SCOTS Rationale for Guidance on a Risk Based Approach to Asset Management

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Title	SCOTS Rationale for Risk Based Approach to Road Asset Management Guidance
Author	SCOTS
Description	This gives an outline of the rationale for the approach taken by SCOTS to the development of its risk based approach guidance: background and collaborative approach to the development work; methodology to be deployed for Safety inspections; approach to inspector training and competency

Document History

Version	Status	Date	Author/ revised by	Changes from Previous Version
1.0	Final	Sept 2018	SCOTS	n/a
1.1	Approved Revision	Nov 2018	SCOTS	Added Change Control section and revision to Likelihood/Probability table.

Document Control

Version	Date Authorised (SCOTS RAMP Steering Committee)
1.0	13/09/2018
1.1	19/11/2018

Contents

1. Background

About SCOTS

The Society of Chief Officers of Transportation in Scotland (SCOTS) is a strategic body comprising of transportation professionals from all the 32 councils and the seven regional transport partnerships in Scotland. The society's role includes improving operational performance through such means as providing guidance and training to promote best practice; providing advice to Local authorities on legislation as it is developed; and through partnership working. One such example of this is the SCOTS Road Asset Management (RAM) Project.

About the SCOTS Road Asset Management Project

The RAM Project is a collaboration of all 32 authorities, established in 2008 to develop a standard framework that would allow authorities to implement Road Asset Management Planning. The project is supported by procured external consulting expertise to develop tools and guidance on asset management and facilitate practitioner development through the provision of training. It takes a task-based pragmatic approach focusing on clear, concise practical methods. The project also provides a platform for engagement with increasing collaboration among practitioners in developing good practice and knowledge sharing.

The current consultancy supporting the SCOTS RAMP Project is Atkins Ltd who were directly involved in the development of the revised code of practice for road asset management: 'Well Managed Highway Infrastructure (WMHI): A code of Practice' (2016).

The Steering Group of the Project comprises the Chair who administers the project on behalf of the 32 authorities and representatives from key SCOTS functional groups of Roads (carriageways and footways), Street Lighting and Structures.

The need for a Risk Based Approach to Asset Management

In 2016 the WMHI was published, recommending that authorities should adopt a 'Risk Based Approach' to managing their assets.

For many councils this guidance represents a step change in the way that defects are assessed. Taking a risk based approach, as per the above code of practice, means that there are NO prescriptive investigation or intervention levels to apply. The rationale for removing these is that the same defect will represent a different level of risk in a different context. In the past this has led to inappropriate and often unnecessary, costly, temporary repairs. Instead, by using a risk based approach, councils can reduce such reactive interventions and target more of their scarce resources towards programmed work that in the longer term will lead to an overall improvement of road condition.

SCOTS therefore set out to develop a suite of resources that would: include practical tools, guidance and training on a Risk Based Approach (RBA); be integrated into its existing SCOTS Road Asset Management framework; comply with the code of practice and provide a level of consistency across Scottish Local Authorities.

Guidance: Risk Based Approach to Safety Inspections

It was decided by SCOTS that a key priority for the RAM project was to provide guidance and training in relation to a risk based approach to road inspections and defect repairs, as ensuring a safe local road network is of paramount importance to authorities. Safety defects are also the area of service that results in the greatest number of claims. Efforts that help ensure defects are identified and assessed appropriately using a RBA, means more resources can be better targeted.

The resources developed to date include:

1. A Risk Based Approach Overview Guidance

   Outline of background and principles of a Risk based approach and the ISO 31000 Risk Assessment Process that SCOTS have aligned their guidance to.

2. Committee Report Template

   Template to allow Local Authorities to prepare a committee report with a revised policy on Safety Inspections to be presented to their Elected Members for approval in accordance with Council Standing Orders.

3. Road Safety Inspection Strategy

   Document providing operational guidance to those officers responsible for the management of safety defects

4. Road Safety Inspectors Operations Manual

   Providing road safety inspectors with information and guidance regarding the method to be deployed in undertaking risk assessment and the prioritisation of defects

5. Training and Competency toolkit on a RBA to Safety Inspections

   Training resources to support local training on the SCOTS recommended practice and provision of a competency assessment for inspectors

Moving forward, SCOTS will review other existing asset management guidance and revise where required to reflect a risk based approach.

2. Guidance Development

Retaining Duty of Care requirements

While WMHI is not a statutory document, SCOTS have taken the view that current Roads (Scotland) Act and Common Law (Duty of Care) of what constitutes as a dangerous defect may be considered unlikely to change with the introduction of the new code. In addition, that the courts will continue judging each claim based on the law (Roads (Scotland) Act and Common Law), legal precedent and the facts presented, as with previous Codes of Practice.

The continued importance of ensuring a Duty of Care has therefore been highlighted within the SCOTS RBA guidance.

Aligning guidance to ISO 31000 Standard

In designing a SCOTS risk based approach it was felt prudent by SCOTS to align their guidance to the internationally recognised ISO 31000 shown in Appendix A. The SCOTS guidance is therefore based on clear, concise process steps to ensure they are adopting a risk based approach in a consistent way. The risk assessment process for safety defect inspections for instance is based on Step 3 of ISO 31000 covering the processes of Identification, Analysis and Evaluation using SCOTS methods.

Collaborative Development of Guidance

SCOTS Focus Group to meet differing requirements

In relation to the safety inspection document suite, this has been developed by the SCOTS RAMP consultant (Atkins Ltd.) in partnership with a SCOTS Focus Group consisting of experienced road engineers from several Scottish authorities representing their respective family groups of urban, semi-urban, rural etc. This collaborative approach was to ensure the guidance would be pragmatic and could accommodate the range of service contexts that exist across the local network in Scotland. It was also felt that greater buy-in to the methodology would be achieved through such wider involvement in its design.

Competency of those involved

The competency of those involved in the development of the SCOTS guidance on a Risk Based Approach to Safety Inspections is detailed in a supporting document *'Risk Based Approach Development Competency Summaries.doc'* held by SCOTS. Involved personnel include:

- SCOTS RAMP Consultants who provided advice and expertise in the code of practice requirements; collaborated in the development of the guidance; developed a training and competency toolkit for risk based road safety inspections; delivered workshop training to practitioners
- Roads practitioner focus group members who compiled draft guidance on risk based road safety inspections
- SCOTS RAMP Steering Group members who refined and approved the guidance for inclusion in the SCOTS RAMP framework of recommended practices
- SCOTS RAMP Project Manager who co-ordinated the development and training activity; assisted with design and proofing of outputs and compilation of this Rationale document.

3. RBA to Safety Inspections: Guidance Content Rationale

This section outlines the rationale behind key aspects of the guidance and resources produced by SCOTS in relation to the management, operation in and training on, road safety inspections.

Template format

The guidance documents have been developed as templates. This is consistent with the general approach to the SCOTS road asset management framework: to provide practical, pragmatic recommended guidance that authorities can amend to accommodate local context considerations and easily implement. Such considerations may be political, geographical or to align with other local policies and procedures. SCOTS recognise that one size does not fit all but have found that its templates provide a high level of consistency and encourage adoption of the recommended practice.

Risk Analysis and Evaluation: rationale for recommended 5 x 5 Risk Matrix

In the SCOTS RBA, hazards are analysed by assessing in turn the LIKELIHOOD of encountering the hazard and the most probable CONSEQUENCES (impact/severity) should the risk occur. To assist with determining the level of risk, inspectors are provided with tables of plain English descriptions of likelihood and consequence scales. Using a 5x5 matrix (Appendix B), a priority response is then determined.

The adoption of a 5x5 risk matrix methodology was suggested by Glasgow City Council (GCC) who had previously trialled this approach, finding it to be more robust that the 4x4 risk matrix recommended in the previous code of practice:

- **Higher Level of consistency in risk evaluation and categorisation**

  Historically, the 4x4 risk matrix was found by Glasgow to have a high level of inconsistency in defect categorisation within the mid-range areas, with more defects falling into the higher of the two mid-range risk categories, resulting in shorter response times than necessary and therefore more expensive, reactive, temporary works. Other impacts of this were greater pressure and failure to meet deadlines leading to: complaints; multiple visits to carry out further temp repairs; court cases and additional cost. As well this additional unnecessary burden on maintenance resources the inconsistency of risk evaluation created uncertainty when cases went to court.

  In 2011, to try to find a methodology that would produce greater consistency, GCC considered the use of their 5x5 corporate risk matrix which provided finer definitions to choose from in the mid-range. In addition, greater consistency was found to be aided by the assessments consideration of descriptive risk factors rather than technical defect tables that specified defect characteristics such as pothole depth < 40mm.

- **Simple to use with minimal training required**

  The trial was run within 3 other Scottish local authorities. GCC firstly provided technical and non-technical maintenance staff in South Lanarkshire with photographs of an actual claim defect and risk description tables with associated likelihood/consequences (impact) scoring. Without any training staff were tasked with assessing and scoring the risk. The results across both staff groups demonstrated a similar higher level of rating consistency than when the

standard 4x4 matrix was used. These consistency results were replicated when the same test was applied in Perth and Kinross, and Falkirk.

The absence of any formal training was encouraging as it demonstrated that defect assessment consistency could be achieved with both technical and non-technical staff without onerous and costly training requirements.

- **Designed to mitigate against 'worst case scenario' thinking**

  In general, when assessing risk, the human tendency is to consider the worst possible outcome, rather than the most probable. Psychologically, the word 'risk' forces our thinking down that route.

  The risk analysis process using the 2 step Likelihood and Consequences analysis, and then identification of risk priority using the risk matrix, mitigates against such 'worst case scenario' thinking and helps ensure an objective assessment is carried out.

  The guidance specifically instructs safety inspectors **not** to work backwards from a Priority conclusion. In addition, the response times that are associated with the priority categories (e.g. priority 2 = 5 working days) have been deliberately omitted from the safety inspectors' operations manual to avoid their assessment being influenced by consideration of response times.

- **Enables more efficient use of resources and value for money**

  The risk based assessment and categorisation of defects described above leads to more appropriate responses and reduces the number of defects that trigger a Category 1 emergency, reactive response and conversely a higher volume of defects falling into the 'planned maintenance' category. Reducing expensive, reactive repairs frees more resources to plan permanent cost effective repairs that will have a longer term positive impact on road condition.

- **Improves defensibility against claims**

  The 5x5 matrix adopts a more objective assessment of potential hazards based on risk and evaluated using meaningful, easily understood criteria. Applied competently, the methodology can therefore improve the ability to defend claims.

To validate the earlier GCC trial findings, the RAM project replicated the use of the matrix with practitioners from across Scotland, and from different asset management functions, during the RAMP workshops in February, 2018. This exercise confirmed that practitioners find it simple to use and that its use produces a high level of consistency in defect categorisation. It was thus confirmed that a 5x5 matrix was an effective risk analysis tool and was therefore subsequently refined and incorporated into the SCOTS RBA guidance.

Rationale for recommended defect Response Times

Currently, there is no known statistical evidence base available from which to determine appropriate risk based response times. The SCOTS recommended safety level response times (see Appendix B) were therefore compiled jointly by the SCOTS Focus Group and Atkins Consultancy using their professional experience and expertise to reach a consensus. These were duly approved by the SCOTS Steering Group at their meeting on the 19th April, 2018.

However, SCOTS recognise the value in having an evidence base and are being proactive in taking steps towards validating the recommendations, and encouraging local authorities to consider evidence for any local divergence from them:

- Scottish Road Research Board (SSRB) Research Project

  Councils potentially hold data which could be used to provide evidence to support response time decisions but lack the resources to identify, collate and analyse critical datasets to do so. SCOTS have been successful in a bid for an SSRB funded research contact to identify a robust evidence base either from existing data, or where this does not exist, to specify how we obtain required data for future analysis. The research is expected to begin late 2018.

- Local Service Levels

  The SCOTS guidance recognises the diversity within the Scottish local road network and political context that may produce a desire to set local **service** levels above the SCOTS recommended **safety** levels. It is recommended that any local changes to the SCOTS recommended response times are documented: clearly identifying where local service levels exceed the recommended safety level, and having a robust rationale fully documented if local standards are lower than any SCOTS recommended safety level.

Rationale for recommendations on compiling and review of Road Hierarchies

Road Hierarchy is the basis for determining the frequency of inspection and is not necessarily determined by the road classification but rather by functionality and use. The SCOTS guidance on hierarchy categorisation for carriageways, footways and cycle routes - and corresponding inspection frequencies - are based on those contained within the Well Managed Highways code of practice. However, the code does not specify a methodology for compiling them. A high degree of local knowledge is required with multiple criteria needing to be taken into consideration e.g. traffic and pedestrian volumes and demographics; location of key destinations; accident history; policy or operational considerations.

SCOTS therefore recommend that a panel of local experts with knowledge of the local network and appropriate competency skills, carry out this task. The guidance also advises that competency detail on those involved and a record of the compilation process/decision making is kept.

SCOTS further recommends a 3 year review period, with annual review where there are major/new developments. The reasoning for this is that any changes made to the hierarchy requires all dependant service routes to be changed such as winter, drainage or safety inspection routes. It is therefore not reasonable or practical to undertake more frequent reviews.

Continuity of Service Levels between Neighbouring Authorities

The WMHI code of practice states that “Users will expect a reasonable continuity of levels of service”. It is expected that by adopting the SCOTS guidance on road hierarchies reasonable continuity across neighbouring authorities can be achieved. However, built into the Scots guidance is the recognition that there needs to be scope for authorities to determine and manage hierarchies with regard to their own particular circumstances, road network condition and budget constraints.

Competency Training and Assessment

The SCOTS RAMP project provides regular road asset management training to engineers and other practitioners. The training is focused on the implementation of SCOTS recommended practice. As well as providing guidance documentation, SCOTS therefore developed training materials on a Risk Based Approach to Safety Defect Inspections and delivered Train the Trainer workshops to enable local delivery of the RBA training. The training includes a SCOTS approved minimum standard competency assessment on safety defect inspections that can be undertaken by safety inspectors, as well as guidance and templates on maintaining training and competency records and training plans where required.

4. Guidance development, review and approval

Throughout the development process draft versions of the guidance produced by Atkins in collaboration with the Focus Group were held on the SCOTS Knowledge hub and made available to the Steering Group for review. Collective review of draft documents also took place at Steering Group meetings on 19th April and 2nd August 2018. Revisions to the guidance document following Steering Group feedback were collaboratively actioned by the Consultant (Atkins) and Client (SCOTS) project managers.

Final versions of the guidance documents were approved for release by the Steering Group via individual members posting confirmation approval within the Steering Group Knowledge hub.

The suite of guidance documents were published on the SCOTS Knowledge Hub for authorities use on 13/09/18.

5. Training

Training on the principles of a Risk Based Approach to Road Asset Management was delivered by Atkins to practitioners at regular SCOTS RAMP workshops held in February 2018 and included an exercise replicating the 5x5 matrix trial run previously by Glasgow City Council to verify the consistency of risk assessment results.

Risk Based Road Safety Inspections Train the Trainer training was delivered by Atkins to 21 delegates from 13 Scottish authorities in May 2018. The rationale was to provide affordable quality training materials to allow councils to carry out their own training and refresher courses to ensure that inspectors understand the basic concept of risk and how to assess defects objectively and consistently.

Drafts of the SCOTS guidance were shared with practitioners at SCOTS RAMP workshops in Jun 2018.

Interactive training on the SCOTS Risk Based Safety Inspections using the final guidance documentation was delivered at SCOTS RAMP workshops in October 2018.

6. Change Control

Following early feedback from local authorities on the published guidance, a change to the Likelihood/Probability table was approved by the Steering Group on 19th November, 2018 as follows:

Original Likelihood Descriptions

Likelihood / Probability	Likelihood Description		
Almost Certain	Will undoubtedly happen	Over 90%	Daily
Likely	Will probably happen, but not a persistent issue	Up to 90%	Weekly
Possible	May happen occasionally	Up to 65%	Monthly
Unlikely	Not expected to happen, but it is possible	Up to 20%	Annually
Remote	Improbable	Less than 5%	100 years

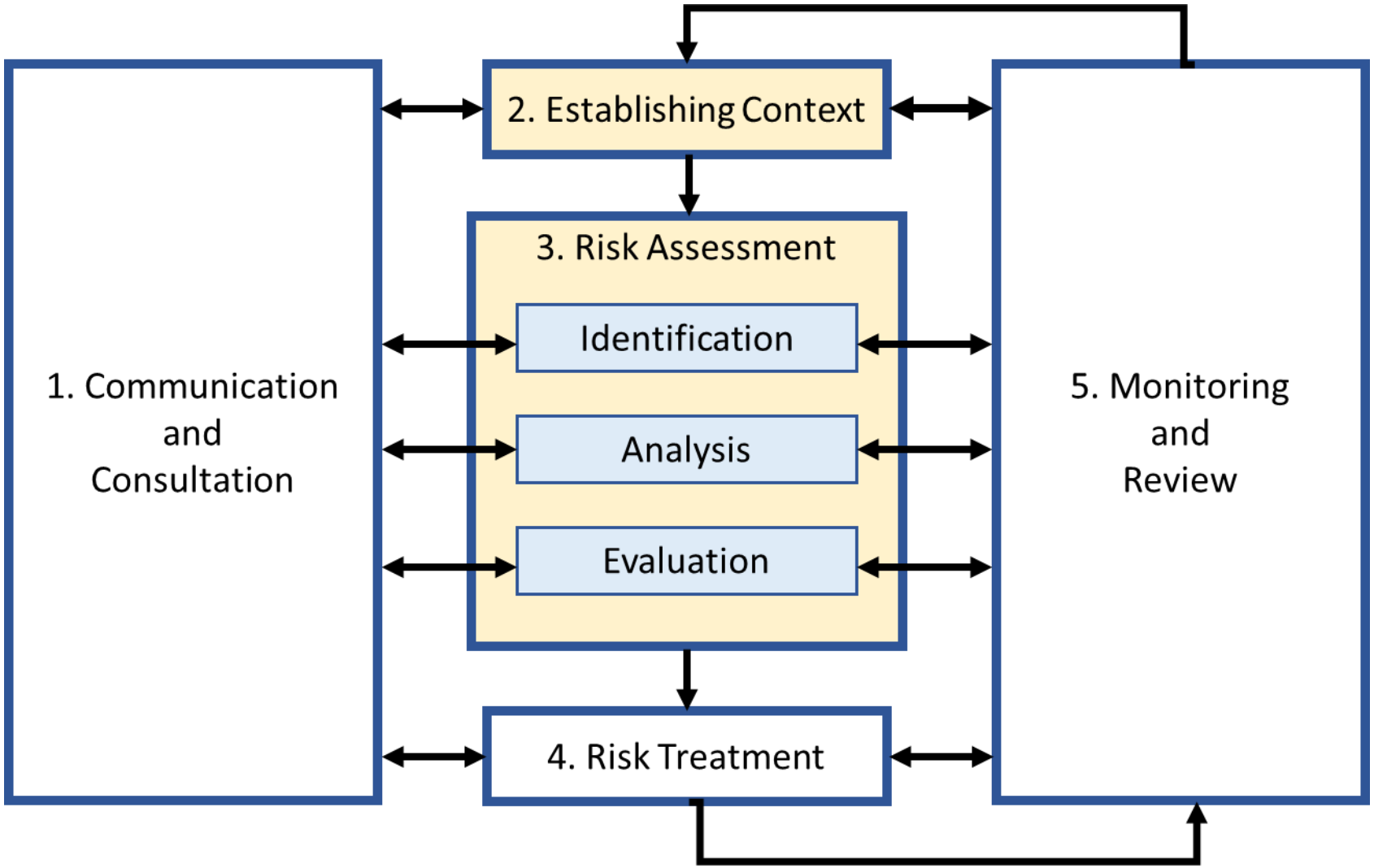
Revised Likelihood Descriptions

Likelihood / Probability	Likelihood Description	
Almost Certain	Will undoubtedly happen	Daily
Likely	Will probably happen, but not a persistent issue	Monthly
Possible	May happen occasionally	Annually
Unlikely	Not expected to happen, but it is possible	10 Years
Remote	Improbable	20 years

It was accepted by the steering group that the numerical quantifiers were not sufficiently helpful and that there was inconsistency between the original defined timeframes and corresponding priority responses within the Risk Matrix.

The Steering Group further agreed that a change control process be introduced whereby any future change requirements will be incorporated into a revised version on an annual basis – unless an immediate change is required due to an exceptional circumstance.

Appendix A: ISO31000 Risk Management Process



Appendix B: Risk Matrix and Responses

Likelihood / Probability	Likelihood Description	
Almost Certain	Will undoubtedly happen	Daily
Likely	Will probably happen, but not a persistent issue	Monthly
Possible	May happen occasionally	Annually
Unlikely	Not expected to happen, but it is possible	10 Years
Remote	Improbable	20 years

Consequence (Impact/Severity)	Description			
	Impact on Service Objectives	Financial Impact	Impact on people	Impact on Reputation
Catastrophic	Unable to function, inability to fulfil obligations	Severe financial loss	Death	Highly damaging, severe loss of public confidence
Major	Significant impact on services provision	Major financial loss	Extensive injury, major permanent harm	Major adverse publicity, major loss of confidence
Moderate	Service objectives partially achievable	Significant financial loss	Medical treatment required, semi-permanent harm up to 1 year	Some adverse publicity, legal implications
Minor	Minor impact on service objectives	Moderate financial loss	First aid treatment, non-permanent harm up to 1 month	Some public embarrassment, no damage to reputation
Negligible	Minimal impact, no service disruption	Minimal financial loss	No obvious harm/injury	No interest to the press, internal only

Consequence / Likelihood	Negligible	Minor	Moderate	Major	Catastrophic
Remote	NR	NR	NR	NR	P3
Unlikely	NR	NR	P4	P4	P3
Possible	NR	P4	P4	P3	P2
Likely	NR	P4	P3	P2	P1
Almost Certain	NR	P3	P2	P1	P1

Risk Category	Priority Response	Safety Level Response Times
Critical Risk	Priority 1 response	24 Hours
High Risk	Priority 2 response	5 working days
Medium Risk	Priority 3 response	60 working days
Low Risk	Priority 4 response	Programmed work
Negligible Risk	No response	No action required

Where appropriate, such as in Island authorities, or within remote locations, the guidance states that an alternative Priority 1 safety level response time can be set to accommodate geographical constraints.