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Welcome

About WARRIP

The Western Australia Road Research Innovation Program is a joint initiative between Main Roads Western Australia and the Australian Road Research Board.

The program has a strategic commitment to the delivery of collaborative research and development that positively contributes to the design, construction and maintenance of safe, sustainable transport infrastructure in Western Australia.

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WESTERN AUSTRALIAN ROAD RESEARCH & INNOVATION PROGRAM

Evaluation of Low-Cost Urban Road Safety Program

MRWA PM: Ian Thompson

ARRB PM: Ali Raza

Key Findings

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- Low-cost treatments were implemented at 33 intersections in three local government areas
- Either raised plateau or compact roundabout treatments were implemented at all 33 project sites
- Implemented treatments are effective in maintaining the 85th percentile speed below the default speed in all areas except Osborne Park.
- 21 crashes at four intersections in Osborne Park. All other project intersections recorded three or fewer crashes in 2017-21.
- During three-phase consultations with LGAs, Council officers highlighted that implemented treatments seem effective in reducing the area-wide speed, and there is generally a positive perception among resident

Key Findings

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- The council officers suggested adopting a two-year staged approach for the Low-Cost URSP program, i.e., planning and design in the first year and on-ground delivery in the second.
- Council officers also expressed that evidence-based data is unavailable to demonstrate improvements in the safety of vulnerable road users.
- Local governments may have considered alternate or additional treatments if adequate time was available for planning and design.
- Council officers are not fully across the Low-Cost URSP process described in the strategy and Implementation Framework of Low-Cost URSP (MRWA document D22#24187).

Recommendations

- Develop a standard layout plan for common low-cost treatments.
- Vulnerable road users needs should be considered in the selection of low-cost treatments.
- Increase awareness of the Low-Cost URSP amongst local government practitioners.
- Work in collaboration with local councils to develop practical planning and delivery timelines.
- Develop pre and post-treatment data analysis plans for each neighbourhood area.
- Consider using a combination of low-cost treatments where necessary to achieve desired safety objectives.
- Commission Safe System assessments for all project sites in a neighbourhood area to evaluate different treatment options and optimise alignment with Safe System principles.

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Low-Cost Urban Road Safety Program (URSP)

Rationale and Scope?

URSP – Rationale

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- Main Roads identified local road mid-block and intersections in urban areas as significant road safety concerns
- Numerous priority-controlled cross-intersections within a grid-style road network
- From a road safety perspective as the straight roads allow vehicles to build up speed between intersections
- The priority-controlled cross-intersections present significant crash opportunities, noting the potential for severe right-angle crashes.
- 51,000 metropolitan intersections
- Casualty crashes at more than 4,500 intersections (2015-19)
- Nearly 3,500 such road intersections are under local government control
- These intersections do not typically qualify for funding under existing road safety programs

What is URSP

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- A fully funded program that aims to improve road safety on local roads and intersections, managed by Local Governments
- Managed by MRWA
- Supported by the Minister for Transport and the Minister for Road Safety through a $16 million commitment via the Road Trauma Trust Account
- Reduce impact speeds to below 30 km/h on local roads
- Enhance the safety of vulnerable road users, such as people who walk, cycle, and ride motorcycles and occupants of vehicles.
- Achieving these lower speeds at intersections can improve safety outcomes for all road users

URSP Treatments

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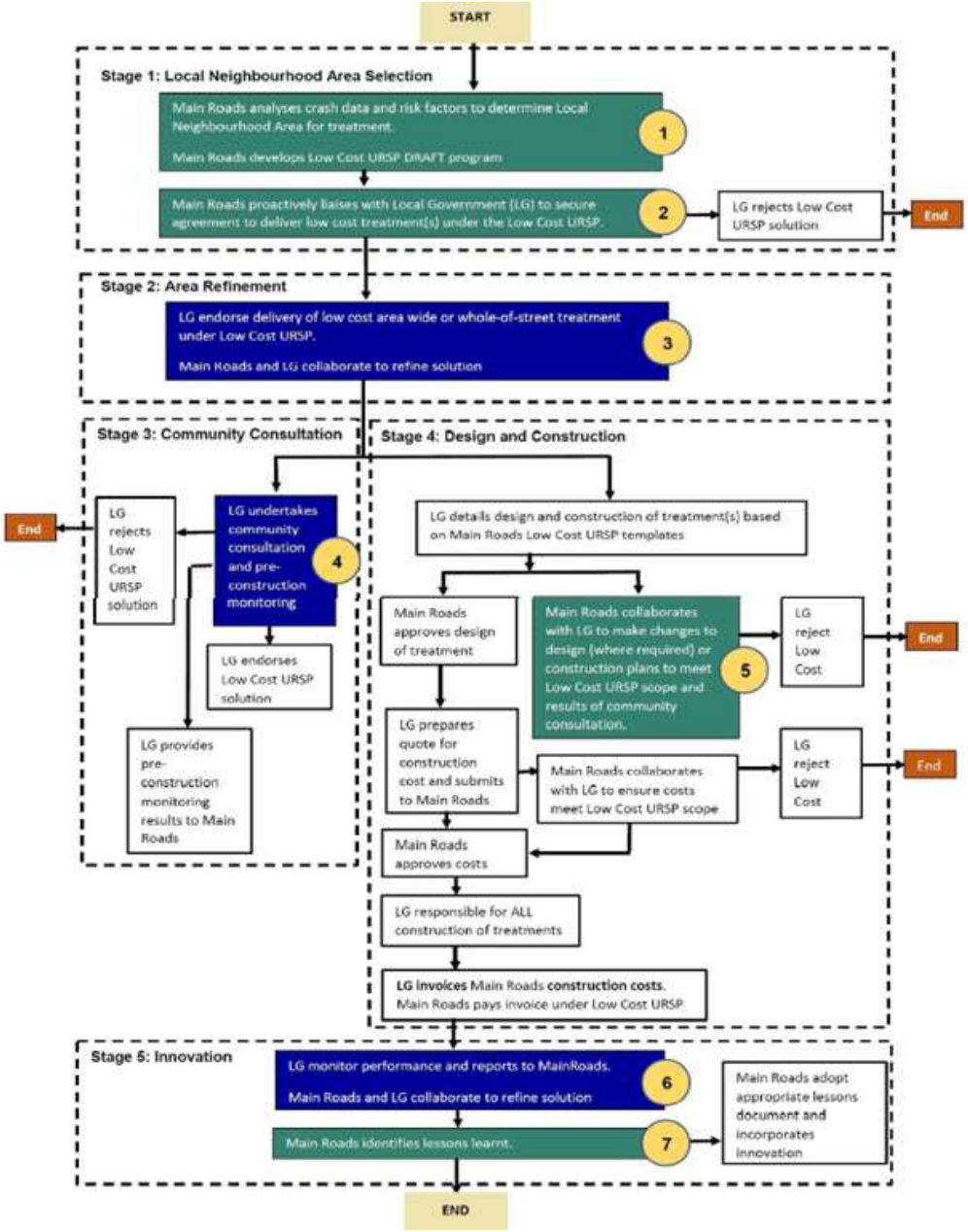
- Mini-roundabouts
- Compact roundabouts
- Uncontrolled pedestrian crossing facilities
- Raised safety platforms
- Speed humps
- Entry statements
- Other minor road features and amendments



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URSP Process

Stage 1	Local Neighbourhood (LN) Area Selection
Stage 2	Area Refinement
Stage 3	Community Consultation and Pre-construction Monitoring Data
Stage 4	Design, Cost Estimations and Construction
Stage 5	Innovation and Post-construction Monitoring Data.

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Low-Cost URSP Pilot Project

URSP – Pilot Project

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Low-cost safety treatments were implemented at 33 intersections in the following three metropolitan LGAs:

- City of Rockingham
- City of Vincent
- City of Stirling

Low-Cost Treatments in City of Rockingham

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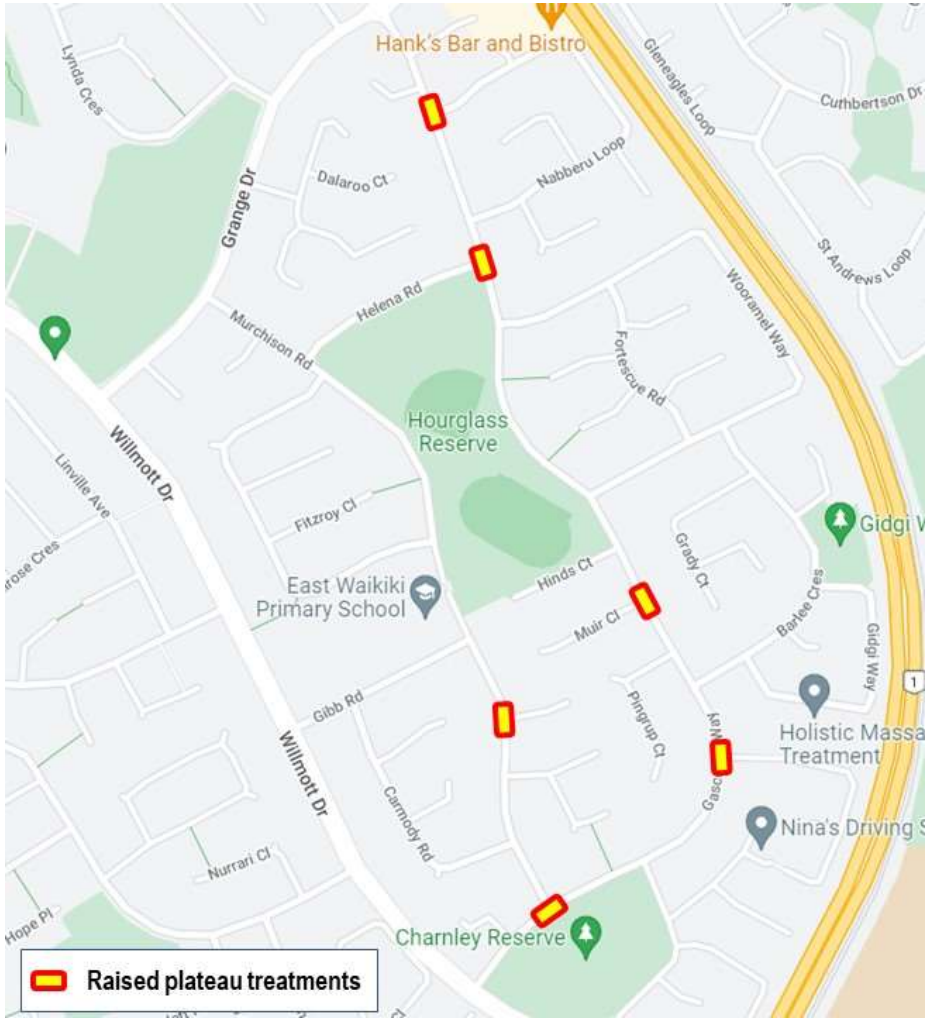

Low-Cost Treatments in City of Vincent

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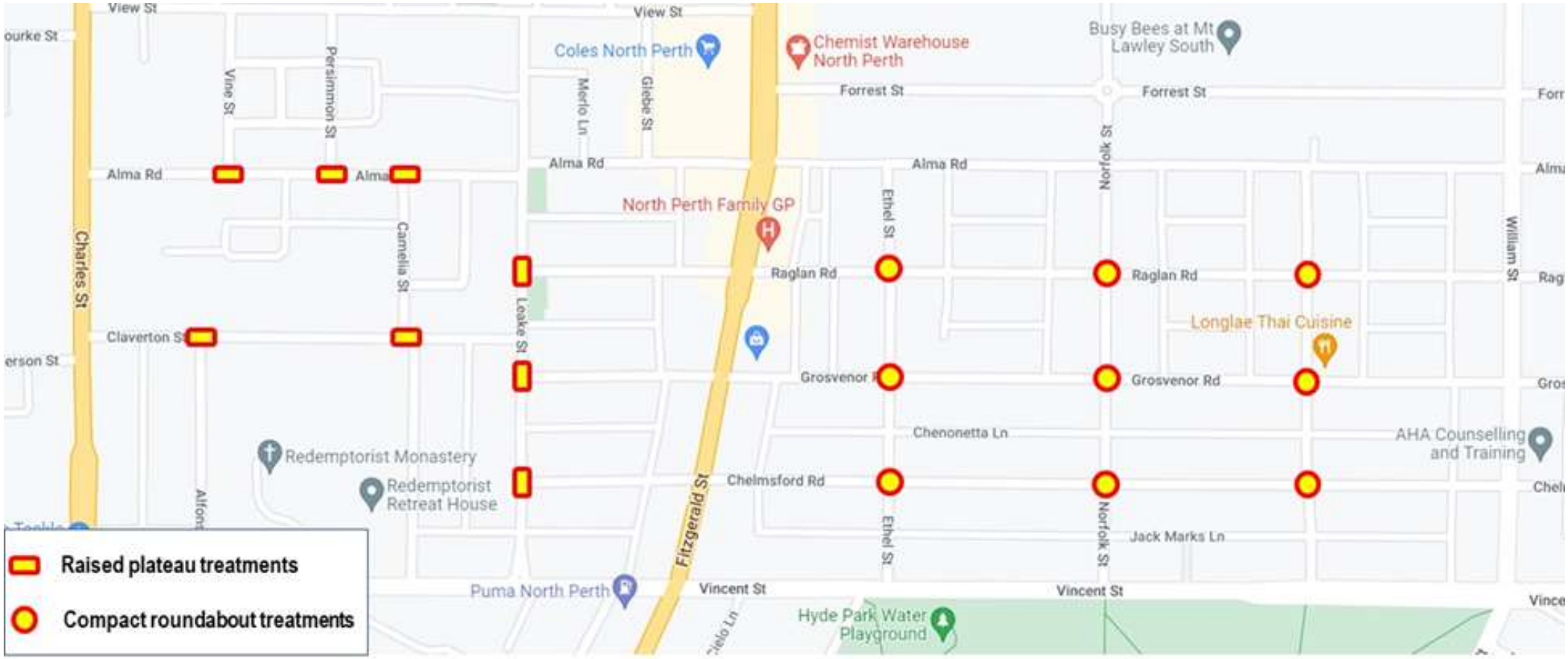

Low-Cost Treatments in City of Vincent

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Low-Cost Treatments in City of Stirling

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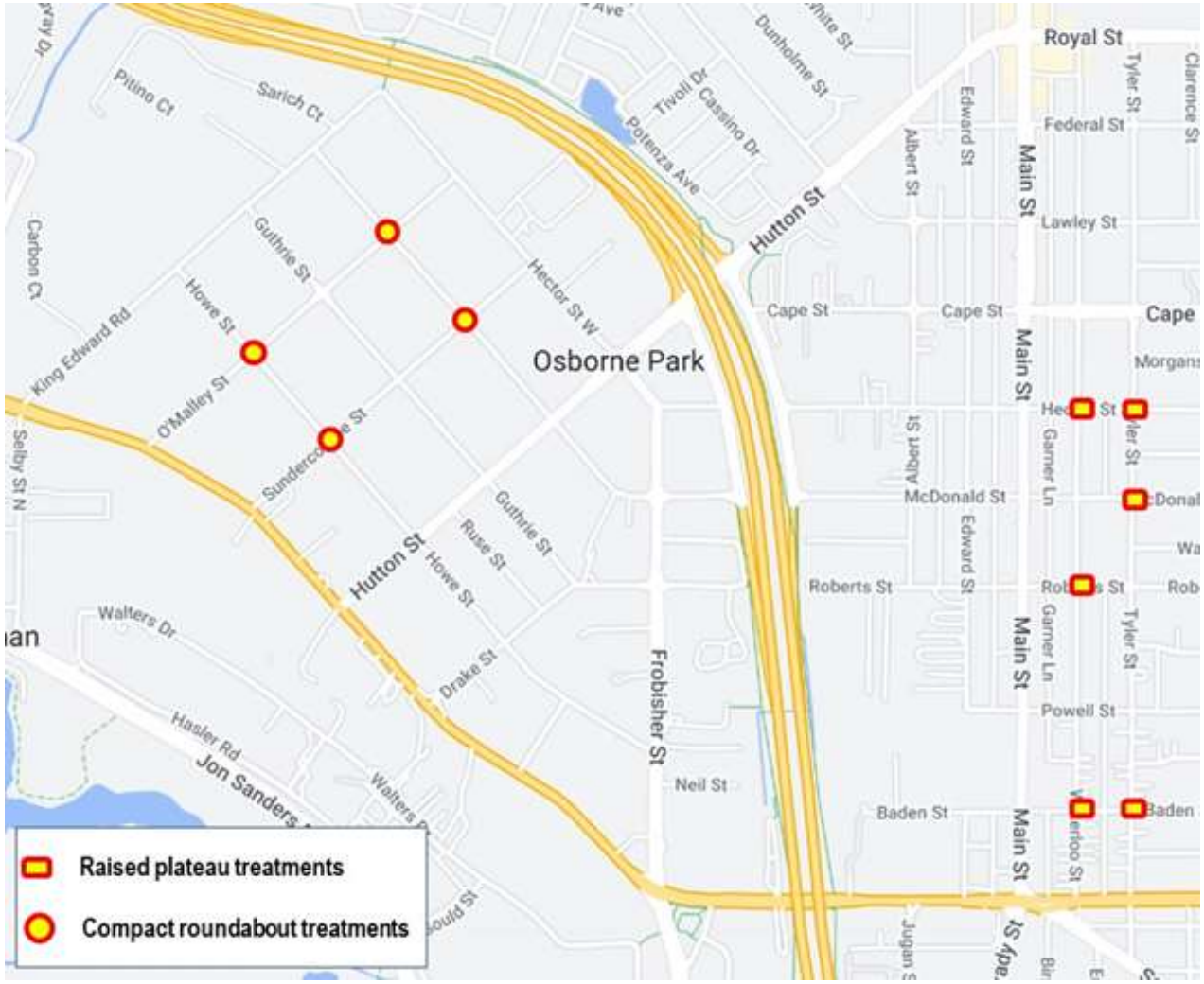

Low-Cost Treatments in City of Stirling

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Evaluation of URSP

Study Methodology

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Project inception	• Meeting with the MRWA project manager • Discuss project scope, opportunities and constraints
Economic benefit preliminary analysis	• Undertake preliminary economic benefit analysis based on available information and data
Preparation of assessment method	• High-level analysis of the provided data by MRWA • Develop assessment methodology to evaluate project sites
Traffic data collection	• Traffic surveys around all project sites to collect traffic demand and speed environment
Data analysis	• Undertake analysis of the survey results including traffic trends and 85th percentile speed limit
Site visits	• Visit all 33 project sites located in three local government areas.
Consultation with local governments	• Carryout consultation, including preliminary discussion and workshop with all three local governments.
Evaluation of implemented treatments	• Based on collected data, site visits and feedback from local governments, evaluate effectiveness of all 33 project sites.
Project report	• Prepare a project documenting evaluation of implemented treatments in each area
Project presentation	• Deliver presentation to the MRWA project manager and other stakeholders to discuss findings of the evaluation and recommendations

Consultation with LGAs

Consultation with LGAs

ARRB adopted a process comprising the following phases for consultation with LGAs:

- **Preliminary discussions** – separate half-hour session with all three LGAs
- **A survey questionnaire**
- **Workshops** – separate 1.5-hour sessions with all three LGAs

Consultation with LGAs

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Survey Questionnaire Parts		Description
1	Information of the survey respondent	This part gathered information on the LGA officer responding to the survey questionnaire
2	Feedback on Low-Cost URSP	This part sought feedback on the process and effectiveness of the overall Low-Cost URSP. The LGAs were requested to provide feedback on the following aspects: • Implemented treatments created a slow-speed environment • Community feedback or enquiries were positive or negative • Impact on public transport or waste collection vehicles • Potential maintenance issues • Comments on the overall process of Low-Cost URSP • Time to consult with the community • Any additional comment
3	Feedback on individual intersections	This part sought feedback on all project sites where low-cost treatments are implemented. The LGAs were requested to provide feedback on the following aspects for each project site: • In general, is the community happy with the implemented treatment? • Has the implemented treatment improved safety for pedestrians? • Has the implemented treatment improved safety for cyclists? • Has the implemented treatment impacted heavy vehicles, public transport or service vehicles? • Has the implemented treatment created a slow-speed environment? • Would LGA consider additional or different treatment at this intersection?

Survey Questions	Questionnaire Response from LGAs		
	Stirling	Vincent	Rockingham
Created a slow-speed environment	Unsure	Yes	Yes
Community feedback or enquiries	Positive	Mixed	Mixed
Impact on public transport and waste collection vehicles	No	No	Yes
Potential maintenance issues	No	No	No
Supportive of the overall process of the Low-Cost URSP	Yes	Yes	Yes
Adequate time to consult with the community	Yes	No	No

Consultation Wrap-up

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The consultation process has identified the following common themes across all three LGAs involved in this process:

- None of the LGAs has carried out their own assessment to evaluate the effectiveness of the implemented low-cost treatments in their jurisdictions.
- Council officers suggested involving LGAs in the identification of areas for treatment and program development.
- There is a lack of evidence-based data to inform whether the treatments improved safety for pedestrians and cyclists.
- No significant negative feedback from the community or businesses related to the implemented treatments was received.
- There is the suggestion of having adequate time to develop a practical design and consult with the community.

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Assessment of Low-Cost Treatments in Waikiki and Cooloongup

Waikiki and Cooloongup

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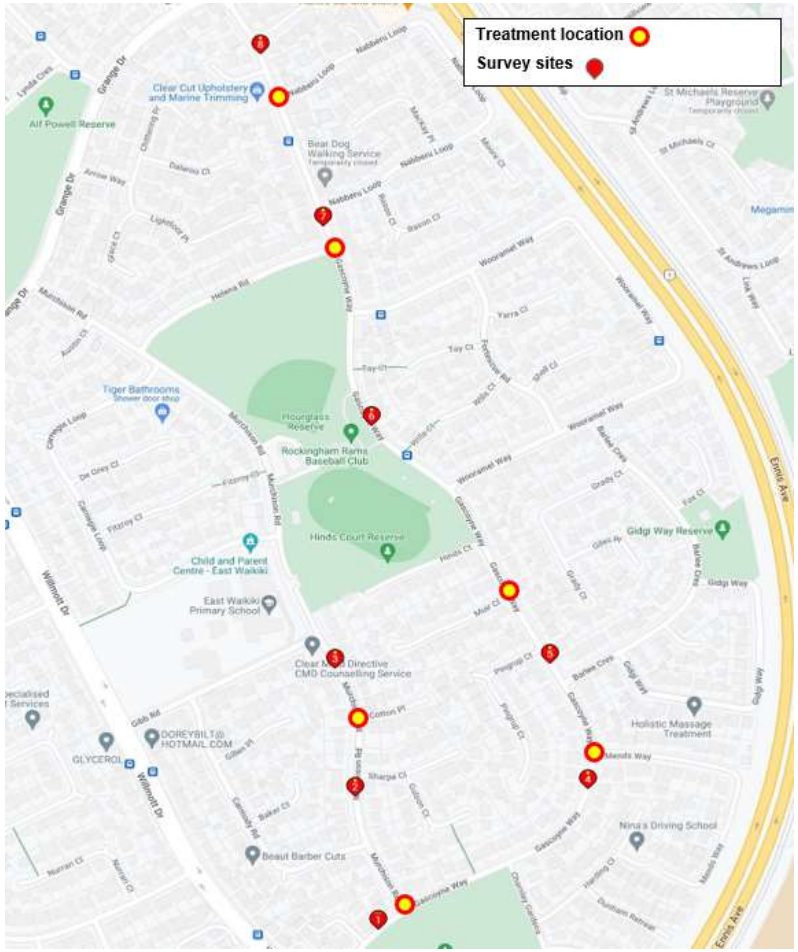

Traffic Survey Results

Survey ID	Average Weekday Traffic	Average Weekend Traffic	85th Percentile Speed (Full week)
1	2,499	2,207	43.7 km/h
2	475	307	50.2 km/h
3	328	181	43.6 km/h
4	1,803	1,559	39.8 km/h
5	1,482	1,349	54.5 km/h
6	1,739	1,518	54.7 km/h
7	2,200	1,907	43.6 km/h
8	2,627	2,365	48.8 km/h

2017-21 Crash Data

Intersection	Fatal	Hospital	Medical	Major PDO	Minor PDO	Total
Gascoyne Way and Muir Close					1	1
Gascoyne Way and Nabberu Loop						0
Gascoyne Way and Helena Road		1				1
Gascoyne Way and Murchison Road						0
Murchison Road and Cotton Place					1	1
Gascoyne Way and Mends Way						0
Total	0	1	0	0	2	3

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Waikiki and Cooloongup

- Areas are predominantly residential
- Treatments include raised plateau with warning signs and raised profile road markings on all approaches
- No additional provisions for pedestrians
- At a few intersections, marks showing vehicle grounding were observed

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Assessment of Low-Cost Treatments in North Perth

North Perth

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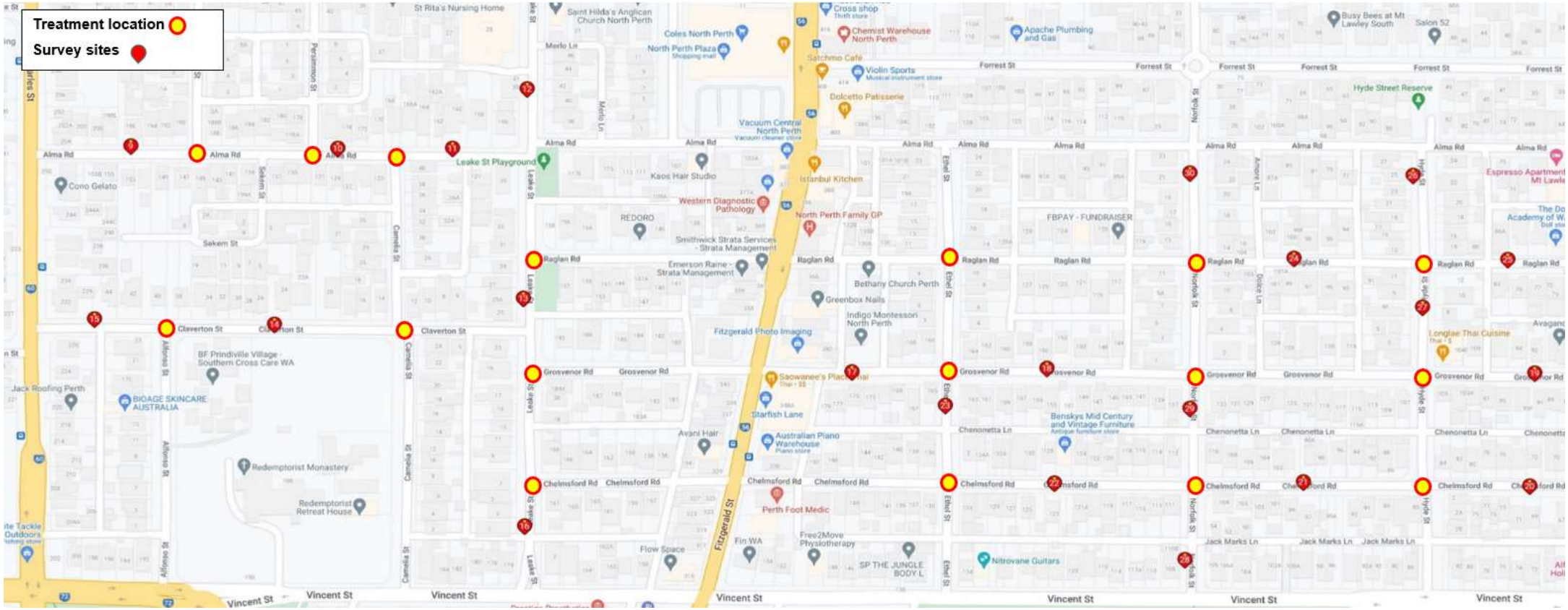

North Perth

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Traffic Survey Results

Survey ID	Average Weekday Traffic	Average Weekend Traffic	Post-treatment 85th Percentile Speed
9	1,084	1,033	40.5 km/h
10	1,191	926	33.3 km/h
11	1,067	948	39.2 km/h
12	1,098	725	45.5 km/h
13	1,241	856	37.6 km/h
14	924	637	50.5 km/h
15	898	818	31.5 km/h
16	628	455	38.9 km/h
17	683	498	45.4 km/h
18	587	477	47.2 km/h
19	398	447	45.4 km/h
20	263	268	44.5 km/h
21	224	226	41.6 km/h
22	374	313	43.0 km/h
23	348	248	33.5 km/h
24	565	514	48.1 km/h
25	591	538	43.7 km/h
26	107	100	33.7 km/h
27	161	152	38.2 km/h
28	996	815	32.9 km/h
29	1,174	861	42.1 km/h
30	1,666	1,240	49.7 km/h

Road Name	Section	Pre-treatment 85th Percentile Speed (km/h) (LGA Data, 2019/2020/2021)	Post-treatment 85th Percentile Speed (km/h) (LGA Data, Mar/Apr-22)		Post-treatment 85th Percentile Speed (km/h) (ARRB Data, Oct-22)	
			Speed	Difference	Speed	Difference
Grosvenor Road	Ethel-Fitzgerald	47.7	44.1	-3.6	45.4	-2.3
Grosvenor Road	Ethel- Norfolk	50	48.4	-1.6	47.2	-2.8
Grosvenor Road	Hyde-William	44.9	43.9	-1	45.4	0.5
Chelmsford Road	Hyde- William	48.2	43.5	-4.7	44.5	-3.7
Chelmsford Road	Hyde- Norfolk	46.8	40.1	-6.7	41.6	-5.2
Chelmsford Road	Ethel- Norfolk	47.7	42.7	-5	43.0	-4.7
Ethel Street	Chelmsford- Grosvenor	40.3	38.9	-1.4	33.5	-6.8
Raglan Road	Hyde- Norfolk	49	46.1	-2.9	48.1	-0.9
Raglan Road	Hyde- William	45.9	47.2	1.3	43.7	-2.2
Hyde Street	Grosvenor-Raglan	37.6	37.3	-0.3	38.2	0.6
Norfolk Street	Chelmsford-Vincent	43	38.2	-4.8	32.9	-10.1
Norfolk Street	Chelmsford- Grosvenor	49.9	41.8	-8.1	42.1	-7.8
Norfolk Street	Alma -Raglan	52.6	47	-5.6	49.7	-2.9

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Crash Stats (2017-21)

Intersection	Fatal	Hospital	Medical	Major PDO	Minor PDO	Total
Persimmon Street and Alma Road						0
Grosvenor Road and Ethel Street				1		1
Raglan Road and Hyde Street						0
Vine Street and Alma Road						0
Camelia Street and Alma Road						0
Raglan Road and Norfolk Street						0
Chelmsford Road and Hyde Street						0
Raglan Road and Ethel Street						0
Chelmsford Road and Norfolk Street		1		1	1	3
Leake Street and Grosvenor Road						0
Grosvenor Road and Norfolk Street			2		1	3
Grosvenor Road and Hyde Street						0
Chelmsford Road and Ethel Street				1		1
Leake Street and Chelmsford Road						0
Leake Street and raglan Road						0
Claverton Street and Camelia Street						0
Claverton Street and Alfonso Street						0
Total	0	1	2	3	2	**8**

North Perth

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Assessment of Low-Cost Treatments in Joondanna

Joondanna

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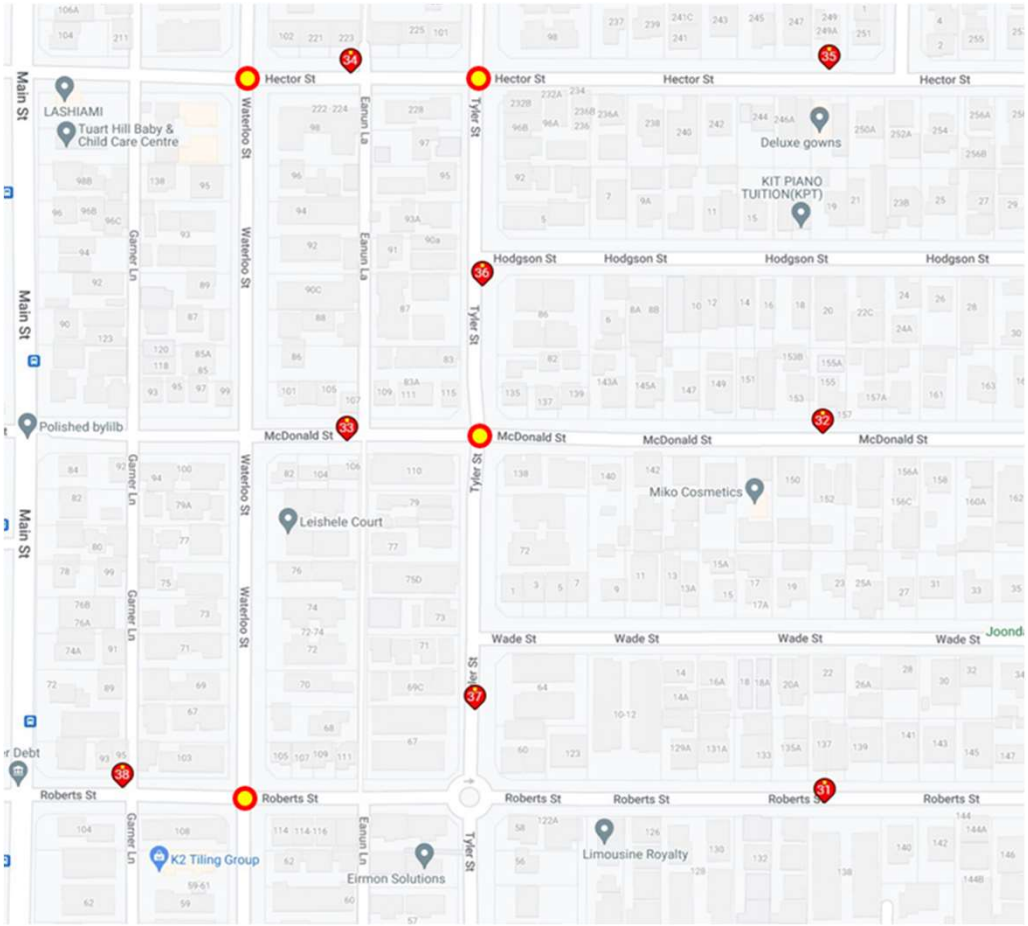

Traffic Survey Results

Survey ID	Average Weekday Traffic	Average Weekend Traffic	85th Percentile Speed (Full week)
31	1,735	1,429	53.3 km/h
32	457	408	49.0 km/h
33	284	223	39.1 km/h
34	1,137	574	44.3 km/h
35	513	348	50.0 km/h
36	1,072	797	52.4 km/h
37	1,230	1,031	43.0 km/h
38	2,621	2,276	46.8 km/h

2017-21 Crash Data

Intersection	Fatal	Hospital	Medical	Major PDO	Minor PDO	Total
Roberts Street and Waterloo Street			1			1
Baden Street and Tyler Street						0
Tyler Street and Hector Street			2			2
Waterloo Street and Hector Street				3		3
Baden Street and Waterloo Street						0
Tyler Street and Mcdonald Street				1		1
Total	0	0	3	4	0	7

Joondanna

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Assessment of Low-Cost Treatments in Osborne Park

Osborne Park

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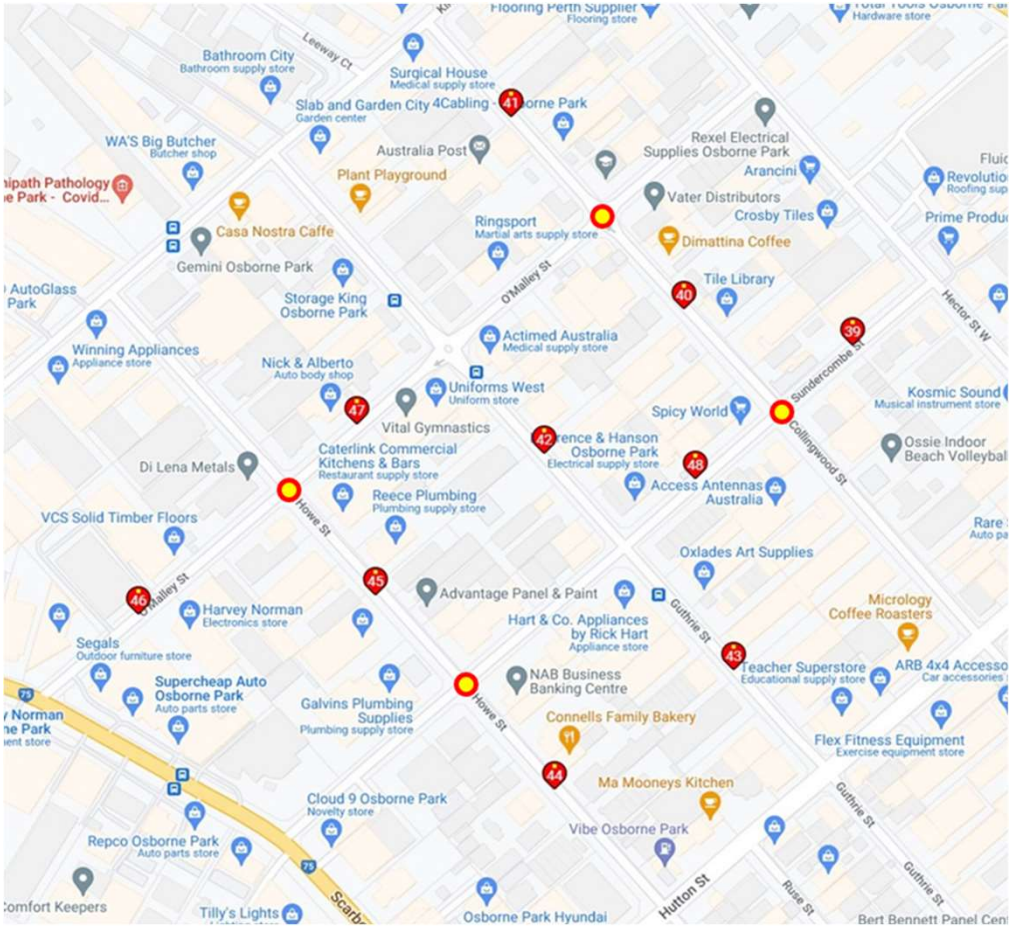

Traffic Survey Results

Survey ID	Average Weekday Traffic	Average Weekend Traffic	85th Percentile Speed (Full week)
39	1,302	344	51.3 km/h
40	2,968	752	53.1 km/h
41	1,975	492	56.2 km/h
42	3,409	841	54.9 km/h
43	4,229	1,031	54.4 km/h
44	4,013	751	53.6 km/h
45	3,215	655	53.1 km/h
46	1,639	636	55.3 km/h
47	1,743	539	51.3 km/h
48	1,725	376	44.1 km/h

2017-21 Crash Data

Intersection	Fatal	Hospital	Medical	Major PDO	Minor PDO	Total
Howe Street and Sundercombe Street		1		3		4
Howe Street and O'Malley Street		1	4	5		10
Collingwood Street and Sundercombe Street				1		1
O'Malley Street and Collingwood Street		1		4	1	6
Total	0	3	4	13	1	21

Osborne Park

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Findings & Recommendations

Uniform Treatments

Raised Plateau Features	City of Rockingham	City of Vincent	City of Stirling	Comments
Asphalt construction	✓	✓	✓	Different colour asphalt
Raised profile marking	✓		✓	On all sides of the raised plateaus
Give Way marking			✓	Only on minor approaches
Stop line marking		✓		Stop line markings were installed at the treatment and not on the approaches to the intersection
Give Way signs			✓	Only on minor approaches
Raised Intersection warning signs	✓			On all approaches
Advisory speed	✓			On all approaches

Consideration of Vulnerable Road Users

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While lower-speed environments are safer for pedestrians and other vulnerable road users, the implementation of the treatments showed no overt consideration for how vulnerable road users will have a safer road environment

Finding

It is suggested that site-specific and area-wide vulnerable road user demands and needs are considered in the planning phase.

The selection of treatment(s) should include elements that support the safer movement of vulnerable road users.

Recommendation

Awareness of URSP

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The council officers interviewed for this report lack awareness regarding the overall process of the Low-Cost URSP and how LGAs can play a role in implementing effective treatments

Finding

It is suggested that MRWA hold sessions for council officers to increase awareness of the program, its process and the role of local governments and make these sessions widely known amongst councils.

This will allow council officers to interact with the MRWA program manager and better understand the program's benefits and objectives.

Recommendation

Planning and Delivery Timeline

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The council officers highlighted that the project timeline was tight and did not allow consideration of alternate or additional treatments

They suggested to adopt staged approach for the Low-Cost URSP, i.e. planning and design in the first year and delivery in the second year

Finding

As suggested previously, MRWA sessions with LGAs provide an interactive discussion regarding the program timeline and expectations and would assist both stakeholders in discussing the challenges and constraints of LGAs and the expectations of Low-Cost URSP.

Recommendation

Pre and Post Treatment Analysis

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None of the LGAs has carried out their own thorough assessment to evaluate the effectiveness of the implemented low-cost treatments in their jurisdictions. This is likely due to the recent construction of treatment and LGAs' perception that there may be no significant changes in the area-wide trends

Finding

MRWA specify the evaluation process for every local neighbourhood area in the initial phases of the project. This will allow LGAs to record data required to be captured before the construction of treatments and provide more rigorous evaluation afterwards.

Recommendation

Combination of Treatment

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Standalone treatments may be effective at some intersections, however, to achieve maximum road safety benefits combination of treatments should be considered

Finding

It is suggested that MRWA consider the following additional low-cost treatments that are expected to enhance safety benefits for all road users:

- Speed cushions
- Kerb outstands
- Lane narrowing
- Sharrows marking
- Pram ramp upgrades
- Non-mountable median islands
- Other low-cost treatments

Recommendation

Safe System Assessment – Treatment Options

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Available data and site assessment indicate that treatment designs at some locations may not significantly impact the speed, and at this time, the post-treatment crash data is not available to analyse the effect on crashes.

The council officers interviewed for this review also expressed ambiguity if the implemented treatments have enhanced the safety of vulnerable road users.

Finding

it is recommended that MRWA require a Safe System assessment for all project sites/treatments on a neighbourhood area basis.

This will assist in ensuring that the proposed treatments are aligned with the Safe System principles (or as close as reasonably possible given the low-cost nature of the program treatments targeted) and, importantly, consider the need of all road users and identify site-specific issues that need to be addressed.

Recommendation

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Thank you

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