iRAP Assessment Projects Performed in Tanzania

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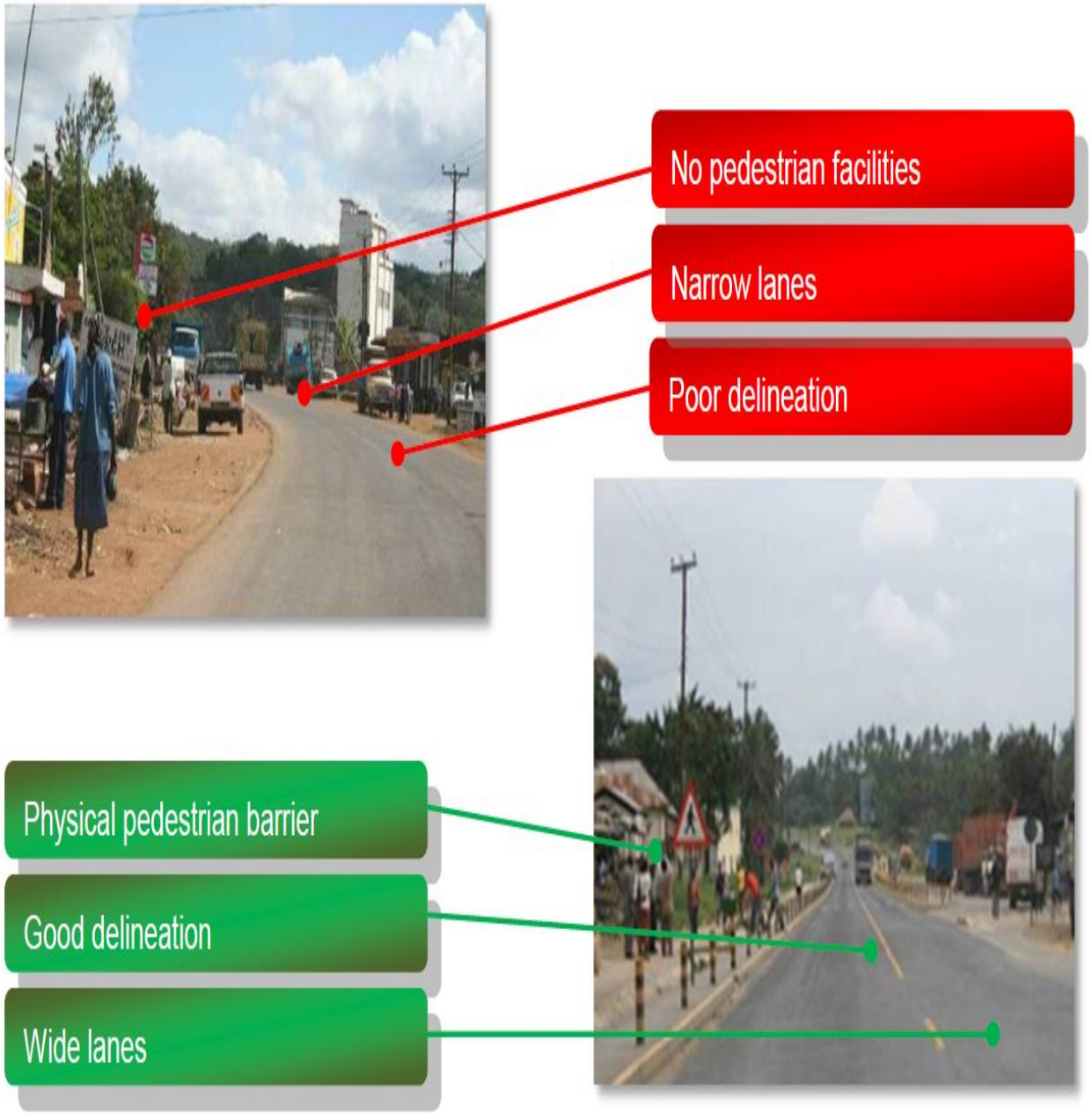
TANZANIA TEN STEP PLAN
SAFER ROAD INFRASTRUCTURE

iRAP Assessment Project Performed in Tanzania

- **2010 Baseline:** 3,124km of the existing national road network
- **2018 Baseline & Design BRT:** 152km of BRT Phase 2, 3, 4 and 5 routes
- **2018 Baseline:** 3,652km of the existing national road network
- **2018 Design:** 2,456km of detailed designs were provided by TANROADS and assessed.
- **2019 Post Construction:** 141km assessments of the Mafinga – Igawa Corridor
- **2018 and 2019 Speed analysis:** Assessments and consideration for safety calculated on various scenarios for optimum speeds.

Assessment of the existing National Road Network

- Assessment was carried out along the Tanzanian National Roads Network
- Determine the built in safety along the existing network and
- Provide insight into the high risk areas



BRT Network assessment (152km) – Baseline and Design

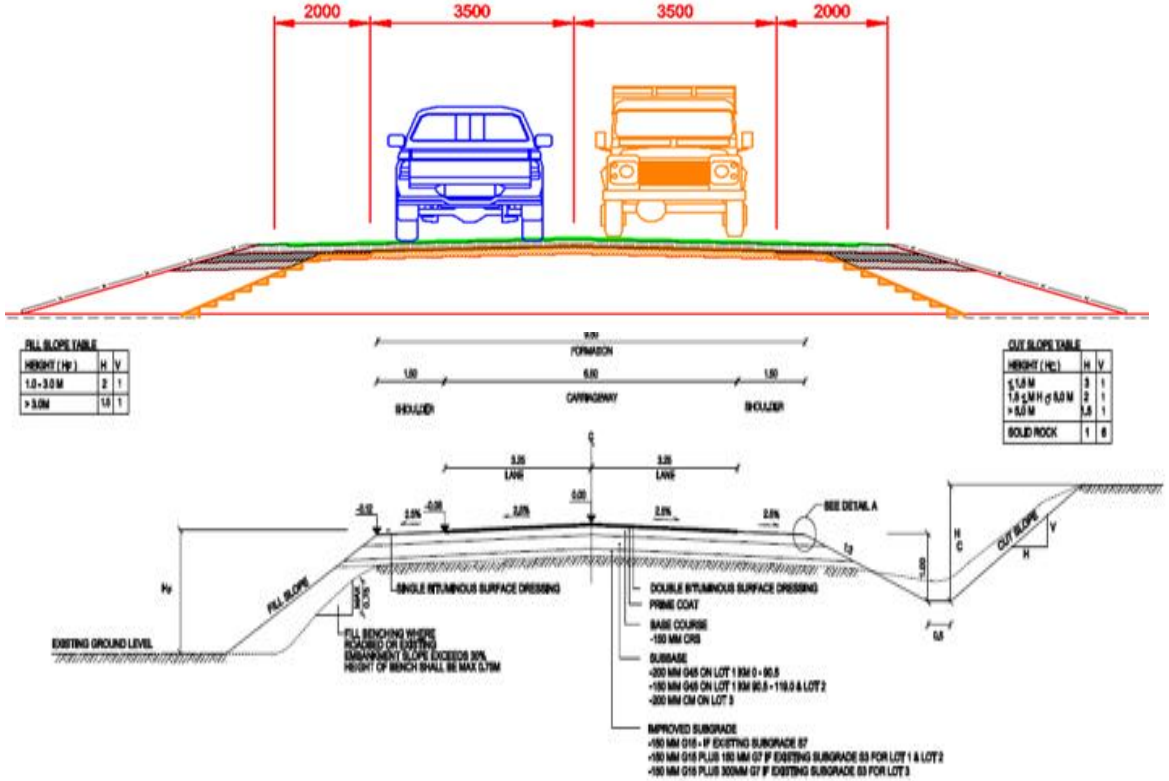
- Assessments was carried out on the proposed BRT network routes.
- Determine impact of the BRT design whether the design for the BRT would enhance safety or cause additional safety challenges.
- The assessment was carried out on Phases 2, 3, 4 and 5 for length of 152km.

BRT Network assessment – Baseline and Design Cont'd

- Recommendations for Improvement of the BRT design were proposed to be incorporated in the design to optimise safety

Design assessment of the National road network

Assessment was carried out to determine the road safety impact of the proposed designs and proposed interventions that are to be incorporated into the design to enhance safety.

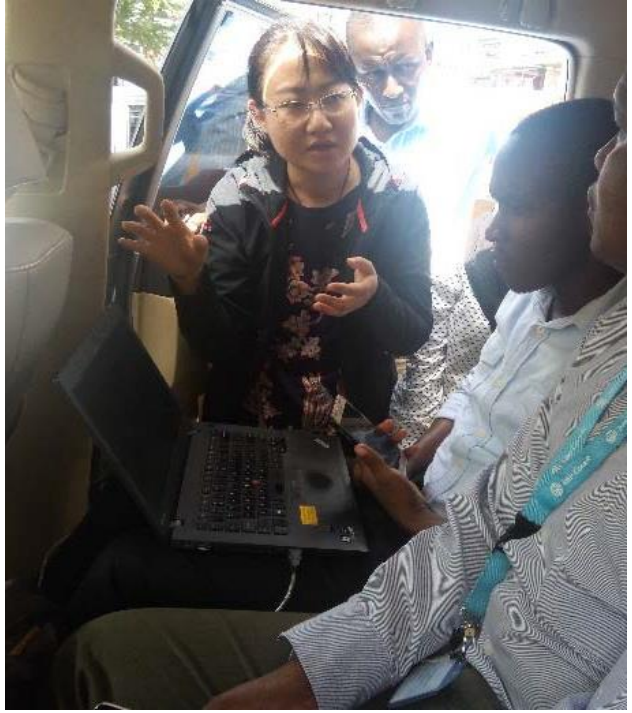


Assessment of the Mafinga – Igawa corridor (141km)

- The corridor had recently been upgraded from Mafinga to Igawa.

- The assessment of the route was implemented to identify the possible cause of the crashes

- Infrastructure improvement was Proposed to minimise the occurrence, and severity of the crashes



Teams were trained in the Survey protocol and took part in the physical surveys of the network. Teams were also involved in collecting available supporting data.

Some trainees pursued and succeeded to achieve their accreditation to the iRAP methodology.

Training and Capacity Building

- Planning meetings and presentation of results to high level stakeholders
- Various training activities on the iRAP protocols of Survey, Coding, Analysis and reporting in Tanzania with stakeholders from Government agencies; Private sector consultants and contractors; as well as academia – Local and international trainers.
- Training and capacity building was undertaken

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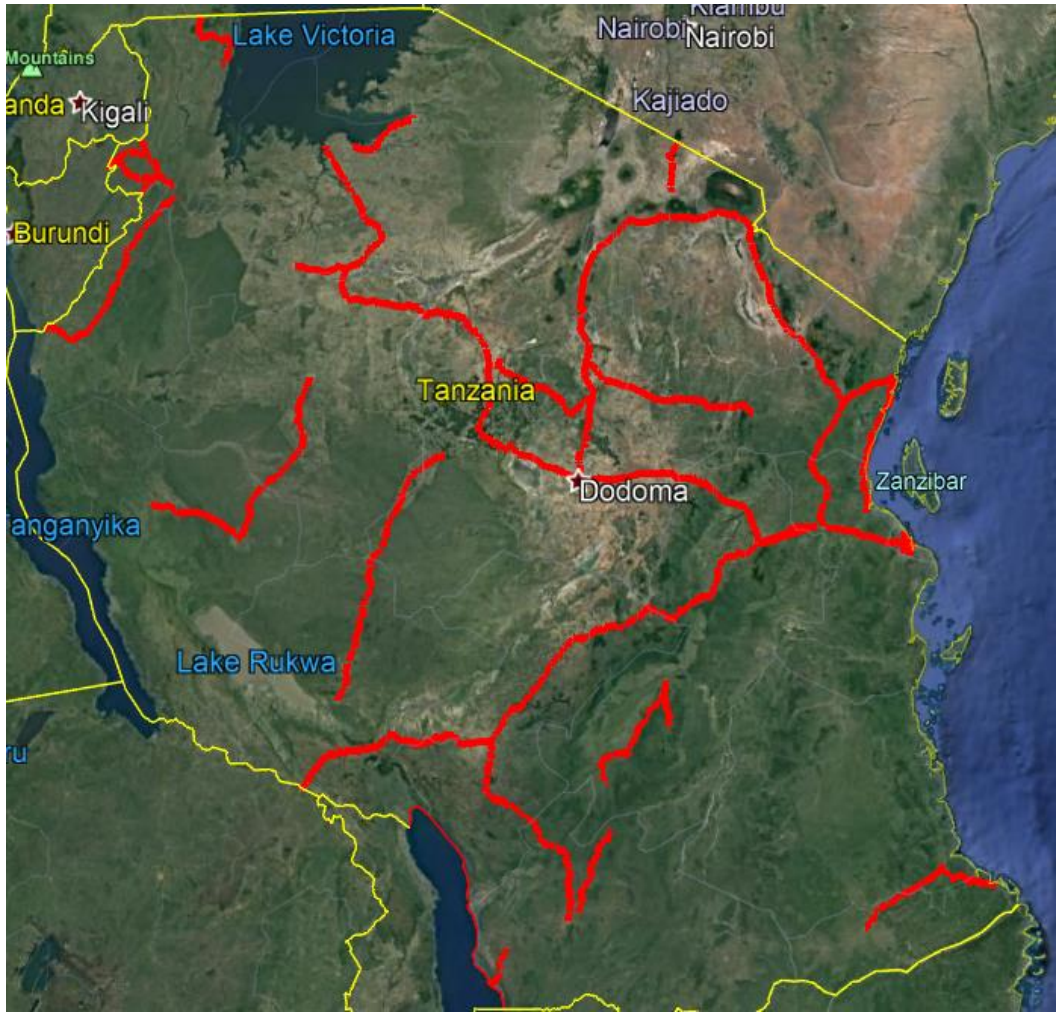
The Assessed Network



Assessed Road Link	Year Assessed	KM Length
Dar es Salaam – Chanlinze	2010	98.4
Chanlinze – Morogoro	2010	74.2
Morogoro - Mikumi	2010	117.8
Mikumi – Iringa	2010	183.3
Iringa – Makambako	2010	164.7
Mbeya – Makambako	2010	172.6
Mbeya – Tuduma	2010	100.9
Chalinze – Segera	2010	172.8
Segera – Himo	2010	244.9
Himo – Moshi	2010	39.3
Moshi – Arusha	2010	79.3
Arusha – Namanga	2010	67.8
Dodoma – Manyoni	2010	125
Morogoro – Dodoma	2010	261.9
Manyoni – Singida	2010	118
Singida – Nzega	2010	217
Nzega – Sangilwa	2010	39.2
Tinde – Kahama	2010	70.9
Kondoa – Dodoma	2010	154.3
Babati - Kondoa	2010	102.6
Arusha – Makuyuni	2010	164
Nzega – Mwanza	2010	164.8
Nzega – Sangilwa	2010	36.3
Segra – Tanga	2010	73.4
Dar es Salaam arterial roads	2010	80.5
BRT Phase 2: Kilwa – Kawawa South	2018	36
TOTAL (km)		7,097

Assessed Road Link	Year Assessed	KM Length
BRT Phase 3: Uhuru Street, Nyerere, Bibi Titi, Azikiwe Street	2018	38
BRT Phase 4: Bagamoyo, Sam Nujoma	2018	49
BRT Phase 5: Mandela Road	2018	29
Singida - Shelui	2018	111.1
Nyakahura-Kumumbuga-Murusagamba-Gahumo	2018	33.4
Kumumbuga-Rulenge-Murugarama	2018	74.5
Morogoro-Dodoma	2018	256.8
Manyovu-Kasulu-Nyakanazi	2018	287.5
Shelui-Nzega	2018	102.5
Muhutwe-Mtukula	2018	113.4
Lusahunga-Rusumo Road Project	2018	92.1
Kobero-Nyakasanza Road	2018	59.2
Makurunge-Saadani-Pangani-Tanga	2018	180.6
Tabora-Koga-Mpanda	2018	351.4
Mbinga-Mbamba Bay	2018	66.2
Mtwara-Mingoyo-Masasi	2018	196.7
Makambako-Songea Road Project	2018	295.2
Nyangunge-Magu-Musoma (Simiyu/Mara border)	2018	99.2
TANZAM Highway (Igawa – Songwe)	2018	217.5
Handeni-Kiberashi-Singida	2018	431.2
Ifakara-Mahenge-Malinyi	2018	177.6
Njuga-Mtulanjiwa-Morogoro border	2018	122.7
Lupiro-Mahenge	2018	40
Makongolosi-Rungwa-Noranga	2018	343.6
Mswaki-Kwediboma-Mgera	2018	27.7
Mafinga Igawa - Post Construction	2019	141

Attributes that significantly influence Star Ratings

99% of roads where pedestrians are present and traffic flows at 40km/h or more have no footpath

100% of roads where bicyclists are present and traffic flows at 40km/h or more have no bicycle facilities

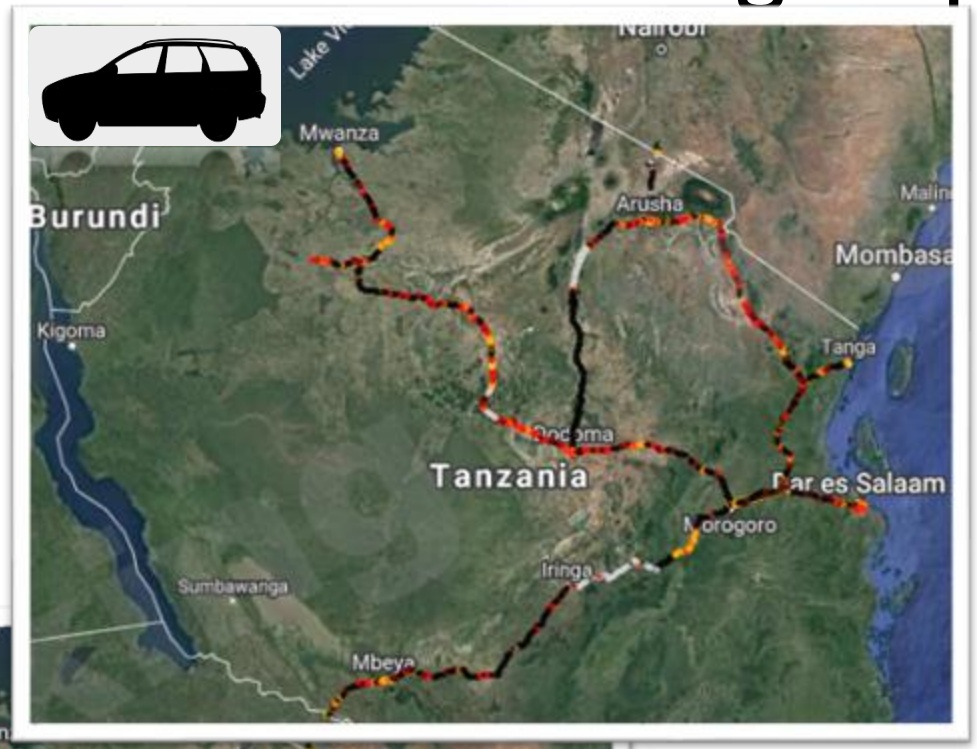
100% of roads with high motorcycle flows (>=20% of total) and traffic flows at 60km/h or more have no motorcycle facilities

100% of roads carrying traffic at 80km/h or more are undivided single carriageways

100% of curves where traffic flows at 80km/h or more have hazardous roadsides

99% of intersections where traffic flows at 60km/h or more have no roundabout, protected turn lane or interchange

2010 Baseline Star Rating Maps



5 Stars
4 Stars
3 Stars
2 Stars
1 Star
N/A

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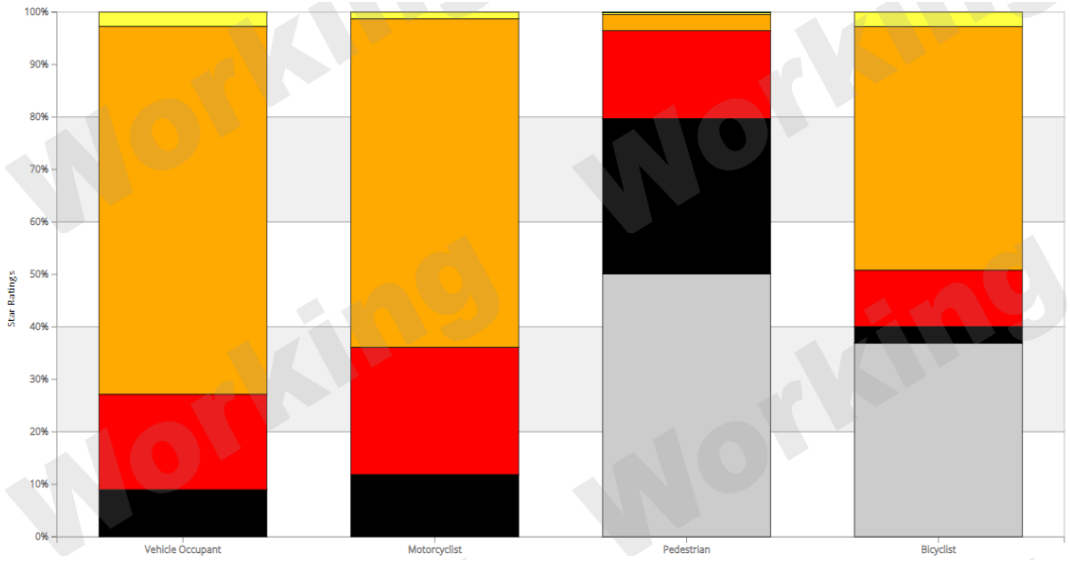
2018 Assessment

Design Star Rating Results



2018 Baseline Star Ratings	Vehicle Occupant		Motorcyclist		Pedestrian		Bicyclist	
	Length (km)	Percent	Length (km)	Percent	Length (km)	Percent	Length (km)	Percent
5 Stars	0	0%	0	0%	3	0%	0	0%
4 Stars	67	3%	31	1%	9	0%	68	3%
3 Stars	1722	70%	1537	63%	75	3%	1140	46%
2 Stars	446	18%	595	24%	412	17%	264	11%
1 Star	221	9%	292	12%	727	30%	77	3%
N/A	0	0%	0	0%	1230	50%	906	37%
Totals	**2,456**	**100.00%**	**2,456**	**100.00%**	**2,456**	**100.00%**	**2,456**	**100.00%**

- 73% of the network rates 3-Stars or better for vehicle occupants (+66%);
- 64% of the network rates 3-Stars or better for motorcyclists (+58%);
- 3% of the network rates 3-Stars or better for pedestrians (+2%); and
- 49% of the network rates 3-Stars or better for bicyclists (+42%).

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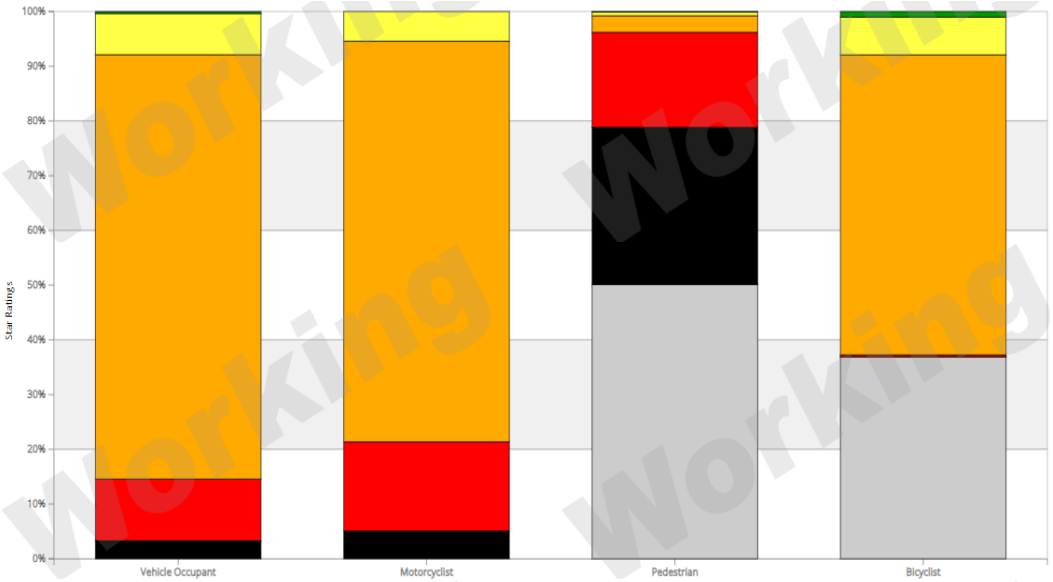
2018 Assessment

Design Star Rating Results **with recommendations** incorporated



2018 Baseline Star Ratings	Vehicle Occupant		Motorcyclist		Pedestrian		Bicyclist	
	Length (km)	Percent	Length (km)	Percent	Length (km)	Percent	Length (km)	Percent
5 Stars	9	0%	0	0%	3	0%	25	1%
4 Stars	185	8%	133	5%	16	1%	170	7%
3 Stars	1904	78%	1798	73%	75	3%	1346	55%
2 Stars	276	11%	400	16%	426	17%	8	0%
1 Star	81	3%	125	5%	706	29%	0	0%
N/A	0	0%	0	0%	1230	50%	906	37%
Totals	**2,456**	**100.00%**	**2,456**	**100.00%**	**2,456**	**100.00%**	**2,456**	**100.00%**

- 86% of the network rates 3-Stars or better for vehicle occupants (79%);
- 78% of the network rates 3-Stars or better for motorcyclists (72%);
- 4% of the network rates 3-Stars or better for pedestrians (+3%); and
- 63% of the network rates 3-Stars or better for bicyclists (+56%).

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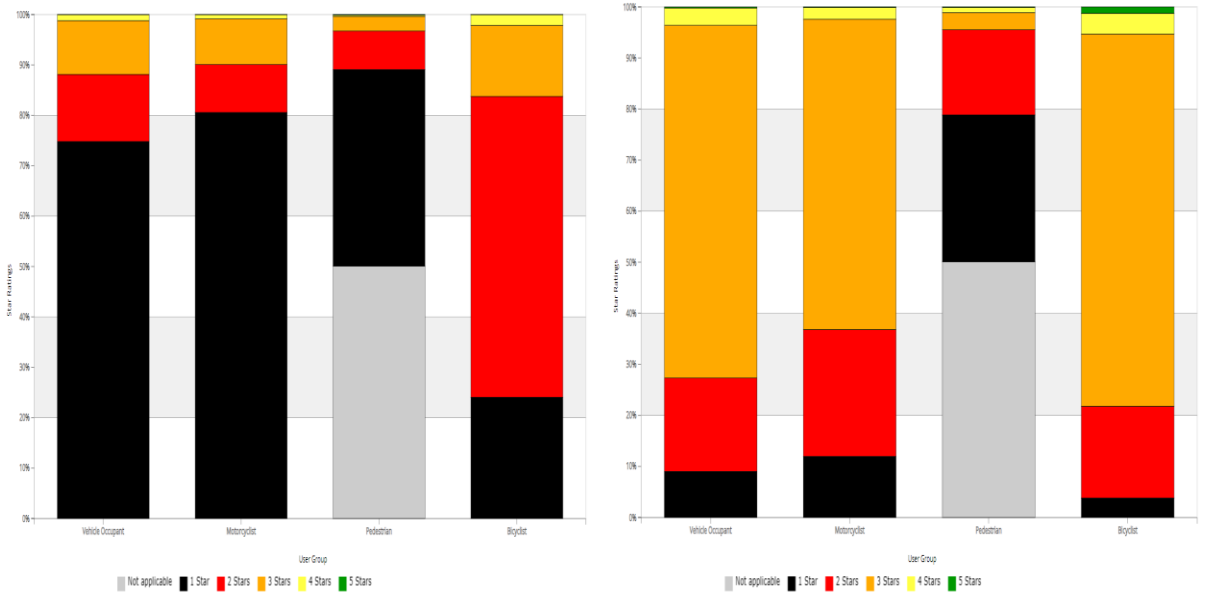
A case for Speed reduction – Impact on Risk

- The speed at which vehicles travel has a significant impact on road risk and the Star Ratings.
- The operating speed is unsuitable on an undivided highway with mixed traffic, hazardous roadside objects and at-grade junctions.

2018 DESIGN NETWORK

Before (As Designed)

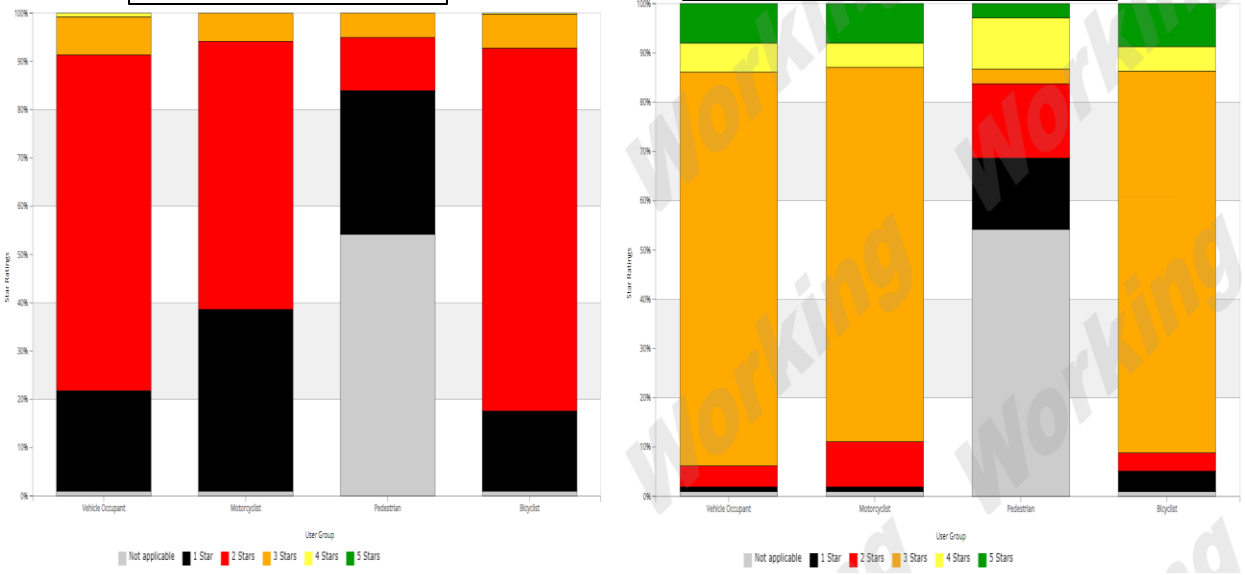
With Speed reduction



2019 MAFINGA – IGAWA CORRIDOR

Before (As Built)

With Speed reduction



Graphs illustrate the **significant improvement** in Star Rating resulting from Speed reduction measures.

The risk of fatal and serious injuries for all road users remains relatively high 'Before' Star Ratings.

Key Recommendations

Intervention	Example Image	Benefits	Intervention	Example Image	Benefits
Pedestrian Walkway		Reduced severity of run-off-road crashes. Reduced road furniture repair costs associated with crash damage. Can improve sight distance	Delineation		Indicating the alignment of the road ahead, especially at curves Helps drivers to maintain a safe and consistent lateral vehicle position Reduction in nighttime and low-visibility crashes Advance information for driver helping in timely decision making.
Street Lighting (Junctions & Crossings)		Helps in improving visibility. Can reduce pedestrian crashes by approximately 50%. Help to aid navigation. People to feel safe and can help to reduce crime. Route lighting can help reduce glare from vehicle headlights.	Channelization and turn lanes		Reduced rear-end and sideswipe crashes. Reduced loss of control while turning crashes. Improved traffic flow. Increased intersection capacity
Traffic Calming		Reduced speeds and reduced crash severity. Reduced traffic volumes on local roads. An improved environment for pedestrians and cyclists	Clear roadside hazards		Reduced severity of run-off-road crashes. Reduced road furniture repair costs associated with crash damage. Can improve sight distance

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