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Mobility • Safety • Economy • Environment

Tackling High-Risk Regional Roads

Implementation Guidelines

Dr Suzy Charman
Road Safety Foundation

October 2017

ROAD SAFETY FOUNDATION

Department for Transport

The Royal Automobile Club Foundation for Motoring Ltd is a transport policy and research organisation which explores the economic, mobility, safety and environmental issues relating to roads and their users. The Foundation publishes independent and authoritative research with which it promotes informed debate and advocates policy in the interest of the responsible motorist.

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About these Guidelines

These guidelines have been commissioned by the RAC Foundation and are part-funded by the Department for Transport (DfT). The guidelines are written by Dr Suzy Charman, Research Director of the Road Safety Foundation and are published by the RAC Foundation.

About the Road Safety Foundation

The Road Safety Foundation is a UK charity advocating road casualty reduction through simultaneous action on all three components of the safe road system: roads, vehicles and behaviour. The charity has enabled work across each of these components and published several reports which have provided the basis of new legislation, government policy or practice.

For the last decade, the charity has focused on developing the Safe Systems approach, and in particular leading the establishment of the European Road Assessment Programme (EuroRAP) in the UK and, through EuroRAP, the global UK-based charity, iRAP (the International Road Assessment Programme).

Since the inception of EuroRAP in 1999, the Foundation has been the UK member responsible for managing the programme in the UK (and, more recently, Ireland), ensuring that the UK provides a global model of what can be achieved.

The Foundation plays a pivotal role in raising awareness and understanding of the importance of road infrastructure at all levels, through:

- annual publication of EuroRAP Risk Mapping and Performance Tracking in a form which can be understood by the general public, policymakers and professionals alike;
- supporting use of the iRAP and EuroRAP protocols at an operational level by road authorities, in order to support engineers in improving the safety of the road infrastructure for which they are responsible; and
- proposing the strategies and goals that the government should set in order to prevent tens of thousands of fatalities and disabling injuries.

The Road Safety Foundation was a founder member of the FIA Foundation (established as an independent UK registered charity in 2001 by the Fédération Internationale de l'Automobile, FIA) and frequently works with FIA members and other organisations both in Britain and abroad, including the RAC Foundation, the AA, IAM RoadSmart, RoadSafe, PACTS (The Parliamentary Advisory Council for Transport Safety) and professional bodies such as ADEPT (the Association of Directors of Environment, Economy, Planning and Transport).

The formal objectives of the charity, which was founded in the 1980s, are to:

- carry out, or procure, research into all factors affecting the safe use of public roads;
- promote and encourage the safe use of public roads by all classes of road users through the circulation of advice, information and knowledge gained from research; and
- conceive, develop and implement programmes and courses of action designed to improve road safety, which are to include the undertaking of any projects or programmes intended to educate young children or others in the safe use of public roads.

The library of the Road Safety Foundation's published work is at www.roadsafetyfoundation.org

About the Author

Dr Suzy Charman is the Road Safety Foundation's Research Director. She has international expertise in road safety management, particularly in the prioritisation of road safety engineering interventions.

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The initial pathfinder project was led by Luke Rogers and Alaster Barlow, with later support from James Bradford, Dr Suzy Charman, John Barrell and Tim Sterling.

Disclaimer

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Foreword

Every year, the Road Safety Foundation publishes risk maps showing the rates of death and serious injury on Britain's roads. That analysis also tracks how risk has changed across thousands of road sections in two consecutive three-year data periods. Over that six-year period, more than 10,000 people are killed on our roads, yet deaths on rail and in the air during the same period can be as low as zero.

The government's road safety strategy has adopted the systematic so-called 'Safe Systems' approach to risk. Highways England is leading the way in seeking to move levels of death and trauma towards zero on its network by 2040.

The rail and aviation industries, like other sectors from mining to medicine, take proactive steps to manage known risks. The safety of road workers is managed in the same way. Risks are eliminated before people are killed or hurt. We do not wait.

The contrast between the risks the public face on the roads and elsewhere in their daily lives is stark. Annual deaths in road crashes, for example, are more than ten times greater in the same period than for all work place accident deaths combined.

I am genuinely grateful to the RAC Foundation for their work and support in enabling local authorities to apply the new proactive approach to the local road networks, which is where the vast majority of road deaths take place.

I would like to thank the pathfinding local authorities who first applied this innovative approach, in particular for their willingness to share what they have learnt with others. My thanks to the Department for Transport for enabling the publication of the learning in these guidelines on how to tackle high-risk regional roads.

Lord Whitty
Chairman, Road Safety Foundation

Part of our mission here at the RAC Foundation is to seek out the highest standards in motoring policy and practice, and to ensure that these are widely disseminated. Nowhere is this more important than in the field of road safety, when money for making road improvements is tight and so the need to get best value from every penny is imperative.

That is why we were keen to seize the opportunity to work with the Road Safety Foundation and the Department for Transport to sponsor the application of the risk-mapping and treatment-planning approach to the highest-risk roads as identified by EuroRAP, and to sponsor the production of these guidelines, which we hope will be taken up more widely by all those charged with ensuring that our roads are safe to use.

Steve Gooding
Director, RAC Foundation

Executive Summary

Road traffic crashes claimed the lives of 1,732 people in Great Britain in 2015, and a further 22,137 were reported as being seriously injured[1]. Although we have witnessed a steady decline in road traffic casualties in recent years, this is still a large number, and represents a significant burden on the economy, not to mention the unimaginable pain, grief and suffering caused for the victims and their families.

Countries across the world are now adopting a Safe Systems approach, which means that they no longer simply blame road users for crashes, but instead are seeking to design a system that will protect the road user from death or serious injury when crashes occur. This is a fundamental change in philosophy, which recognises that humans are, by their very nature, frail and error prone, and that we should ensure that vehicles and roads are designed such that when crashes occur, the resulting crash forces can be tolerated.

Central to the concept of Safe Systems is the notion of shared responsibility. There are actions to be taken by a wide variety of public and private entities in order to produce results, working across various disciplines to ensure that a robust system is put in place. One key discipline is road safety engineering, where road authorities seek to provide roads that are safe and fit for use. There are a variety of road safety management tools and methods that can be adopted to determine priorities for improving the safety of roads, including proven and established processes such as Road Safety Audits (for new roads and schemes) and Accident Investigation and Prevention (AIP) (for existing roads).

When AIP is undertaken, historical data is analysed to identify crash cluster sites where there is a clear deficit in road safety and remedial treatment can be applied. As the number of crashes becomes sparse across the road network, it can be beneficial to also bring into play proactive methods that seek to identify and manage risks which are real, but which nevertheless may not yet have resulted in crashes. The approach outlined in these guidelines is not intended to replace traditional AIP, but to provide a complementary approach for use alongside it.

In the Autumn of 2016, the RSF embarked on a project to inspect, Star-Rate and generate Safer Roads Investment Plans (SRIPs) for 11 high-risk A-road sections in England. Shortly after this project commenced, DfT announced the establishment of a 'Safer Roads Fund' of £175 million for the top 50 high-risk local A-road sections in England as identified in the RSF analysis of 2012–14 crash data. The RSF has provided assistance to the authorities responsible for the original 11 high-risk sections, and is presently supporting authorities in generating their applications to the fund for the next 39 high-risk sections.

1 Reported road casualties in Great Britain: main results 2015. DfT June 2016 Statistical Release.

These guidelines have been written to help road authorities manage road crash risk on busy regional roads. This document provides a step-by-step guide on how to use Risk Mapping and Star Rating to identify high-risk roads and then develop treatment plans that will reduce their risk.

The first section provides some background information on Risk Mapping, Performance Tracking, Star Rating and SRIPs. This is followed by a step-by-step overview of how each of these approaches can be applied to manage risk on busy regional roads. In the final section, two case studies are presented to illustrate the process, and the outcome of using this approach.

1. Background

This section provides background information about the approach, in particular Risk Mapping, Performance Tracking, Star Rating and the development of Safer Roads Investment Plans (SRIPs).

1.1 Risk Mapping and Performance Tracking

1.1.1 Risk Mapping

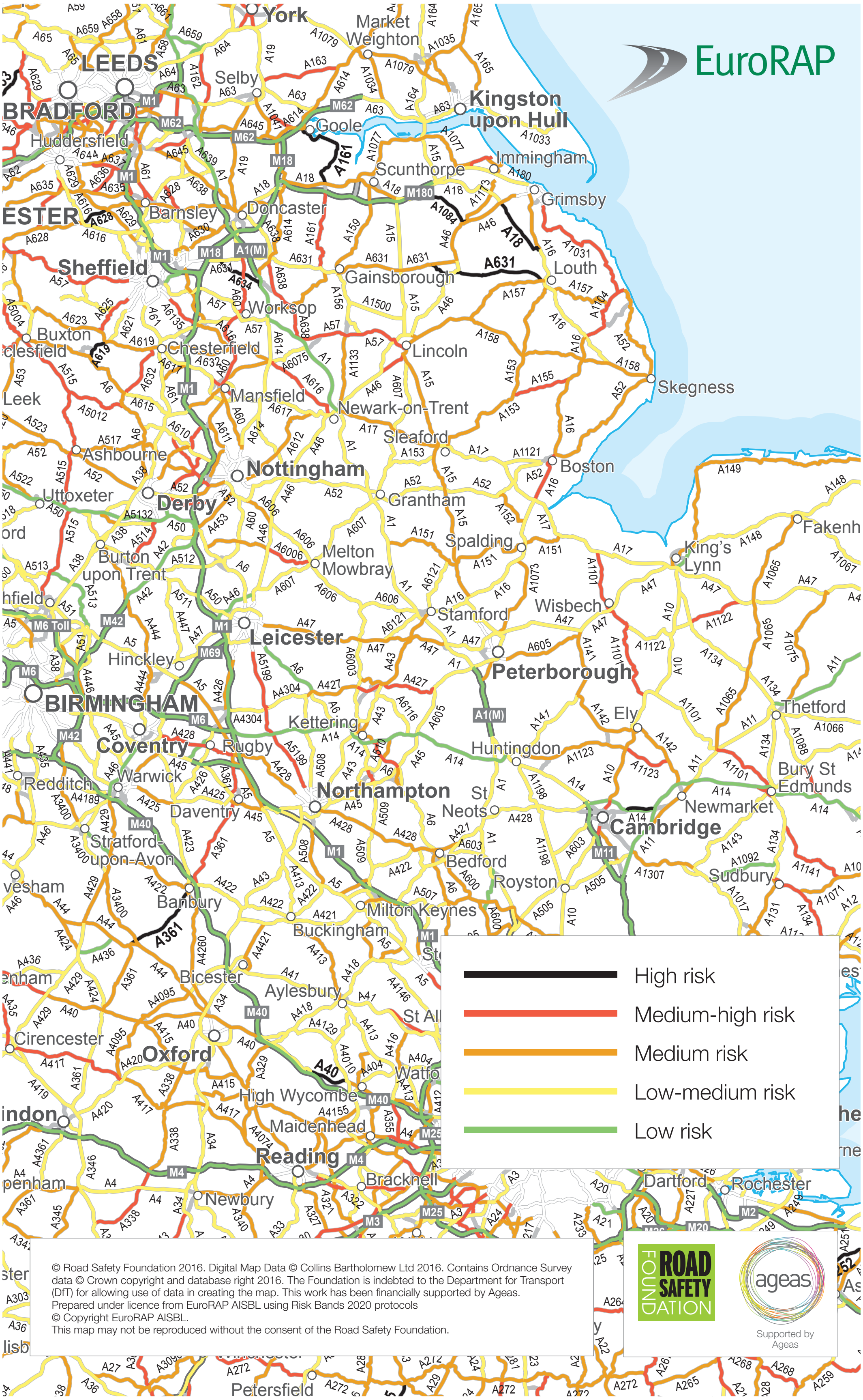
Risk maps provide an objective view of where fatal and serious crashes have occurred on a road network. Such maps can provide a visual representation of various measures, including:

- crash density (crashes per kilometre – commonly called ‘collective risk’ – note that this is influenced by how busy the road is); and
- crash risk (fatal and serious crashes per billion vehicle-kilometres driven – ‘individual risk – which allows for how busy the road is to give more of an idea of how inherently un-safe the road is’).

For crash density or crash risk maps, data from at least three consecutive years is used in order to ensure that the results are robust. Road sections are allocated into colour-coded categories from high-density (or high-risk), to low-density (or low-risk).

The EuroRAP maps most often used show individual risk, and are colour-coded into five categories as shown in Figure 1.1.

Figure 1.1: Excerpt of 2016 Great Britain Risk Map



Source: Road Safety Foundation

Great Britain's latest Risk Mapping results can be found here: http://www.roadsafetyfoundation.org/media/33779/britisheurorapresults2016.pdf. The annual British Risk Maps include the Strategic Road Network (Motorways and Trunk Roads) and busy regional roads outside major conurbations. The network accounts for approximately 10% of Britain's road length, and is the collective location of half of all UK road deaths.

1.1.2 Performance Tracking

Performance Tracking uses the data compiled for consecutive risk maps to assess how risk on the network (or individual sections) has changed over time. This can highlight where roads are persistently high-risk (i.e. remain high- or medium-high- risk over two Risk Mapping periods), or where significant improvements have been made. Capturing the reason behind significant improvements can highlight successful interventions.

1.2 Star Rating and Safer Roads Investment Plans

In this approach, roads are video-surveyed, and then more than 50 road features that are known to influence crash likelihood and severity are coded every 100 m along the route. The data is combined with supporting data such as speed surveys, road user flows, crash distributions and is uploaded into ViDA, which is iRAP's online analysis tool (see vida.irap.org). ViDA provides Star Ratings and SRIPs.

1.2.1 A proactive risk management approach

This method allows road authorities to take a 'proactive' risk assessment approach to identifying potential treatments to reduce risk, in the same way as is applied in other industries such as medicine, mining, aviation, and even road worker safety. A proactive approach can mean taking action to remove risks *before* people are killed or hurt. Rather than focusing on historical crash cluster sites alone, where chance can often be the main explanation of clusters and 'regression to the mean' effects can flatter the effectiveness of action, a proactive approach seeks to focus on real, known high risks.

1.2.2 Star Ratings and risk

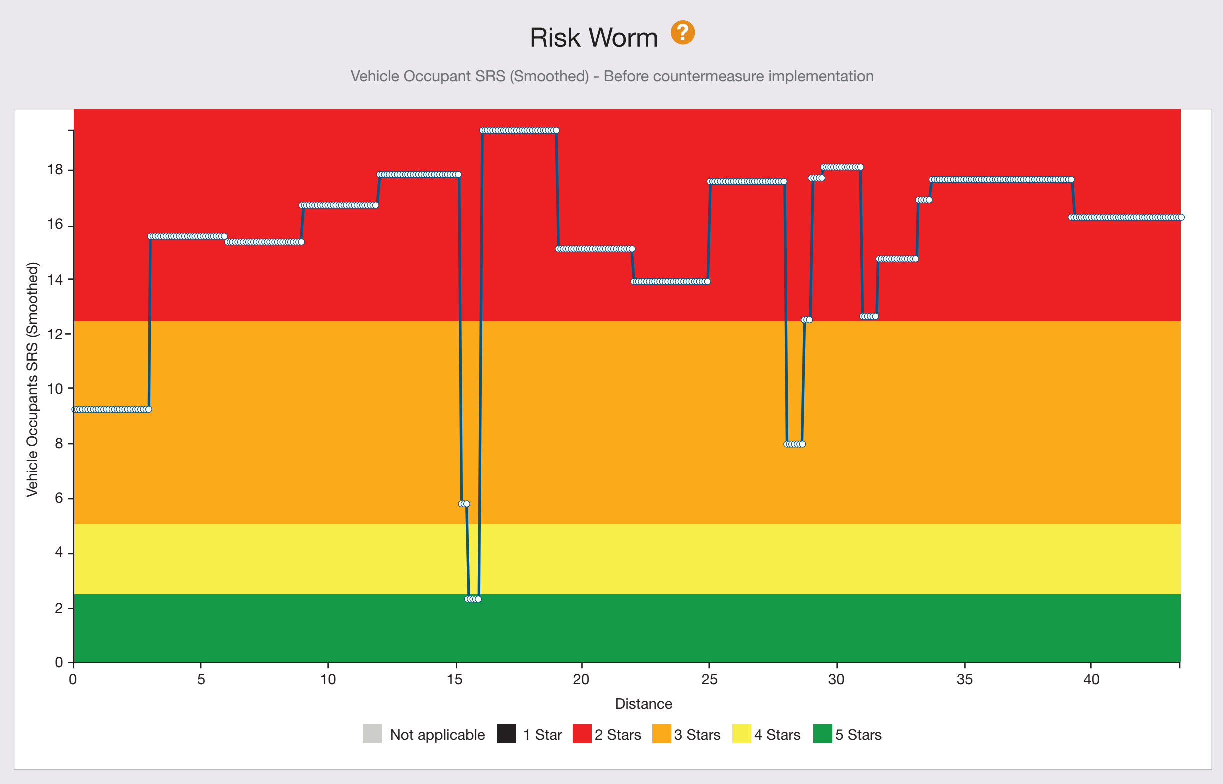
Star Ratings are based on road attribute data (information about the geometry and layout of the road such as lane width, junction type, presence and distance to roadside obstacles), and provide a simple and objective measure of the level of safety built in to the roads, for each of four types of road user: vehicle occupants, motorcyclists, pedestrians and cyclists.

The Star Ratings reflect risk contributed by each of the road attributes that are coded – the higher the risk, the lower the rating. The risk is calculated on the basis of research evidence on crash modification factors that describes relationships between road attributes and crash risk. More about the model can be found at: http://irap.org/en/about-irap-3/methodology. Star Rating information can be viewed using charts, tables and maps.

Star Rating maps provide a powerful visual for describing how risk changes along a route. These can be viewed for the type of road user mentioned above: vehicle occupants, motorcyclists, pedestrians and cyclists. The safest categorisation is 5-star roads (green), and 1-star (black) are the least safe.

The **risk worm** is a line chart that displays the Star Rating Score (SRS) along the route. An example is shown in Figure 1.2. The SRS is the numerical score that underpins the Star Ratings. The risk worm is able to show the SRS for each of the road user types. This helps a road authority to identify locations that are particularly high-risk along a given route.

Figure 1.2: Example of a risk worm



Source: iRAP

Star Ratings can also be applied to designs. This can motivate designers of new and improved roads to think about risk management in a fresh way.

Increasing numbers of road authorities around the world are using **Star Ratings as policy targets**. This approach can be attractive to senior officers and elected members of local authorities and other government bodies who are accountable for ensuring that policies are being effective at the macro level, and that funds are well allocated. International experience is that officials in high positions are more likely to support road safety action if what is being delivered can be expressed in clear objective terms alongside an evaluated business case. For example, Highways England has a delivery plan commitment to ensure that 90% of travel on the Strategic Road Network occurs on 3-star roads or above by 2020. More about this can be found in the *iRAP Star Rating Policy Targets: Discussion Paper* available at http://irap.org/en/about-irap-3/research-and-technical-papers.

1.2.3 Safer Roads Investment Plans

SRIPs identify ways in which fatal and serious injuries (FSIs) can be prevented in a cost-effective way. ViDA calculates the casualty reduction expected from around 90 countermeasures (treatments designed to improve safety such as crash barriers, central cross hatching and shoulder rumble strips also known as raised rib line), and does so every 100 m along an inspected road, comparing this against the cost of implementing the treatment, to produce an economic appraisal. Greater value can be achieved through implementing treatments along a whole section, rather than individual site treatments. The output is a SRIP, which can be interrogated at the individual section, regional or national (portfolio) level to assess the appropriateness and effectiveness of individual options for improvement. These can be refined to allow economic appraisal of a locally acceptable treatment programme. The appraisal period is normally 20 years, allowing the cost of implementing each measure to be evaluated against the expected casualty savings over the same time period. ViDA provides Present Values (PVs) and Benefit Cost Ratios (BCRs) for appraisal of each proposed countermeasure. The information presented in ViDA is shown in Figure 1.3.

Figure 1.3: Example of a Safer Roads Investment Plan

Safer Roads Investment Plan

Currency: £ GBP - Analysis Period: 20 years

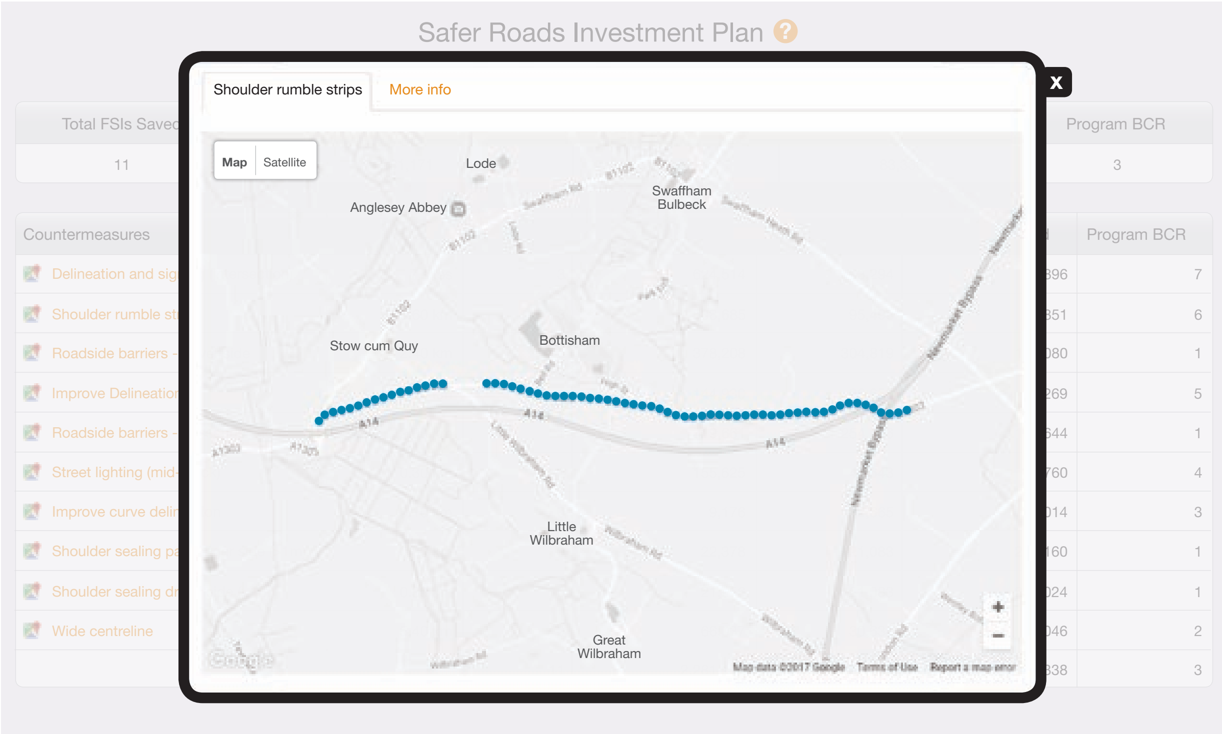
Total FSIs Saved	Total PV of Safety Benefits	Estimated Cost	Cost per FSI saved	Program BCR
11	2,281,171	890,392	83,338	3

Countermeasures	Length / Sites	FSIs saved	PV of safety benefit	Estimates Cost	Cost per FSI saved	Program BCR
Delineation and signing (intersection)	7 sites	3	624,514	93,294	31,896	7
Shoulder rumble strips	6.60 km	3	538,685	95,498	37,851	6
Roadside barriers - driver side	2.40 km	2	378,208	304,819	172,080	1
Improve Delineation	1.00 km	1	144,930	26,655	39,269	5
Roadside barriers - passenger side	2.00 km	1	319,661	254,016	169,644	1
Street lighting (mid-block)	0.30 km	1	155,625	40,643	55,760	4
Improve curve delineation	0.10 km	0	9,176	2,665	62,014	3
Shoulder sealing passenger side (>1m)	0.30 km	0	22,378	21,083	201,160	1
Shoulder sealing driver side (>1m)	0.30 km	0	21,956	21,083	205,024	1
Wide centreline	5.40 km	0	66,037	30,634	99,046	2
		11	2,281,171	890,392	83,338	3

Source: iRAP

Clicking on one of the treatments in the SRIP in ViDA identifies the location where the treatment is suggested (Figure 1.4), and provides the economic details of the treatment at each 100 m segment. This assists engineers to determine appropriate countermeasures along a route.

Figure 1.4: Map showing the location of recommendation for shoulder rumble strips



Source: iRAP

1.2.4 User-Defined Investment Plans

Once an engineer has reviewed the initial SRIP, they will consider the proposals and will start to formulate a final user-defined set of treatments for implementation that are called a User-Defined Investment Plan, or UDIP. Although very sophisticated, the SRIPs are simply based on logical models and, as with all models, an expert engineer will be able to ensure that an optimised plan is developed that takes into account the local environment and other nuances.

2. The Process

The iRAP methodology was originally developed to enable network-wide assessments utilised by investors or national authorities, to assess levels of investment for large-scale national programmes. Although regional roads have been assessed before, the pathfinder project and subsequent project to inspect the top 50 high-risk A-roads in England is novel, since smaller individual sections have been selected using the Risk Mapping approach, and then SRIPs have been generated and refined for use in an application process to DfT's Safer Roads Fund. This requires greater refinement and localisation of SRIPs than has previously been necessary. When this refinement is undertaken, a UDIP is developed.

This section outlines a process for local authorities to apply the Risk Mapping and Star Rating methodologies, from the selection of priority sections, through to survey and coding, SRIP generation, UDIP development, and finally evaluation. An overview is shown in Figure 2.1.

Figure 2.1: Overview of process

2.1 Identifying priority sections

The first step in the process is to identify the roads to which the Star Rating and SRIP methodology is to be applied.

A number of options are possible, each with their advantages and disadvantages. The approach could be applied to:

- **The whole road network:** this has the advantage of enabling you to manage risk across the network in a prioritised manner. In addition, you can set strategic goals – for example ensuring that 90% of travel is on roads which are 3-star or above by 2025. Star-Rating a whole road network would provide a baseline from which to monitor improvement and a roadmap detailing how a goal may be achieved, the investment required, and the overall benefit (in terms of fatalities and serious injuries prevented) to the economy.
- **A subset of the road network**: although there are economies of scale that can be achieved – and other benefits – by surveying a whole road network, this might not be possible owing to funding or other constraints. Rather than surveying the whole road network, you could identify a subset of the network to be surveyed. You could identify these roads by road type, e.g. all rural roads, all A-roads, or all roads with an annual average daily traffic (AADT) figure greater than a given value. These could be used in combination with each other, e.g. all rural A-roads with an AADT greater than *x*. Alternatively, they could be used in combination with a threshold for given crash density (fatal and serious crashes per mile) or for crash risk (fatal and serious crashes per billion vehicle kilometres travelled).

  If a crash density or crash risk threshold approach is taken, the network will need to be divided into sections long enough for a statistically reliable result to be obtained. Several years (at least three) of crash data should be used, ideally more, to ensure that a road is persistently high-risk and has not been subject to a randomly high number of crashes in one data period.

  It is possible to find roads that are particularly worthy of consideration for further investigation through a combination of selection criteria, for example, rural A-roads that have an AADT above *x*, a crash density of above *y*, and where the individual risk is greater than *z* crashes per billion vehicle-kilometres driven.

- **Individual sections:** individual sections can be surveyed as and when they are identified as a priority, when funding opportunities specific to that road emerge, or where major rehabilitation works are planned, meaning that additional improvements can be made at marginal cost. Using this approach means that it will not be possible to prioritise investment across a portfolio of roads; the greatest possible impact may thus not be achieved.

2.2 Survey, coding and supporting data

2.2.1 Survey

Once a road section, or subset of road sections, has been identified, the first step is to undertake the survey. During the survey, GPS-referenced videos are collected along the route. It is possible for road authorities to capture their own videos of the network, which they would then need to upload for coding. If an external supplier is preferred, the RSF will be able to assist with procurement. There is a standard Terms of Reference available at http://www.irap.net/en/about-irap-3/specifications.

This does not require expensive, high-tech equipment, as sufficient quality can be achieved using readily available equipment. Alternatively, existing images can be used – such as those available in Google Street View. Further information can be found in *Star Rating and Investment Plans: Roads Survey and Coding Specification* available at: http://downloads.irap.org/docs/RAP-SR-2-1_Road_survey_and_coding_specification.pdf. Some consideration should be given to compatibility of video and GPS files with the coding software that will be used in the next stage of the project.

2.2.2 Coding

In the coding process, 50 attributes that are relevant to road safety outcomes are coded every 100 m along the road section. Coding is an intricate and time-consuming task and needs to be undertaken by accredited personnel who are adequately trained and experienced. It is possible to do this in-house; however, there are also accredited coding teams available in several countries should an authority prefer to procure this activity. Various documents describing the coding process are available, including a coding manual (in two versions, according to which side of the road traffic drives), at http://irap.org/en/about-irap-3/specifications.

iRAP requires all coding to be scrutinised through a quality assurance (QA) process, whereby 10% of the network is recoded and any problems or inaccuracies are identified. The QA process runs throughout the project, and it is important that the first sample is reviewed early in the coding task. More information about QA in the coding process is available in the document *Star Ratings and Investment Plans: Quality Assurance Guide* at http://irap.org/en/about-irap-3/specifications.

2.2.3 Coding review

An important step in the process is for engineers to review and update the coded data using their local knowledge. In order to interrogate the coded data, the process outlined in Appendix A: Updating the Core Data File can be followed. Some coding systems allow the videos to be reviewed alongside the coded features, which makes this task relatively straightforward.

In particular, road authorities will have a more accurate feel for the number of pedestrians and cyclists using the route than a remote coding team would, and may have access to quantitative survey data that provides AADTs for the through road and intersecting roads, and observed vehicle speeds through the route. These data items can be found in the core data file under the following columns (column numbers in brackets):

- AL (38) Intersecting road volume
- BK (63) Vehicle flow (AADT)
- BL (64) Motorcycle %
- BM (65) Pedestrian peak hour flow across the road
- BN (66) Pedestrian peak hour flow along the road driver-side
- BO (67) Pedestrian peak hour flow along the road passenger-side
- BP (68) Bicycle peak hour flow
- BQ (69) Operating Speed (85^{th} percentile)
- BR (70) Operating Speed (mean)

2.2.4 Supporting data

At an overall project level, three sets of information are required: crash data, economic parameters, and countermeasure costs.

Supporting data can be edited through selecting ‘Project Setup & Access’ in the ViDA dashboard and then selecting the dataset that you are working with and using the ‘edit’ function. In the ‘edit dataset’ screen you will see eight steps. Road authorities will need to update the information in Stages 5 and 6. All updates will need to be saved and then, in order to ensure that changes are reflected in the results, the dataset will need to be reprocessed in Stage 7.

The overall model is calibrated to the total number of fatalities occurring on the inspection route. In ‘Stage 5: Fatality Estimation’ you can enter the total number of fatalities in a specified time period. If no fatalities have occurred during the time period, then you can divide the number of serious injuries by the overall network’s ‘serious injury to fatality’ ratio. This will be in the region of 10 to 12.

Further down the screen, the percentage of crashes by road user and crash type can be seen (see Figure 2.2). For a large inspection network it is possible to enter actual numbers of casualties here; however, for individual sections data will be too sparse to provide robust distributions. Therefore for a single section it will be necessary to build a crash distribution for several roads with a similar traffic mix and environment.

Figure 2.2: ViDA screen where casualty percentage distribution can be entered

Percentages and Annual Fatalities | Percentages | Fatalities

Assigned total: 1.1 Calibration total: 1.1	Vehicle occupant	Motorcyclist	Pedestrian	Bicyclist
	Percentage (%)	Percentage (%)	Percentage (%)	Percentage (%)
User group distribution	40	25	25	10
Run-off LOC driver-side	30	30		10
Run-off LOC passenger-side	30	30		
Head-on LOC	10	10		
Head-on overtaking	10	10		
Intersection	10	10		10
Property access	5	2		
Along		3	80	80
Crossing intersected road			10	
Crossing inspected road			10	
Other	5	5	0	0

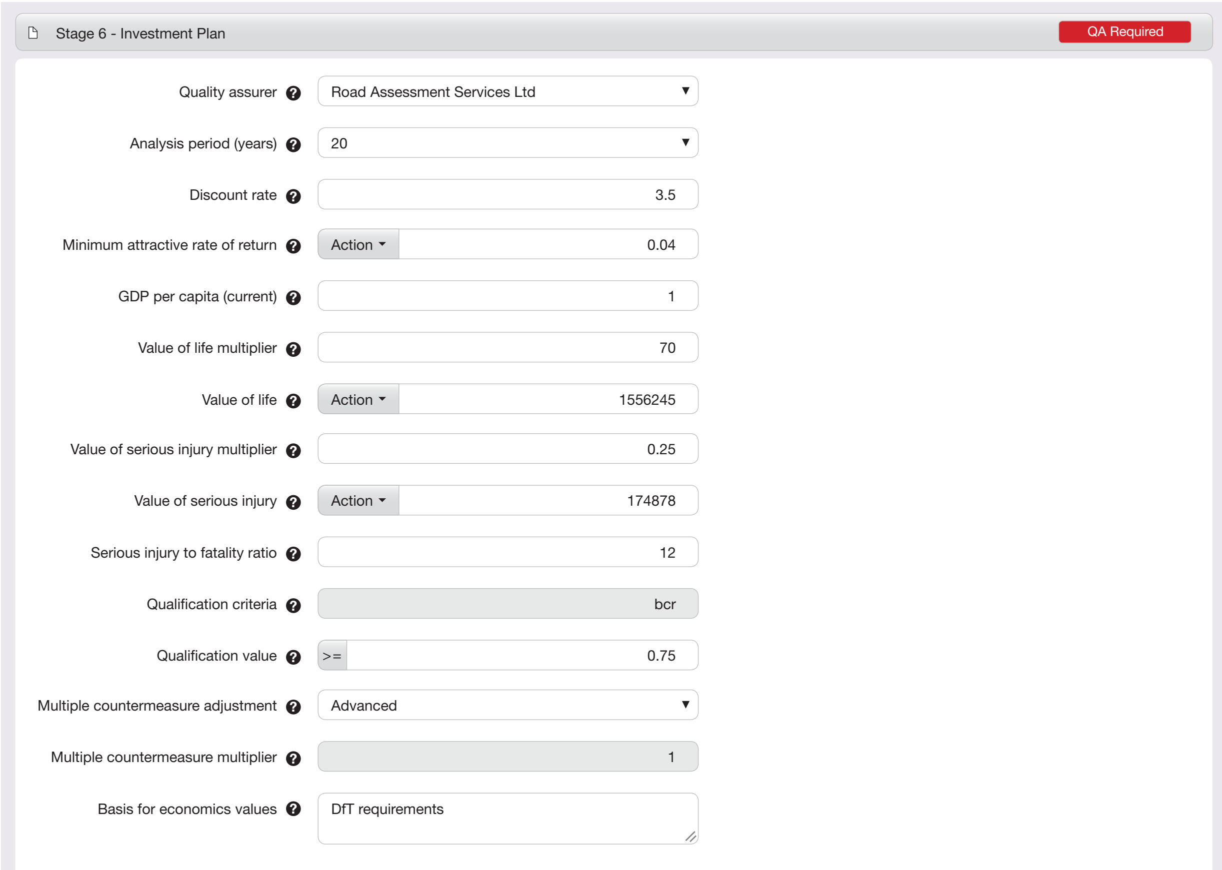
Source: iRAP

In ViDA it is possible to set various economic parameters to be used for the SRIP. These are:

- cost of a fatality;
- cost of a serious injury;
- appraisal period (typically we use 20 years although this can be adjusted);
- discount rate;
- 'serious injury to fatality' ratio; and
- a BCR qualification criteria.

These can be edited in 'Stage 6: Investment Plan' as shown in Figure 2.3.

Figure 2.3: ViDA screen that allows tailoring of economic appraisal values



Source: iRAP

The SRIP uses a lookup table of costs when calculating the cost of implementing triggered countermeasures – these can be edited further down the screen in Stage 6. The best way to review and edit these is by downloading the costs to a .csv file using the button on the right of the table, and then re-uploading the file once edited, using the button on the left.

For each countermeasure, the downloaded .csv file shows the unit of cost (which is either per km or per site, depending on the treatment), the service life, and six costs. A low, medium and high cost for each countermeasure in urban and rural environments is included to allow the system to take account of areas where cost to upgrade is high (e.g. where there are buildings adjacent to the road, or utilities to move), medium or low (e.g. where there are open fields adjacent to the road). These costs can be based on previous projects, and then amended to suit local procurement conditions. These can also be edited in the 'Project Setup & Access' screens, 'Stage 6: Investment Plan', as shown in Figure 2.4.

Figure 2.4: ViDA screen that allows tailoring of countermeasure costs

Countermeasure costs

Review Countermeasure Triggers

Countermeasure cost upload file requirements

Upload costs

Download costs

Run-off LOC passenger-side	Service Life	Rural / open areas			Urban / rural town of village			Ignore	Edit
		Low	Medium	High	Low	Medium	High	All:	
Improve Delineation	5	4234	4704	5174	5504	6115	6727		
Bicycle Lane (on-road)	20	16934	18816	20698	22015	24461	26907		
Bicycle Lane (off-road)	20	123621	137357	151092	160707	178564	196420		
Motorcycle Lane (Painted logos on-road)	5	7620	8467	9314	9907	11007	12108		
Motorcycle Lane (Construct on-road)	20	8467	9408	10349	11007	12230	13453		
Motorcycle Lane (Segregated)	20	127008	141120	155232	165110	183456	201802		

Save stage   Restore

Source: iRAP

The more accurate this supporting data is, the better the SRIP outputs will be. Refining this background data with local intelligence is a necessary activity. Further information about supporting data can be found in *Star Ratings and Investment Plans: Supporting Data Template* available at: http://irap.org/en/about-irap-3/specifications.

2.3 Preliminary generation of a Safer Roads Investment Plan

Once the coding and supporting data are entered into ViDA, the analysis can be run, the final core data file can be uploaded, and the data reprocessed in ‘Stage 7: Processing’.

The next step is a sense check of the initial results to determine if there are any further areas in the coding that need to be amended to reflect true local conditions. This stage is best undertaken by an experienced road safety engineer, who will check the risk worm output and countermeasure proposals as they review the video of the surveyed section. They will then assess the credibility of the risk values and countermeasures using their expert judgement.

There may be situations where the road safety engineer detects anomalies in the coding or background data. This provides an opportunity to update these to accurately reflect the local environment. The process for downloading, amending and re-uploading the core data file is described in Appendix A: Updating the Core Data File.

2.4 Development of a User-Defined Investment Plan

Once the initial sense checking has been undertaken, the outputs should be logical. The next step is to refine the SRIP and formulate a UDIP. Not every countermeasure proposed by the model will be a preferred solution locally, and it is likely that not every countermeasure will be affordable. The countermeasure options that are proposed are only a guide to highlight where treatments may be beneficial to address an identified risk.

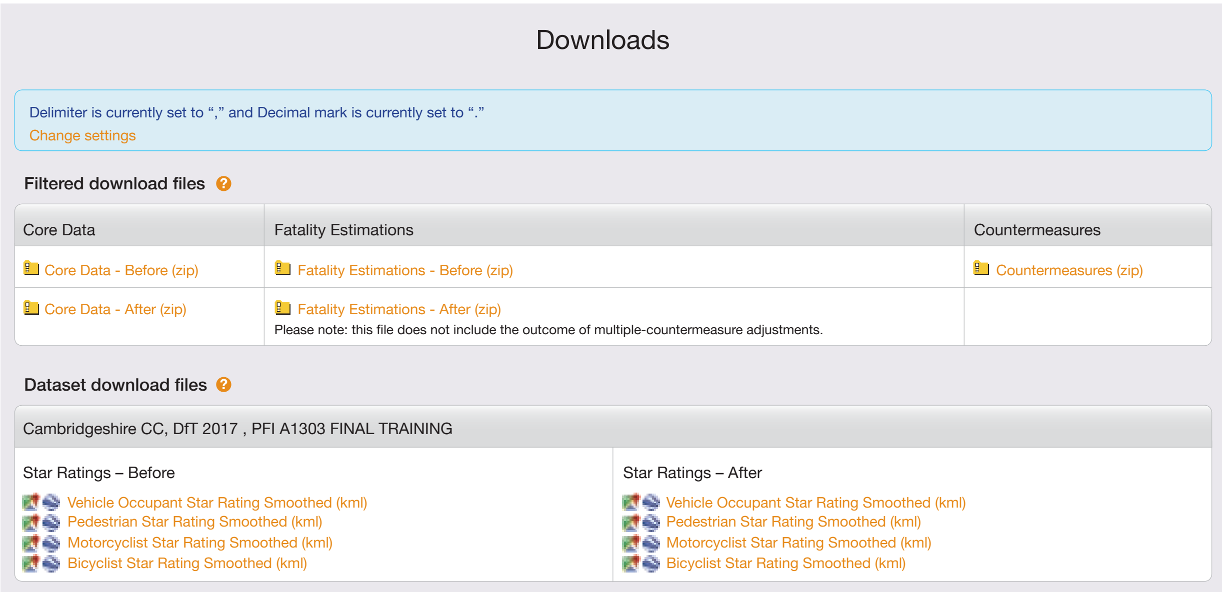
For example, a countermeasure such as constructing a crash barrier in the median of a single carriageway road may be suggested. While this may not be a preferred solution locally, the SRIP is indicating that there is a head-on crash risk that may be usefully and economically addressed by quite an extreme measure. Instead, a road authority may choose to introduce central hatching, along with a reduced speed limit. Further information about road safety countermeasures can be found at http://toolkit.irap.org/.

A road authority can use the SRIP suggestions, coupled with road safety engineering experience, to develop a UDIP. The RSF will then model a proposed UDIP that combines local knowledge with the SRIP, by creating a post-implementation scenario for a programme of proposed treatments.

The RSF has developed a spreadsheet 'iRAP Star Rating – UDIP' to help road authorities describe what treatments they would like to implement, and where.

The first task is to upload the data in the preliminary SRIP for each road section into the spreadsheet. From the dashboard, select results (for a single section of road). Then select 'Downloads' from the menu at the top of the page. Once you are in the download screen, select the countermeasure file on the right-hand side (see Figure 2.5). Just as with the core data file, this will then be requested, and a message will then pop up in your message inbox so you can download the file.

Figure 2.5: Countermeasure download file



Source: iRAP

Open the countermeasure file and select the contents, and copy and paste this into the 'countermeasure_download_file' tab in the 'iRAP Star Rating – UDIP' spreadsheet. Go to the first tab and press the 'Create UDIP plan' button. This will allow the countermeasure suggestions generated in ViDA to be entered into the 'UDIP_plan' tab. Chainage (distance) along the route in kilometres is shown across the top, and all of the possible countermeasures are shown down the left-hand side. Green cells denote where ViDA has recommended a countermeasure, orange cells are where ViDA suggested a countermeasure but it was overridden (see Figure 2.6). Countermeasures can be overridden in ViDA if the BCR does not meet a specified threshold, or if a more effective countermeasure was triggered.

Figure 2.6: Spreadsheet for road authorities to record intended countermeasure plans for ViDA modelling

Countermeasure		Distance (km)																			
ID	**Name**	**0**	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1**	**1.1**	**1.2**	**1.3**	**1.4**	**1.5**	**1.6**	**1.7**	**1.8**	**1.9**
29	Duplicate - 10-20m median																				
30	Duplicate - >20m median																				
31	Service road																				
32	Additional lane (2 + 1 road with barrier)	R	R	R	R	R	R	R	R	R	R	R		S	S	S	S	S	S	S	S
33	Implement one way network																				
34	Upgrade pedestrian facility quality																				
35	Refuge Island													F		F					
36	Unsignalised crossing													S	S	S	S				
37	Signalised crossing																				
38	Grade separated pedestrian facility																				
40	Road surface rehabilitation																				
41	Clear roadside hazards - passenger side		S	R					S	S	S	S	S						R		
42	Clear roadside hazards - driver side	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	R	S
43	Sideslope improvement - passenger side																				
44	Sideslope improvement - driver side																				
45	Roadside barriers - passenger side	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
46	Roadside barriers - driver side	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
47	Shoulder sealing passenger side (<1m)	S	S	S	S	R	R	S	S	S	S	S	S	S	S	S	S	S	F	F	F
48	Shoulder sealing passenger side (>1m)	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
52	Restrict/combine direct access points	S	S																		
54	Footpath provision passenger side (adjacent to road)																				
55	Footpath provision passenger side (>3m from road)																				
56	Speed management reviews																				
57	Traffic calming																				
59	Vertical realignment (major)																				
60	Overtaking lane	S	S	S	S	S	S	S	S	S	S	S	R	R	R	R	R	S	S	S	S
61	Median crossing upgrade																				
62	Clear roadside hazards (bike lane)																				

Source: iRAP

Road authorities can then review this spreadsheet and add an F (for final) to denote where they would like to install a treatment (once F is added, the cell will automatically turn red). This allows the authority to select locally suitable treatments.

Once the RSF receives the completed 'iRAP Star Rating – UDIP' spreadsheet, we will process this information in order to model a new scenario in ViDA. This will allow the RSF to provide you with a 'finalised UDIP' as a Microsoft Excel file. For each countermeasure in the plan, this will provide:

- the name of the countermeasure and length along which, or sites where, it will be applied;
- the estimated number of fatalities saved and serious injuries prevented over the appraisal period;
- the PV of the crash cost savings over the appraisal period;
- the cost of implementing the countermeasure, discounted to the baseline year;
- the cost per FSI saved; and
- the BCR over the appraisal period.

The RSF will also be able to provide an 'after implementation' Star Rating for comparison with the original Star Rating results.

2.5 Monitoring and evaluation

2.5.1 Shorter-term monitoring and evaluation

In the first instance, new scheme designs will often require an independent Road Safety Audit at various stages, which should include monitoring of crash data once the scheme is open. New schemes may not always improve the section's road safety record, so it is vital to identify any emerging trends quickly and rectify any problems that have been identified.

Once a scheme has been implemented, it is possible to Star-Rate the new scheme either from design or by resurveying the road section. This allows an immediate comparison with the original Star Rating results.

2.5.2 Longer-term evaluation

Once a proposed scheme has been agreed, it is important to collate baseline data against which performance can be evaluated. This should be data from a period before any work commences. It is recommended that fatal, serious and slight crash numbers are recorded by crash type and road user. Formal evaluation may only be achieved once sufficient crash numbers have occurred. It is suggested that a two- to three-year period will need to pass following completion of the scheme before sufficient data will be available for formal evaluation.

3. Case Studies

These case studies have been developed from a project where the RSF supported local authorities in their applications to DfT's Safer Roads Fund. In 2017, local authorities with one of England's top 50 high-risk local A-road sections were invited to apply for funding under DfT's Safer Roads Fund which has a budget of £175 million over four financial years, from 2017/18. The top 50 high-risk road sections were identified through the RSF's annual Risk Mapping analysis. The two case studies reported in the sections that follow have come from a pathfinder local authority group which was supported by the RSF in submitting proposals by April 2017 for funding commencing in financial year 2017/18. The pathfinder project was sponsored by the RAC Foundation.

In the pathfinder project, the RSF surveyed and coded 11 road sections from eight pathfinder local authorities. The RSF team worked with engineers from the local authorities to refine their SRIPs for submission to DfT.

3.1 A1303 – Cambridgeshire

The first case study relates to a section of the A1303 in Cambridgeshire. Table 3.1 gives a description of the route and key facts relevant to road safety on the section in question.

Table 3.1: Case study 1 – A1303 in Cambridgeshire: key facts

Description of route	This section is east of Cambridge, running from Stow cum Quy to the Newmarket Bypass. The road runs mainly through agricultural land, with a small number of residential and commercial frontages. This stretch of road is the main signed route for Newmarket from the west, and also provides access to the local villages of Bottisham and Great Wilbraham.
Length	4.4 miles (7.1 km)
Speed limit	The majority of the road (87%) has a posted speed limit of 60 mph, with the remainder being 50 mph. It is a rural single carriageway road.
AADT	4,851 vehicles (2015)
Fatal and serious crashes, 2012–14	Seven serious crashes from 2012–14. Two of these serious crashes involved vulnerable road users, three were at junctions, one was a run-off-road crash and one was a head-on crash.
Link to application form	https://www.cambridgeshire.gov.uk/transport-funding-bids-and-studies/transport-funding-bids/

Source: Cambridgeshire County Council

3.1.1 Main features

83% of the road has a centreline in the median, 13% has hatching or a wide centreline, and there is a small amount of physical median.

There are roadside objects within 5 m of the roadside along 42% of the road.

Nearly all of the route has a narrow-paved shoulder of 0–1 m.

75% of the road is straight or gently curving, the rest having moderate bends.

Most of the route (83%) has adequate delineation, 17% was poor.

Intersections comprise:

- 1 roundabout;
- 3 three-leg un-signalised intersections with protected turn lane;
- 4 three-leg un-signalised intersections with no protected turn lane; and
- 1 three-leg signalised intersection with no protected turn lane.

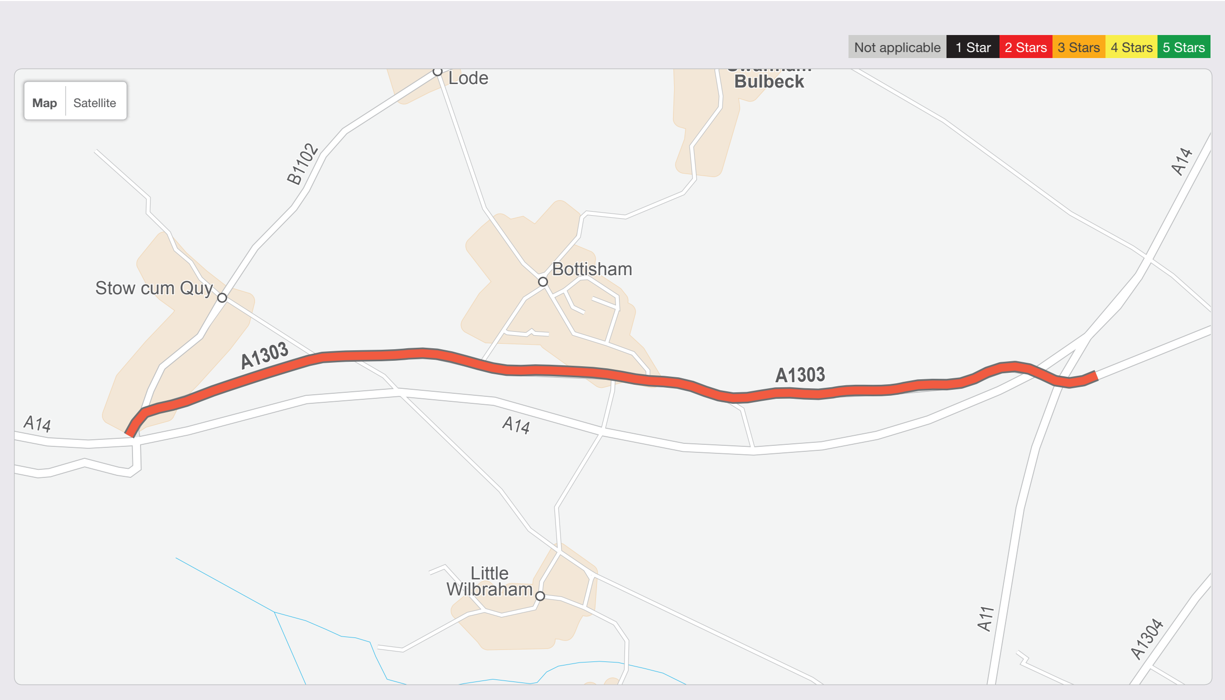
There was limited evidence of pedestrian and cyclist flow.

37% of the route had a shared use cycle path.

3.1.2 Star Rating results

The vehicle occupant Star Rating for the entire route is 2 stars, as shown in Figure 3.1.

Figure 3.1: A1303 Star Rating map (vehicle occupant)



Source: iRAP

Figure 3.2 shows the Star Ratings by road user group.

Figure 3.2: Snapshot of A1303 Star Ratings by road user group

Star Ratings By Distance

	Vehicle Occupant		Motorcyclist		Pedestrian		Bicyclist	
Star Ratings	Length (kms)	Percent	Length (kms)	Percent	Length (kms)	Percent	Length (kms)	Percent
5 Stars	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
4 Stars	0.00	0.00%	0.00	0.00%	3.70	52.11%	0.00	0.00%
3 Stars	0.00	0.00%	0.00	0.00%	0.00	0.00%	3.00	42.25%
2 Stars	7.10	100.00%	4.10	57.75%	0.00	0.00%	0.00	0.00%
1 Stars	0.00	0.00%	3.00	42.25%	0.00	0.00%	4.10	57.75%
Not applicable	0.00	0.00%	0.00	0.00%	3.40	47.89%	0.00	0.00%
Totals	7.10	100%	7.10	100%	7.10	100%	7.10	100%

Source: iRAP

3.1.3 Key considerations in developing the User-Defined Investment Plan

The first step undertaken in refining the SRIP was to review the coded data and make any amendments required before uploading it to ViDA. The countermeasures generated by the SRIP were then reviewed by experienced highways engineers to assess the feasibility and affordability of each proposed measure along the route.

The original SRIP recommended central hatching and median barrier for much of the route. There was insufficient carriageway/verge width available for this, so these measures were switched off, and a wide centreline was instead included in the final proposal to manage head-on risk.

One of the most challenging risks to mitigate related to the existence of roadside hazards that were highlighted by the model. ViDA suggested that these should be protected with roadside barrier, based on the optimum BCR. Whilst the benefits of this are clear, applying this remedy to a rural road network can be challenging for local authorities in terms of maintenance and aesthetics. Consideration was therefore given as to whether any of these hazards could be removed, relocated, or – as was established with the street lighting columns – replaced with passively safe infrastructure. Ultimately a mixed approach was selected, to balance the removal of trees with their protection, with the proposed use of wooden clad safety barrier to mitigate visual impact on the rural environment.

All of the proposed countermeasures were brought together and illustrated in one general layout plan by the highway design team and used as the base document for the feasibility and costing exercise. The cost information in the final UDIP was then manually corrected to reflect local cost data provided by our Highway Services Contractor, incorporating risk, design and project management costs.

3.1.4 Submitted User-Defined Investment Plan

Table 3.2 provides a summary of the proposed countermeasures included in the proposal for A1303. It includes the ViDA-generated 20-year economic appraisal information, along with 2017 capital investment costs. The scheme is estimated to save 11 FSIs, and the overall programme BCR is 2.54, meaning that for every £1 spent, it is expected that the economy will benefit from a return of £2.54.

Table 3.2: UDIP as submitted for A1303

Countermeasure	Length/ No. of sites	Unit	FSIs saved[a]	PV of benefits (£)[b]	Cost (2010 prices) (£)	Cost per FSI saved (£)	BCR[c]	2017 capital cost/unit (£)	Total cost (£)
Delineation and signing (intersection)	7	sites	2.8	805,416	43,035	15,194	18.72	7,289	51,026
Roadside barriers – passenger-side	1.051	km	0.6	182,343	112,084	174,795	1.63	126,447	132,896
Roadside barriers – driver-side	1.394	km	0.9	244,755	109,869	127,649	2.23	93,451	130,270
Shoulder rumble strips	6.6	km	2.3	653,881	64,355	27,987	10.16	11,561	76,304
Improve delineation	1.1	km	0.7	187,126	6,788	10,315	27.57	7,316	8,048
Protected turn lane (un-signalised 3-leg)	2	sites	1.1	311,577	183,996	167,925	1.69	109,081	218,161
Shoulder sealing passenger-side (>1m)	2.1	km	0.5	152,355	310,987	580,440	0.49	175,586	368,731
Street lighting (mid-block)	0.9	km	0.9	250,672	51,557	58,486	4.86	67,922	61,130
Improve curve delineation	0.75	km	0.3	90,630	10,142	31,823	8.94	16,034	12,026
Shoulder sealing driver-side (>1m)	1.796	km	0.5	139,171	286,858	586,125	0.49	189,378	304,122
Wide centreline	5.64	km	0.3	87,585	41,141	133,572	2.13	8,649	48,780
Total			**10.9**	**3,105,511**	**1,220,812**	**111,786**	**2.54**		**1,447,496**

Notes:
(a) Fatal injuries estimated to be saved and serious injuries estimated to be prevented, over a 20-year period
(b) The present value of the crash cost savings over a 20-year period that could be realised if the countermeasures are built
(c) The Benefit Cost Ratio (BCR) is the economic benefit (the PV) divided by the cost over the 20-year period in 2010 prices.
Source: Cambridgeshire County Council

3.1.5 Cambridgeshire County Council's experience

> "As chairman of the Cambridgeshire and Peterborough Strategic Road Safety Partnership, I was keen for Cambridgeshire to be involved in the DfT Safer Roads Scheme. The County Council is committed to reducing road casualties and fully intends to use this opportunity to improve safety on the A1303 between Stow cum Quy and Newmarket. We also hope to apply the learning from this project, to improve other roads within Cambridgeshire."
>
> County Councillor Steve Criswell.

> "Increasing the safety and reducing the number of road casualties on the public highway network across Cambridgeshire is a key objective of the County Council. Part of encouraging growth and vitality of an area is the Local Highway Authority's ability to provide a safe road environment within which communities are able to go about their day-to-day business. As a key route, the A1303 is of regional importance, and the opportunity to make meaningful and sustainable safety improvements is positively welcomed."
>
> Richard Lumley, Head of Highways, Cambridgeshire County Council

3.2 A285 – West Sussex

The second case study relates to a section of the A285 in West Sussex. Table 3.3 includes a description of the route and gives key facts relevant to road safety on the section studied.

Table 3.3: Case study 2 – A285 in West Sussex: key facts

Description of route	This section is north-east of Chichester, running from Tangmere to Petworth. The road runs mainly through the South Downs National Park.
Length	11.7 miles (18.8 km)
Speed limit	The majority of the road (71%) has a posted speed limit of 60 mph, with the remainder having speed limits of 40 mph and 30 mph. It is a rural single carriageway road.
AADT	Approximately 5,500 vehicles
Fatal and serious crashes, 2012–14	Three fatal and 21 serious crashes from 2012–14. Two fatal crashes were at junctions, the other was a run-off-road. Half of the serious crashes were run-off-road crashes.
Link to application form	https://www.westsussex.gov.uk/roads-and-travel/roadworks-and-projects/road-projects/a285-safer-roads-investment-plan/

Source: West Sussex County Council

3.2.1 Main features

99% of the road has a centreline or wide centreline in the median.

There are roadside objects within 5 m of the roadside along 76% of the road.

97% of the route has no paved shoulder, 3% has a narrow-paved shoulder of 0–1 m.

72% of the road is straight or gently curving, 22% has moderate bends, 4% has sharp bends, and 1% is very sharp.

Most of the route (93%) has adequate delineation, 7% was poor.

Intersections comprise:

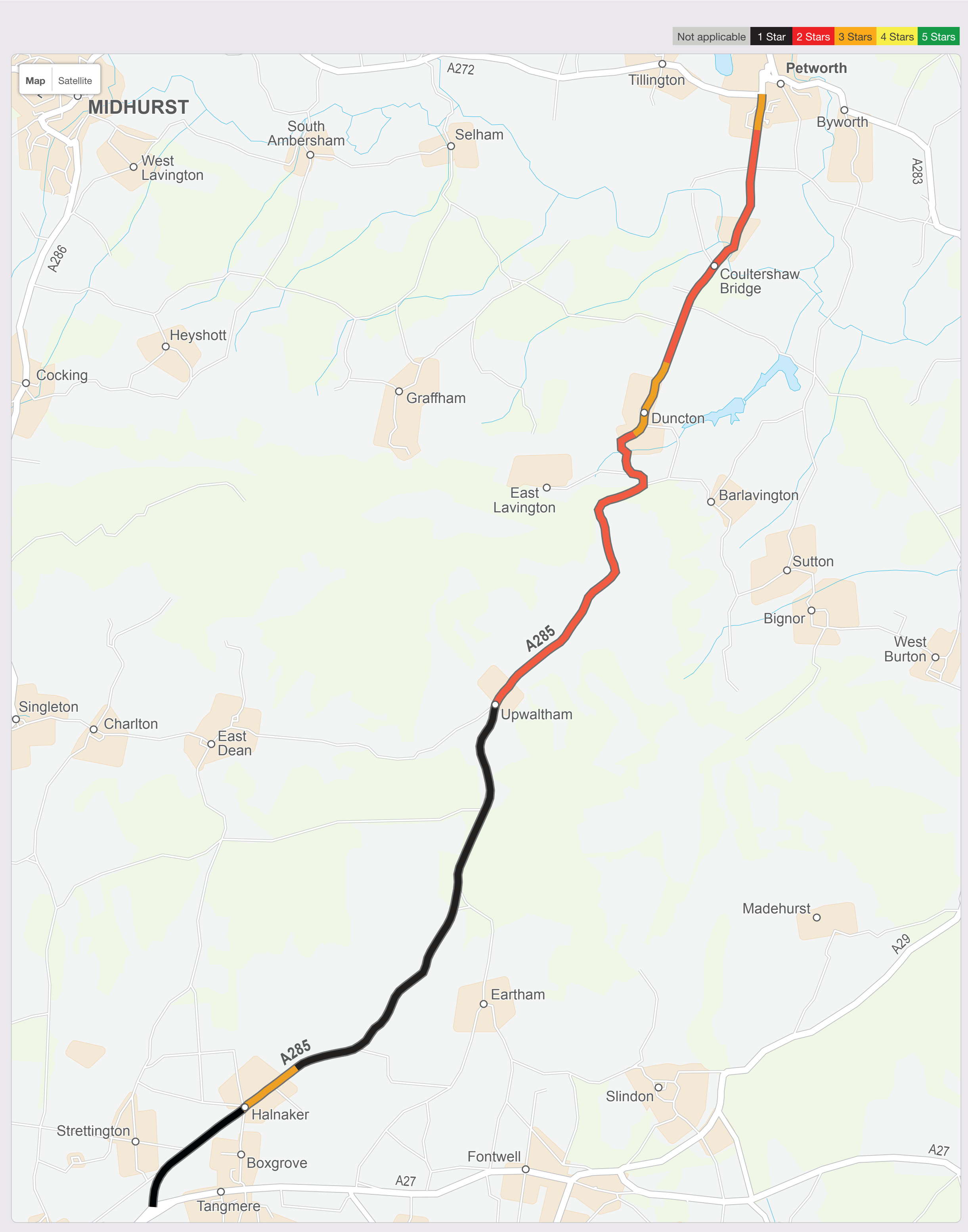
- 1 roundabout, 2 mini-roundabouts;
- 1 three-leg un-signalised intersection with protected turn lane;
- 25 three-leg un-signalised intersections with no protected turn lane; and
- 3 four-leg un-signalised intersections with no protected turn lane.

There was limited evidence of pedestrian and cyclist flow.

3.2.2 Star Rating results

The majority of the route (68%) achieves a vehicle occupant Star Rating of only 1 star, as shown in Figure 3.3.

Figure 3.3: A285 Star Rating map (vehicle occupant)



Source: iRAP

Figure 3.4 shows the Star Ratings by road user group.

Figure 3.4: Snapshot of A285 Star Ratings by road user group

Star Ratings By Distance

	Vehicle Occupant		Motorcyclist		Pedestrian		Bicyclist	
Star Ratings	Length (kms)	Percent	Length (kms)	Percent	Length (kms)	Percent	Length (kms)	Percent
5 Stars	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
4 Stars	0.00	0.00%	0.00	0.00%	1.80	9.57%	0.00	0.00%
3 Stars	2.60	13.83%	2.60	13.83%	0.70	3.72%	2.60	13.83%
2 Stars	8.40	44.68%	0.00	0.00%	0.10	0.53%	0.00	0.00%
1 Stars	7.80	41.49%	16.20	86.17%	0.30	1.60%	16.20	86.17%
Not applicable	0.00	0.00%	0.00	0.00%	15.50	84.57%	0.00	0.00%
Totals	18.80	100%	18.80	100%	18.80	100%	18.80	100%

Source: iRAP

3.2.3 Key Considerations in developing the User-Defined Investment Plan

West Sussex CC followed a slightly different process to some of the pathfinder authorities because, as the A285 was identified by the RSF as being the most persistently high-risk road in England, they were offered the opportunity to bid early for £1million. The first step was to review the initial SRIP because the countermeasures proposed were far in excess of the available funds. They selected 1-star subsections to treat first, and two countermeasures that had a reasonable BCR that would work together to reduce the risk of run-off-road crashes. Their subsequent proposal extended these treatments along the rest of the route.

3.2.4 Submitted User-Defined Investment Plan

West Sussex County Council has submitted two proposals for the treatment of A285, and a summary of this information is presented in Table 3.4. The first proposal was to provide sealed shoulders (<1 m) and shoulder rumble strips along a 5 km portion of the route. The second proposal extended the shoulder sealing and rumble strips along the remainder of the route.

Table 3.4: Safer Roads Investment Plan as submitted for A285

Proposal	FSIs saved[a]	PV of benefits (£)[b]	Cost (2010 prices) (£)	Cost per FSI saved (£)	BCR[c]	2017 capital cost (£)
1	11	1,875,500	644,500	58,590	2.91	926,300
2	13	2,134,600	1,091,700	83,977	1.96	1,532,400

Notes:
(a) Fatal injuries estimated to be saved and serious injuries estimated to be prevented, over a 20-year period
(b) The present value of the crash cost savings over a 20-year period that could be realised if the countermeasures are built.
(c) The Benefit Cost Ratio (BCR) is the economic benefit (the PV) divided by the cost over the 20-year period in 2010 prices.
Source: West Sussex County Council

The first scheme is estimated to save 11 FSIs, and the overall programme BCR is 2.91, meaning that for every £1 spent, it is expected that the economy will benefit from a return of £2.91.

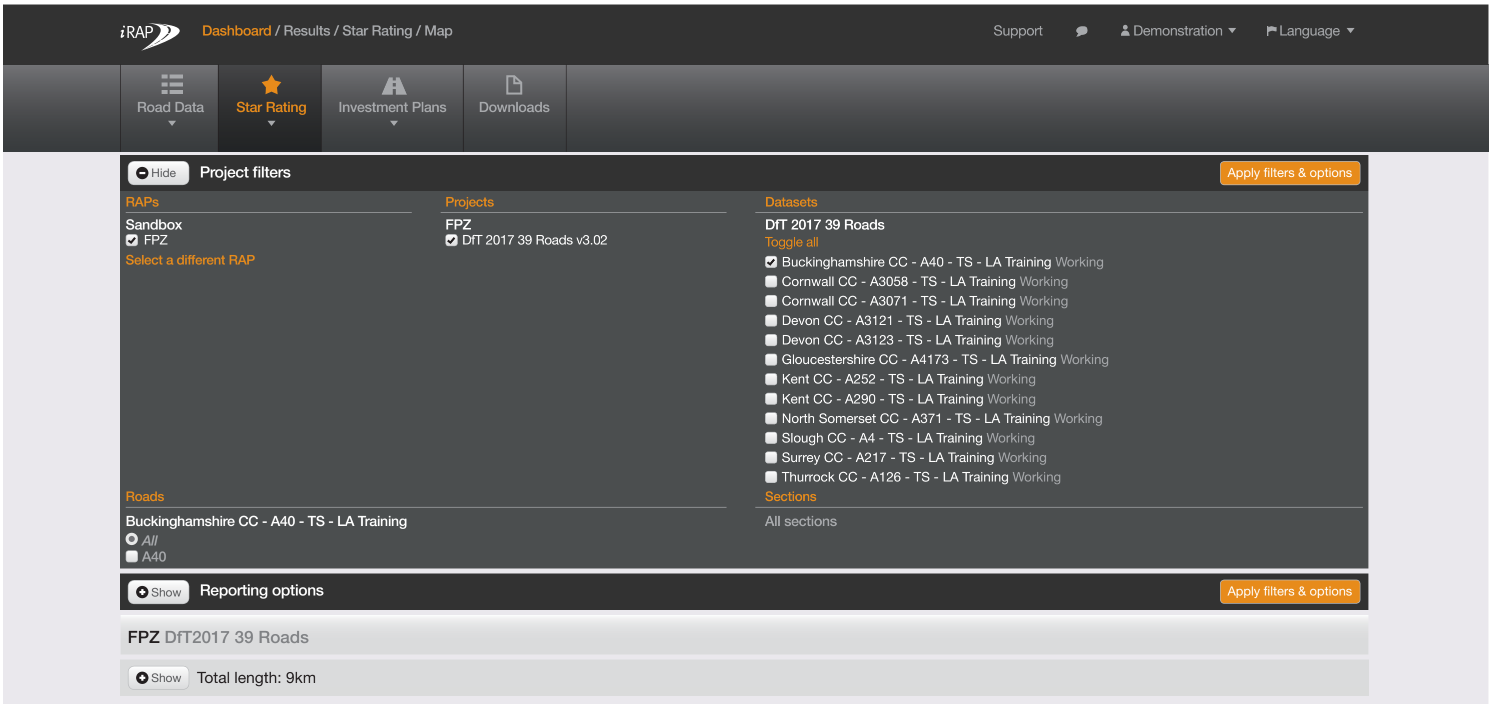
The second scheme is estimated to save 13 FSIs, and the overall programme BCR is 1.96, meaning that for every £1 spent, it is expected that the economy will benefit from a return of £1.96.

Appendix A: Updating the Core Data File

In order to update the core data file, several steps are needed:

1. Log in to ViDA and select 'Results' in the dashboard.
2. Select your project in 'Project Filters' and use the checkboxes to select all of the datasets that you wish to download. Press 'Apply Filters & Options' (see Figure A.1).

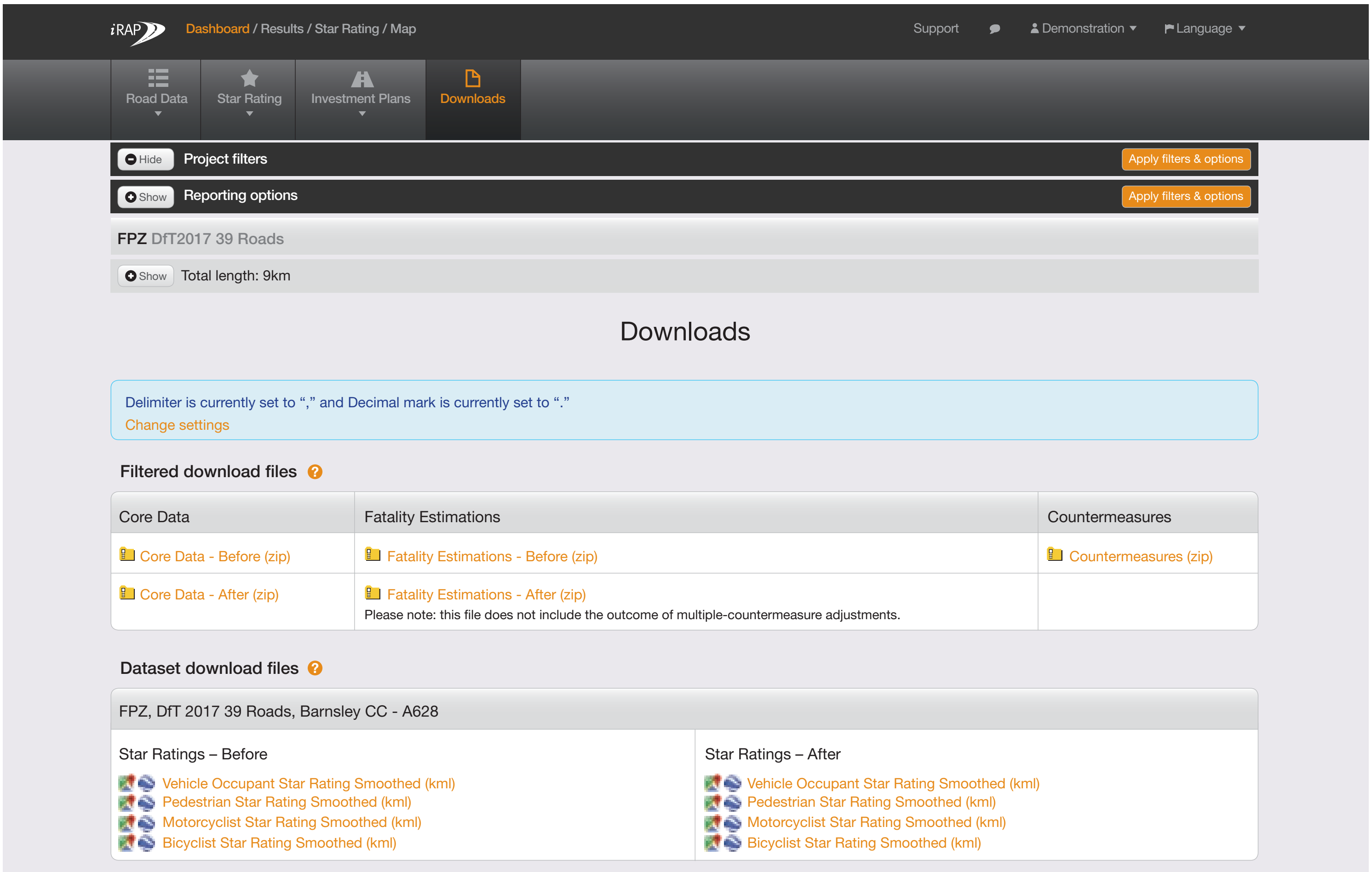
Figure A.1: Selecting a project in ViDA



Source: iRAP

3. Select 'Downloads' at the top of the screen and the screen shown in Figure A.2 should appear.

Figure A.2: Download screen in ViDA



Source: iRAP

4. Here you can download the current core data file (.csv file) for the dataset. This contains all of the coding information.
   a. Click on 'Core Data – Before (zip)' and select 'Request'.
   b. Wait for a few seconds, and a new message should appear in your messages at the top right.
   c. Click on the 'Activity Feed' and select the prepared dataset to start the download.
5. Save the core data file on your computer as a .csv file using a new name.
6. Open the downloaded .csv file:
   a. Go to column number 79 (or column CA) where the Smoothed Section ID is recorded, and then delete all the columns starting with this column and those to the right (only the columns from 1 to 78 or A to BZ should remain in your csv. file). See Figure A.3.

Figure A.3: Editing the Core Data spreadsheet in ViDA

	76	77	78	79	80	81	82	83	84	85	86	87
1	Annual Fatality	School zone	School zone	Smoothed Section ID	Vehicle SRS	Vehicle SRS	Vehicle SRS	Vehicle SRS	Vehicle SRS	Vehicle SRS	Vehicle SRS	Vehicle SRS
2	1	4	3	1	1.5935775	1.5935775	0.9858	0.159	5.565	0	9.896955	5.818764
3	1	4	3	1	1.274862	1.274862	0.9858	0.159	0.2862	0.0795	4.060224	5.818764
4	1	4	3	1	1.274862	1.274862	0.818214	0.131175	0	0	3.499113	5.818764
5	1	4	3	[illegible]	[illegible]	2.718102	2.1018	0.339	6.2469225	0.093225	14.2171515	21 714655
6	1	4	3	[illegible]	[illegible]	.2617224	2.0933928	0.279675	7.496307	0	16.3928196	655
7	1	4	3	[illegible]	[illegible]	.2617224	2.0933928	0.279675	0	0	8.8965126	21 714655
8	1	4	3	2	3.2107579875	3.2107579875	5.391117	0.339	0	0.1695	12.321132975	21.714655
9	1	4	3	2	3.2617224	3.2617224	2.396052	0.339	0	0	9.2584968	21.714655
10	1	4	3	2	9.7851672	9.7851672	7.188156	1.017	0	0	27.7754904	21.714655
11	1	4	3	2	9.7851672	9.7851672	7.188156	1.017	0	0.279675	28.0551654	21.714655
12	1	4	3	2	9.7851672	9.7851672	7.56648	1.017	0	0	28.1538144	21.714655
13	1	4	3	2	8.58348	8.58348	6.3054	1.017	0	0.279675	24.769035	21.714655
14	1	4	3	2	10.300176	4.506327	7.56648	1.017	0	0	23.389983	21.714655
15	1	4	3	2	10.300176	4.506327	7.56648	1.017	0	0.279675	23.669658	21.714655
16	1	4	3	2	3.567508875	8.154306	6.3054	1.017	0	0.279675	19.323889875	21.714655
17	1	4	3	2	8.154306	8.154306	6.3054	1.017	17.161875	0.5085	41.301387	21.714655
18	1	4	3	2	8.154306	8.154306	5.99013	1.017	0	0.5085	23.824242	21.714655
19	1	4	3	2	9.7851672	4.28101065	7.188156	1.017	0	0	22.27133385	21.714655
20	1	4	3	2	4.28101065	4.28101065	7.188156	1.017	0	0	16.7671773	21.714655
21	1	4	3	2	9.7851672	1.2231459	7.188156	1.017	31.8304728	0.279675	51.3236169	21.714655
22	1	4	3	2	4.28101065	4.28101065	7.188156	1.017	0	0	16.7671773	21.714655
23	1	4	3	2	4.28101065	4.28101065	7.188156	1.017	0	0.279675	17.0468523	21.714655
24	1	4	3	2	9.7851672	4.28101065	7.188156	1.017	0	0	22.27133385	21.714655
25	1	4	3	2	4.28101065	4.28101065	7.188156	1.017	0	0.279675	17.0468523	21.714655
26	1	4	3	2	9.7851672	9.7851672	7.188156	1.017	0	0.279675	28.0551654	21.714655
27	1	4	3	2	4.28101065	4.28101065	7.188156	1.017	0	0	16.7671773	21.714655
28	1	4	3	2	4.28101065	4.28101065	7.188156	1.017	0	0.279675	17.0468523	21.714655

DELETE ALL THE COLUMNS FROM COLUMN 79 TO THE LAST EXISTING COLUMN IN THE CSV FILE

Source: iRAP

7. Once the columns are deleted you can save the file and start editing the columns that you need to update. You need to take care to do this accurately. For information on the coding values and what they mean, please:
   a. Go to the ViDA homepage where you can see your dashboard and select 'Upload Coding Data'.
   b. Click on 'view upload specification'.

   If you are not sure how to amend the coding file, please ask a member of the RSF team.

8. The next stage is to upload the coding data again into ViDA:
   a. Go to the ViDA homepage where you can see your dashboard and select 'Upload Coding Data'.
   b. Select your project using the dropdown menus.
   c. Browse to find the file you wish to upload on your computer.
   d. Click on 'Upload Files'.
   e. If there are no errors in the .csv file, ViDA will open a new page with message 'validation successful'.
   f. Click on the 'Proceed' button and this will start the re-upload process.
   g. When the upload is complete, there will be a new message in your ViDA activity feed.

Notes

RAC Foundation

Mobility • Safety • Economy • Environment

The Royal Automobile Club Foundation for Motoring Ltd is a transport policy and research organisation which explores the economic, mobility, safety and environmental issues relating to roads and their users. The Foundation publishes independent and authoritative research with which it promotes informed debate and advocates policy in the interest of the responsible motorist.

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