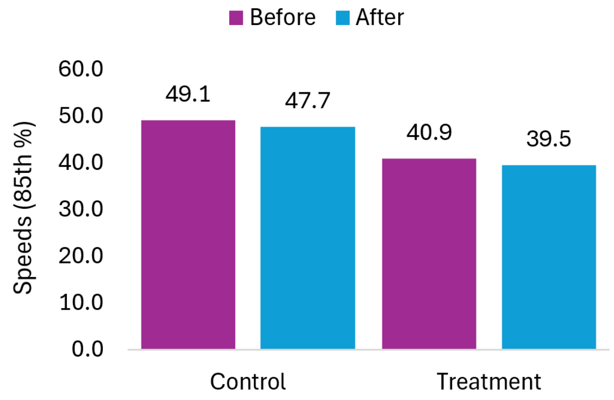
Figure 2: Cambridge – average daily vehicles on SAS segments



Vehicle speeds - overall

- There was a small reduction in 85th percentile vehicle speeds on the treatment route, and overall 85th percentile vehicle speeds were reduced to within an upper bound of the preferred operating range: 32.1 km/h to 38.1 km/h. The change was moderate, however, indicating that more could be done to further reduce the fastest speeds.
  - Recommendations could include continued monitoring of speeds, minor or localised interventions where context warrants, or targeted speed reductions at specific locations.

Figure 3: Cambridge– 85th percentile speeds

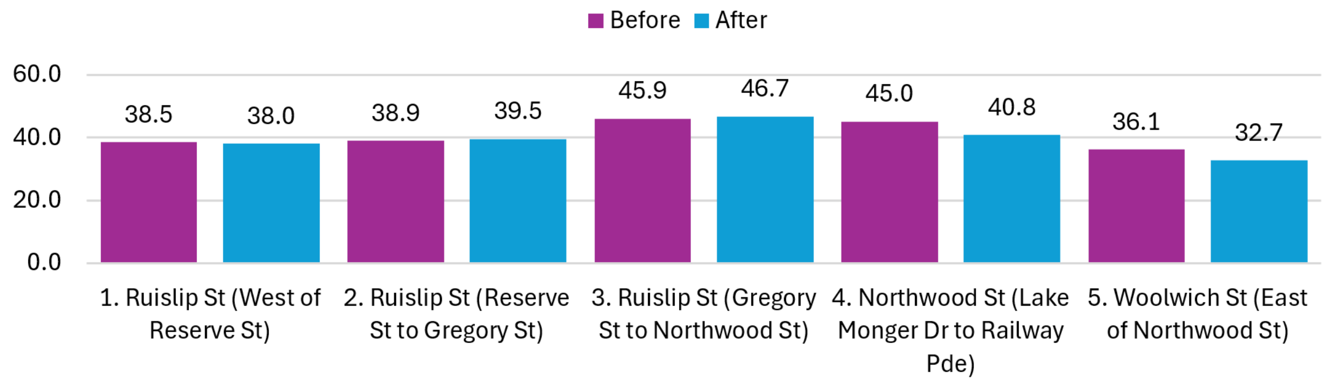


This result indicates moderate overall SAS performance in supporting the safety of vulnerable road users by sufficiently lowering the fastest vehicle speeds, with large variability across the route.

Vehicle speeds – segment comparison

- There was a large degree of variation in 85th percentile speeds across all five segments of the route, indicating there was a significant proportion of vehicles not observing the lowered speeds, nor sufficiently impacted by the changed street conditions. This was most likely because efforts to reduce carriageway width were not consistently applied along the route.
- 85th percentile speeds exceeded the preferred range on segments 3 and 4, indicating a review of speed reducing design elements is required on these segments.
  - Segment 3 saw an increase in the 85th percentile speeds, taking them far above the preferred operating range for an SAS. This segment applied long stretches of trafficable central median to reduce carriageway width. The combination of reduced vehicles and high speeds suggests the trafficable central medians were not sufficient to reduce carriageway width and compel drivers to slow down. Instead, drivers were unconstrained and able to speed along this segment.
    - This finding suggests that if trafficable central medians are applied on an SAS, other vertical and horizontal deflections should be applied at regular intervals to further reduce speeds.
- Segment 2 saw a small increase in 85th percentile speeds. These were above the acceptable operating range, but within an upper buffer, suggesting that continued monitoring is required to identify whether speeds are trending up or down, and if further design response is needed.

Figure 4: Cambridge – 85th percentile (fastest) speeds on SAS segments



Active transport

Method

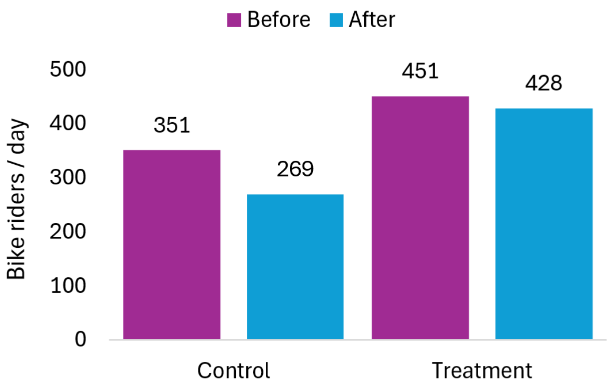
Video surveys were used to detect rates of active transport. Video cameras were placed at strategically selected intersections on the SAS route (treatment) and comparable locations on adjacent streets (control). Depending on segment length, between 1 - 4 counters were placed on each.

Results

Bike riding - overall

- Riding activity decreased on the treatment route (-5 per cent), however, control streets observed a greater loss (-23 per cent), suggesting while overall activity dropped in the neighbourhood, riders were still more likely to choose the SAS route over alternative streets.
  - The Cambridge SAS was first sampled in December 2020, following the large increases in bike riding observed in 2020 across the whole Perth metropolitan area.
  - Post construction sampling was undertaken in December 2023, and the reduction in bike riding activity across the whole SAS route is consistent with the decline in bike riding that was observed across the Perth network in 2023. See DTMI's 'Making Tracks' reports for more information.
- Comparing the declines on the treatment and control routes, the odds ratio generated a low score of 0.82, **indicating the SAS was unlikely responsible for the decreases observed enroute**.

Figure 5: Cambridge – average daily bike riders



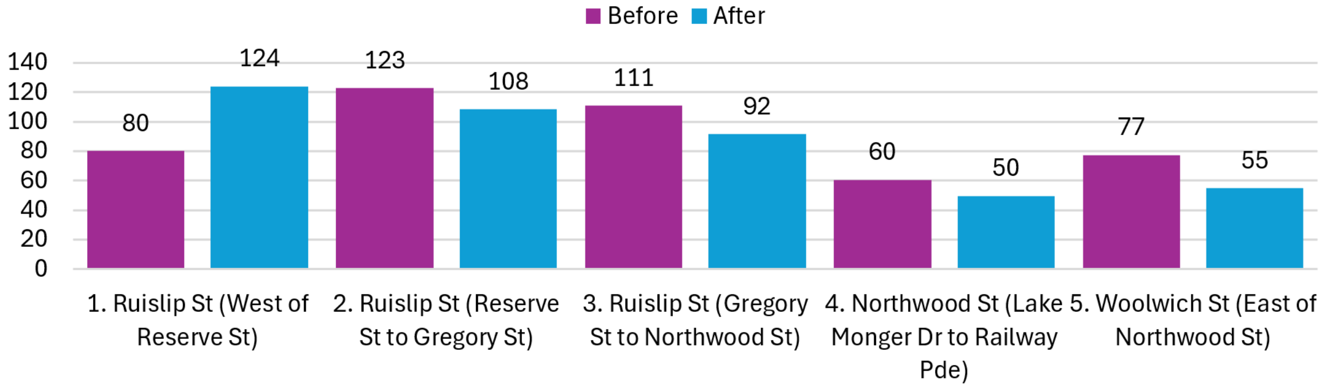
Bike riding activity decreased on the SAS and on control streets, with the degree of loss lower on the SAS, indicating that although riding activity declined in the area, the SAS route was more attractive for people to ride along.

The odds ratio indicated the decrease in riding on the SAS route after construction was unlikely attributable to the SAS when compared with area-wide trends.

Bike riding – segment comparison

- Segment 1 experienced an increase in riding activity and scored more than other segments for 'active transport infrastructure', with an upgrade to the crossing treatment at Selby Street.
- All other segments saw decreases in riding activity post construction.
  - With the odds ratio score indicating that the degree of loss on the SAS was less than the surrounding area, it is probable these declines were more associated with area-wide changes than due to the SAS treatments applied. However, ongoing monitoring of riding activity is recommended to determine if treatment route riding usage has remained stable since DTMI's post construction sampling took place.
  - Nevertheless, with 85th percentile vehicle speeds on segments 2, 3 and 4 remaining above the preferred operating range, it is also possible that riders remained uncomfortable sharing the road in these sections of the SAS, and a review of speed reducing design elements is required on these segments.

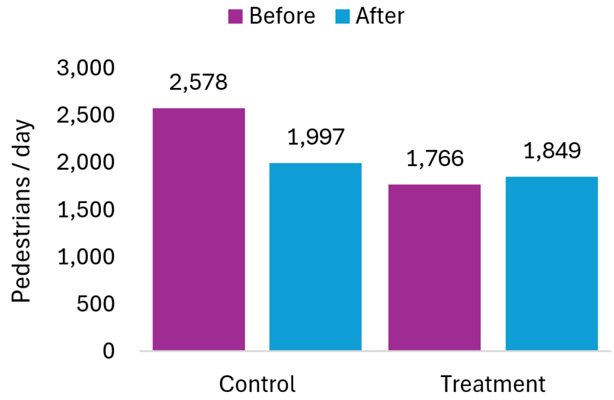
Figure 6: Cambridge – average daily bike riders on SAS segments



Walking – overall

- Walking activity increased on the treatment route (+5 per cent) and decreased on control streets (-23 per cent) suggesting the SAS upgrades, including safer crossing points, encouraged a switch from parallel roads to the route, despite the low scores for 'active transport infrastructure'.
- Comparing changes on the treatment and control routes, the odds ratio generated a high score of 1.22, **indicating the SAS was likely responsible for the increases observed enroute**.

Figure 7: Cambridge – average daily walkers



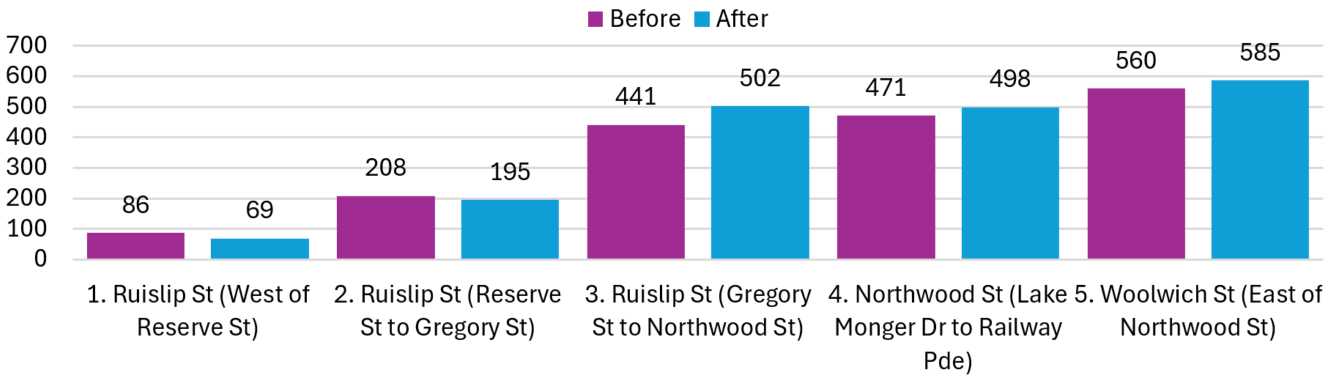
Walking activity increased on the SAS whilst losses were observed on control streets, indicating the SAS was a more attractive route for walkers.

The odds ratio indicated the increase in walking on the SAS route after construction was likely attributable to the SAS when compared with trends observed on nearby control streets.

Walking – segment comparison

- Pedestrian movement increased overall, however segments 1 and 2 observed some loss in walking activity, possibly suggesting part of the SAS route was less traversable by pedestrians than bike riders.
  - This end of the route, however, was also not as well connected with key destinations and the losses at that location could also reflect the change in area-wide activity related to sampling periods (2020 and 2023) as discussed for bike riding activity.

Figure 8: Cambridge – average daily walkers on SAS segments



Crash incidents

Additional to the count data collected to assess user behaviour, a review of available crash data provided an indication of safety performance of the road environment before and after implementation of the SAS.

Objective evidence on the number, type and severity of crashes occurring in the area, in light of the changed user behaviour along the route, helps identify whether the SAS treatments have influenced road safety outcomes.

Method

Crash incidents were downloaded from the Main Roads WA data warehouse via Data WA. Eleven years of reported incidents across the State, from 1 January 2013 to 31 December 2023,[11] were available which included midblock and intersections.

Data was filtered to anything involving bike or pedestrian, and geospatially mapped to visualise their location, type and injury severity against the SAS routes.

Sample sizes were low, which limited analysis to a simple visual count. Nevertheless, patterns were assessed alongside the design features of the route and user behaviour count results for vehicles, people walking and bike riders.

Sample sizes in active transport related crash data were typically low due to:

- frequency of incidents being generally low in the specific areas of interest
- the incident dataset only containing medical, hospital, fatal or property damage reports.

Results

Table 2 provides a summary of incidents between vehicles and bike riders or people walking, before, during or after SAS route construction, shown for each stage of the SAS route and corresponding control street locations. Notable data patterns:

- The completed Cambridge SAS route experienced no crash incidents enroute, from a base of four bike related incidents in previous years.
- Several incidents involving bike riders or pedestrians were recorded on control streets before SAS construction, and only one in the year after construction.

The reduced rate of crash incidents for bike riders on the SAS route could indicate increased safety for bike riders. There may also be an association with the reduction in bike riding on the route post construction, however, the number of daily bike riders remained quite high (428 per day) compared with other SAS routes, suggesting the decline in daily bike riders alone would be unlikely to affect crash rates and there must have been an association with vehicle volume and speed reductions.

Walking increased on the SAS and decreased on control streets. This could indicate pedestrians shifted to the SAS for improved safety experiences, or possibly, that the declines in walking and bike riding activity on control routes were linked with the reduced crash rates on those surrounding streets.

Additional years of crash data could be analysed to determine if these patterns persist.

> This pattern indicates positive SAS performance in supporting the safety of vulnerable road users, with more years of data required to determine if patterns persist.

[11] Note: At the time of analysis (late 2025), data for 2024 and 2025 was not available to download.

Table 2: Incidents between vehicles and bike riders or pedestrians, before, during or after SAS route construction

Years of data reviewed[12]	SAS construction status	Crashes on SAS route – Bike	Crashes on SAS route – Pedestrian	Crashes on control street – Bike	Crashes on control street – Pedestrian
10 years	Before	1 hospital 3 medical	Nil	2 hospital 3 medical	4 hospital 2 medical
1 year	During	Nil	Nil	Nil	Nil
1 year	After	Nil	Nil	Nil	1 hospital

Community Sentiment

No community sentiment data is available for the Cambridge SAS route. Community sentiment could not be collected due to delays in the project construction timeline pushing out into 2023, after the survey sampling period had concluded.

This highlights the importance of incorporating ACE principles throughout all phases of project planning, design, delivery and post construction review.

[12] Years of data reviewed reflects the combined total of all available incident data analysed relative to the SAS's construction status. Due to the limited sample size and targeted location, averaging incidents per year was not suitable for this analysis.

SUMMARY OF FINDINGS

Achievements

- Reductions in vehicle counts greater than the decline in background traffic on neighbouring streets.
- Increases in pedestrian activity, while decreases were observed on control streets.

Opportunities for improvement

- Riding activity decreased on the treatment route to a lower proportion than the surrounding area, which suggested that while overall activity dropped in the neighbourhood, riders were still more likely to choose the SAS route over alternative streets.
- Small reductions in overall 85th percentile speeds compared to baseline levels, to within an upper bound of the preferred the operating range.
  - Nevertheless, there remained a large degree of variation across the route, indicating there was a significant proportion of vehicles not observing the lowered speeds, nor sufficiently impacted by the changed street conditions.
  - Segment 3 specifically saw an increase in 85th percentile speeds, taking them far above the preferred operating range for an SAS. This segment utilised a long stretch of trafficable central median to reduce carriageway width, however, drivers appeared to feel unconstrained and able to speed along this segment.
    - This finding suggests that if trafficable central medians are applied on an SAS, other vertical and horizontal deflections should be applied at regular intervals to further reduce speeds.
  - The inconsistent and poor results for reduction of fastest speeds on several route segments was likely related to lack of consistent carriageway narrowing treatments and insufficient use of vertical and horizontal deflections at regular intervals. The SASs Pilot Program Final Evaluation Report indicates these treatments should be applied 80-100 m apart for maximum benefit and speed reduction.
- No crash incidents enroute, from a base of four bike related incidents in previous years.
  - The reduced rate of crash incidents for bike riders on the SAS route may indicate increased safety for bike riders, associated with overall vehicle volume and speed reductions. Additional years of crash data could be analysed to determine if these patterns persist.
- Community sentiment could not be collected for the Cambridge SAS due to delays in the project construction timeline pushing out into 2023, after the survey sampling period had concluded.
  - This highlights the importance of incorporating ACE principles throughout all phases of project planning, design, delivery and post construction review.

Insights and recommendations

Recommendations to improve outcomes on this SAS project, informed by insights summarised in the SASs Pilot Program Final Evaluation Report:

- Lowering 85th percentile speeds consistently across all segments of the route to within the preferred operating range, by considering additional road treatments as required.
- Applying vertical or horizontal deflection treatments 80-100 m apart for maximum benefit realisation and consistent reduction of unsafe speeds.
- Incorporating ACE principles throughout all phases of project planning, design, delivery and post construction review.

Alignment with program insights

By trialling the use of different design features, and collecting data on user behaviour and community sentiment, the nine evaluated projects in the pilot program generated a rich array of insights that will guide future design and development of SASs.

The SAS Design Guidance developed through this trial provides insights for retrofitting brownfield sites but perhaps most importantly, guidance on how to establish an SAS on greenfield sites at inception.

With this guidance and support from DTMI, local governments can design and implement more SASs, creating effective 30 km/h shared street spaces for people to walk, wheel and ride comfortably and safely in their communities.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