

# **A Step by Step Guide to using GG104 Requirements for Safety Risk Assessment**



# Introduction

In meeting its obligations under the Infrastructure Act 2015, National Highways and its suppliers carry out a vast array of activities<sup>1</sup> that can have a real impact on safety. Regardless of the type of activity being completed the organisation should be able to explain at all points how safety is, will, or has been managed. The Safety Risk Assessment (SRA) process provides structured approach for management and requires all steps and relevant evidence to be documented.

This step by step guide is intended to support National Highways staff, supplier or third party in documenting the SRA process in accordance with the Design Manual for Roads and Bridges (DMRB) Document, GG104 – Requirements for Safety Risk Assessment. This guide provides advice on the possible structure and content of a compliant document as templates and examples of SRAs are not provided by National Highways. This guide should be read alongside the requirements in GG104 and the safety risk governance procedures for the specific business area.

<sup>1</sup> Activity or activities is GG104 terminology for any function carried out by individuals or groups in meeting National Highways obligations as a strategic highways company.



## Background

GG104 provides requirements and advice on the SRA process and report, notably it:

- Provides a framework rather than a rigid process.
- Allows for activities to be categorised and defines the subsequent safety risk governance thereafter.
- Requires those proposing any activity to undertake and record an 8-step process.
- Helps activity owners comply with Health and Safety Legislation.
- Allows the level of effort or rigour to be varied depending on the complexity of the activity under consideration.

GG104 sub-divides the SRA process into eight key steps. The first five steps can be considered as preparation for the assessment, the sixth is the assessment itself and the final two as maintenance of the assessment. (see figure 1). An SRA report is produced to record the progress made in applying the process. An SRA report provides a snap shot of the evidence and accompanying information that demonstrate how GG104 requirements have been satisfied.

## Structure of this guide

This guide provides commentary against each of the eight steps including supplementary advice on:

- **Why** each of the different steps are important.
- **What** needs to be included in an SRA report.
- **How** the requirements for the step can be met.

In producing a guide of this type, it should be recognised that the topics that may be assessed are vast and it is not possible to provide specific advice on each and every topic. This document should not be considered as an exhaustive 'how to' guide in applying the framework.

Those approving or producing an SRA are advised to seek advice and support from the Safety Risk Requirements team early in the process. The 8 steps of the SRA process defined in GG104 are addressed in each of the following sections. Each section heading includes reference to the clauses in GG104 that describe the step and examples. The examples<sup>2</sup> introduced in Step 1 are continued throughout the subsequent 7 steps to illustrate how requirements relate to the documentation of that step.

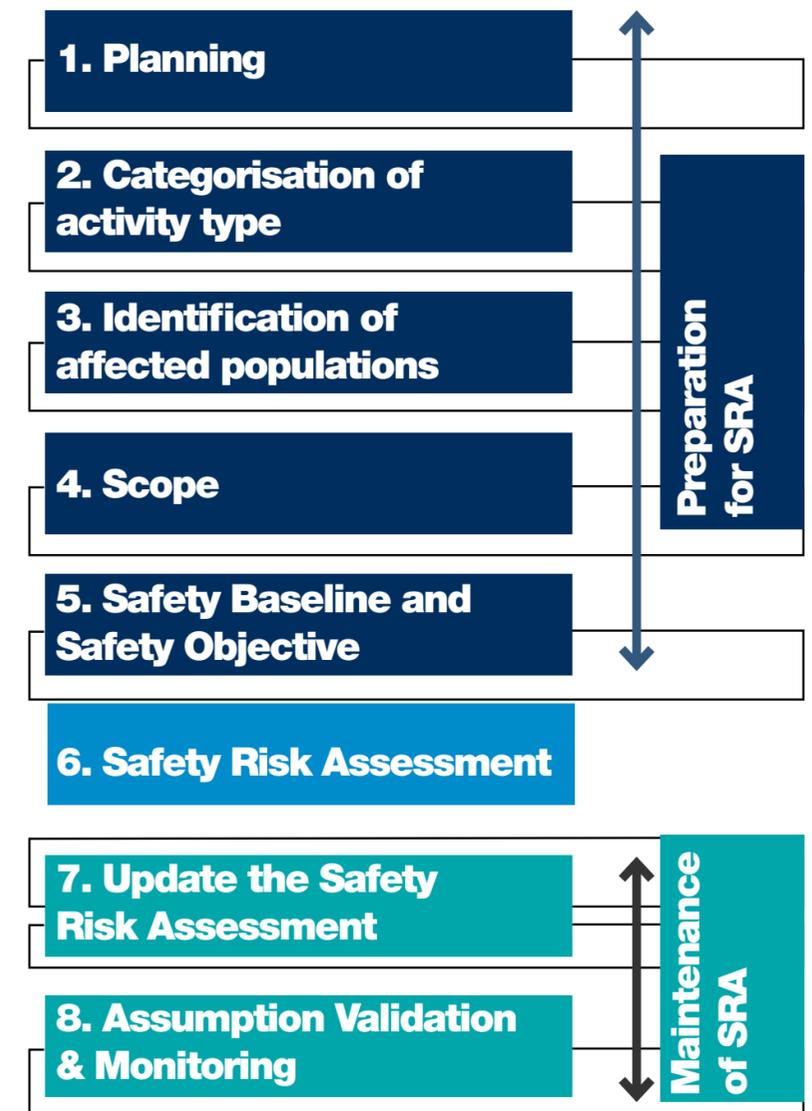


Figure 1 - The 8 principle steps of SRA in GG104

<sup>2</sup>The examples provide only an illustration of the main points to be considered in each step for the described scenario and in practice there will be additional considerations, aspects or details to be documented.

**To navigate to a Step, please click on the relevant button:**

## STEP

# 1

## Planning the SRA ([Clauses 2.2-2.5](#))

The Planning step is critical to the SRA process being completed successfully. It helps those involved in the safety of the activity understand what is being considered and what safety risk governance will be applied.

GG104 applies to all activities that could, or can, have an impact on the safety risk. As such it is important for anyone managing an activity to consider how they are meeting the requirements. This should include asking others involved with the activity if there is pre-existing safety risk documentation before starting a new SRA<sup>3</sup>. It should also be determined at this stage who is documenting the SRA process and who is the activity owner<sup>4</sup>. The activity owner does not have to complete the process themselves but should remain involved in its application as the approver of the activity being assessed.

### GUIDANCE

Starting the process of carrying out an SRA early in the activity lifecycle is encouraged even if at this point there is limited information available. This is especially true where different options are being considered.

The SRA process is iterative and even when completed the report should be treated as a live document (See Step 7). If the SRA is not expected to be definitive at this stage in the development of the activity this should be made clear.

The author should ensure they understand why the SRA is being produced and what is intended to be achieved. Possible aims of the process could be:



- To determine whether an activity should take place, begin or can continue safely.
- To measure the impact of a proposed change to an activity.
- To identify which control measures are needed to manage risk.
- To compare options for completing an activity in terms of the safety risk outcomes.
- To explore the acceptability of non-compliance with another DMRB standard.
- To support research, innovation and the development of new policy or standards.

In undertaking the SRA, it is sensible to be open minded about the possible outcome and not attempt to influence the outcome or bias the assessment. This extends to activities that are intended to improve safety. Whilst the outcome of the activity categorisation (Step 2) defines the safety risk governance for the SRA, thought should be given to the approval and management of the process more generally. Business specific safety risk governance procedures should be consulted.

<sup>3</sup> This can include SRA's that consider the generic aspects of an activity which are subsequently reviewed and complemented with location or deployment specific information.

<sup>4</sup> This is likely to be the relevant National Highways Project Manager.

## STEP

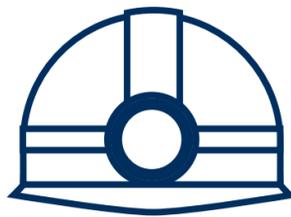
# 1

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### OUTPUT



The documentation of the planning step in the SRA report can be short but should include:

- ✓ A question that clarifies the purpose and what is trying to be achieved applying the SRA process.
- ✓ A clear context in which the question(s) is being asked.
- ✓ Who is managing/has managed the application of the SRA process and who is the activity owner?
- ✓ Reference to the 8 steps and how they have been or will be approached.
- ✓ What the activity in question is and what options are available.
- ✓ Clarification of the safety risk governance procedures being followed.

<sup>3</sup> This can include SRA's that consider the generic aspects of an activity which are subsequently reviewed and complemented with location or deployment specific information.

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## STEP

# 2

## Categorising the activity ([Clauses 2.6-2.11](#))

Categorising the activity requires the activity owner to understand what level of safety concern may exist with the activity in question and identify the appropriate amount of effort required to manage the challenge. The GG104 framework is intended to provide a proportionate means by which risk can be managed, depending largely on the complexity of what's proposed. The output of this stage has a significant bearing on what is required in the subsequent steps, notably it:

- Defines the level of detail and effort required to complete the SRA.
- Determines if a Safety Control Review Group (SCRG) is needed to approve the categorisation and subsequently endorse the SRA.

The categorisation process uses a number of features to classify the activity as either A, B or C. The indicator text provided for each feature should be taken literally and considered at an organisational level. The focus should be on placing each feature clearly into one of the defined A, B or C boxes and not splitting the activity between different selections. Each indicator should be considered only in the safety context established in Step 1.

### GUIDANCE

The features should be categorised based on what the potential impact is. At this point the possible (or probable) control measures should not be built into the categorisation to influence the result. Later steps of the process consider the need for control measures in accordance with GG104.

The outcome of the categorisation helps shape the later stages of the process. It provides a very high-level review of the activity to establish the type of risk management to be applied; it is not a form of risk assessment in itself. The activity owner should not attempt to artificially force the activity into a lower or higher categorisation to influence the risk management approach. A higher categorisation should not be perceived as a threat to completion of the activity. Neither should a lower one be seen as potentially not paying due regard to risks the activity may present.

The requirement for a SCRG for Type B activities should not be considered restrictive and create unnecessary bureaucracy. There may be an existing SCRG or other committee that can be reconstituted to fulfil this function. It is however important that any SCRG is effective and has an appropriate composition. The policy document 'Management Arrangement of Safety Risk for National Highways Activities' contains further advice. The Safety Risk Requirements team owns the Safety Governance in National Highways document and a GG104 self-assessment tool to help with establishing the appropriate group. The Smart Motorway Programme has also produced a best practice guide on SCRGs.



## STEP

# 2 Categorising the activity (Clauses 2.6-2.11)

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## OUTPUT



The output from Step 2 is the selection of an appropriate categorisation for the activity. The document should:

- ✓ Provide an A, B or C selection for each feature using Table 2.6 from GG104.
- ✓ Include a commentary as to why each feature selection is appropriate.
- ✓ Have a statement of the outcome of the categorisation based on Table 2.7N in GG104.
- ✓ Include a commitment to convene an SCRG for a Type B or C outcome and also to escalate the activity to the NSCRG for a Type C outcome.

## STEP

# 3

## Identifying the affected populations (Clauses 2.12-2.13)

GG104 requires that the risk to all populations affected i.e. users, workers or other Parties is managed. This step is important to ensure that the activity owner is clear on the affect and can consult, via an SCRG or by other means, with the correct stakeholders and specialists to come to a decision.

GG104 establishes different safety risk criteria for the different populations so recognising who is affected helps clarify the outcome of later steps.



### GUIDANCE

The starting point is to assume that all three populations are affected and then to rule them out recording the justification for each one by one. The significance of the effect on the population must also be considered. Only populations affected will be considered in the later steps. If it is decided that there is no material effect on a population at this stage this should be clearly articulated. If there is uncertainty it is preferable for the population to be included and the actual impact can be explored, investigated and disregarded in the later steps. This is especially useful where a particular stakeholder has concerns that need to be addressed in the SRA.

Identification of the different sub-populations at this point is also useful. This is particularly important for the workers population which can be made up of National Highways staff e.g. Traffic Officers and those working on behalf of National Highways e.g. Maintenance Service Providers. The Road User population can also be usefully sub-divided e.g. HGV drivers, cyclists, ex-vehicle pedestrians, emergency services, recovery operators.



<sup>5</sup> If discussions and outline agreement take place away from an SCRG care must be taken to record these, report them back to the SCRG and document them in the minutes for the SCRG group.

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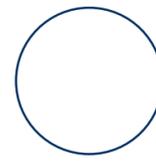
### OUTPUT



The output from Step 3 is the selection of the affected populations which will be subject to the later steps of the SRA. The document should:

- ✓ Document the populations considered affected.
- ✓ Identify any pertinent sub-division of the population.
- ✓ Clearly document which populations are not further assessed past this point and why

<sup>5</sup> If discussions and outline agreement take place away from an SCRG care must be taken to record these, report them back to the SCRG and document them in the minutes for the SCRG group.



## STEP

# 4

## Scoping (Clauses 2.14-2.16)

The scoping step allows the SRA to focus on the relevant safety risk aspects of the activity and ensure the SRA process is effective and produces a robust and meaningful outcome.

Without the ability to focus on the correct aspects the process can become unwieldy with effort expended exploring related but inconsequential risks that do not influence the outcome.

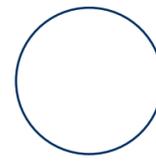
### GUIDANCE

It is critical that any aspects where the safety risk is not being assessed are recorded; this may be because:

- An SRA has already been undertaken for this aspect.
- The aspect is not material to the outcome or unlikely to change.
- Clearly required by an existing standard, code or procedure and such standards have been adequately considered by the user to be fully appropriate and suitable for application.

The risks posed to individual populations should all be included and assessed within the SRA. Where the SRA is focussed on the risk posed by features provided on a highway it should be clear what geographical area is covered. It is also essential to record any assumptions made in the process of generating the SRA. Care should be taken to distinguish between control measures that are required by legislation or requirements that can be assumed to be non-negotiable and discretionary control measures that should be justified by the SRA.





## STEP

# 4

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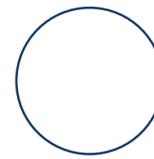
Without the ability to focus on the correct aspects the process can become unwieldy with effort expended exploring related but inconsequential risks that do not influence the outcome.

### OUTPUT

The output from Step 4 is typically a short description of the scope of the SRA. The document should include:



- ✓ A clear statement of the scope of the SRA - what is included and what is not included.
- ✓ A list of assumptions that have helped shaped the outcome.
- ✓ The justification for any assumptions and explanation of why they are considered appropriate and applicable.
- ✓ A plan of the physical scope of the assessment if appropriate.



## STEP

# 5

## Setting a safety baseline and safety objective

(Clauses 2.17-2.22)

National Highways is committed to Home Safe and Well for both users and workers. Setting safety objectives is how the SRA process can drive continual improvement.

In Step 5 the aim is to:

- a. Identify what evidence is available for the activity.
- b. Analyse available safety data to determine performance.
- c. Select baseline metrics.
- d. Set a safety objective for the activity using the metrics.

This process needs to be completed for each population identified as being affected in Step 4. A separate baseline and objective should be documented for each population.

### GUIDANCE

#### Safety Baseline

Understanding, or researching the available evidence about the activity in question helps provide a context for selecting the appropriate baseline parameters. Where the activity is completely new, or novel, seek advice from the SES Safety Risk Requirements team on the best approach. Care must be taken to select the best available data, which often means the most recent data should be used. As the available safety data may also inform consultees to the context in which the decision is being made the data and any analysis should be shared and/or presented at SCRG and NSCRG for Type B/C activities.

Where possible the baseline should be a numerical parameter or parameters of some kind that is either reported within the business or could readily be calculated. The parameters should be specific to the activity or directly link to the activity in some way. Where a bespoke parameter is developed the intended method of calculation should be documented. The documentation of the SRA should include a description of the parameter and an indication of the value at the time of writing. Where a scheme is proposed, the parameter should be measured for a period ending with the start of scheme works.

In some instances, there may be limited suitable data for the activity or no practical means of measurement. In these situations, it may be appropriate to define the baseline using a form of 'lead' indicators rather than 'lag' indicators.

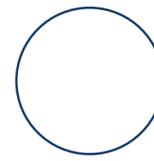
The documentation of the SRA should justify the chosen baseline parameters.

#### Safety Objective

The Safety Objective should be aligned with National Highways policy, business area objectives and any pre-existing activity requirements<sup>6</sup> where possible. The Safety Objectives are a statement focussed only on the parameters chosen for the baseline.

Opportunities to improve outcomes for road workers and road users by setting improvement objectives should be explored and documented. It is recognised that not all activities and their documented SRAs will look to achieve an improvement in safety performance. In these instances, a 'nil detriment' type objective may be appropriate. Targeting 'nil detriment' against existing performance would likely be acceptable where the existing performance is shown to be good. In the majority of instances, acceptable may already be defined by the existing safety performance of the same or similar activity already taking place elsewhere in the organisation or on the network. Safety Objectives that allow a worsening of safety performance for a population are unlikely to be allowable unless justified by an improvement to another population. The selection of the safety objective is important as this will be validated in Step 6 and may subsequently be verified as a result of Step 8.

<sup>6</sup> For schemes this may include 'client scheme requirements' documents.



## STEP

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This process needs to be completed for each population identified as being affected in Step 4. A separate baseline and objective should be documented for each population.

### OUTPUT

The documentation of this step in the SRA report should include:



- ✓ Baseline parameters that can be measured in both the 'before' and 'after' scenarios.
- ✓ Safety Objectives for each population identified in Step 3.
- ✓ Analysis of recent safety data to evidence the selection of the baseline parameters and safety objectives.

# Application of the process

The text for each step illustrates some of the aspects to be considered and documented.  
The examples provide a snapshot based on the point the activity is at in the development lifecycle.

Scenario	<p>The Safety Engineering and Standards Directorate are in the process of undertaking an editorial update of Volume 10 of the DMRB. A supplier has been tasked with producing a new Landscape Management Handbook.</p>	<p>A major project is in the option selection stage (PCF Stage 2). The scheme is intended to reduce congestion and the scheme designer has suggested that in order to increase capacity it would be necessary to reduce the lane widths to accommodate an increase from three to four lanes.</p>	<p>A small safety scheme has been proposed by the National Highways OD team and is due to be handed over to the Design Services Provider for detailed design. The scheme is intended to improve road safety where vehicles have been leaving the carriageway. A study has recommended a length of vehicle restraint system on a bend of a single carriageway road.</p>	<p>The Safety Engineering and Standards Directorate are considering using 4G wireless technology in the future for the connection of CCTV. Prior to starting an initial Research and Development (R&amp;D) project they want to understand what safety data to collect.</p>
Step one - Planning	<ul style="list-style-type: none"> <li>The National Highways document owner asks the supplier to develop an SRA to assess the safety impact of the new handbook</li> <li>The supplier has been asked to develop the SRA alongside the new handbook, as part of the brief for the DMRB update.</li> <li>The National Highways document owner is the activity owner.</li> <li>The 8 steps will be applied in full for the final published DMRB standard.</li> <li>The activity would be “the application of any new/amended requirements and advice as a result of the revised document”.</li> <li>The question being considered in the SRA could be defined as - To what extent do the DMRB content refresh change the safety risk of affected populations and is it tolerable?</li> </ul>	<ul style="list-style-type: none"> <li>The project is at option selection stage - PCF stage 2.</li> <li>The design requires a departure from standard for the proposed highway cross section.</li> <li>The activity owner would be the National Highways Project Manager.</li> <li>The design consultant is applying the SRA process and managing the risk.</li> <li>The National Highways Project Manager has asked the designer to consult with the SES specialist for highways cross-section.</li> <li>The 8 steps will be applied initially to inform the options selection and further developed as the project progresses.</li> <li>In this case the activity may be “the operation of the revised lane widths post scheme construction”.</li> <li>The question being considered in the SRA could be defined as – how does the proposal change the existing safety risk to exposed populations?</li> </ul>	<ul style="list-style-type: none"> <li>The activity owner would be the National Highways Project Manager for the scheme development.</li> <li>The annual study report has identified a Killed and Seriously Injured casualty problem from vehicle leaving the carriageway collisions.</li> <li>The proposed treatment has been developed using advice contained in the route treatment guide.</li> <li>The 8 steps will be completed in full to support the handover into the next phase.</li> <li>No departures from standard have been identified.</li> <li>The activity may be the operation of “the operation of the new layout post scheme construction”.</li> <li>The question being considered in the SRA could be defined as – Is the current scheme design likely to deliver the anticipated road safety improvement in a way that is acceptable to all populations?</li> </ul>	<ul style="list-style-type: none"> <li>The aspiration is to use 4G technology to provide improved CCTV coverage without the need for a communications network.</li> <li>The National Highways document owner for existing CCTV requirements is the activity owner.</li> <li>The 8 steps will be applied in part to inform the R&amp;D scope.</li> <li>The activity would be “the use of 4G technology to provide CCTV”.</li> <li>The question being considered in the SRA could be defined as – What are the safety risk impacts and benefits of moving to 4G?</li> </ul>

# Application of the process

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The examples provide a snapshot based on the point the activity is at in the development lifecycle.

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Step two - Categorisation of the activity type	<ul style="list-style-type: none"> <li><b>Extent of prior experience of activity</b> – The existing DMRB document has been in use for a number of years and there are many people across National Highways and the supply chain with experience of its application. <a href="#">Outcome A</a></li> <li><b>Statutory and formal processes and procedures</b> – As an editorial update there is no intention to change any requirements or impact on other standards or legislation. <a href="#">Outcome A</a></li> <li><b>Impact on organisation</b> – There would likely be no impact, or at least very little impact on planting, landscaping and maintenance activities. <a href="#">Outcome A</a>.</li> <li><b>Activity Scale</b> – The standard applies across the entire strategic road network; however, the intention is to make no changes to requirements. <a href="#">Outcome B</a>.</li> <li><b>Technical</b> – Even if changes were made to requirements these would not involve technical innovation. <a href="#">Outcome A</a>.</li> <li><b>Stakeholder</b> - There have been numerous requests from across the organisation to update the document. Some stakeholders have suggested that the existing document could be contrary to safety related requirements contained elsewhere. <a href="#">Outcome B</a>.</li> <li>With more than three of the aspects categorised as Type A the outcome is that the activity is Type A. An SCRG is not required but a technical project board will endorse safety outcomes as part of their remit.</li> <li><b>NOTE:</b> The above classification would need to be kept under review as the work develops. i.e. if the scope of the DMRB update changes from being purely editorial.</li> </ul>	<ul style="list-style-type: none"> <li><b>Extent of prior experience of activity</b> – Exploration of the issue reveals that the use of four lanes on an all-purpose trunk road (APTR) is rare in National Highways and the rest of the UK and as such there is limited experience. <a href="#">Outcome B</a></li> <li><b>Statutory and formal processes and procedures</b> – The current standards provide no guidance for lane width and overall cross section of APTR. There are requirements and advice on dual four lane motorways and 3 lane APTR which broadly establish what a compliant cross section would be. <a href="#">Outcome B</a></li> <li><b>Impact on organisation</b> – Whilst the approach taken may set a precedent it appears to be unique to the location and not require organisational change. <a href="#">Outcome A</a>.</li> <li><b>Activity Scale</b> – The location of the scheme is critical to the operation of the route but is not significant regionally or nationally. <a href="#">Outcome A</a>.</li> <li><b>Technical</b> – Despite there being no standard the proposals would only involve adapting existing techniques and approaches. <a href="#">Outcome A</a>.</li> <li><b>Stakeholder</b> – The proposals have proved contentious with those involved internally, within the supply chain and with those consulted. There are 2-3 people who have asked for further evidence in order for the scheme to progress. <a href="#">Outcome B</a>.</li> <li>With three of the aspects categorised as Type B the outcome is that the activity is Type B. An SCRG is required and will need to be convened to endorse the activity.</li> </ul>	<ul style="list-style-type: none"> <li><b>Extent of prior experience of activity</b> – There is significant experience in the area team and within National Highways. Evidence of successful intervention is captured in the route treatment guide. <a href="#">Outcome A</a></li> <li><b>Statutory and formal processes and procedures</b> –The requirements for the provision of VRS is included in the DMRB. The activity requires no formal change to procedures or departures from standard. <a href="#">Outcome A</a></li> <li><b>Impact on organisation</b> – The activity and proposed change would not have any impact on National Highways. <a href="#">Outcome A</a>.</li> <li><b>Activity Scale</b> – The activity represents a very localised change at a non-critical location. <a href="#">Outcome A</a>.</li> <li><b>Technical</b> – The features proposed are in widespread use and don't present a technical challenge to those involved in operations and maintenance. <a href="#">Outcome A</a>.</li> <li><b>Stakeholder</b> – There has been little interest and challenge in what seems like a traditional approach to the collision problem. <a href="#">Outcome A</a>.</li> <li>With all of the aspects categorised as Type A the outcome is that the activity is Type A. An SCRG is not required and the activity manager will approve the SRA.</li> </ul>	<ul style="list-style-type: none"> <li><b>Extent of prior experience of activity</b> – There is no experience within National Highways of using the 4G to communicate images in this way. However, all parties are clear that learning and experience from 4G based solutions is largely transferable. <a href="#">Outcome B</a></li> <li><b>Statutory and formal processes and procedures</b> – The proposal is quite a substantial departure from existing standards and procedures. <a href="#">Outcome C</a></li> <li><b>Impact on organisation</b> – The activity owner believes that National Highways may need to develop new skills, roles or procure new services to manage the amount of data that could be collected. This could involve greater use of algorithms in a safety context. <a href="#">Outcome B</a>.</li> <li><b>Activity Scale</b> – The intention would be for emerging requirements and advice to apply across the whole SRN and ultimately could significantly reduce the amount of communications infrastructure. <a href="#">Outcome C</a>.</li> <li><b>Technical</b> – Despite the use of 4G being very new and considered to be technological innovation there is use of 4G for other data transfer and use of 4G for CCTV imagery transfer. <a href="#">Outcome B</a>.</li> <li><b>Stakeholder</b> – There have been numerous internal discussions and given the impact on safety i.e. on smart motorway schemes its considered that there are large number of stakeholders with an ability to influence. <a href="#">Outcome C</a>.</li> <li>With three of the aspects categorised as Type C the outcome is that the activity is Type C. If the R&amp;D leads to a change in requirements, then an SCRG is required and endorsement will need to come from the NSCRG. At R&amp;D stage these groups are likely to provide only validation and direction.</li> </ul>

# Application of the process

The text for each step illustrates some of the aspects to be considered and documented.  
The examples provide a snapshot based on the point the activity is at in the development lifecycle.

Scenario	<p>The Safety Engineering and Standards Directorate are in the process of undertaking an editorial update of Volume 10 of the DMRB. A supplier has been tasked with producing a new Landscape Management Handbook.</p>	<p>A major project is in the option selection stage (PCF Stage 2). The scheme is intended to reduce congestion and the scheme designer has suggested that in order to increase capacity it would be necessary to reduce the lane widths to accommodate an increase from three to four lanes.</p>	<p>A small safety scheme has been proposed by the National Highways OD team and is due to be handed over to the Design Services Provider for detailed design. The scheme is intended to improve road safety where vehicles have been leaving the carriageway. A study has recommended a length of vehicle restraint system on a bend of a single carriageway road.</p>	<p>The Safety Engineering and Standards Directorate are considering using 4G wireless technology in the future for the connection of CCTV. Prior to starting an initial Research and Development (R&amp;D) project they want to understand what safety data to collect.</p>
Step three – Affected populations	<ul style="list-style-type: none"> <li>• <b>Workers</b> – This population will be impacted by the activity. The management of landscape on the network requires maintenance service providers to work in the verge when adjacent to traffic lanes which may or may not be closed. Planting and its subsequent maintenance exposes workers to risk.</li> <li>• <b>Users</b> – Planting on the strategic road network can result in trees growing in the verge and becoming a hazard for errant vehicles or impacting visibility. The deployment of traffic management for maintenance also exposes users to increased risks.</li> <li>• <b>Other parties</b> – There no expected safety risk impact on other parties.</li> <li>• Workers and Users are considered in the overall SRA.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Workers</b> – The choice of lane width, and cross section overall will have an impact on how the section of the route can be maintained and operated safely.</li> <li>• <b>Users</b> – The choice of lane width and cross section is particularly important for safe operation. The sub-populations of cyclists, abnormal loads (wide) and heavy good vehicles will require specific consideration as sub-populations.</li> <li>• <b>Other parties</b> – It is not foreseeable other parties could be impacted in safety risk terms.</li> <li>• Workers and Users are considered in the overall SRA.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Workers</b> – The proposed changes will increase the amount of VRS and the potential for maintenance.</li> <li>• <b>Users</b> – The provision of VRS will change the outcome of collisions for vehicles leaving the carriageway. It will also affect users who break down.</li> <li>• <b>Other parties</b> – It is not foreseeable other parties could be impacted in safety risk terms.</li> <li>• Workers and Users are considered in the overall SRA.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Workers</b> – The proposed changes will likely decrease the amount of infrastructure required for CCTV. This is likely to reduce the risk posed by ducting the communications network and undertaking maintenance. The reliability of the new equipment is however uncertain.</li> <li>• <b>Users</b> – Safety of this population could be affected based on the improved or reduced reliability of technology and the system in identifying incidents and collisions.</li> <li>• <b>Other parties</b> – It is not foreseeable other parties could be impacted in safety risk terms.</li> <li>• Workers and Users are considered in the overall SRA.</li> </ul>

# Application of the process

The text for each step illustrates some of the aspects to be considered and documented.  
The examples provide a snapshot based on the point the activity is at in the development lifecycle.

Scenario	<p>The Safety Engineering and Standards Directorate are in the process of undertaking an editorial update of Volume 10 of the DMRB. A supplier has been tasked with producing a new Landscape Management Handbook.</p>	<p>A major project is in the option selection stage (PCF Stage 2). The scheme is intended to reduce congestion and the scheme designer has suggested that in order to increase capacity it would be necessary to reduce the lane widths to accommodate an increase from three to four lanes.</p>	<p>A small safety scheme has been proposed by the National Highways OD team and is due to be handed over to the Design Services Provider for detailed design. The scheme is intended to improve road safety where vehicles have been leaving the carriageway. A study has recommended a length of vehicle restraint system on a bend of a single carriageway road.</p>	<p>The Safety Engineering and Standards Directorate are considering using 4G wireless technology in the future for the connection of CCTV. Prior to starting an initial Research and Development (R&amp;D) project they want to understand what safety data to collect.</p>
Step four - Scope	<p><b>The scope is:</b></p> <ul style="list-style-type: none"> <li>Limited to amended requirements and advice and does not assess the existing requirements.</li> </ul> <p><b>It is assumed that:</b></p> <ul style="list-style-type: none"> <li>The maintenance arrangements are as per the latest version of the asset delivery contract. By the time the document is published other contract forms will no longer be in use.</li> <li>The devolved administrations will review and assess their own maintenance arrangements so only the SRA only covers application in England.</li> </ul>	<p><b>The scope is:</b></p> <ul style="list-style-type: none"> <li>Confirmed (geographically) in the SRA as the section of the scheme where the four reduced width lanes are provided.</li> </ul> <p><b>It is assumed that:</b></p> <ul style="list-style-type: none"> <li>The activity does not impact on the safety of the upstream approach or downstream carriageway.</li> <li>There are no other infrastructure safety issues in the locality i.e. the other features are all to standard.</li> <li>A change in speed limit is not appropriate as the four-lane section is short.</li> </ul>	<p><b>The scope is:</b></p> <ul style="list-style-type: none"> <li>Extends approx 300m upstream and downstream of the extents of the proposed VRS.</li> </ul> <p><b>It is assumed that:</b></p> <ul style="list-style-type: none"> <li>The VRS provided is one already used by the Maintenance Service Provider, in stock and does not change storage requirements in the depot.</li> <li>Operatives are sector scheme trained the installation of the VRS.</li> </ul>	<p><b>The scope is:</b></p> <ul style="list-style-type: none"> <li>Using 4G to communicate between the CCTV equipment and road side cabinet.</li> </ul> <p><b>It is assumed that:</b></p> <ul style="list-style-type: none"> <li>The existing communications system between the cabinet and the Regional Operating Centre is not changed.</li> <li>DMRB requirements for coverage and the placement of cameras are not changed.</li> </ul>

# Application of the process

The text for each step illustrates some of the aspects to be considered and documented.  
The examples provide a snapshot based on the point the activity is at in the development lifecycle.

Scenario	<p>The Safety Engineering and Standards Directorate are in the process of undertaking an editorial update of Volume 10 of the DMRB. A supplier has been tasked with producing a new Landscape Management Handbook.</p>	<p>A major project is in the option selection stage (PCF Stage 2). The scheme is intended to reduce congestion and the scheme designer has suggested that in order to increase capacity it would be necessary to reduce the lane widths to accommodate an increase from three to four lanes.</p>	<p>A small safety scheme has been proposed by the National Highways OD team and is due to be handed over to the Design Services Provider for detailed design. The scheme is intended to improve road safety where vehicles have been leaving the carriageway. A study has recommended a length of vehicle restraint system on a bend of a single carriageway road.</p>	<p>The Safety Engineering and Standards Directorate are considering using 4G wireless technology in the future for the connection of CCTV. Prior to starting an initial Research and Development (R&amp;D) project they want to understand what safety data to collect.</p>
Step five – Safety baseline and safety objective	<p><b>Baseline</b> A possible road user baseline could be:</p> <ul style="list-style-type: none"> <li>The average number of collisions occurring in traffic management installed to support landscaping per year that occur across the SRN.</li> <li>An analysis of the relevant data from the Safety Risk Model is documented. From this, the actual value for the baseline parameter is estimated based on the latest five years of data. Safety data from AIRS web related to workers is also quoted.</li> </ul> <p><b>Objectives</b> A possible safety objective for road users could be:</p> <ul style="list-style-type: none"> <li>The safety objective for road users will be met if the parameter is the same or lower than the baseline five years after publication of the standard.</li> <li>The objective for road workers would be as per GG104 Clause 2.19 i.e. to manage risk as low as reasonably practicable.</li> </ul>	<p><b>Baseline</b> A possible road user baseline could be:</p> <ul style="list-style-type: none"> <li>The rate of collisions per million vehicle miles travelled.</li> <li>The Fatal Weighted Index rate of casualties per million vehicle miles travelled.</li> <li>The baseline period is set as three years immediately prior to the start of construction over the area in scope.</li> <li>An analysis of the existing safety performance of the section in scope is provided. The current values for the baseline parameter is calculated using the latest available data. The actual baseline value can only be set once work on site commences.</li> </ul> <p><b>Objectives</b> A possible safety objective for road users could be:</p> <ul style="list-style-type: none"> <li>The safety objective for road users will be met if the two parameters are the same or lower than the baseline following three years of operation.</li> <li>The objective for road workers would be as per GG104 Clause 2.19 i.e. to manage risk as low as reasonably practicable.</li> </ul>	<p><b>Baseline</b> A possible road user baseline could be:</p> <ul style="list-style-type: none"> <li>The Fatal Weighted Index for casualties resulting from vehicles leaving the carriageway.</li> <li>The baseline period is set as three years immediately prior to the start of construction over the area in scope.</li> <li>The road safety study analysis undertaken for the study is included. The current values for the baseline parameter is calculated using the latest available data. The actual baseline value can only be set once work on site commences.</li> </ul> <p><b>Objectives</b> A possible safety objective for road users could be:</p> <ul style="list-style-type: none"> <li>The safety objective for road users will be met if the parameter is the same or lower than the baseline following three years of operation.</li> <li>The objective for road workers would be as per GG104 Clause 2.19 i.e. to manage risk as low as reasonably practicable.</li> </ul>	<p><b>Baseline</b> A possible road user baseline could be:</p> <ul style="list-style-type: none"> <li>The % of time that a CCTV camera produces an image of sufficient quality to identify objects as per IAN 161 requirements.</li> <li>The number of faults that occur that prevent any image be transmitted.</li> <li>The baseline in this instance could be the performance of existing CCTV equipment using 4G technology.</li> <li>The R&amp;D project includes a commitment to collect the necessary data for the existing 4G system.</li> </ul> <p><b>Objectives</b> A possible safety objective for road users could be:</p> <ul style="list-style-type: none"> <li>The safety objective for road users will be met if the parameter is the same or lower than the baseline.</li> <li>The objective for road workers would be as per GG104 Clause 2.19 i.e. to manage risk as low as reasonably practicable.</li> </ul>

## STEP

# 6 Undertaking the assessment

### GUIDANCE

This is the formal hazard identification and risk assessment step in the process. This can be the most involved part of the process and determines the outcome of the overall SRA.

The effort required and the detail of the documentation produced will vary greatly dependant on the categorisation. There are 5 separate tasks that need to be completed to satisfy Step 6; these are shown in Figure 2.

These tasks are not sequential. Those undertaking an SRA should expect to progress both forwards and backwards through the list of tasks amending the outcomes of previous tasks as the risks become more defined. This task can be time consuming and may also lead to changes to the outputs of earlier steps, specifically Steps 4 & 5.



## STEP

# 6

## Undertaking the assessment (Clauses 3.2-3.3)

### IDENTIFYING THE HAZARDS

**There are numerous methods by which the reasonably foreseeable hazards can be identified, and the appropriate method will depend on the activity.**

With the exception of the simplest SRAs it would be sensible that the identification is undertaken collaboratively with input from stakeholders who understand the activity. This is an effective way of quickly developing a raw list of hazards that can later be refined. The list should be developed so that there is no overlap between the individual hazards; although the same hazard may be repeated as it presents a risk to different populations or sub-populations.

The Safety Risk Requirements team maintain a library of Hazard Logs for different road types that could be used to inform a hazard identification. An Impact Assessment Tool is also available that focusses on Traffic Officer Risk. Reliance on one individual's knowledge, lists from previous SRAs or generic hazard lists alone is likely to result in hazards being missed and misinformed decisions being made.

The documentation should record the nature of the hazard identification activity undertaken and include the final hazard list.

## STEP

# 6

## Undertaking the assessment (Clauses 2.2-2.6)

### ANALYSING THE HAZARDS

The hazard analysis task involves the development of the hazards into risks that could be realised. This step can be thought of as a cause and effect mapping exercise using the test provided in Clause 3.4 of GG104 and the raw list of hazards.

This step will result in some reconfiguration of the original hazard list and it is sensible to carry out this task at the same time as the hazard identification.

Exploring the different causes and consequences of a hazard will illustrate the complexity of a highway environment. Care should be taken to consider if division of the entries into sub entries, i.e. where one hazard results in numerous risks, is appropriate. Often the lack of reliable or detailed safety data makes quantifying risk in this way difficult.

The analysis should be structured in such a way to clarify what is a primary hazard and where there is an event that leads to a secondary hazard.

The documentation of this task should include details of the risk posed by each hazard. Appendix D of GG104 provides one possible means of documenting the outcome of this task but a more detailed table may be appropriate for SRAs with a Type B and C categorisation.

## STEP

# 6

## Undertaking the assessment (Clauses 3.5)

### ANALYSING THE SAFETY RISK

**In simple terms this task involves identifying the level of risk of each entry from the previous two tasks. This is often the most challenging part of the process.**

It is commonplace for this exercise to involve a large degree of judgement and the involvement of stakeholders familiar with the activity is advised. As such, this task benefits being undertaken in parallel with the hazard identification and hazard analysis.

The SRA process is a means to make safety decisions where outcomes are not certain and although some data may be available to quantify risk there will always be an element of estimation. It is typical for data to be available to quantify the frequency of the hazard (e.g. potholes) and one of the outcomes (e.g. loss of control collisions) but no way of determining when the hazard leads to the outcome. There are numerous sources of data which can inform the analysis exercise including the Safety Risk Model, H&S Data from AirsWeb, Controlworks data and STATS19 collision data. Where uncertainty over supporting data, or assumptions, is a concern a sensitivity or 'what if' analysis may be useful to confirm that the level of risk is not impacted.

The scoring matrix included in Appendix D of GG104 provides one possible means of scoring and analysing the risks. This approach is simple and allows the relative risk of numerous hazards to be quickly quantified with limited data.

This approach is not suitable where more detailed analysis of particular hazards is appropriate or where only subtle changes in risk occur. For Type B and C activities it is more likely that each hazard and risk will need to be analysed for different scenarios. The scenarios will be dependent on the activity, the question being asked and the way in which the evaluation is being approached.

The inclusion of a 'baseline' against which to compare the scenario is useful to help evidence the safety objective. In most cases it is sensible to first analyse the hazards for the baseline defined in Step 3 and then commence analysis of the activity in the scenario envisaged. Throughout the process care must be taken not to unconsciously assume the presence of control measures, that lower the risk posed by a hazard in either the baseline or scenarios being considered.

The documentation of this task should include the results of the analysis, the scoring system used and the justification for its selection. Appendix D of GG104 provides one possible means of documenting the outcome of this task.

## STEP

# 6

## Undertaking the assessment (Clause 3.6 – 3-11)

### EVALUATING THE SAFETY RISK

This task brings together much of the assessment undertaken in the first three tasks to determine if the risks posed can be accepted.

There are two different acceptance tests that the SRA should satisfy:

- The Safety Objectives set in Step 5.
- The Safety Risk Criteria in GG104 i.e. as low as reasonably practicable (ALARP) and Reasonably Required.

The Safety Risk Criteria are subjective whereas Safety Objectives can have numerical parameters that can eventually be quantified post implementation. The SRA and the hazards and risk work completed can only ever give confidence that these criteria can be met for the activity. This part of the process typically involves building a case, either qualitatively or quantitatively, that the objectives and criteria can be met.

In all instances there should be some form of qualitative evidence and well-reasoned justification provided; this can be supplemented with quantitative assessment where appropriate. Whilst it is useful for this step to conclude that risks to a particular population are 'unchanged', 'low', 'broadly acceptable' or 'remain tolerable' this alone is not sufficient to satisfy GG104.

It is likely that at the outset, at least, the two safety risk criteria cannot be met. As such the Evaluation cannot be completed until the next task, the selection of appropriate mitigation, is also complete. Combined these tasks form the conclusion of the Safety Risk Assessment step, should determine if the activity is in accordance with GG104 and answer the question posed in Step 1.

The documentation of this task should include evidence, in a quantitative and/or qualitative form, to demonstrate that the Safety Objectives and Safety Risk Criteria can be met.

## STEP

# 6

## Undertaking the assessment (Clause 3.12 – 3-15)

### INTRODUCING SAFETY RISK MITIGATION

The introduction of safety risk mitigations, often referred to as control measures, is an important outcome from the process. Many of the possible control measures will be directly linked to the hazards and risks and as such can be documented as the hazard identification, hazard analysis and analysis of safety risk progresses.

The evaluation of risk is only possible by proposing and testing control measures against the appropriate criteria. This process will result in the refinement of the possible control measures into a list that meets the requirements of GG104. Appendix A of GG104 includes a flow chart to illustrate the process of evaluation and selection of control measures.

Regardless of the activity categorisation, population affected, hazard or risk score the process to be completed to confirm control measures is the same. Possible control measures considered should be listed along with reasoning for their adoption or non-adoption. Measures should be introduced if they are likely to be effective unless the cost is grossly disproportionate to the benefit. Cost benefit analysis may guide the inclusion of identified measures, especially for Type B and C activities; documentation of cost benefit should be included where this has informed selection.

All control measures taken forward should be documented, this should include:

- Controls that are deemed to already be required and present for other reasons
- Additional controls specifically required as a result of the SRA

Where control measures are considered to be critical to the outcome it may be appropriate to define these as 'Safety Requirements' which need to be met and can be verified at key lifecycle stages.

The documentation of this task should be a list of confirmed control measures that are deemed necessary to ensure the successful evaluation of the risk to each population.

## STEP

# 6

## Undertaking the assessment

### OUTPUT

The documentation of this step in the SRA report should include:

- ✓ A clear description of the process undertaken to identify the hazards.
- ✓ A list of the hazards to all affected populations relevant to the activity with the scope of the SRA.
- ✓ Results of the hazard analysis including the risk that may be realised.
- ✓ Analysis of the Safety Risk for each hazard.
- ✓ A summary of the expected change in risk for each population.
- ✓ A written evaluation that provides evidence whether the safety objective and safety risk criteria can be met for each population.
- ✓ Confirmed control measures.

Much of the documentation for Step 6 can be recorded in tabular format and as such it may be appended to the main SRA document.

# Application of the process

The text for each step illustrates some of the aspects to be considered and documented.  
The examples provide a snapshot based on the point the activity is at in the development lifecycle.

Scenario	<p>The Safety Engineering and Standards Directorate are in the process of undertaking an editorial update of Volume 10 of the DMRB. A supplier has been tasked with producing a new Landscape Management Handbook.</p>	<p>A major project is in the option selection stage (PCF Stage 2). The scheme is intended to reduce congestion and the scheme designer has suggested that in order to increase capacity it would be necessary to reduce the lane widths to accommodate an increase from three to four lanes.</p>	<p>A small safety scheme has been proposed by the National Highways OD team and is due to be handed over to the Design Services Provider for detailed design. The scheme is intended to improve road safety where vehicles have been leaving the carriageway. A study has recommended a length of vehicle restraint system on a bend of a single carriageway road.</p>	<p>The Safety Engineering and Standards Directorate are considering using 4G wireless technology in the future for the connection of CCTV. Prior to starting an initial Research and Development (R&amp;D) project they want to understand what safety data to collect.</p>
Step six – Safety risk assessment	<p>The supplier identifies a small number of clauses in the new standard that would have an impact on the risk to the populations.</p> <p>The supplier brings together a small group of maintenance service provider staff with experience of landscape work, traffic management and smart motorway working to undertake a hazard identification and risk assessment session.</p> <p>The supplier develops the list of hazards, identifying risks to both parties and analyses the safety risk using the approach outlined in Appendix D of GG104. One of the hazards identified may be; Landscape operative working in verge. This hazard sometimes occurs with traffic management and sometimes without. One of the suggested DMRB document clauses could increase the frequency of grass cutting on smart motorways which means more traffic management may be required. The team explore the need for control measures using the eliminate, reduce, isolate or control (ERIC) risk reduction approach. In the case of this particular hazard they determine that there are a number of existing control measures in place e.g. use of Chapter 8 traffic management using remotely operated temporary traffic management signs and the potential use of signals during the set-up and removal of roadworks. These measures should reduce risks in accordance with ALARP and these are recorded in the SRA. The same approach to risk reduction is completed for the other road worker hazards identified. The risks to road users are explored and a number of control measures considered. It is determined that to meet the reasonably required principle there are no additional controls needed.</p> <p>An evaluation of all the risks suggest that the objective for road users and road workers can be met.</p> <p>The SRA would confirm that the changes to the standard are acceptable in safety risk terms subject to the control measures described in the SRA.</p>	<p>The designer convenes a meeting with the SES geometry specialist and the operational safety members of the team. Based on the discussion and experience of similar design decisions previously they identify a list of hazards across the options. The supplier further develops the list of hazards, identifying a number of risks to the main populations. An initial assessment of the safety risk is completed using the approach outlined in Appendix D of GG104. One of the hazards identified across all options is; cyclist travelling in narrow lanes. This hazard is related only to users and specifically cyclists. The risk documented is that a cyclist travels through the section on the nearside of a lane and the driver of another vehicle attempts to overtake within the lane. This could result in a side swipe collision with the cyclist and a fatal injury.</p> <p>The design team identify a number of control measures for all hazards following the ERIC risk reduction approach. With respect to the cyclists hazard the favoured approach is to prohibit cyclists from using the section and providing improvements along another, local highway authority, route. The exploration of the control measure reveals that the change would be inexpensive as the local highway authority already have funding for improvements. There is also evidence of cyclist collisions with the existing layout. The Designer undertakes a cost benefit analysis to show a possible benefit to cost ratio of over three. This suggests that this measure meets the reasonably required principle and other possible control measures are not as effective. The same approach to risk reduction is followed for the other road user hazards.</p> <p>A number of hazards related to road workers are included in the list. The majority of these relate to traffic management activity and it appears that Traffic Signs Manual Chapter 8 Layouts can be used with no increase in risk.</p> <p>An evaluation of all the risks suggest that the objective for road users and road workers can be met.</p> <p>The SRA would confirm that the option is acceptable in safety risk terms subject to the control measures described in the SRA.</p>	<p>As part of the scheme development the proposal is subject to value management. The local road safety team begin to document the hazards related to the different populations using the outline drawings, collision data with input from the route steward.</p> <p>An initial assessment of the safety risk is completed using the approach outlined in Appendix D of GG104. On quantifying the risk, the team realise that the provision of VRS increases the risk of two of the most significant hazards at the location. Firstly, it is more likely that an errant vehicle will collide with a hard object with the VRS than without. Secondly repairs to the VRS, which is likely to be struck and damaged from time to time, will increase the risk to road workers.</p> <p>Applying ERIC, the team identify a number of alternative control measures that do not result in road user risk increasing. The main approach is to replace existing street furniture with passive equivalents. This approach has a lower capital and maintenance cost and would not increase maintenance interventions above existing levels.</p> <p>This demonstrates that the new proposal meets the reasonably required principle and is ALARP for road workers. The same approach to risk reduction is followed for the other road user hazards.</p> <p>An evaluation of all the risks suggest that the objective for road users and road workers can be met.</p> <p>The SRA would confirm that the proposals should be amended, and the earlier steps of the SRA updated to reflect the new approach.</p>	<p>The project team source an existing SRA that covers the deployment of 4G to assist in hazard identification. There is limited data to support the quantification of the risks, but it is possible to prioritise the hazards and:</p> <ul style="list-style-type: none"> <li>Identify unknowns that have a significant impact.</li> <li>Identify measures that might prevent the hazard occurring.</li> <li>Identify measures that might mitigate the impact of the hazard.</li> </ul> <p>The project team brainstorm the possible benefits of the new technology and identify a number of ways in which it may reduce risk.</p> <p>The project team document the initial work done to identify hazards and analyse the risks. The work forms the basis of a task brief for a supplier to enhance the understanding of the possible risks and eventually evidence that the safety objectives can be met.</p>

## STEP

# 7

## Establishing the need for further updates to documentation

This short step is intended to consider and confirm the validity of the SRA.

### GUIDANCE

All SRAs are live documents that should remain under review. However, the nature of the framework means it will be necessary for the SRA to make some assumptions about how the activity will be undertaken so that the scope can be defined. As such there may be some specific assumptions, or possible changes to the activity, that may have a significant impact on the findings.

Where the SRA is produced early in the planning or during the development of the activity it may also be possible to define a series of update hold points through the development process.

Setting the correct update requirements are especially important where the management of the risk may pass from one party to another. Governance procedures for the specific business area contain further advice on update and handover and the SRA should confirm what is proposed.



STEP

7

## Establishing the need for further updates to documentation

This short step is intended to consider and confirm the validity of the SRA.

### OUTPUT

The output from Step 7 is typically a short list of requirements for updating the document that include specific triggers based on:

- ✓ Significant assumptions in the assessment.
- ✓ Milestones in the activity development.
- ✓ A change to a Safety Requirement.
- ✓ New information emerging as a result of monitoring of the activity (see step 8).
- ✓ Business area specific procedures.

# Application of the process

The text for each step illustrates some of the aspects to be considered and documented.  
The examples provide a snapshot based on the point the activity is at in the development lifecycle.

Scenario	<p>The Safety Engineering and Standards Directorate are in the process of undertaking an editorial update of Volume 10 of the DMRB. A supplier has been tasked with producing a new Landscape Management Handbook.</p>	<p>A major project is in the option selection stage (PCF Stage 2). The scheme is intended to reduce congestion and the scheme designer has suggested that in order to increase capacity it would be necessary to reduce the lane widths to accommodate an increase from three to four lanes.</p>	<p>A small safety scheme has been proposed by the National Highways OD team and is due to be handed over to the Design Services Provider for detailed design. The scheme is intended to improve road safety where vehicles have been leaving the carriageway. A study has recommended a length of vehicle restraint system on a bend of a single carriageway road.</p>	<p>The Safety Engineering and Standards Directorate are considering using 4G wireless technology in the future for the connection of CCTV. Prior to starting an initial Research and Development (R&amp;D) project they want to understand what safety data to collect.</p>
Step seven – Update the SRA	<p>The following specific triggers for review are set:</p> <ul style="list-style-type: none"> <li>• When the final version of the DMRB document becomes available.</li> <li>• The SRA is valid for the update of the DMRB document as presented and any future changes would justify a review and potentially an update.</li> </ul>	<p>The following specific triggers for review are set:</p> <ul style="list-style-type: none"> <li>• The SRA should be reviewed when additional topographical survey data becomes available to confirm the lane width options.</li> <li>• The SRA should be reviewed at the next PCF Stage and the work should feed into the Combined Safety and Hazard Log Report PCF Product.</li> <li>• If the proposed prohibition on cyclists cannot be delivered or the local highway authority scheme is not in place.</li> <li>• When the monitoring of cycle users identified in Step 8 is complete.</li> </ul>	<p>The following specific triggers for review are set:</p> <ul style="list-style-type: none"> <li>• The SRA should be reviewed when the passive product has been selected by the contractor.</li> </ul>	<p>The initial SRA is only undertaken to determine priorities for data collection. The content of the SRA would need to be updated at the end of the R&amp;D project when the new information is available. This update would need to look in detail at the quantity, quality and appropriateness of the data collected and its usefulness in understanding the safety risk.</p>

## STEP

# 8

# Confirming validation arrangement and the need for monitoring

This step is required to confirm arrangements for validation of the safety objective and consider the need for other monitoring of the activity as it is undertaken.

As a minimum this section should make it clear what arrangements are in place for the eventual validation of the safety objective; additional monitoring beyond this validation is only recommended where justified by the previous steps.

## GUIDANCE

Monitoring can take many forms; some possible options include:

- Analysis of STATS19 collision records or Airswab accident records.
- Analysis of Controlworks data.
- Feedback from those undertaking the activity.
- Feedback from maintainers or the traffic officer service.
- Conflict analysis.
- Human Factors or Ergonomics study.
- Verification of safety requirements.
- Additional requirements in the Benefits Realisation and Evaluation Plan.
- Consideration via the Road Safety Audit process (highway schemes only).
- Additional requirements in the Plan for Monitoring PCF Product (Major projects only)
- Regional Operation Centre based monitoring.

The decision of what aspects, or parameters, to monitor will be specific to the activity and circumstances. The justification will likely come from the work undertaken at Step 6 and the significant assumptions identified in Step 7. Step 8 and Step 7 are closely related. Update requirements may define the need for monitoring and the results of the monitoring may result in updates to the SRA or the activity itself.

It is important that any monitoring that is proposed has:

- A clear purpose.
- A defined methodology.
- An owner with the ability to deliver the work required, including funding
- A defined timescale that allows for sufficient data collection.
- Where appropriate, thresholds which serve as abort criteria for the activity.

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### OUTPUT

The documentation of step 8 should include:

- ✓ An explanation of how the safety objective could be evaluated.
- ✓ Details of how planned activities could be adapted to help validate assumptions or outcomes.
- ✓ A list of aspects, if any, that justify specific monitoring.
- ✓ A plan, or reference to other processes, for the monitoring proposed.



# Application of the process

The text for each step illustrates some of the aspects to be considered and documented.  
The examples provide a snapshot based on the point the activity is at in the development lifecycle.

Scenario	<p>The Safety Engineering and Standards Directorate are in the process of undertaking an editorial update of Volume 10 of the DMRB. A supplier has been tasked with producing a new Landscape Management Handbook.</p>	<p>A major project is in the option selection stage (PCF Stage 2). The scheme is intended to reduce congestion and the scheme designer has suggested that in order to increase capacity it would be necessary to reduce the lane widths to accommodate an increase from three to four lanes.</p>	<p>A small safety scheme has been proposed by the National Highways OD team and is due to be handed over to the Design Services Provider for detailed design. The scheme is intended to improve road safety where vehicles have been leaving the carriageway. A study has recommended a length of vehicle restraint system on a bend of a single carriageway road.</p>	<p>The Safety Engineering and Standards Directorate are considering using 4G wireless technology in the future for the connection of CCTV. Prior to starting an initial Research and Development (R&amp;D) project they want to understand what safety data to collect.</p>
Step eight - Monitoring	<p>The following specific triggers for review are set:</p> <ul style="list-style-type: none"> <li>When the final version of the DMRB document becomes available.</li> <li>The SRA is valid for the update of the DMRB document as presented and any future changes would justify a review and potentially an update.</li> </ul>	<p>The following specific triggers for review are set:</p> <ul style="list-style-type: none"> <li>The SRA should be reviewed when additional topographical survey data becomes available to confirm the lane width options.</li> <li>The SRA should be reviewed at the next PCF Stage and the work should feed into the Combined Safety and Hazard Log Report PCF Product.</li> <li>If the proposed prohibition on cyclists cannot be delivered or the local highway authority scheme is not in place.</li> <li>When the monitoring of cycle users identified in Step 8 is complete.</li> </ul>	<p>The following specific triggers for review are set:</p> <ul style="list-style-type: none"> <li>The SRA should be reviewed when the passive product has been selected by the contractor.</li> </ul>	<p>The initial SRA is only undertaken to determine priorities for data collection. The content of the SRA would need to be updated at the end of the R&amp;D project when the new information is available. This update would need to look in detail at the quantity, quality and appropriateness of the data collected and its usefulness in understanding the safety risk.</p>