STAR RATINGS FOR ROAD SAFETY AUDITS

SR4RSA

DAY 2

DECADE OF ACTION FOR ROAD SAFETY 2021 - 2030

SUSTAINABLE DEVELOPMENT GOALS

CAREC

ASIA-PACIFIC ROAD SAFETY OBSERVATORY

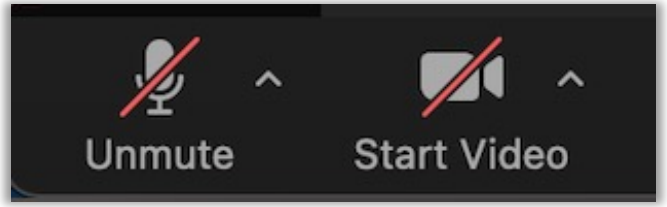
iRAP

SAFE SYSTEM SOLUTIONS

HOUSEKEEPING

Webinar 90 mins

Questions 15 mins



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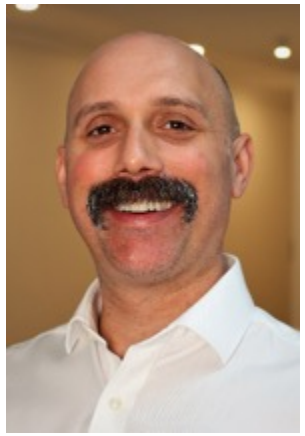
WORKSHOP PRESENTERS



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TODAY'S AGENDA

- Brief recap on Day 1
- Review of Assignment 1
- Focus on the Level 2 approach
- Focus on the Level 3 approach
- Questions
- Situational scrutiny
- Capacity requirements
- Standard terms of reference
- Questions
- Introduction to Exercise 2

REVIEW OF ASSIGNMENT 1

Image 2: Road design

During the Road Safety Audit, the audit team identified a safety concern relating to pedestrians. As part of the SR4RSA Level 1 assessment, you are required to:

i. Produce Star Ratings for each road user for the design.

ii. Generate a recommendation to address the safety concern identified by the audit team.

iii. Produce Star Ratings for each road user for the design including your recommendation.

Detailed Instructions

1. Go to ViDA (http://vida.irap.org) and access the Star Rating Demonstrator (Demonstrator). If you haven't already, you will need to register to use ViDA.
2. Use the Demonstrator to record the road attributes for the road image including the proposed design in the Results Form. You should focus on a 100m segment. You might need to refer to the Coding Manual – it's available by clicking the help ("?") icon in the Demonstrator.
3. For the following attributes, standard categories can be used:
   a) Speed limit and operating speed (85th percentile): 50km/h
   b) Vehicle flow (AADT): 4000
   c) Motorcycle %: 41%-60%
   d) Pedestrian peak hour flow across the road: 51 to 100
   e) Pedestrian peak hour flow along the road driver-side: 51 to 100
   f) Pedestrian peak hour flow along the road passenger-side: 51 to 100
   g) Bicycle peak hour flow: 1 to 5
4. Record the Star Ratings for each road user (for the design provided) in the Results Form (see next page).
5. Generate a recommendation to address the specific safety concern identified by the audit team and record it in the Results Form (see next page).

REVIEW OF ASSIGNMENT 1

Safety concern	Star Ratings for the design	Recommendation	Star Ratings for the design with recommendation
This is a location where pedestrians frequently cross the road. With relatively high flows of mixed motorised traffic, people cannot cross the road safely 			

REVIEW OF ASSIGNMENT 1

https://demonstrator.vida.irap.org

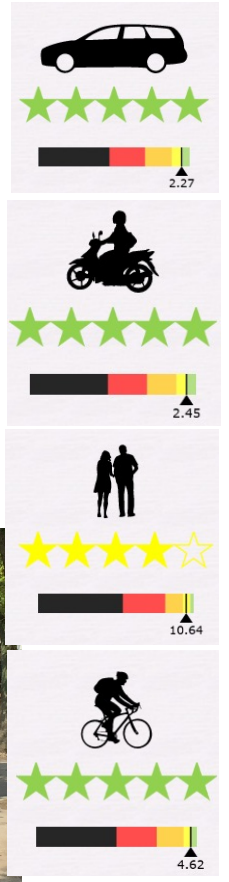
REVIEW OF ASSIGNMENT 1

Safety concern	Star Ratings for the design	Recommendation	Star Ratings for the design with recommendation
This is a location where pedestrians frequently cross the road. With relatively high flows of mixed motorised traffic, people cannot cross the road safely 			

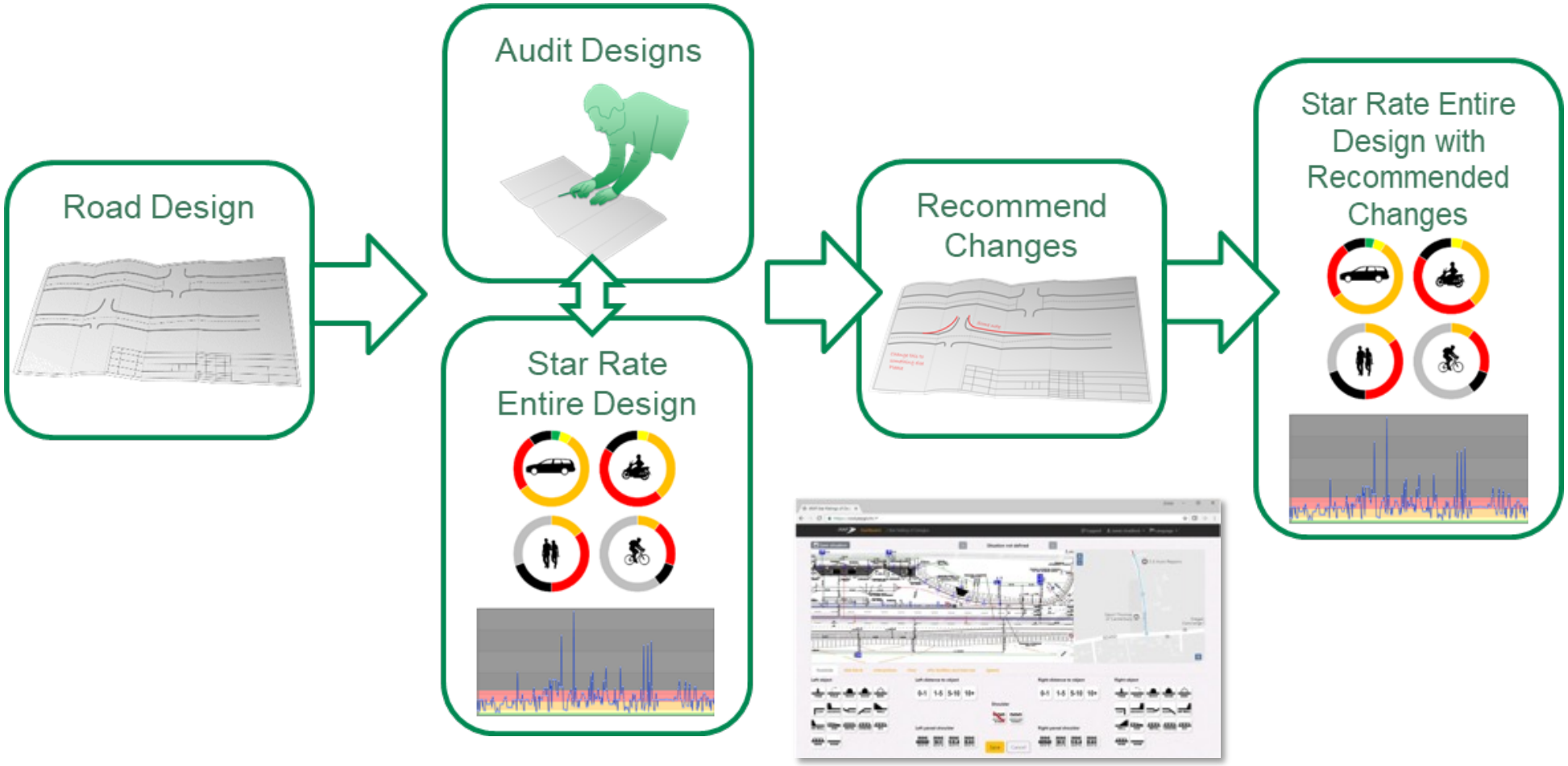
REVIEW OF ASSIGNMENT 1

Safety concern	Star Ratings for the design	Recommendation	Star Ratings for the design with recommendation
This is a location where pedestrians frequently cross the road. With relatively high flows of mixed motorised traffic, people cannot cross the road safely 		Raised pedestrian crossing with refuge island 	

REVIEW OF ASSIGNMENT 1

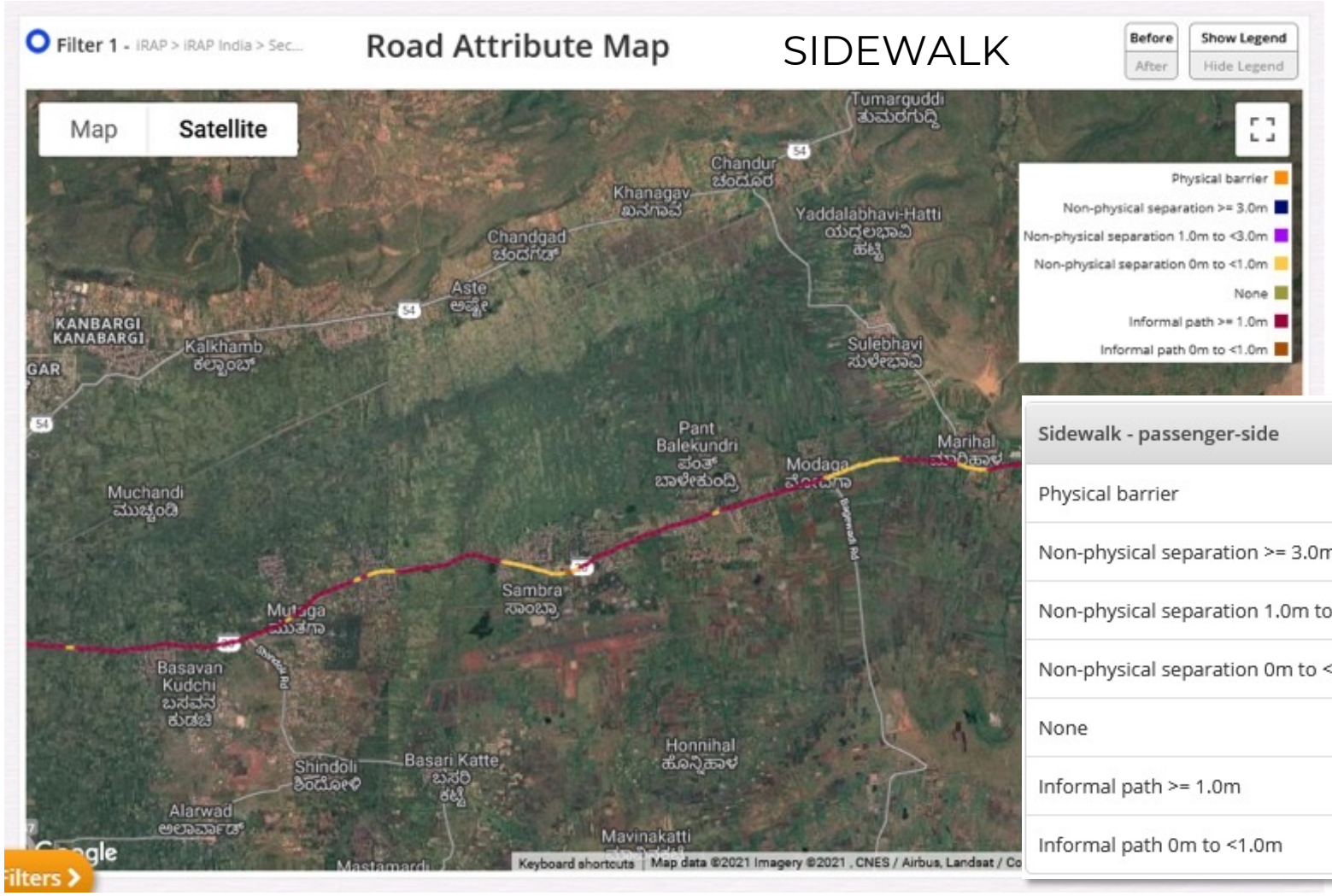
Safety concern	Star Ratings for the design	Recommendation	Star Ratings for the design with recommendation
This is a location where pedestrians frequently cross the road. With relatively high flows of mixed motorised traffic, people cannot cross the road safely 		Raised pedestrian crossing with refuge island 	

HOW? LEVEL 2 APPROACH



HOW? LEVEL 2 APPROACH

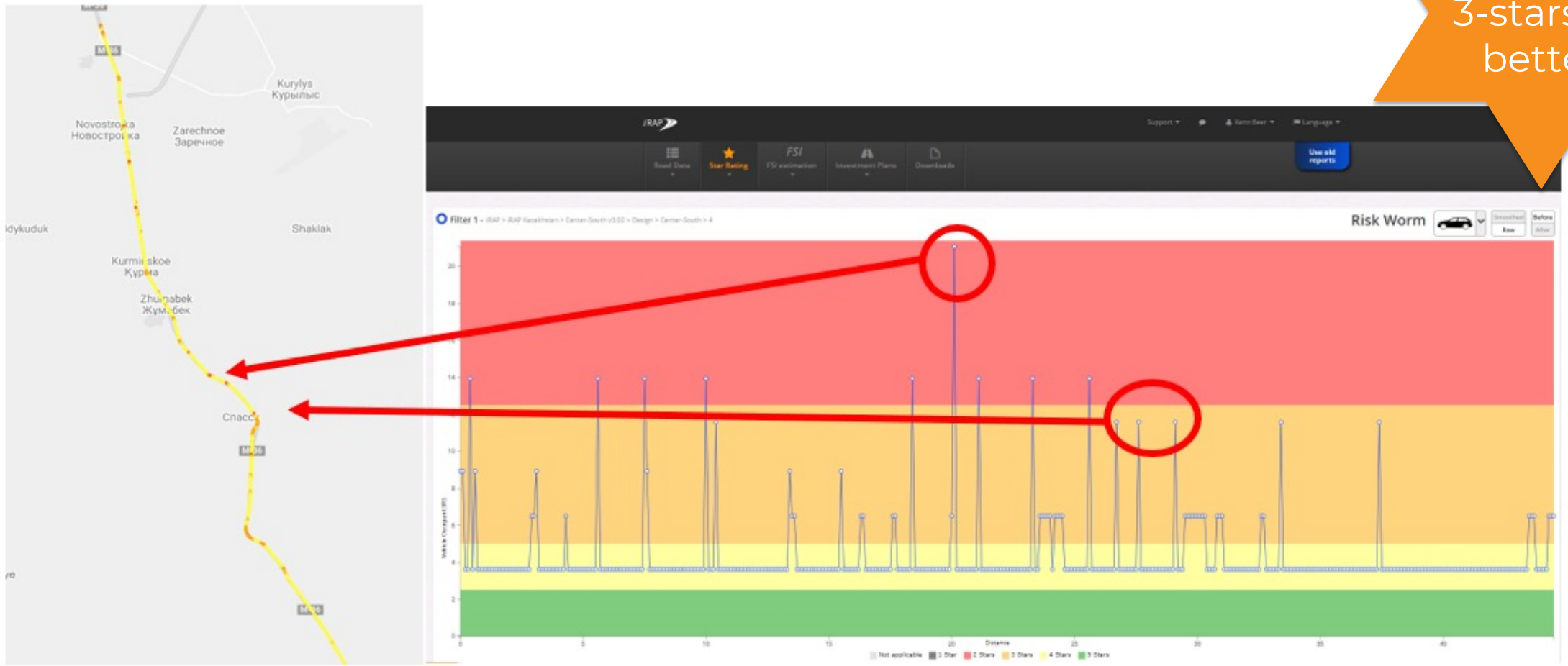
Target: % sidewalk



Sidewalk - passenger-side	km	%
Physical barrier	0.00	0
Non-physical separation >= 3.0m	0.00	0
Non-physical separation 1.0m to <3.0m	0.00	0
Non-physical separation 0m to <1.0m	6.50	12
None	0.00	0
Informal path >= 1.0m	49.70	88
Informal path 0m to <1.0m	0.30	1

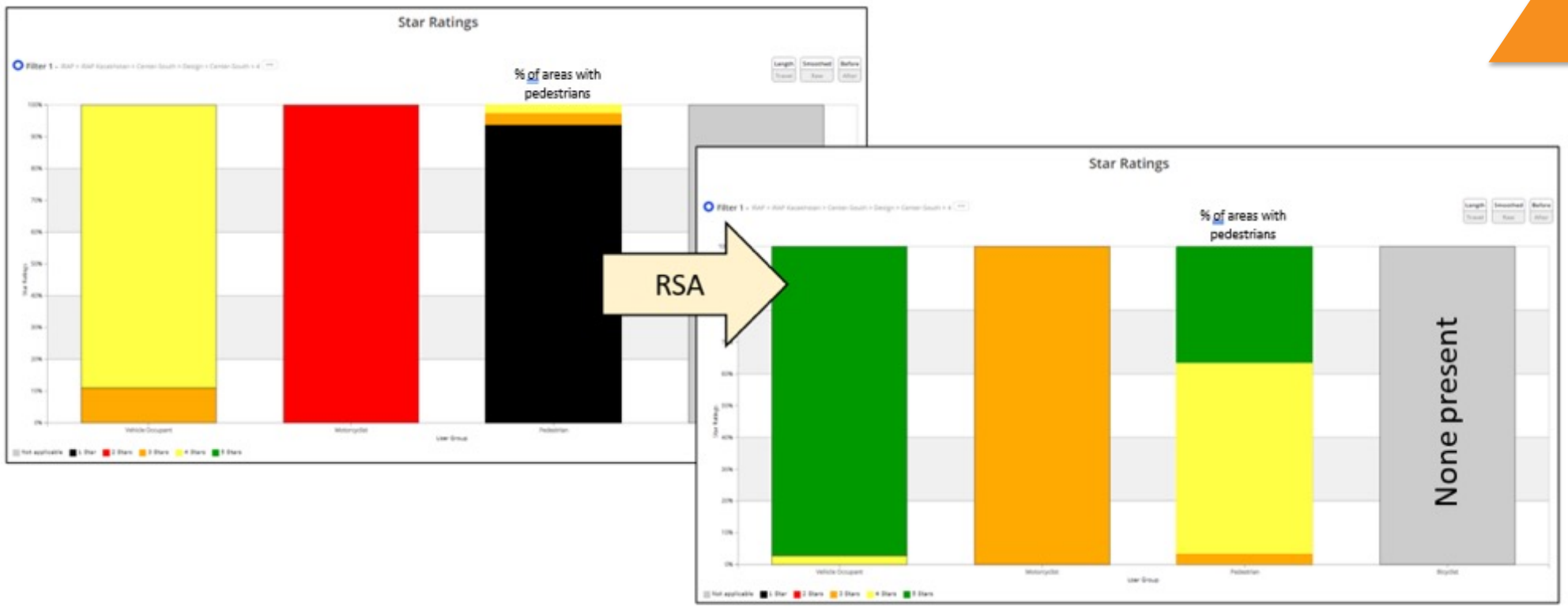
HOW? LEVEL 2 APPROACH

Target: 3-stars or better

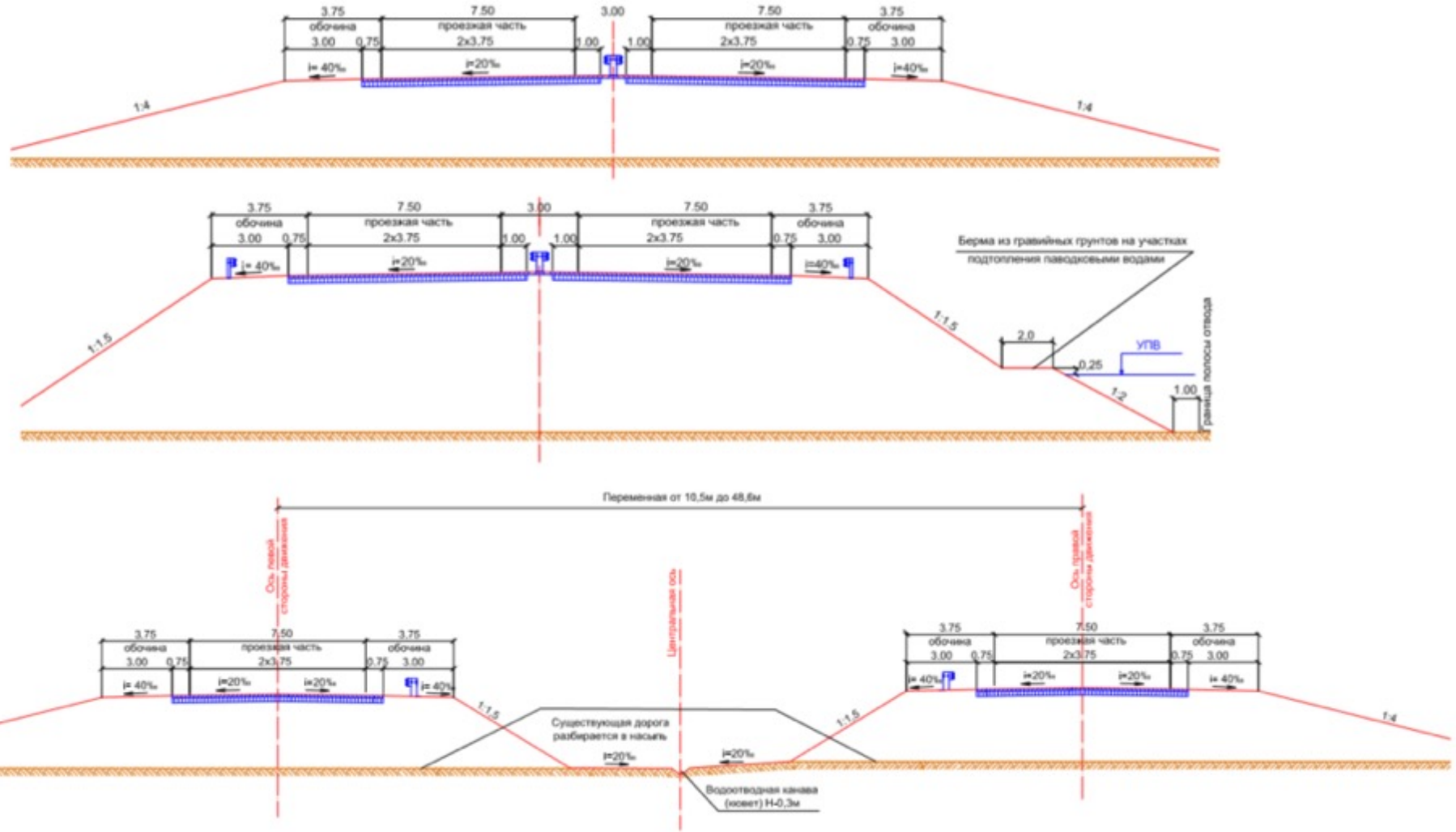


HOW? LEVEL 2 APPROACH

Target: 3-stars or better



Not applicable 1 Star 2 Stars 3 Stars 4 Stars 5 Stars

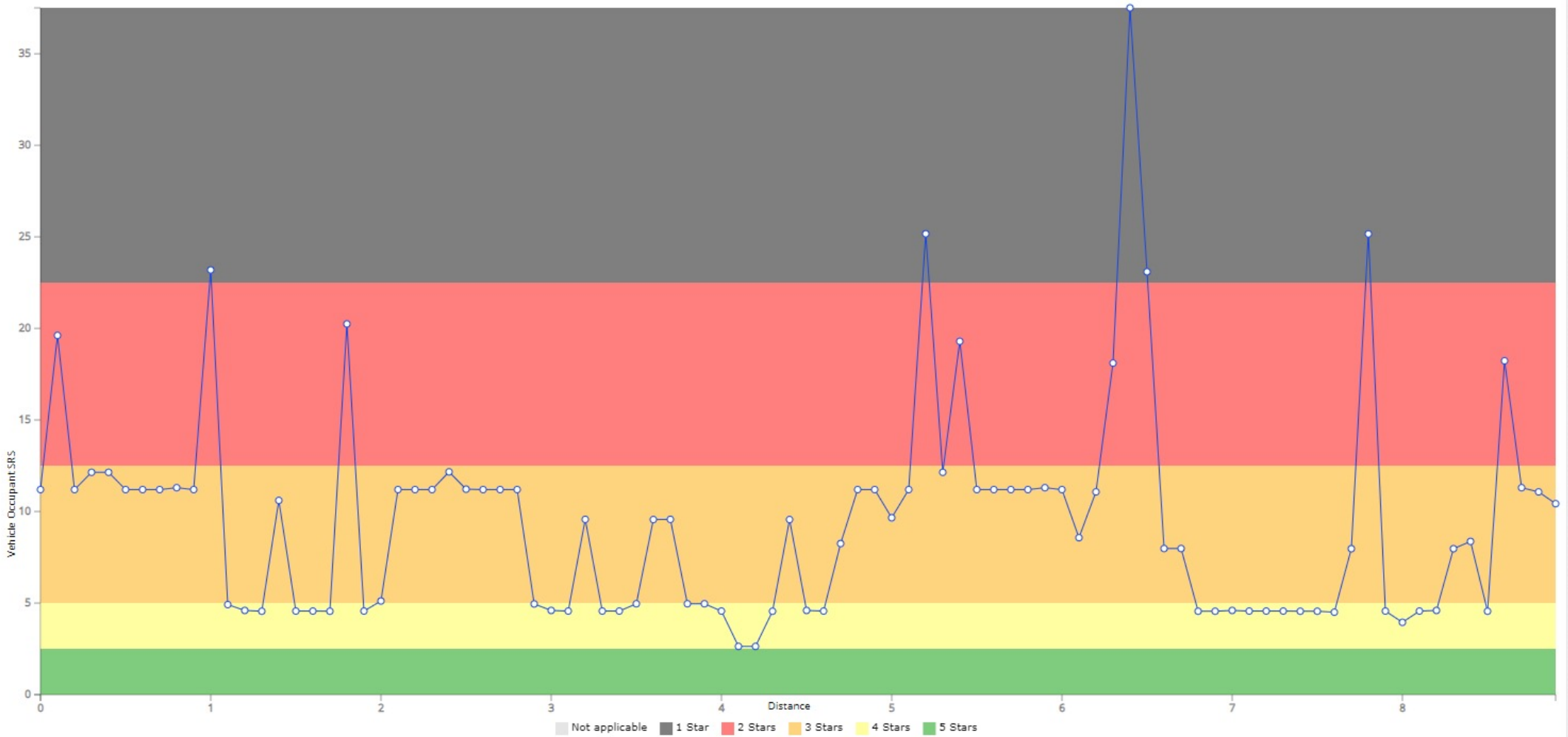

3.75
обочина
3.00
0.75
7.50
проезжая часть
2x3.75
3.00
1.00
i= 40‰
i=20‰
1:4
Берма из гравийных грунтов на участках подтопления паводковыми водами
1:1.5
2.0
0.25
1:2
1.00
УПВ
граница полосы отвода
Переменная от 10,5м до 48,6м
Ось левой стороны движения
Центральная ось
Ось правой стороны движения
Существующая дорога разбирается в насыпь
Водоотводная канава (кювет) H-0,3м

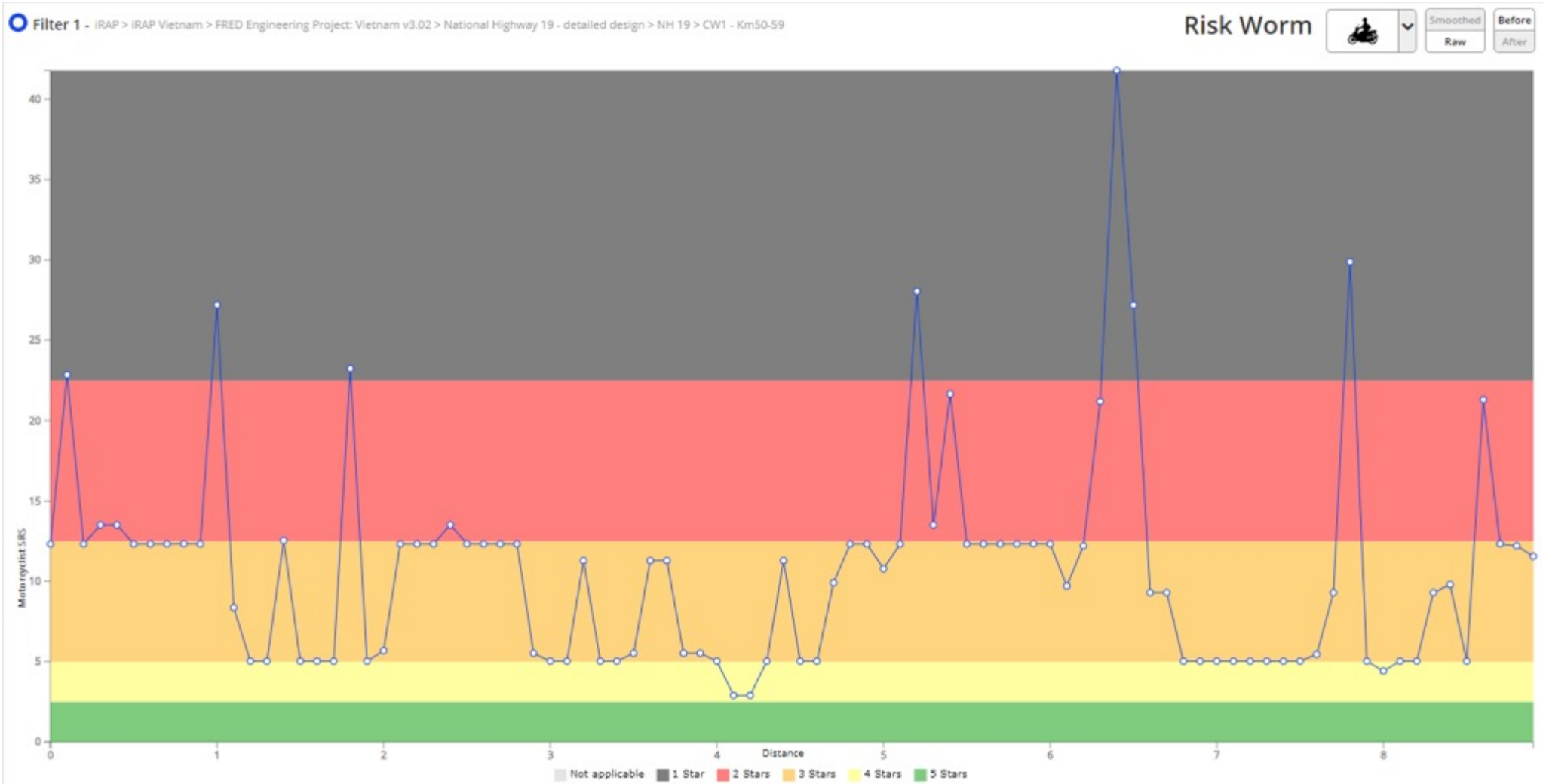
Filter 1 - iRAP > iRAP Vietnam > FRED Engineering Project: Vietnam v3.02 > National Highway 19 - detailed design > NH 19 > CW1 - Km50-59

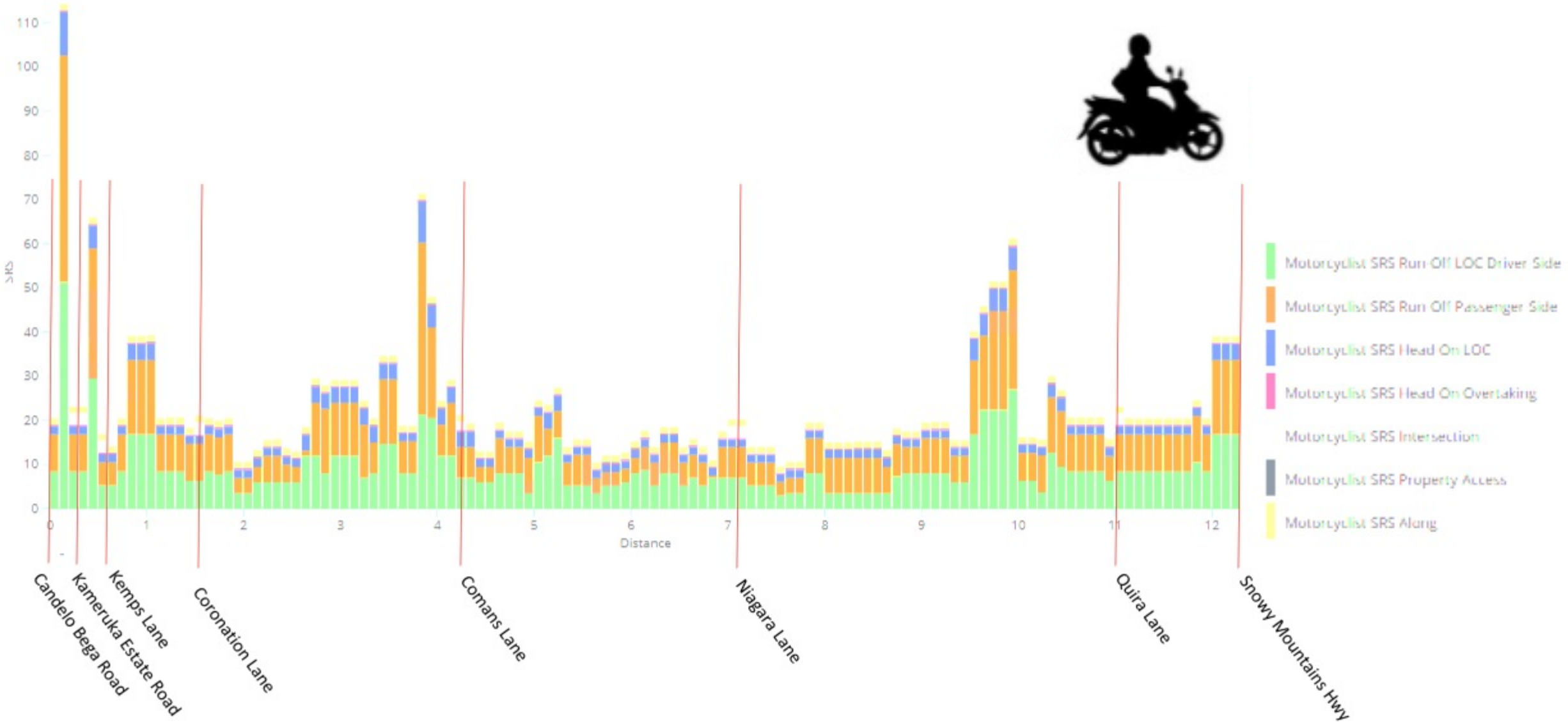
Risk Worm

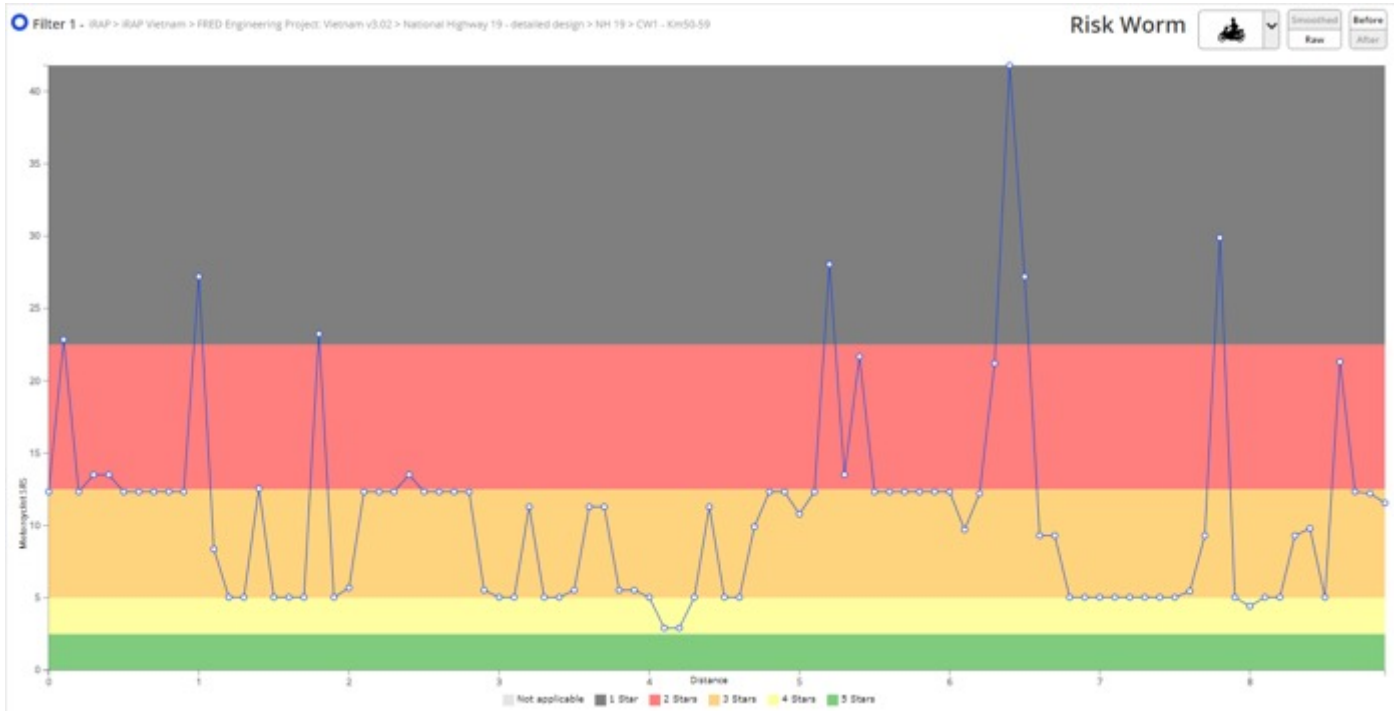
Smoothed | Raw

Before | After



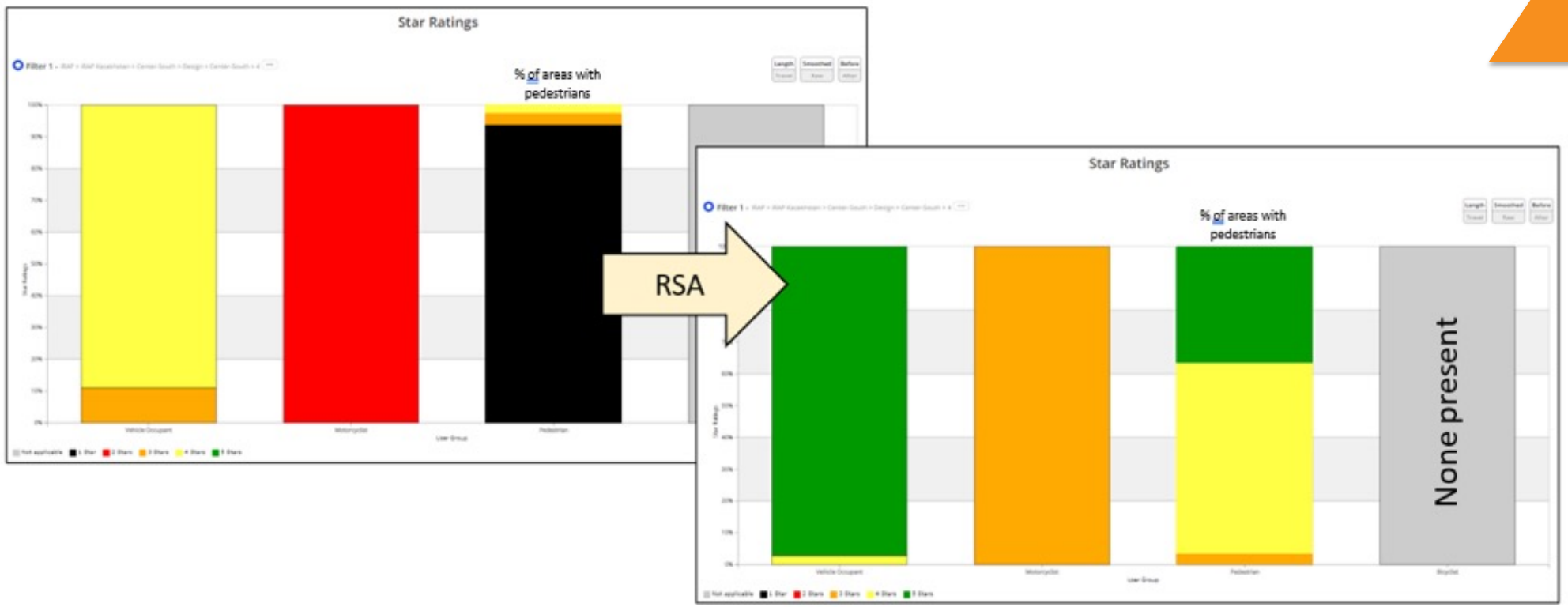

Filter 1 - iRAP > iRAP Vietnam > FRED Engineering Project: Vietnam v3.02 > National Highway 19 - detailed design > NH 19 > CW1 - Km50-59
Risk Worm
Smoothed
Raw
Before
After
Motorcyclist SRS
Distance
Not applicable
1 Star
2 Stars
3 Stars
4 Stars
5 Stars


110
100
90
80
70
60
50
40
30
20
10
0
SRS
0
1
2
3
4
5
6
7
8
9
10
11
12
Distance
Motorcyclist SRS Run Off LOC Driver Side
Motorcyclist SRS Run Off Passenger Side
Motorcyclist SRS Head On LOC
Motorcyclist SRS Head On Overtaking
Motorcyclist SRS Intersection
Motorcyclist SRS Property Access
Motorcyclist SRS Along
Candelo Bega Road
Kameruka Estate Road
Kemps Lane
Coronation Lane
Comans Lane
Niagara Lane
Quira Lane
Snowy Mountains Hwy


Filter 1 - iRAP > iRAP Vietnam > FRED Engineering Project: Vietnam v3.02 > National Highway 19 - detailed design > NH 19 > CW1 - Km50-59
Risk Worm
Smoothed
Raw
Before
After
Motorcyclist SRS
Distance
Not applicable
1 Star
2 Stars
3 Stars
4 Stars
5 Stars

HOW? LEVEL 2 APPROACH

Target: 3-stars or better

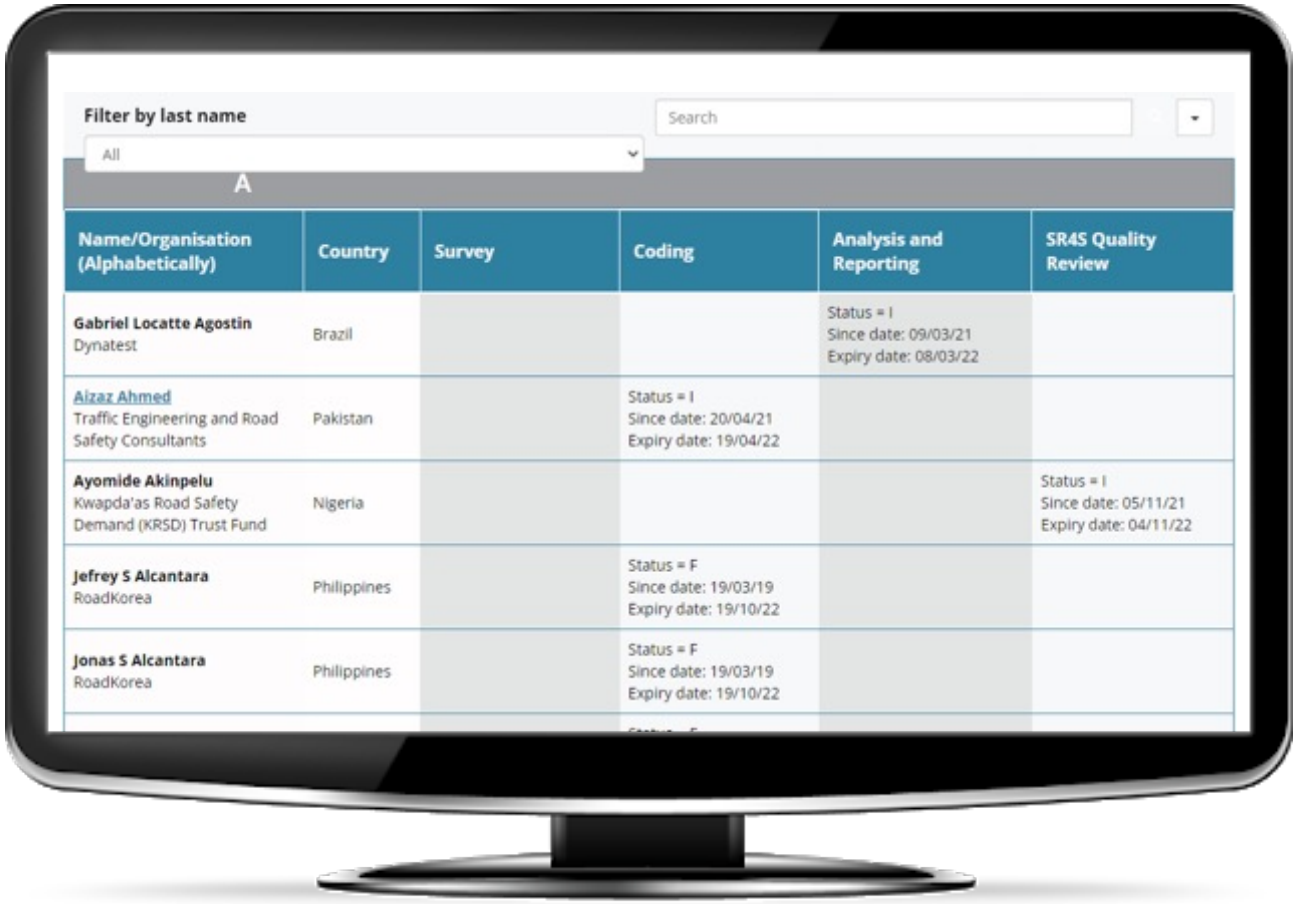


Not applicable 1 Star 2 Stars 3 Stars 4 Stars 5 Stars

WWW.VIDA.IRAP.ORG

WWW.IRAP.ORG

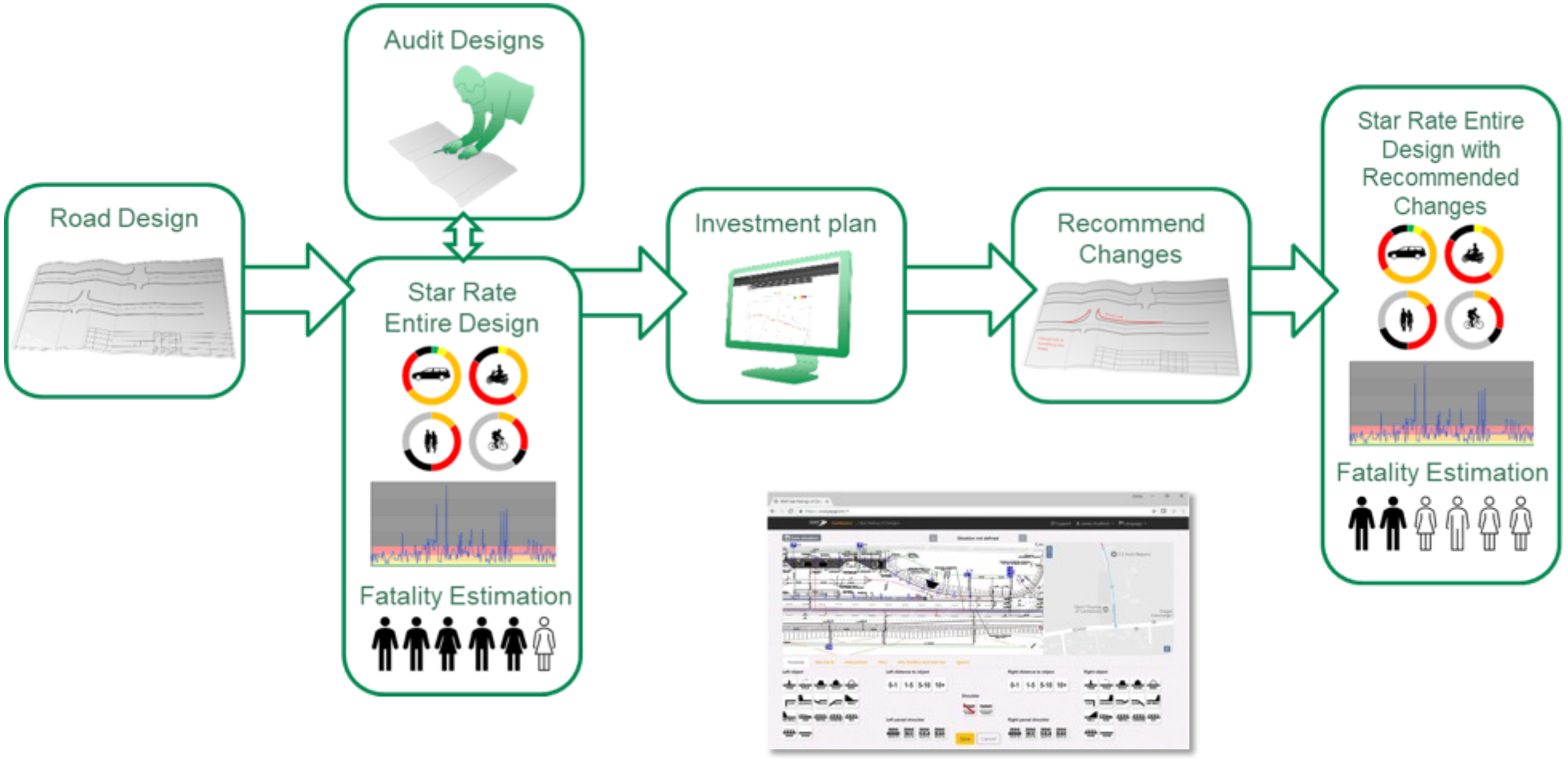
iRAP ACCREDITED



THREE FUNDAMENTAL APPROACHES

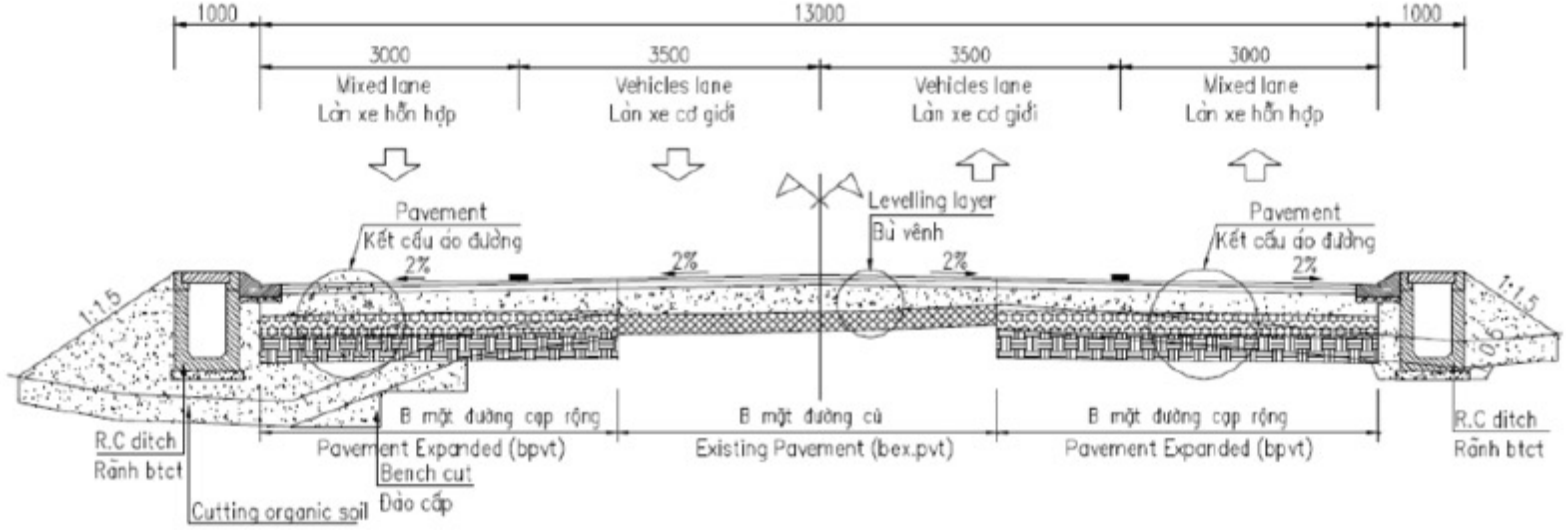
Outputs	Level 1	Level 2	Level 3
Stars for specific safety concerns and recommendations	✓	✓	✓
Stars for length of design		✓	✓
Fatality estimations			✓
Investment plan			✓
Can be used to measure against targets	Partial	✓	✓

HOW? LEVEL 3 APPROACH



DESIGN

- 23km section of national highway connecting 2 major cities
- Upgrade to include a new 'mixed lane' for motorcyclists and bicyclists on both sides

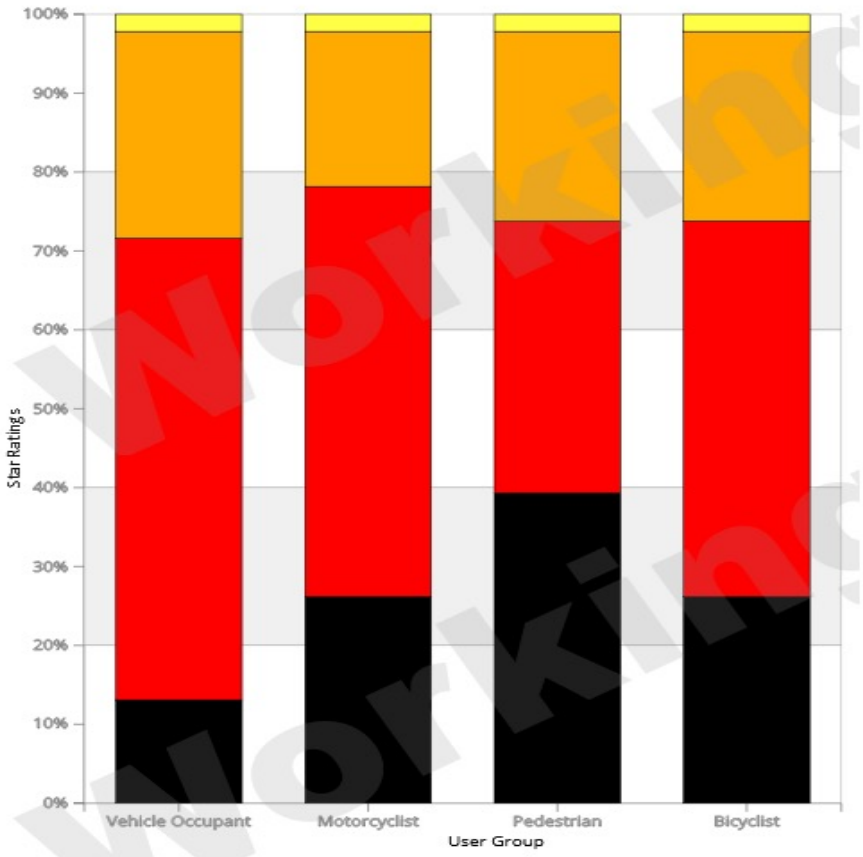


- Footpaths and crossing facilities at bus stops and villages
- Narrow shoulders and centre line median treatment
- Design speeds: 40km/h, 50km/h and 70km/h
- Safety target 3-stars or better for all road users

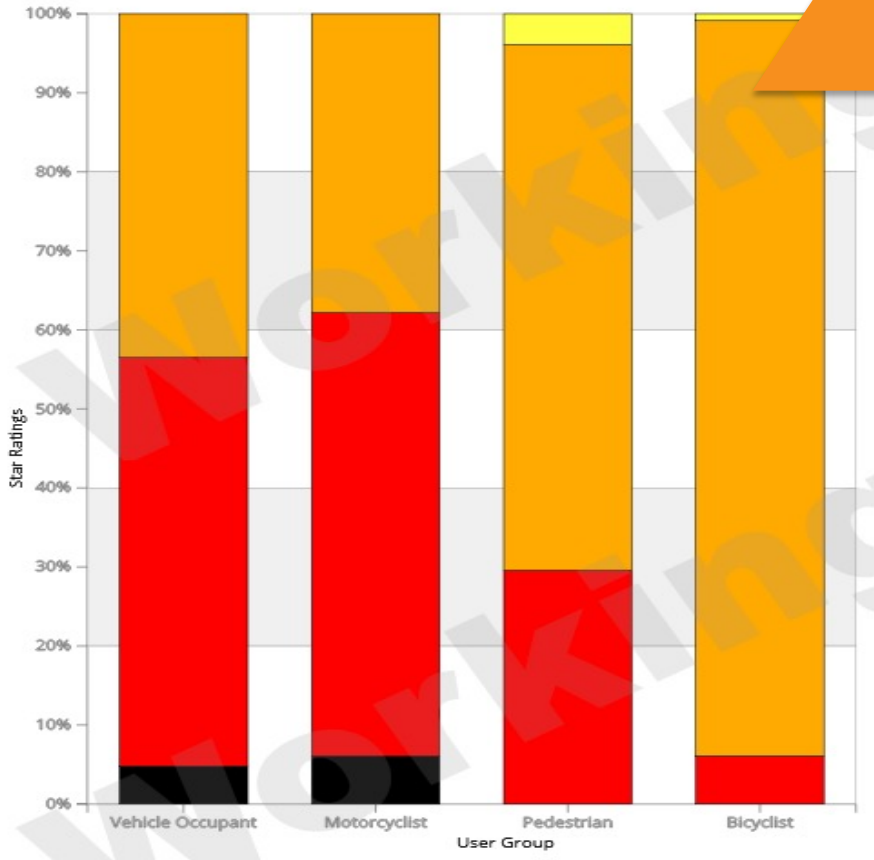
STAR RATINGS

Target: 3-stars or better

EXISTING ROAD

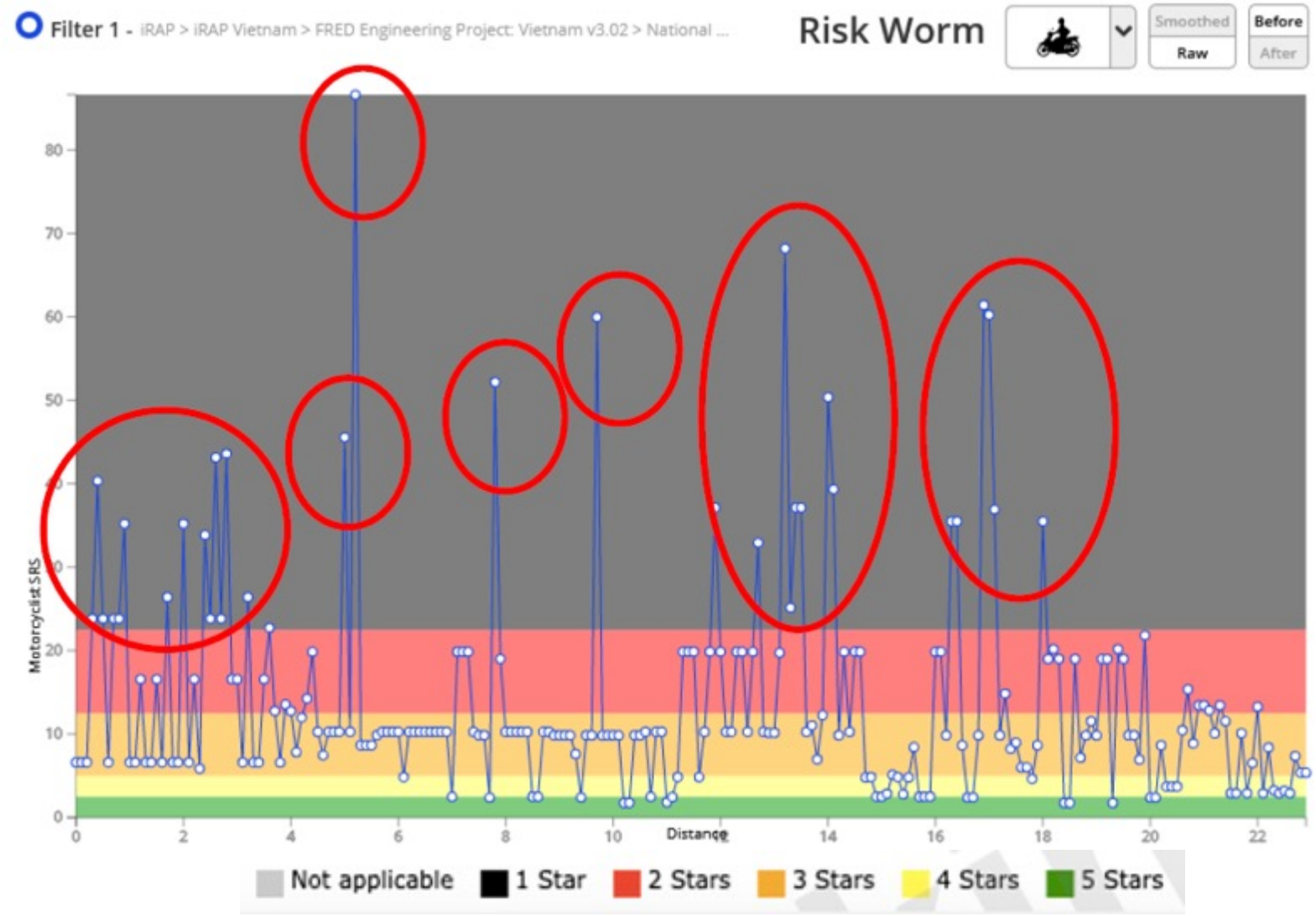


DESIGN

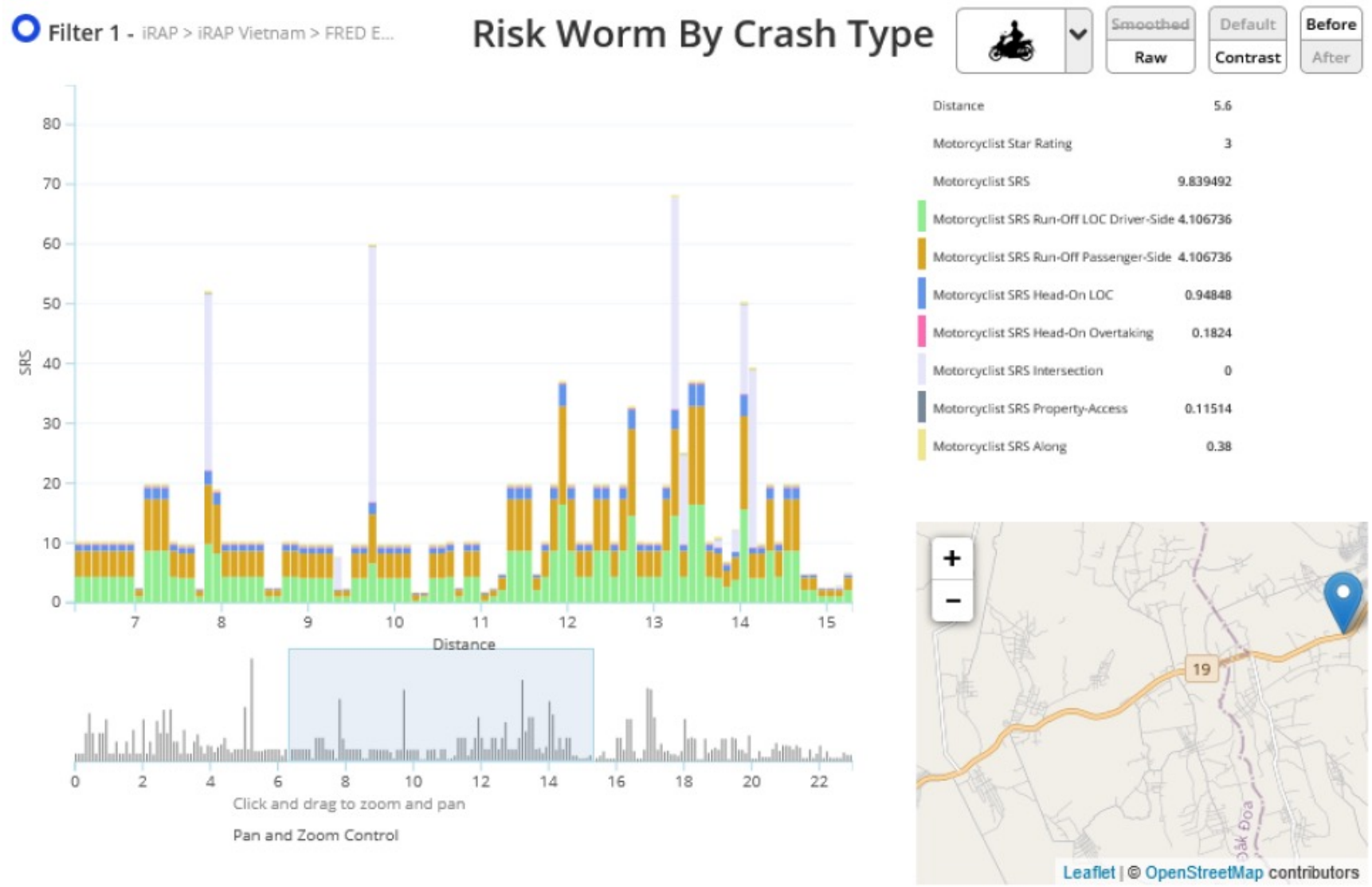


Not applicable | 1 Star | 2 Stars | 3 Stars | 4 Stars | 5 Stars

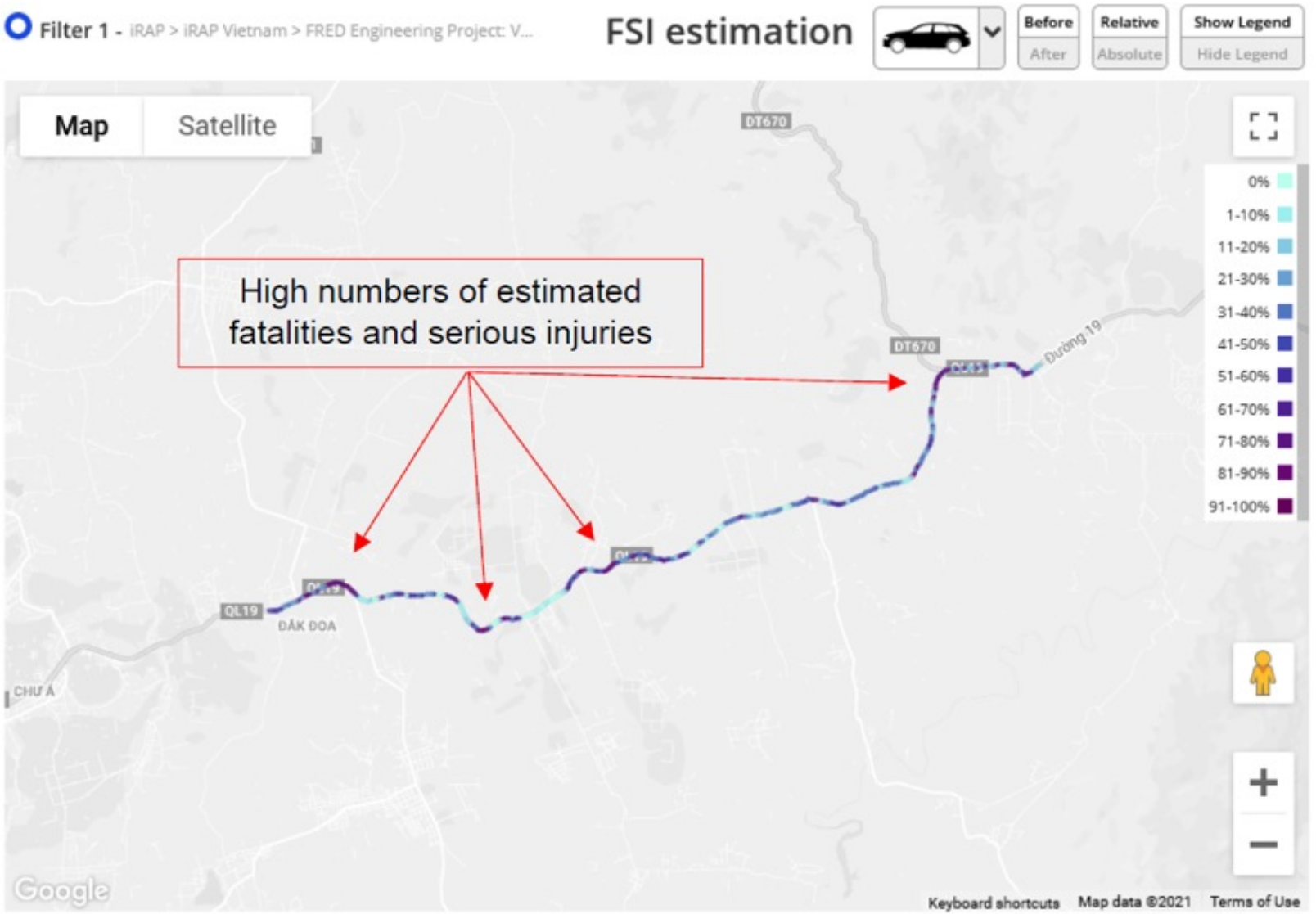
RAW STAR RATINGS – RISK WORM



RISK WORM BY CRASH TYPE



ESTIMATED FATAL AND SERIOUS INJURIES (DESIGN)



SAFER ROADS INVESTMENT PLAN – STRIP PLAN

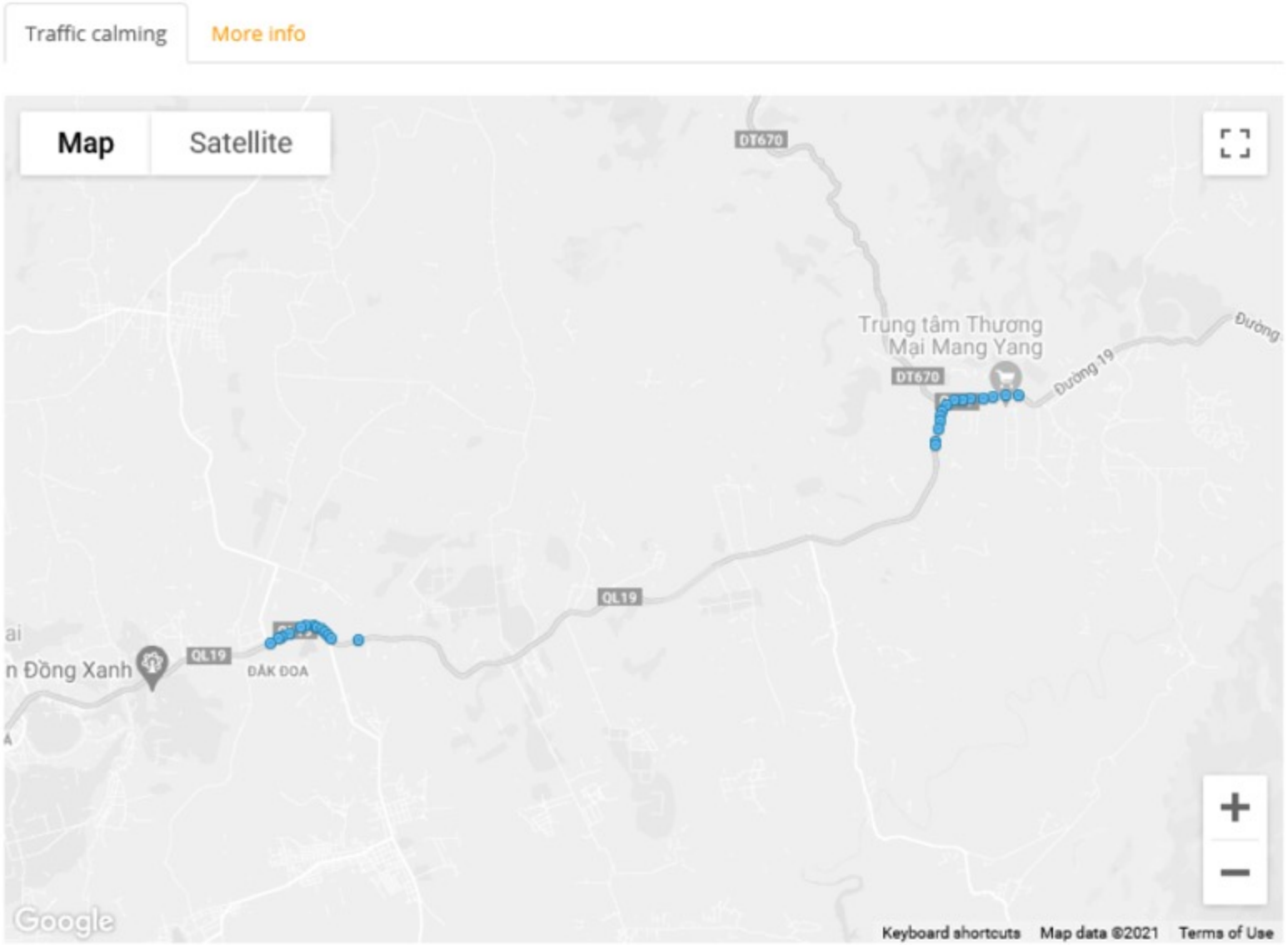
Filter 1 - iRAP > iRAP Vietnam > FRED Engineering Project: Vietnam > National Highway 19 - detailed design > NH 19 > CW4A - Km 131 130-155

Strip Plan

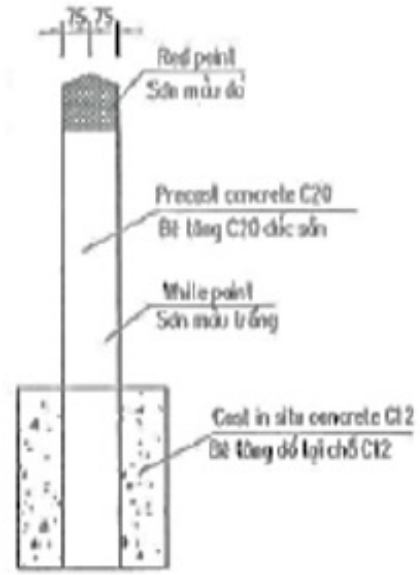
Distance	0.000	0.100	0.200	0.300	0.400	0.500	0.600	0.700	0.800	0.900	1.000	1.100	1.200	1.300	1.400	1.500	1.600	1.700
Improve Delineation																		
Bicycle Lane (off-road)																		
Improve curve delineation																		
Delineation and signing (intersection)																		
Central hatching																		
Upgrade pedestrian facility quality																		
Clear roadside hazards - passenger side	●	●	●				●			●	●	●	●	●	●	●	●	●
Clear roadside hazards - driver side	●	●	●				●			●	●	●	●	●	●	●	●	●
Roadside barriers - passenger side				●	●	●		●	●									
Roadside barriers - driver side				●	●	●		●	●									
Shoulder sealing passenger side (<1m)																		
Footpath provision passenger side (adjacent to road)																		
Traffic calming										●			●			●		●
Street lighting (mid-block)													●			●		
Street lighting (intersection)										●								●
Pedestrian fencing																		
Side road unsignalised pedestrian crossing										●								●
Footpath provision passenger side (informal path >1m)																		
Shoulder sealing driver side (<1m)																		
Shoulder sealing driver side (>1m)																		

CAREC ASIA-PACIFIC ROAD SAFETY OBSERVATORY iRAP SAFE SYSTEM SOLUTIONS

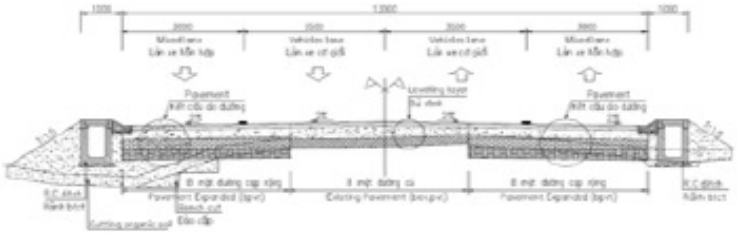
SAFER ROADS INVESTMENT PLAN - COUNTERMEASURES



ROAD SAFETY AUDIT OBSERVATIONS AND RECOMMENDATIONS

Ref	Safety Concern	Risk	Star Rating (Initial Design)	Recommendation	Star Rating (with recommendations)	Client Response
3.3	A feature throughout the design (particularly in the 80km/h speed zone environments) and as part of the standard layout is the use of concrete guideposts. While the auditors support the addition of delineation features, the solid concrete posts present a run-off-road hazard to an errant vehicle or motorcyclist. It is noted that the current Design Standards specific this post and foundation, however the auditors strongly recommend the client view this as a roadside hazard. 	Medium		• Provide breakable guideposts throughout the route.		

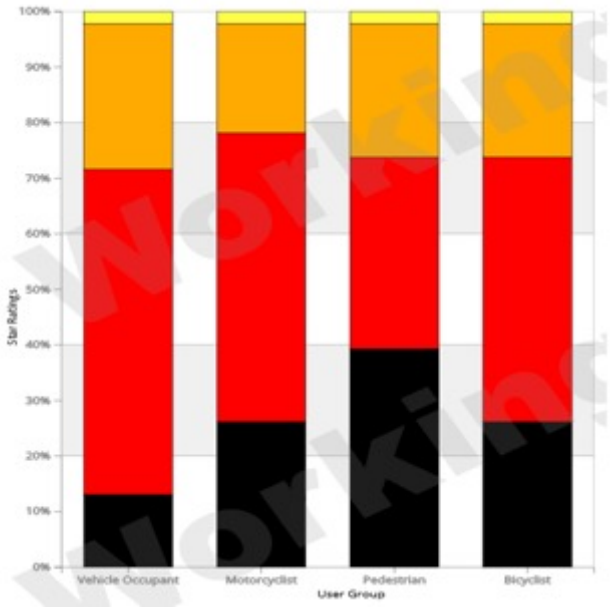
ROAD SAFETY AUDIT OBSERVATIONS AND RECOMMENDATIONS

Ref	Safety Concern	Risk	Star Rating (Initial Design)	Recommendation	Star Rating (with recommendations)	Client Response
1.7	Through densely populated areas, the flow of pedestrians is very high due to the presence of commercial activities, schools, residences, etc. Even if there is a covered ditch, the width of 1m is not enough to ensure the passage of pedestrians. If there is no sidewalk or if it is too narrow, pedestrians are forced to walk on the carriageway with the risk of being run over. The risk is higher during the rainy seasons, when possible informal footpaths may be muddy, discouraging pedestrians from using them. 	High		• Provide a sidewalk along all built – up areas. In particular, the sidewalk must be separated from the roadway (with a reasonable kerb or barrier system) and should be offset by at least 3m with a path width of at least 2m wide.		

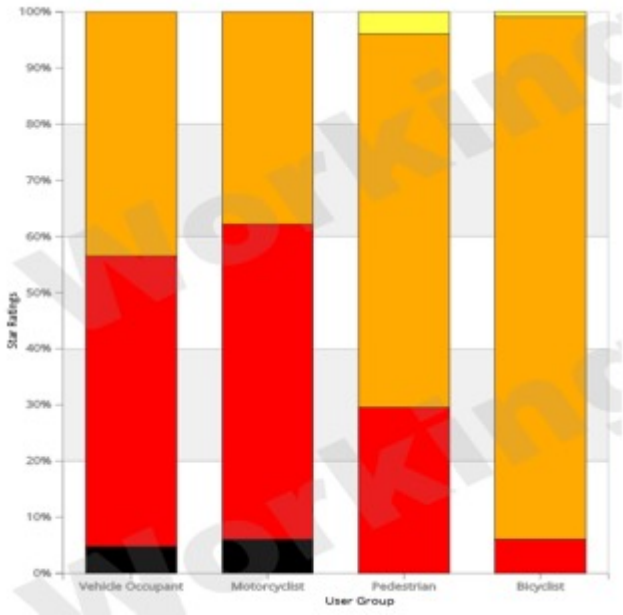
STAR RATING RESULTS

Target: 3-stars or better

EXISTING ROAD



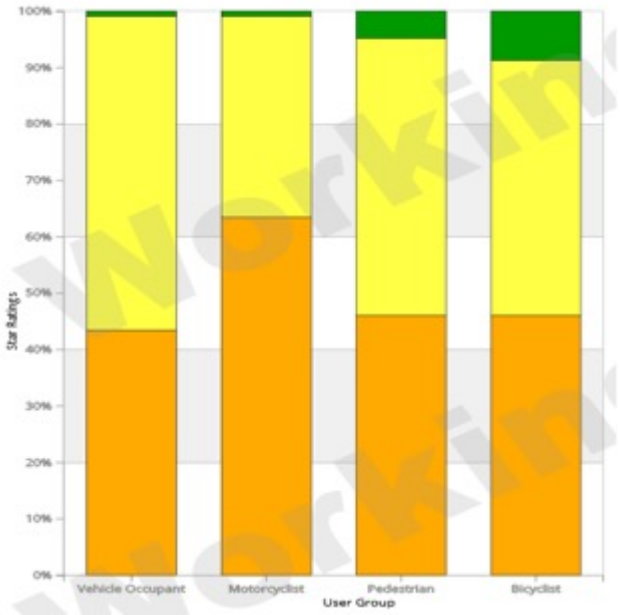
DESIGN



SR4RSA LEVEL 3

(STARS + FSI + SRIP)

FINAL DESIGN



Not applicable | 1 Star | 2 Stars | 3 Stars | 4 Stars | 5 Stars

ESTIMATED REDUCTION IN FATAL AND SERIOUS INJURIES

Initial Highway Upgrade Design (**Before SR4RSA**)

Predicted Fatality and Serious Injuries:

Vehicle Occupants: 3.6 Motorcyclists: 22.8 Pedestrians: 2.7 Bicyclists: 6.2

TOTAL: 35.3

Target: % FSI reduction

Altered Highway Upgrade Design (**After SR4RSA**)

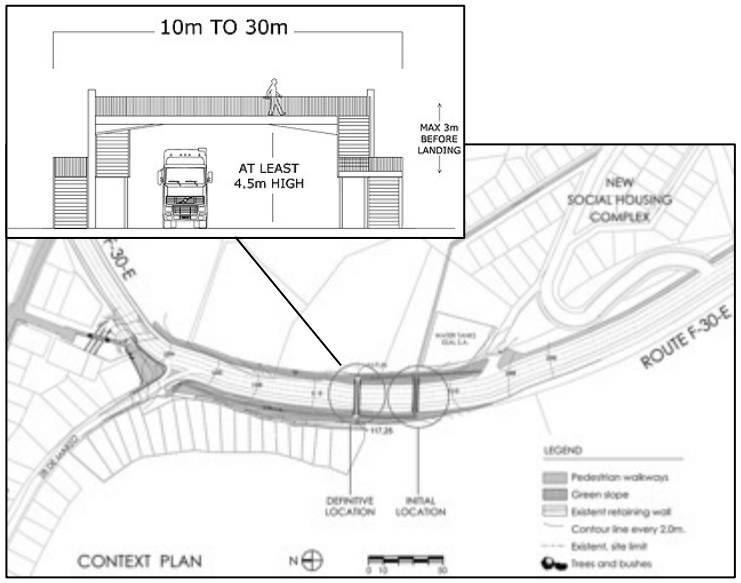
Predicted Fatality and Serious Injuries:

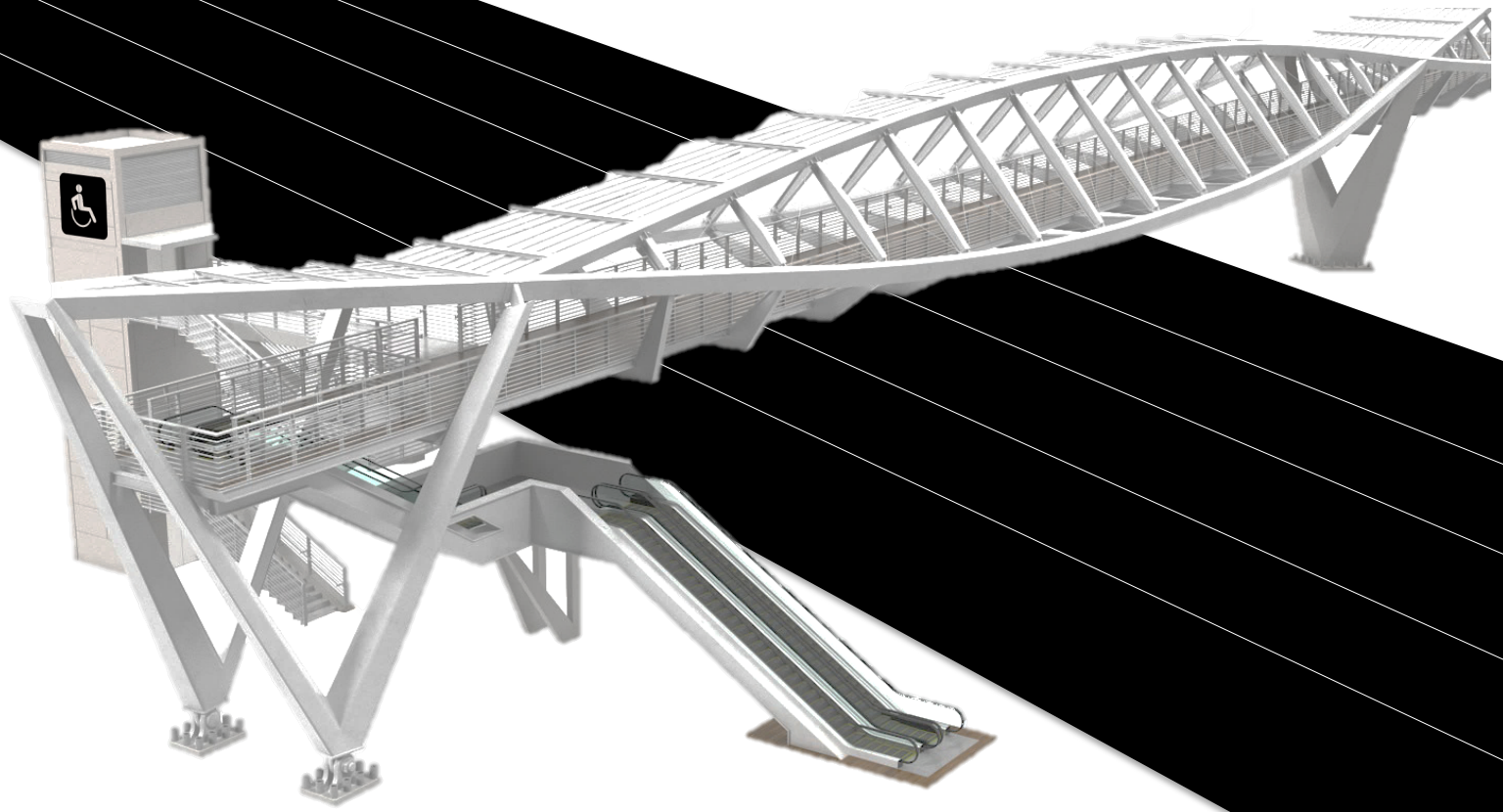
Vehicle Occupants: 1.6 Motorcyclists: 9.8 Pedestrians: 1.4 Bicyclists: 2.2

TOTAL: 15.0

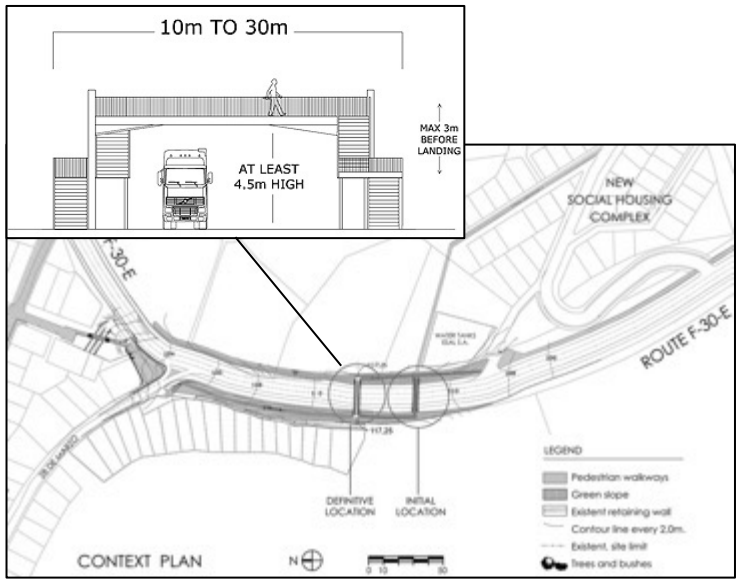
(58% reduction in Fatal and Serious Injuries)

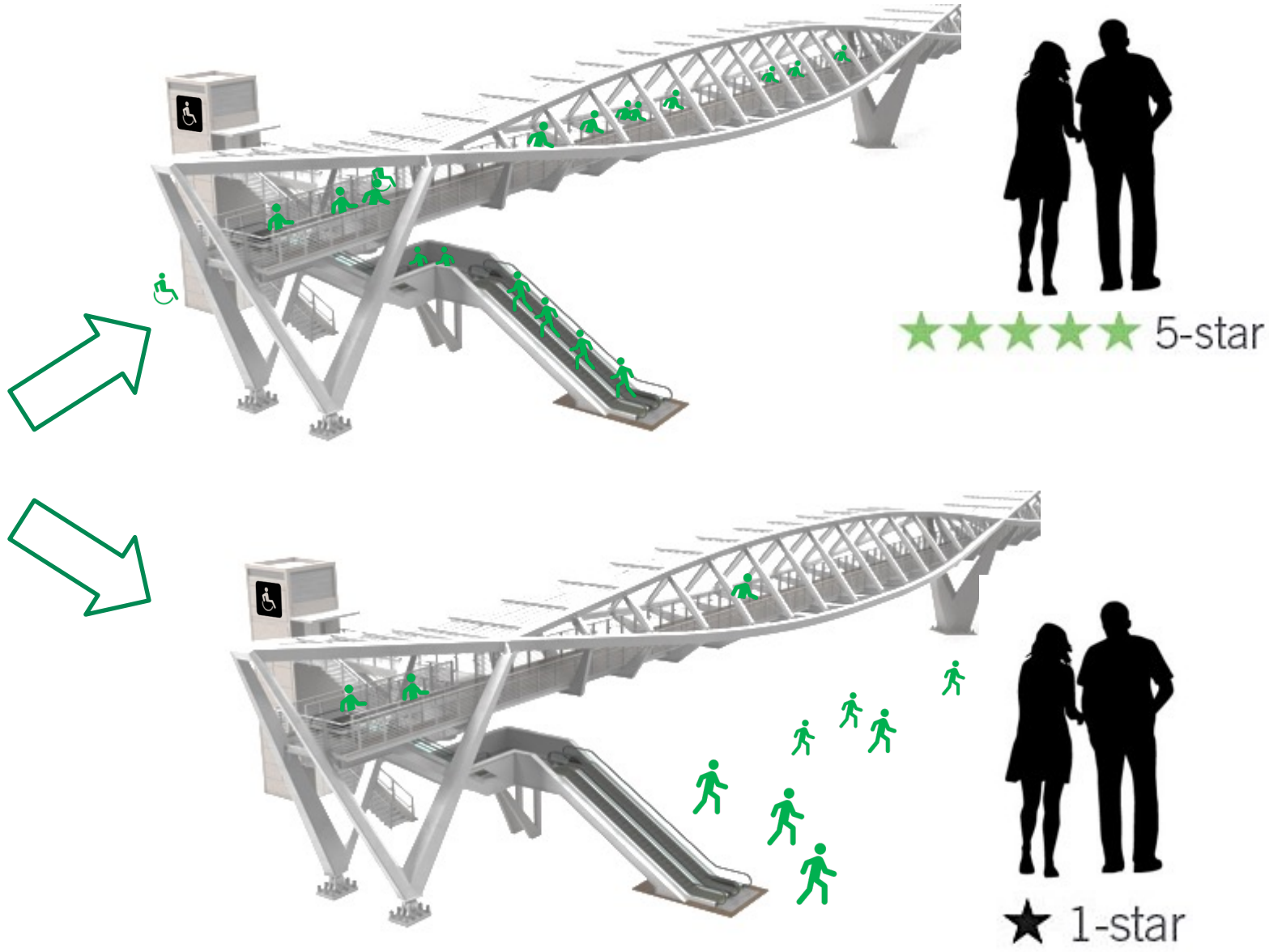
SITUATIONAL SCRUTINY





SITUATIONAL SCRUTINY











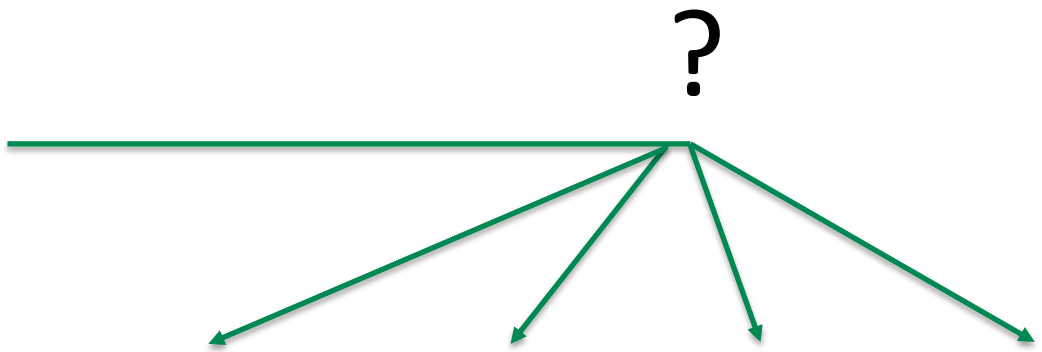









SITUATIONAL SCRUTINY



END

Unprotected safety barrier end

Code: 15

Aggressive ends to safety barriers.

Examples are ramped ends, unprotected ends, sharp ends or fish-tail terminals.

This category should also be used to record damaged sections of safety barrier.

METAL

Safety barrier – metal

Code: 1

Metal safety barrier sufficient to restrain most cars and small vehicles (not wire rope safety barrier).

Should be a continuous length of unbroken, undamaged safety barrier.

CONCRETE

Safety barrier – concrete

Code: 2

Concrete safety barrier sufficient to restrain most cars and small vehicles.

Should be a continuous length of unbroken, undamaged safety barrier.

WIRE ROPE

Safety barrier – wire rope

Code: 4

Wire rope safety barrier sufficient to restrain most cars and small vehicles.

Should be a continuous length of unbroken, undamaged safety barrier.

SITUATIONAL SCRUTINY

iRAP Coding Options

Present

Code: 2

Pedestrian fencing is complete and effective.

Pedestrian fencing can be on one or two sides or in the centre of the road.

Not present

Code: 1

Pedestrian fencing/barriers are incomplete or ineffective.

Pedestrian fencing traps pedestrians on the road

Road Safety Auditor input

SITUATIONAL SCRUTINY

iRAP Coding Options

LINES

Poor

Code: 2

Signing of hazards, or centre and edge markings are generally absent or in poor condition.

LINES

Adequate

Code: 1

Signs warning of severe hazards, and centre and edge markings are generally present and visible.

LINES

Line marking directs (or misleads) drivers into a hazardous situation

Road Safety Auditor input

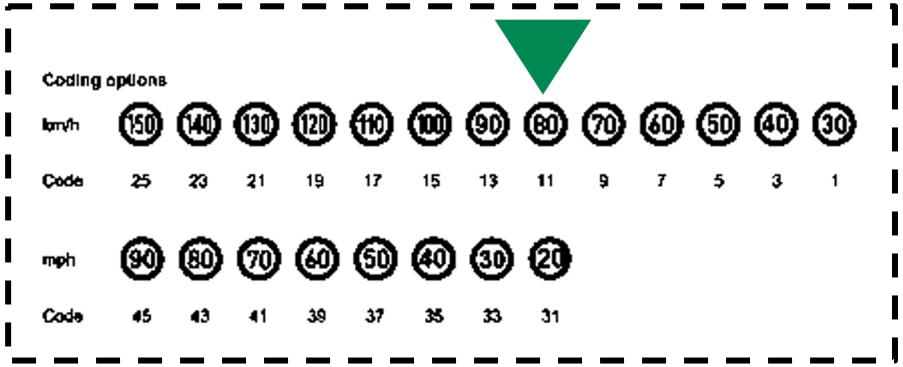
SITUATIONAL SCRUTINY

New Road

Source: Sebatek

Speed Limit

Operating Speed (85th percentile)



Road Safety Auditor input for new road

WHO? AUDITORS CAN STAR RATE

Training and competencies	SR4RSA level		
	Level 1	Level 2	Level 3
Road Safety Audit training and Competencies			
Completion of a formal Road Safety Audit course	✓	✓	✓
Experience as a Road Safety Auditor		✓	✓
iRAP training and competencies			
Ability to use the Star Rating Demonstrator	✓	✓	✓
Completion of Star Rating for Designs (SR4D) course		✓	✓
Ability to use the Star Rating for Designs tool (SR4D)		✓	✓
SR4RSA			
Completion of a SR4RSA fundamentals course	✓	✓	✓

- iRAP tools are free to use.
- iRAP accreditation is not mandatory but it is recommended for Level 2 and 3 SR4RSA

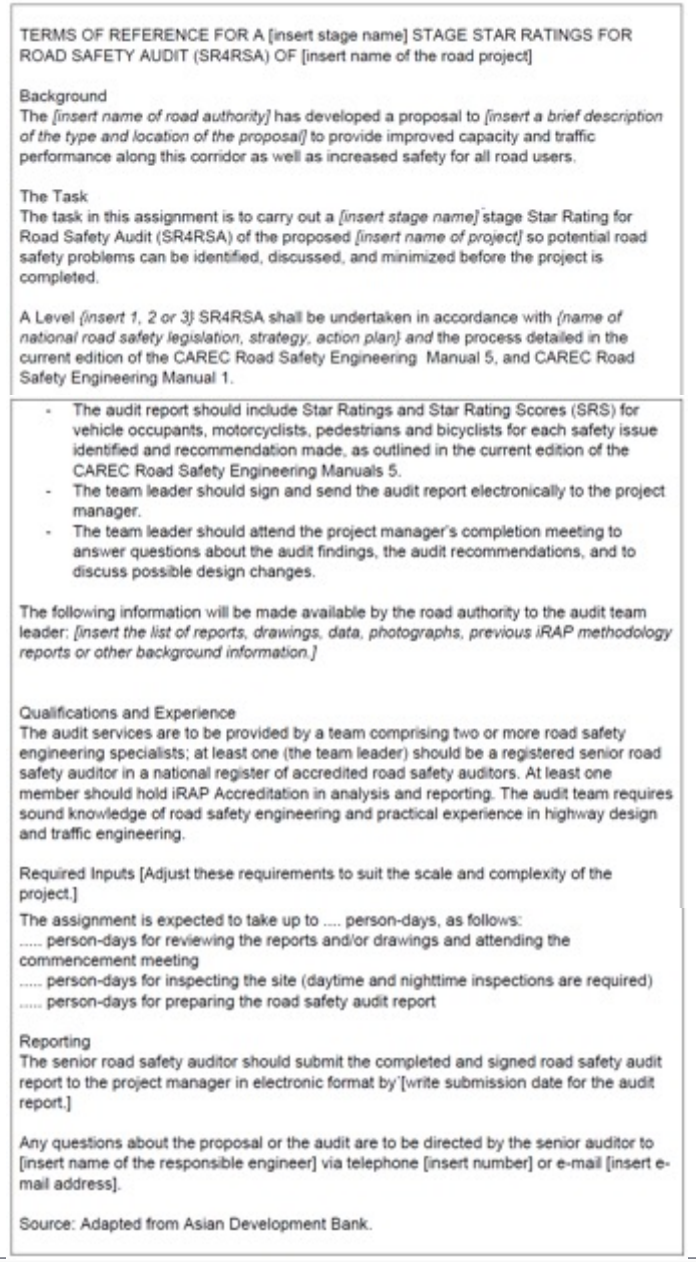
STANDARD TERMS OF REFERENCE

- Terms of reference (TOR) define the purpose and structures of a project and should contain:
  - The background, vision, objectives, scope and deliverables (what has to be achieved)
  - Stakeholders, roles and responsibilities (who is involved)
  - Resource, financial and qulaity plans (how it will be achieved)
  - Work breakdown structure and schedule e(when it will be achieved)

- The Star Ratings for Road Safety Audit (SR4RSA) Manual contains an example Terms of Reference (adapted from CAREC Road Safety Engineering Manual 1) for those who want to undertake or procure a Star Ratings for Road Safety Audit assessment.
- The template can be used to engage consultants to deliver services and the TOR can form the basis of a future contract with suppliers.

STANDARD TERMS OF REFERENCE

- Details of the road project (brief description)
- What stage of RSA
- What Level of SR4SRA is required
- Information that will be made available (reports, drawings, data, previous iRAP results)
- Expected duration/person days
- Reporting requirements/deadlines
- Client contact details



TERMS OF REFERENCE FOR A [insert stage name] STAGE STAR RATINGS FOR ROAD SAFETY AUDIT (SR4RSA) OF [insert name of the road project]

Background
The *[insert name of road authority]* has developed a proposal to *[insert a brief description of the type and location of the proposal]* to provide improved capacity and traffic performance along this corridor as well as increased safety for all road users.

The Task
The task in this assignment is to carry out a *[insert stage name]* stage Star Rating for Road Safety Audit (SR4RSA) of the proposed *[insert name of project]* so potential road safety problems can be identified, discussed, and minimized before the project is completed.

A Level *{insert 1, 2 or 3}* SR4RSA shall be undertaken in accordance with *{name of national road safety legislation, strategy, action plan} and* the process detailed in the current edition of the CAREC Road Safety Engineering Manual 5, and CAREC Road Safety Engineering Manual 1.

- The audit report should include Star Ratings and Star Rating Scores (SRS) for vehicle occupants, motorcyclists, pedestrians and bicyclists for each safety issue identified and recommendation made, as outlined in the current edition of the CAREC Road Safety Engineering Manuals 5.
- The team leader should sign and send the audit report electronically to the project manager.
- The team leader should attend the project manager's completion meeting to answer questions about the audit findings, the audit recommendations, and to discuss possible design changes.

The following information will be made available by the road authority to the audit team leader: *[insert the list of reports, drawings, data, photographs, previous iRAP methodology reports or other background information.]*

Qualifications and Experience
The audit services are to be provided by a team comprising two or more road safety engineering specialists; at least one (the team leader) should be a registered senior road safety auditor in a national register of accredited road safety auditors. At least one member should hold iRAP Accreditation in analysis and reporting. The audit team requires sound knowledge of road safety engineering and practical experience in highway design and traffic engineering.

Required Inputs [Adjust these requirements to suit the scale and complexity of the project.]
The assignment is expected to take up to .... person-days, as follows:
..... person-days for reviewing the reports and/or drawings and attending the commencement meeting
..... person-days for inspecting the site (daytime and nighttime inspections are required)
..... person-days for preparing the road safety audit report

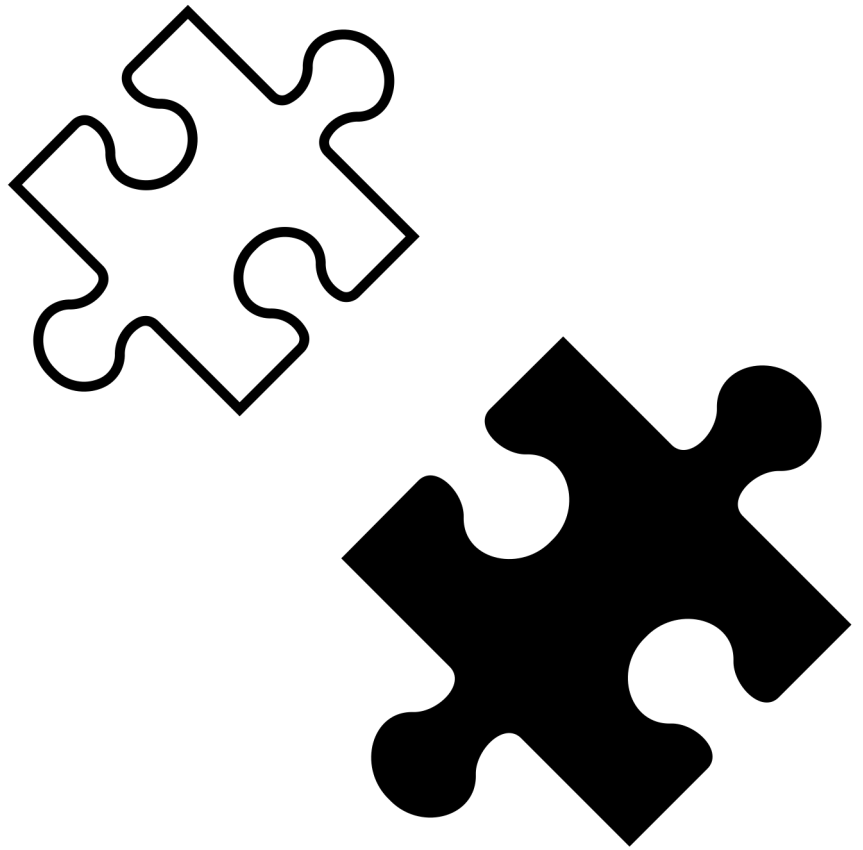
Reporting
The senior road safety auditor should submit the completed and signed road safety audit report to the project manager in electronic format by [write submission date for the audit report.]

Any questions about the proposal or the audit are to be directed by the senior auditor to [insert name of the responsible engineer] via telephone [insert number] or e-mail [insert e-mail address].

Source: Adapted from Asian Development Bank.

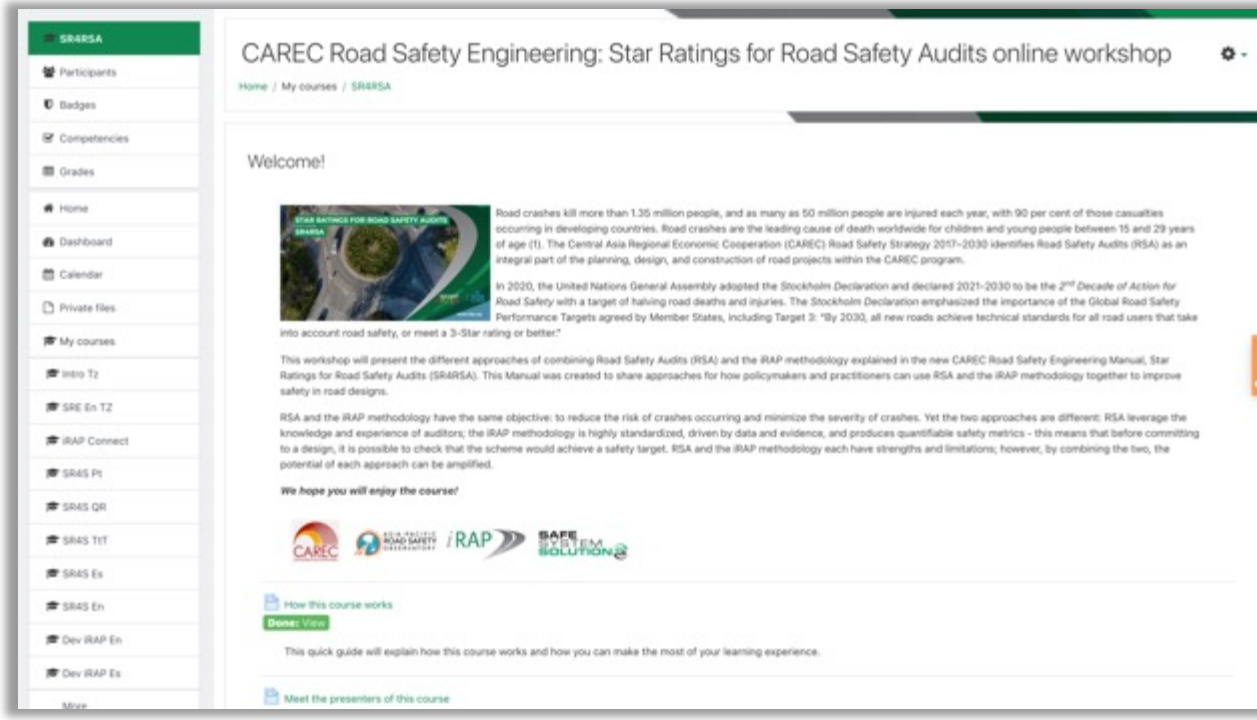
ASSIGNMENT

8 multiple choice questions about the webinar content.



ONLINE ACTIVITIES

- Go to this website
  https://iraptraining.moodlecloud.com/
- Your username is your email
- Use the password provided to you
- Update your profile
- Complete the activities
- Video and presentation are available there.




CAREC
Central Asia Regional Economic Cooperation Program


ASIA-PACIFIC
ROAD SAFETY
OBSERVATORY


iRAP


SAFE
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