WEBINAR SUPPORT

- Please use the Q&A Section to ask questions – We will answer as many as we can
- This is being recorded and will be available to review shortly
- The PDF slides are also available

ROUTE ANALYSIS

- Agilysis
  - Cluster Analysis
  - Route Analysis
  - Selecting a Network
  - Matching Collisions
  - Density vs Risk
  - Mapping Demonstration

- Road Safety Foundation
  - EuroRAP GB Annual Risk Report
  - Star Rating of Roads

- Q&A
  - How can road authorities combine multiple approaches?

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CLUSTER ANALYSIS

- Crude density analysis tool

- Lacks network-awareness

- Frequently identifies busy junctions

- Doesn't reflect how roads are used

- BUT has been successful in the past
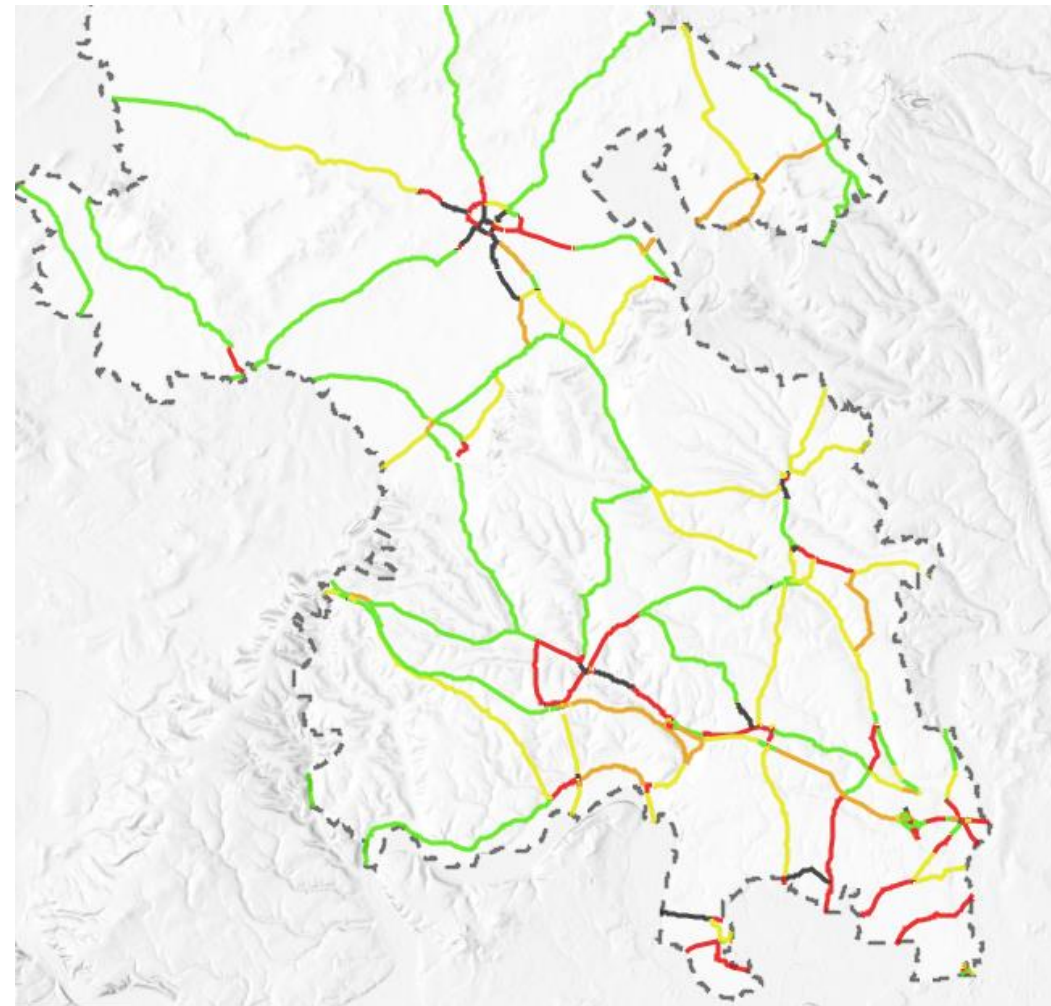

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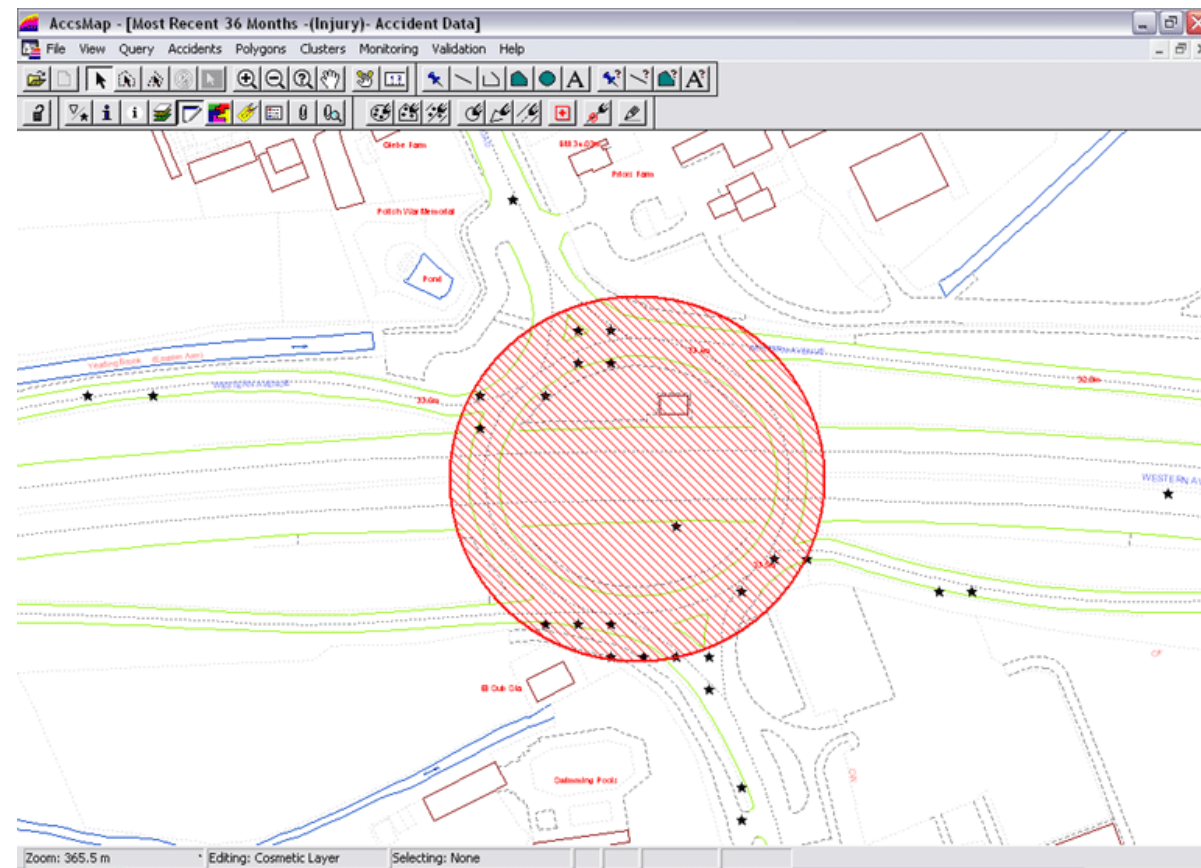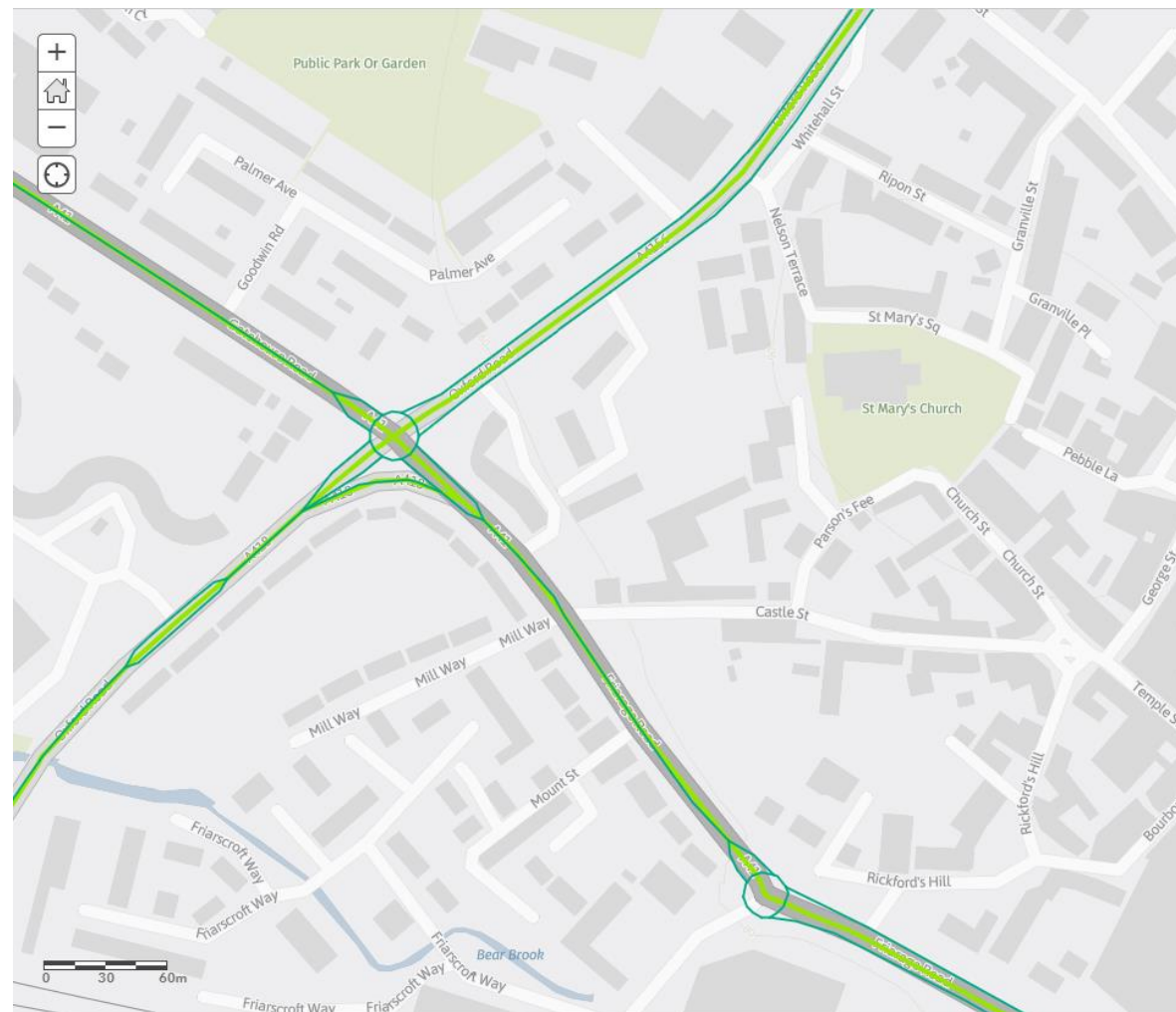
ROUTE ANALYSIS

- Looks at risk rates along sections of road

- Requires collisions to be matched / snapped

- Risk rates can be compared internally / externally

- Aids prioritisation

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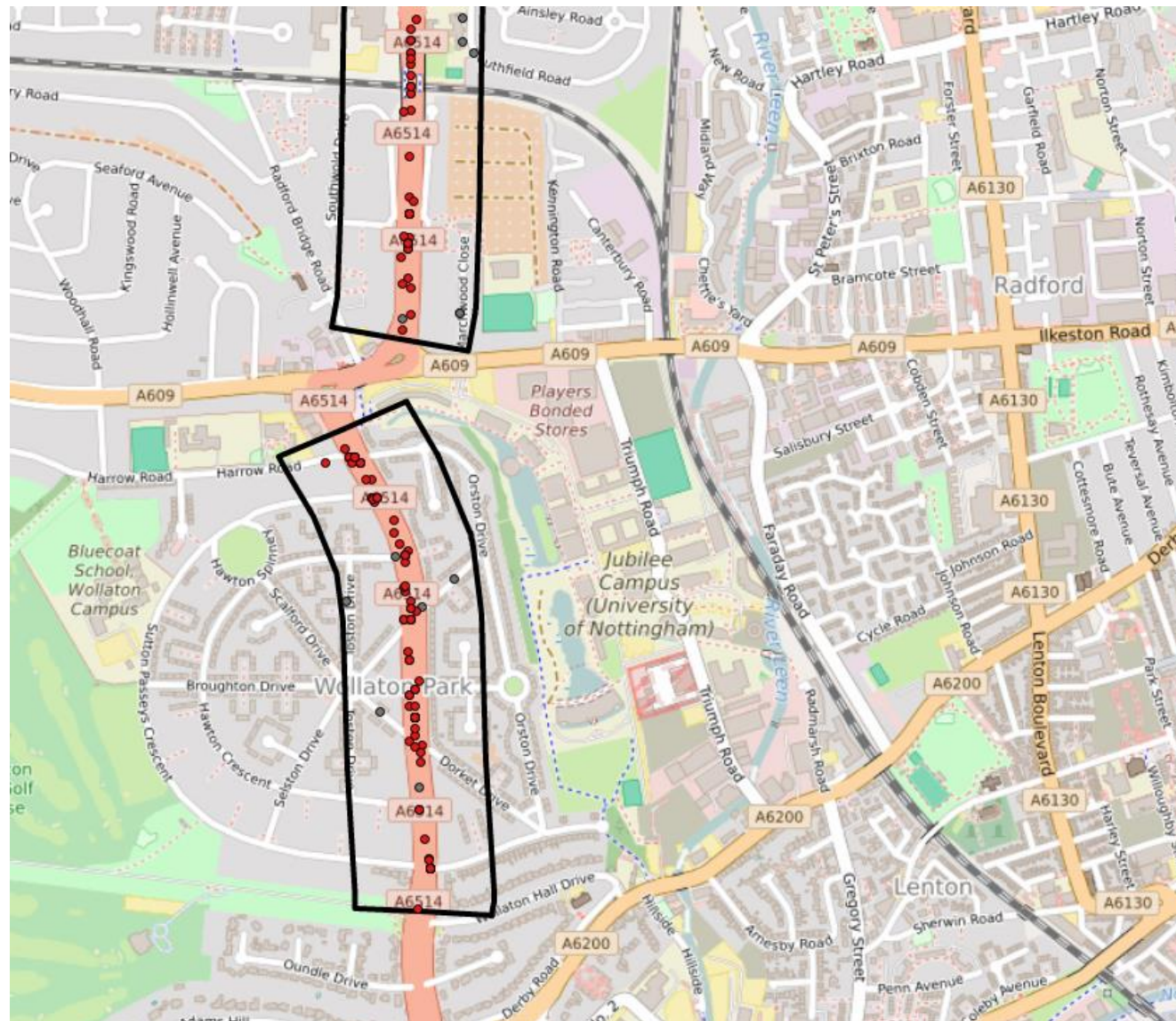agilysis.co.uk

SELECTING A NETWORK

- Open Street Map

- OS Open Roads

- OS MasterMap Highways

MATCHING COLLISIONS

- Polygons
  - Collisions within
  - Option filter by road number / name

MATCHING COLLISIONS

- Automated
  - Proximity
  - Road Number

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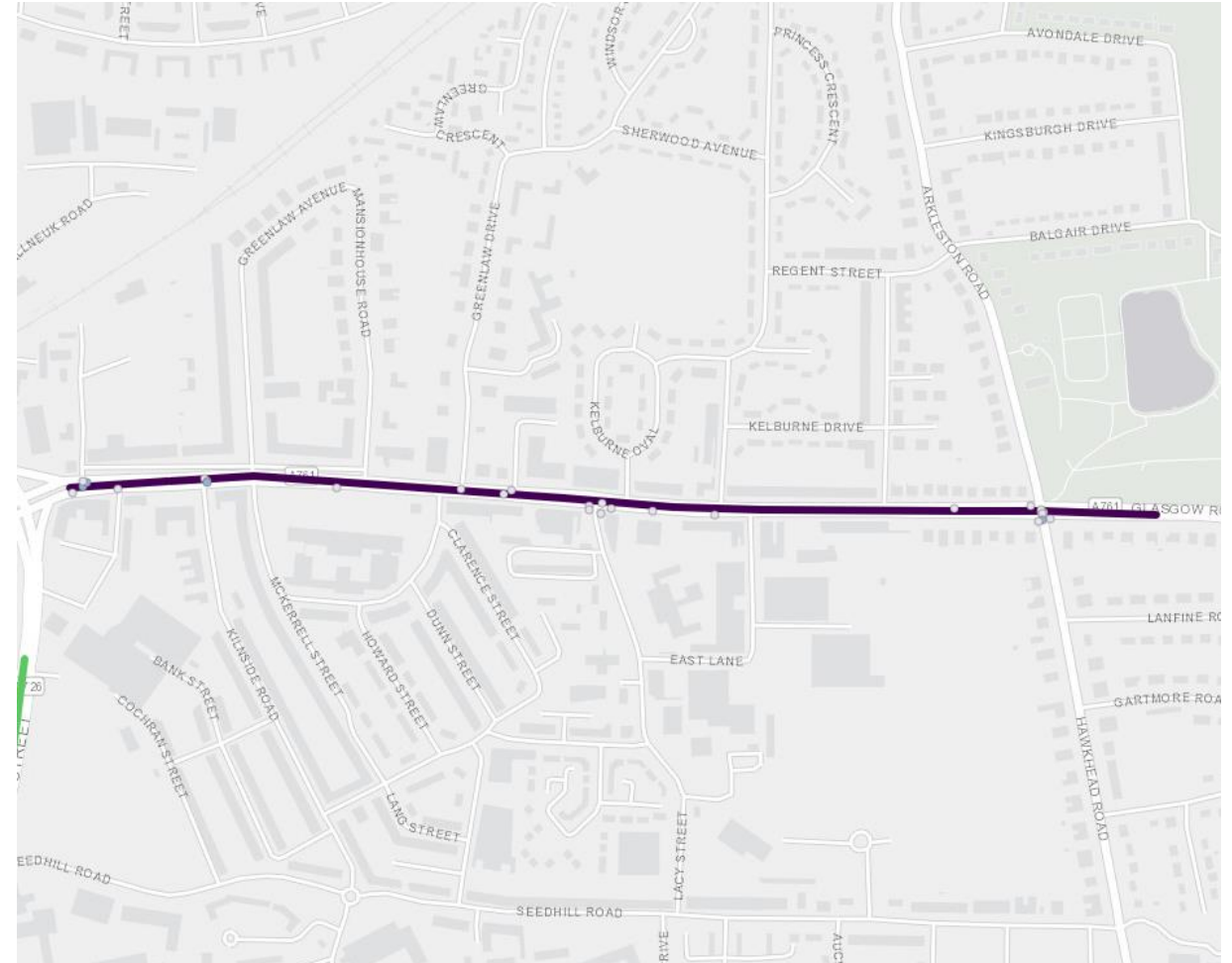
DENSITY VS RISK

- Density
  - Collisions per Km / Year
  - KSI / All
  - Road User Group
    - Motorcyclist
    - Cyclists
    - Pedestrian
  - Collision Type
    - Speed
    - Fatigue

- Risk
  - Collisions per MvKM / Year
  - KSI / All
  - Road User Group
    - Motorcyclist
    - Cyclist
    - ~~Pedestrian~~
    - HGV

- Requires AADF for Routes

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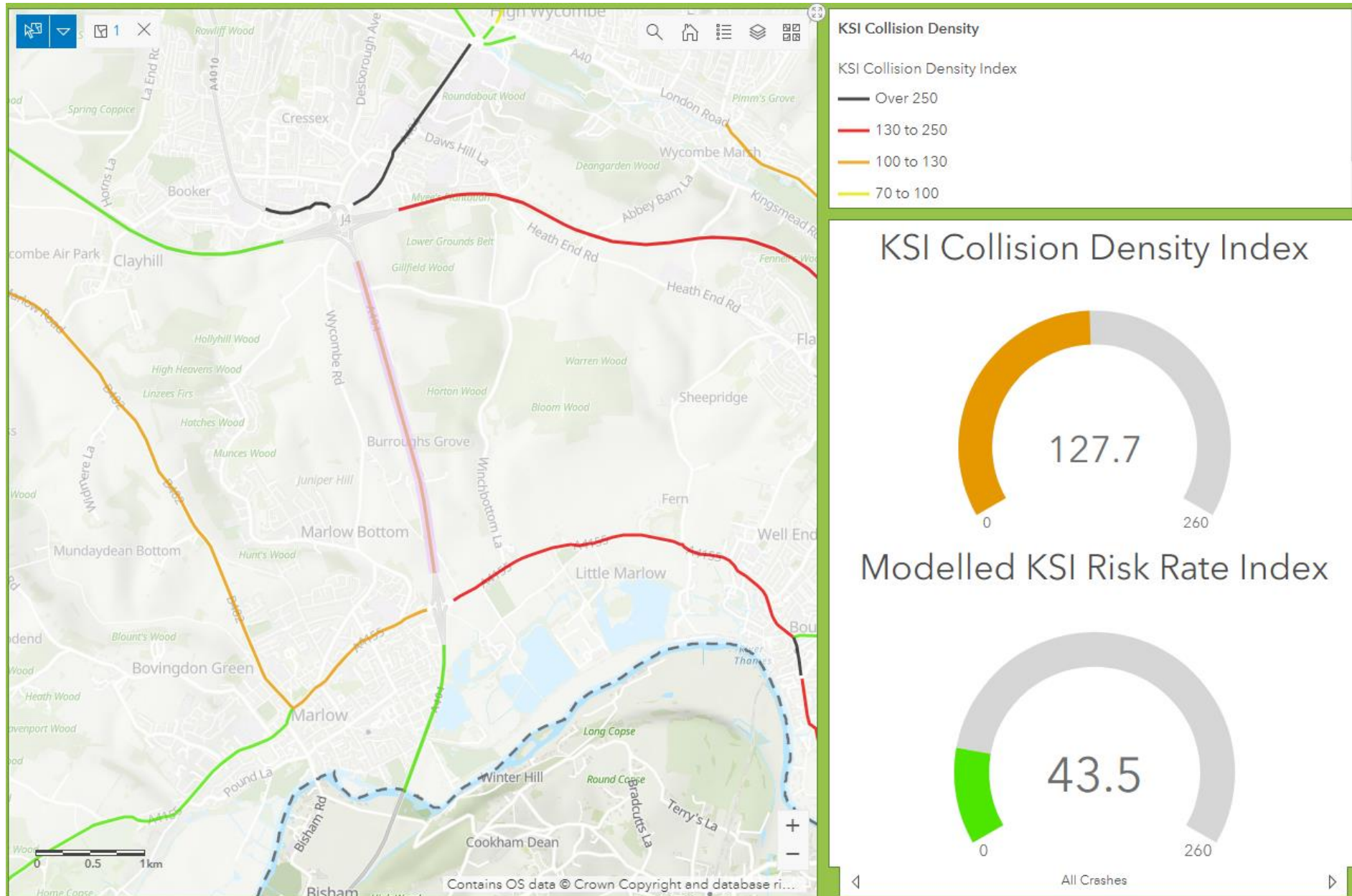
DENSITY VS RISK

DENSITY VS RISK

- Expanding the Analysis

- Count Points Data

- Telematics Data to create modelled flow
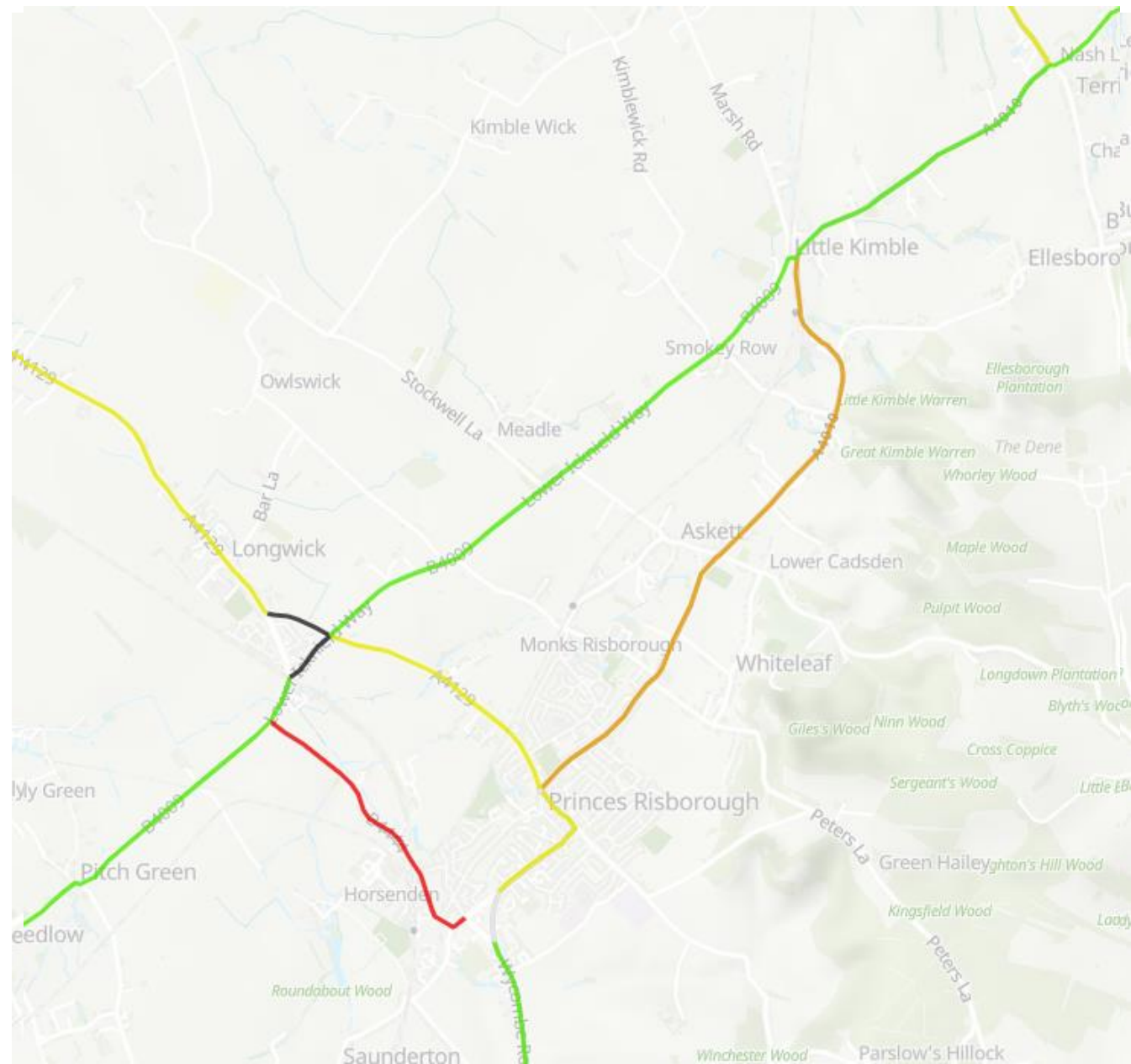
MAPPING DEMONSTRATION

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Measuring Road Risk

Crash Risk Mapping – Reactive: Measuring crashes per km or per vehicle-km travelled

Star Rating – Proactive: Measuring infrastructure* danger

Labels on road image:
- Straight
- Clear roadside
- Trees @ 1-5m
- Paved shoulder 0-1m
- Wide lanes
- Centre line median
- Paved shoulder 0-1m

Road Safety Foundation

RSF Programme

- RAP Crash Risk Mapping since 2002

- RAP Star Rating:

  - Highways England Strategic Road Network (with TRL)
    Commitment for 90% travel on 3 star or above roads by 2020

  - Safer Roads Fund – 50 'highest risk' roads
    35+ local authorities

  - Projects with around a dozen local authorities
    From single roads up to whole road networks

Road Safety Foundation

How Safe Are You on Britain's Main Road Networks?

Low risk

Low-medium risk

Medium risk

Medium-high risk

High risk

- Annual risk mapping report

- Analysis of all A roads and motorways

- Individual risk: Fatal and serious crashes per billion vehicle kilometres travelled

- Colour coded maps for ease of interpretation

- Lots of analysis

- Calls for investment in 75 persistently higher risk roads

Road Safety Foundation

Practitioner Tools

Road Safety Foundation
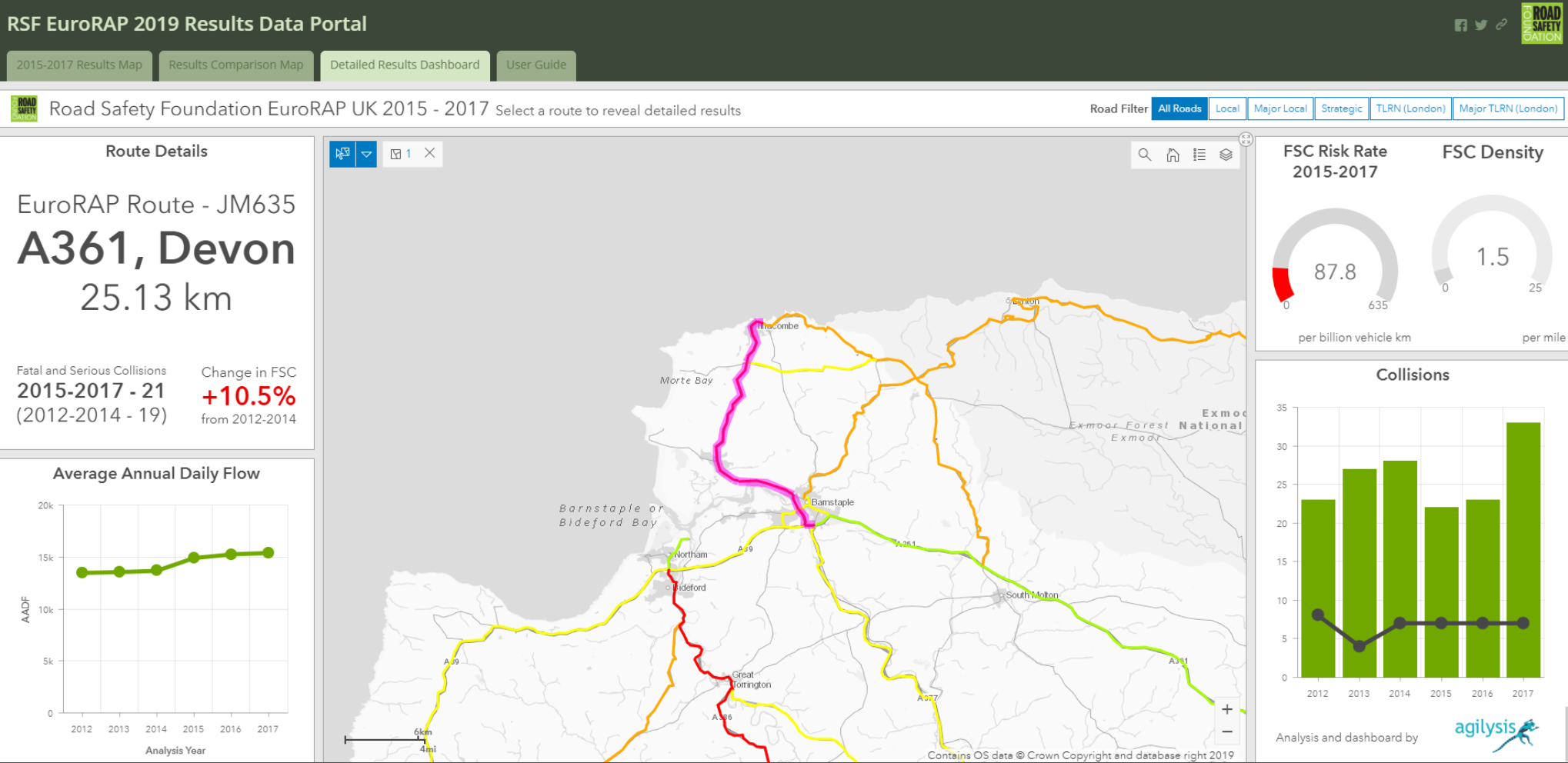
Proactive Approaches

- Risk/danger management approach
- Managing risks that could lead to death or serious injury
- Integral part of the safe system approach

- NOT traditional cluster site analysis and treatment

RAP Star Rating Process

Existing road data collection			ViDA		
Road Survey	Road coding	Data preparation	Processing	Star Ratings	Investment plan
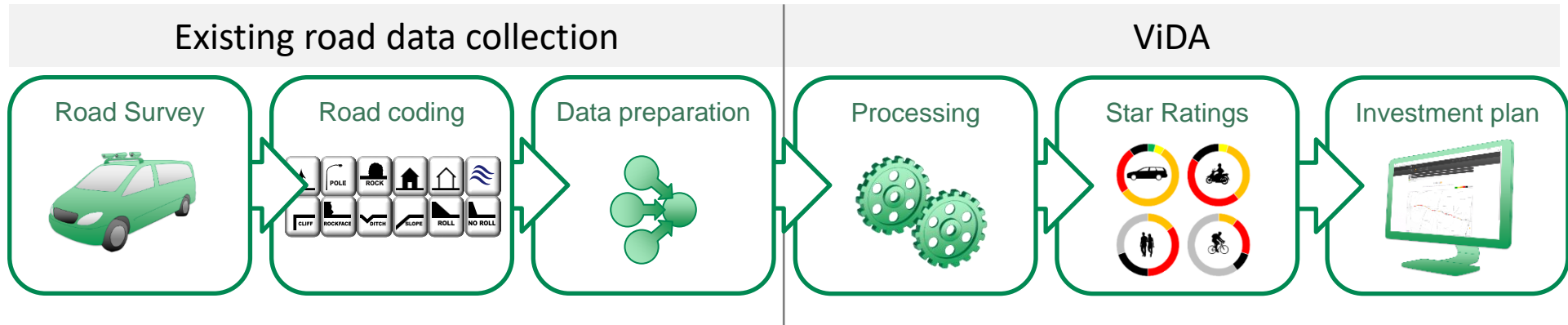
- Assessed every 100 meters

- Model based on crash studies from around the world

- Technical oversight of the model provided by iRAP Global Technical Committee

Road Safety Foundation

Road Coding Attributes

Area type
Speed
Vehicle flow

Motorcycle facility
Bicycle facility
Bicycles flow
Pedestrian flow

Paved shoulder – left
Sidewalk provision – left
Roadside object – left
Roadside distance - left

Curvature
Quality of curve

Paved shoulder – right
Sidewalk provision – right
Roadside object – right
Roadside distance - right

Intersection type
Intersection quality
Intersecting volume
Channelisation
Property access point

Crossing facility
Crossing quality
Speed management
Roadworks

Street lighting
Shoulder rumble strips
Vehicle parking
Service road
Pedestrian fencing

Median
Centreline rumble strips
Sight distance
Delineation
Grade

Lane width
Number of lanes
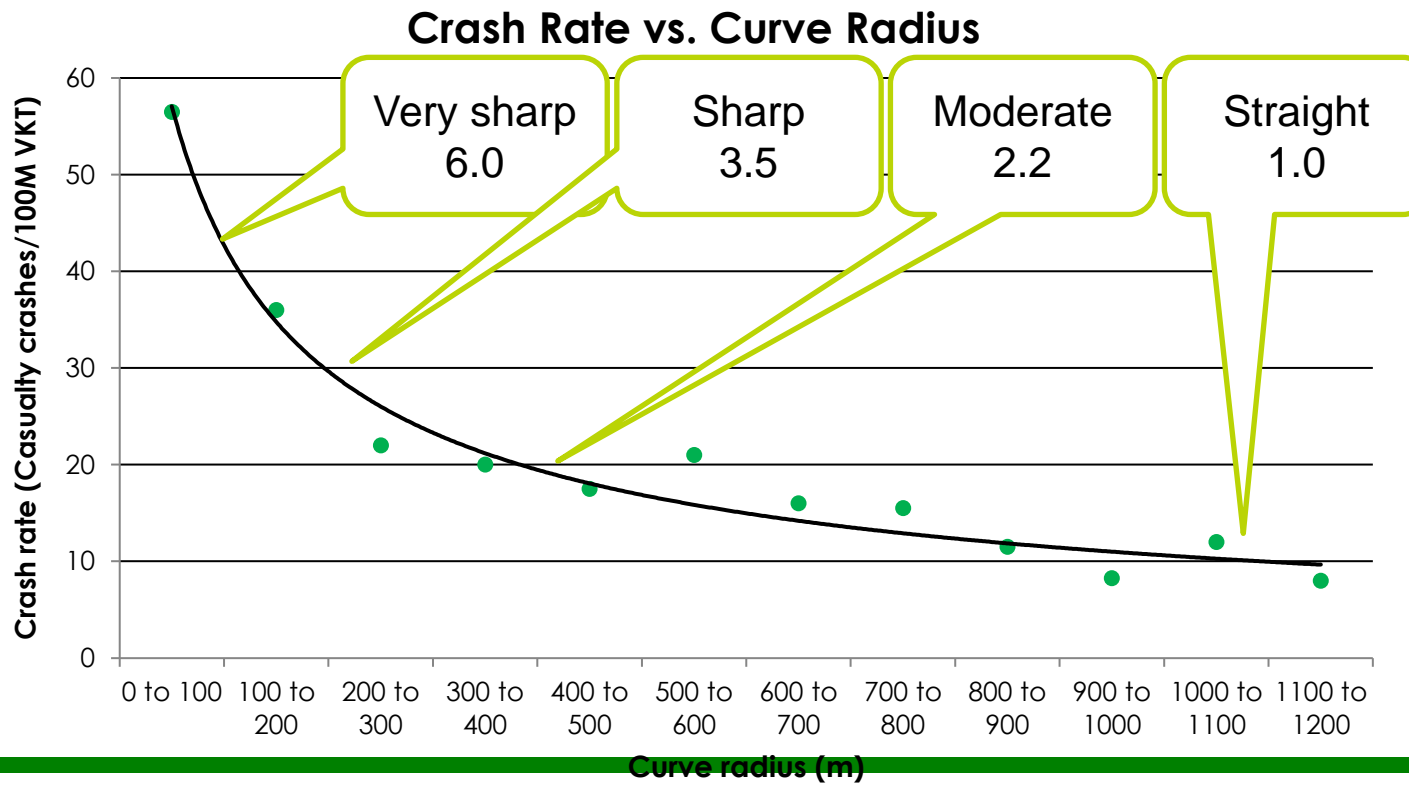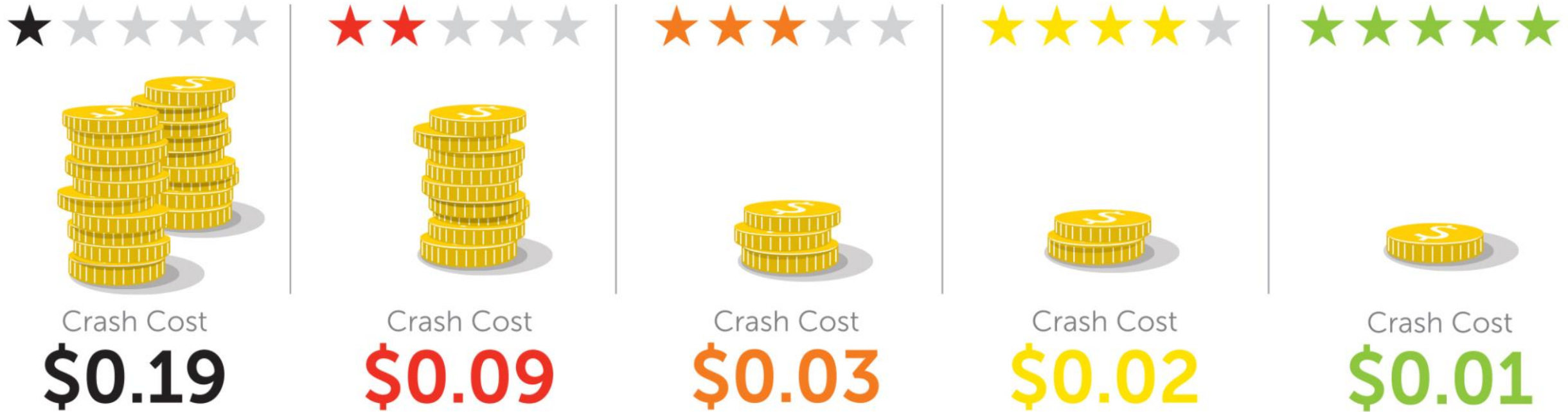Road condition
Skid resistance

Road Safety Foundation

Risk factor example

Road attributes are characterised so the crash risk can be linked to the nature of each of the road attributes.

Crash Rate vs. Curve Radius

| Very sharp 6.0 | Sharp 3.5 | Moderate 2.2 | Straight 1.0 |

Crash rate (Casualty crashes/100M VKT)

Curve radius (m)

Road Safety Foundation

Crash costs are halved for each Star Rating improvement

Crash Cost
$0.19

Crash Cost
$0.09

Crash Cost
$0.03

Crash Cost
$0.02

Crash Cost
$0.01

* Based on the cost of people killed and serious injury crash costs per vehicle kilometer travelled.

Road Safety Foundation

The RAP Star Rating Model

Find out more
iRAP.org/methodology

iRAP Road Attribute Risk Factors

Fact Sheet: Centreline Rumble Strips

This factsheet describes the road attribute risk factors used in the iRAP methodology for Centreline Rumble Strips. Centreline Rumble Strips (also referred to as raised profile centre lines or audible centre lines) can be used to delineate the centre of paved roads. As

Fact Sheet: Curvature

This factsheet describes the road attribute risk factors used in the iRAP methodology for Curvature. Curvature is a measure of the horizontal alignment of a road.
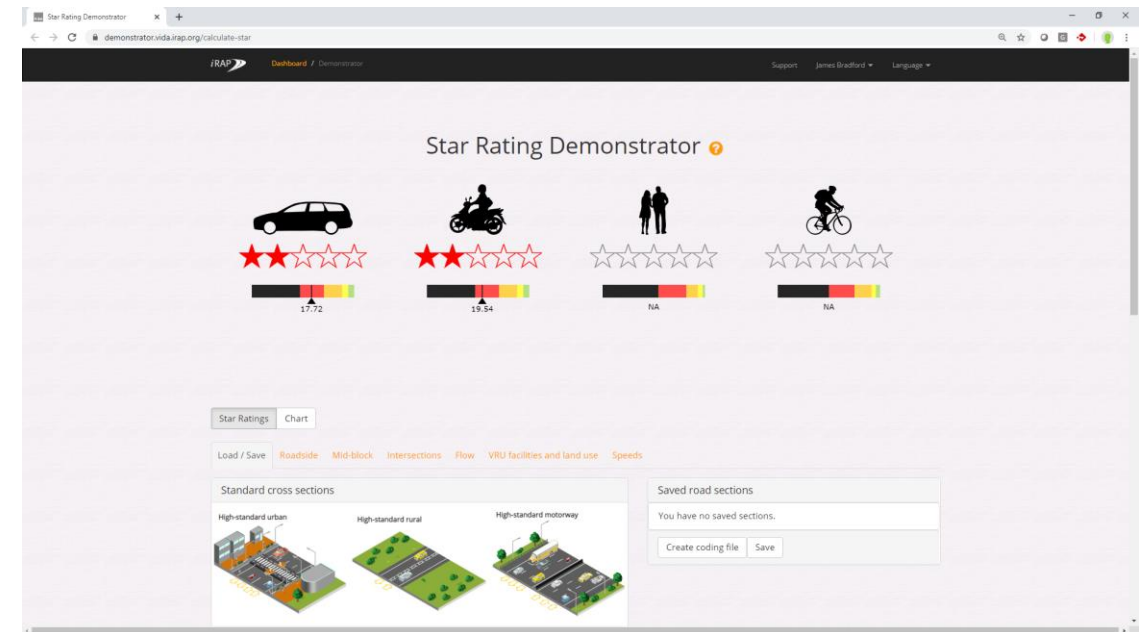
Fact Sheet: Delineation

This factsheet describes the road attribute risk factors used in the iRAP methodology for Delineation. Delineation is a measure of the road attributes that inform drivers of road conditions to keep them within the driven lane and aware of road ahead.
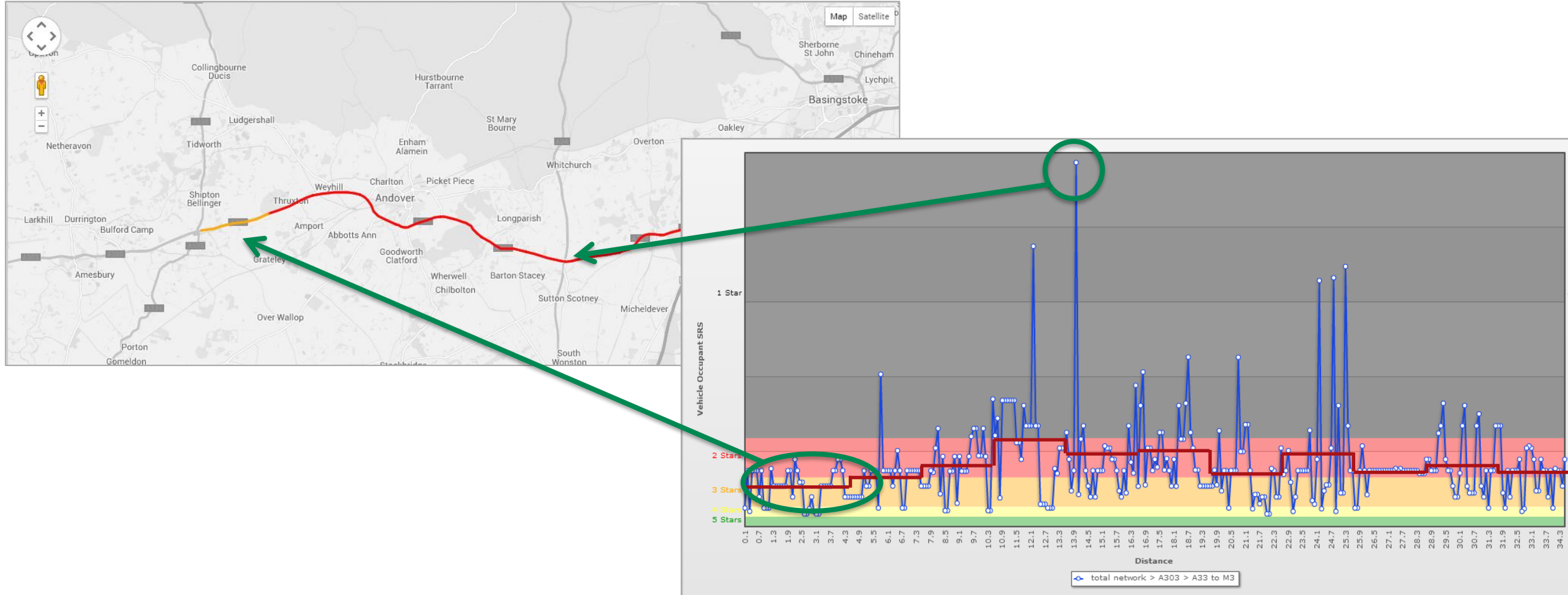
Fact Sheet: Facilities for Bicycles

This factsheet describes the road attribute risk factors used in the iRAP methodology for Facilities for Bicycles. Facilities for Bicycles records the presence of purpose-built facilities for non-motorised vehicles.

Star Rating demonstrator
vida.irap.org

Understanding and Reviewing Risk/Danger

Example - Undivided Carriageway

Single carriageway A Operating Speed vs Star Rating

35,000 AADT

15,000 AADT

5,000 AADT

Vehcile SRS / Star Rating

Speed km/h

— 5000 AADT   — 15000 AADT   — 35000 AADT
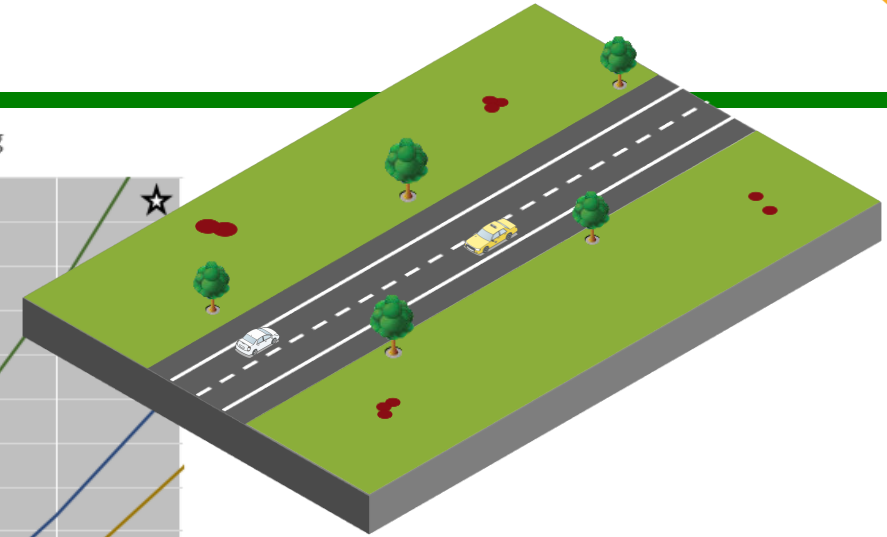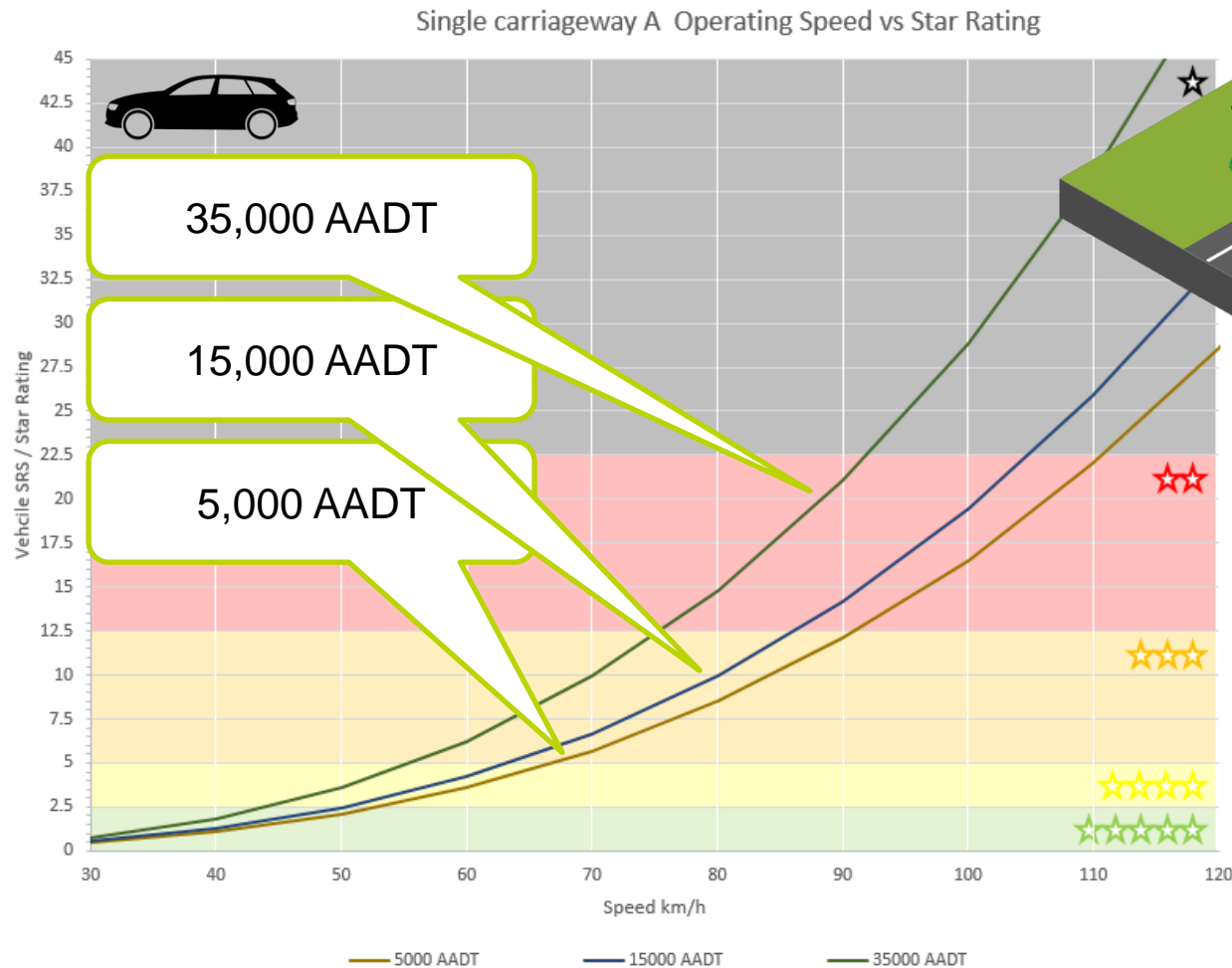
Flow: varying AADT
Median: centre line
Roadside: trees 1-5m offset
Intersections: 4 leg –
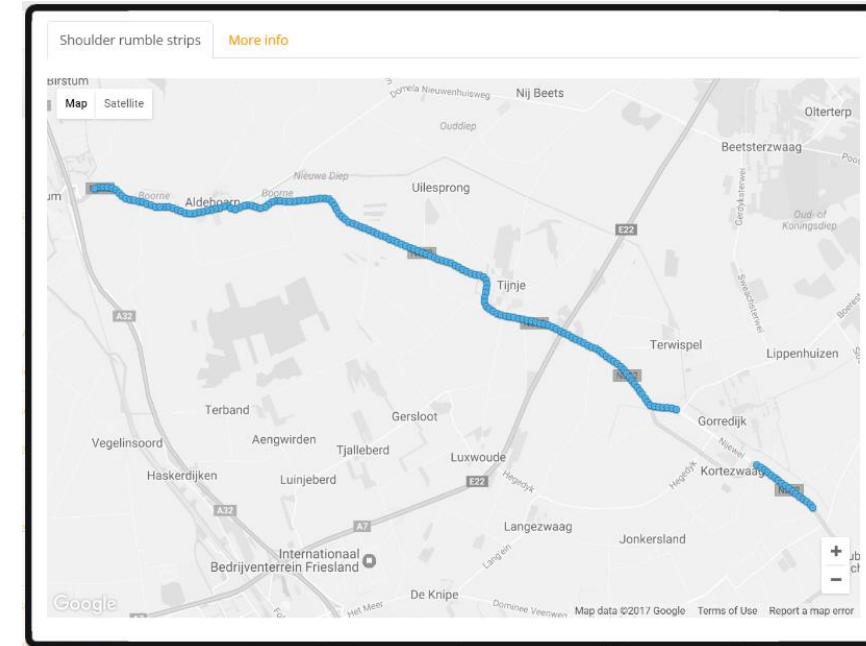unsignalised, no turn lane

Safer Roads Investment Plans
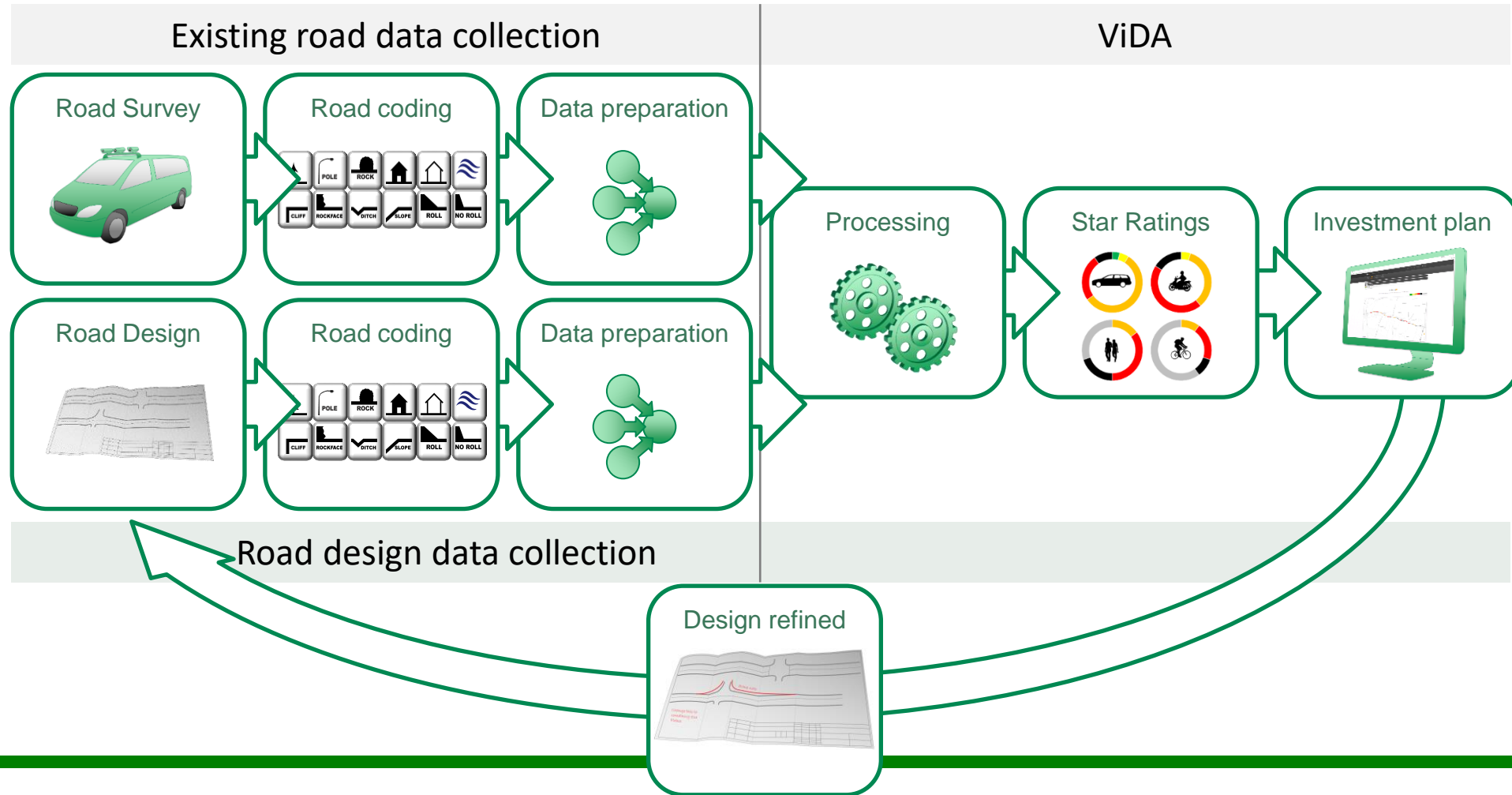
Safer Roads Investment Plan ❓

Currency: € EUR - Analysis Period: 20 years

Total FSIs Saved	Total PV of Safety Benefits	Estimated Cost	Cost per FSI saved	Program BCR
35	11,413,953	6,258,017	176,414	2

Countermeasure	Length / Sites	FSIs saved	PV of safety benefit	Estimated Cost	Cost per FSI saved	Program BCR ▲
Shoulder rumble strips	17.20 km	4	1,336,797	204,641	49,256	7
Improve Delineation	9.60 km	2	660,939	181,267	88,245	4
Protected turn lane (unsignalised 3 leg)	4 sites	6	2,040,064	533,020	84,068	4
Central hatching	1.60 km	0	39,453	9,915	80,860	4
Pedestrian fencing	0.70 km	0	18,513	4,879	84,797	4
Centreline rumble strip / flexi-post	0.10 km	0	3,904	1,190	98,048	3
Sight distance (obstruction removal)	0.10 km	0	6,784	2,520	119,521	3
Footpath provision passenger side (informal path >1m)	1.10 km	0	74,067	26,175	113,709	3
Roadside barriers - driver side	15.60 km	11	3,388,257	2,107,500	200,136	2
Parking improvements	0.30 km	0	5,806	3,780	209,483	2
Footpath provision driver side (informal path >1m)	5.20 km	1	271,122	123,737	146,848	2
Wide centreline	2.60 km	0	25,814	15,678	195,419	2
Roadside barriers - passenger side	6.70 km	4	1,254,544	906,000	232,367	1
Shoulder sealing passenger side (<1m)	0.30 km	0	13,222	13,230	321,962	1
Shoulder sealing passenger side (>1m)	1.80 km	1	177,672	158,760	287,511	1
Footpath provision passenger side (adjacent to road)	0.90 km	0	132,397	140,940	342,523	1

Shoulder rumble strips | More info

Map | Satellite

Star Rating for Designs

Combining Crash Risk Mapping and Star Rating

Medium priority roads

Lower crash rate, but road design is less safe.

Ensure infrastructure basics such as line markings and signage are adequate to reduce likelihood of crash rate increasing.

Highest priority roads

Higher crash rate, road design more likely to be a factor.

Targeted infrastructure investment highly likely to be cost-effective; enforcement and/or education might be used to support infrastructure improvements.

Low priority roads

Lower crash rate, safer road infrastructure.

Celebrate the success!

Medium priority roads

Higher crash rate, road design less likely to be a factor.

Detailed crash investigation required to determine underlying factors; address these e.g. through enforcement and/or education and maintain basic infrastructure.

STAR RATING — 1 STAR / 5 STAR

LOW RISK — HIGH RISK

CRASH RISK

Road Safety Foundation

HOW CAN ROAD AUTHORITIES COMBINE MULTIPLE APPROACHES?

Q & A SESSION

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