

# Bridge Inspection Competence and Training Phase 2



ATKINS

Department for Transport

March 2012

Training Manual

Volume 1 – Report

Plan Design Enable

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# Training Manual

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This document requires the following approvals. A signed copy should be placed in the project files.

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# Table of Contents

## Volume 1 – Report

<b>Foreword</b>	<b>8</b>
<b>1. Introduction</b>	<b>9</b>
1.1. Routes to Certification	9
1.2. Competences	10
1.3. Advice to Existing Inspectors	11
1.4. People to Help You	11
<b>2. Scheme Parties</b>	<b>13</b>
2.1. Different Roles	13
2.2. Roles and Responsibilities	13
<b>3. Inspector Levels and Competences</b>	<b>17</b>
3.1. Inspector Levels	17
3.2. Competences	17
3.3. Achievement Ratings	17
3.4. Theoretical v Experience	21
3.5. Specific Modules	21
<b>4. Scheme Operation – Trainee Inspector</b>	<b>23</b>
4.1. Getting Started	23
4.2. Phase 1 – Achievement of Competences	23
4.3. Phase 2 – External Review	28
4.4. Phase 3 – Continued Consolidation/Broadening of Experience	28
<b>5. Scheme Operation - Employer</b>	<b>29</b>
5.1. Mentor Assignment	29
5.2. Progress Monitoring	29
5.3. Internal Review	29
5.4. Training Agreement Sign-off	29
5.5. Post Certification Support	29
<b>6. Scheme Operation - Assessor</b>	<b>31</b>
6.1. The Role of an Assessor	31
6.2. Assessor Registration	31
6.3. Responsibilities	31
6.4. Guidelines	31
<b>7. Scheme Operation - Administrator</b>	<b>33</b>
7.1. Administration	33
7.2. Review/Improvements	33
7.3. Liaison with UKRLG/UKBB	33
7.4. Assessors Register Owner	33
7.5. Inspectors Public Register Owner	33
<b>8. Scheme Operation –Training Provider</b>	<b>35</b>
8.1. Development of Training Course and Materials	35
8.2. Delivery of Courses	35
8.3. Issue of Attendance and Achievement Certificates	35
<b>9. Templates</b>	<b>37</b>
9.1. Templates for Trainee Inspector	37
9.2. Templates for Mentor	38
9.3. Templates for Assessor	38

<b>10.</b>	<b>Model Submissions</b>	<b>39</b>
10.1.	Xxxx	39
10.2.	Xxxxx	39
<b>11.</b>	<b>Background Information</b>	<b>41</b>
11.1.	References	41
11.2.	Xxxxxx	41
<b>12.</b>	<b>The Future</b>	<b>43</b>
12.1.	Benefits	43
12.2.	Way Forward	43
<b>13.</b>	<b>Glossary</b>	<b>45</b>
<b>14.</b>	<b>Abbreviations</b>	<b>47</b>
	<b>Acknowledgements</b>	<b>49</b>

**Volume 2 – Appendices**

<b>Appendix A</b>	<b>Inspector Entry Guidelines</b>
<b>Appendix B</b>	<b>Inspection Core Modules Summary</b>
<b>Appendix C</b>	<b>Competence Evidence Templates</b>
<b>Appendix D</b>	<b>Example Competence Evidence Sheets</b>
<b>Appendix E</b>	<b>Assessor Guidelines</b>
<b>Appendix F</b>	<b>Training Agreement Application</b>
<b>Appendix G</b>	<b>Application for certification review</b>
<b>Appendix H</b>	<b>CPD Record Template</b>
<b>Appendix I</b>	<b>To-do Checklist for Inspector</b>
<b>Appendix J</b>	<b>Inspector Certificate / Senior Inspector Certificate</b>
<b>Appendix K</b>	<b>Mentor Allocation Form</b>
<b>Appendix L</b>	<b>To-do Checklist for Mentor</b>
<b>Appendix M</b>	<b>Assessor Review Sheet</b>

# Foreword

This new training scheme for Bridge Inspectors, entitled '**Bridge Inspection Competence Scheme**', has been jointly developed by the UK Bridges Board and the Irish National Roads Authority and has been overseen by the Department for Transport, Transport for London, the Highways Agency, Transport Scotland, the London Bridges Engineering Group, ADEPT and the National Roads Authority (Ireland). It augments the continuing development of good practice already initiated through the publication of the following key documents:

- Bridge Condition Indicators, County Surveyors' Society, 2002 and 2004
- Management of Highway Structures: A Code of Practice, UK Roads Liaison Group, 2005
- Inspection Manual for Highway Structures, Highways Agency, 2007
- EIRSPAN Principal Inspection Manual, National Roads Authority of Ireland, 2008

These documents demonstrate the importance of bridge inspections, and subsequently the quality of bridge inspectors, as a part of the management processes employed by bridge owners to ensure that their assets are safe for use and fit for purpose.

Studies by the ADEPT Bridges Group have identified a lack of consistency in inspection reporting, while the use of asset management plans and decision support tools have created a greater need for better quality inspection data, both in terms of consistency and accuracy. International, high-profile bridge collapses in the United States, Canada and China have increased the importance of rigorous inspection routines.

As a consequence, a wide range of bridge owners have jointly supported the development of a training scheme for Bridge Inspectors which can be adopted across different industries. The importance of having reliable, accurate inspection data for bridges cannot be underestimated and has increasingly become more apparent in recent years. This explains the enthusiasm and drive to ensure successful implementation of this scheme.

The training scheme has been developed using a modular approach so as to enable flexibility. Core modules, applicable to all sectors, have been developed but the structure is such that specific additional modules, to accommodate the requirements of different sectors and organisations, can be added, as and when required.

The benefits of the scheme are anticipated to include:

- An increase in the profile of Bridge Inspectors via the introduction of a recognised training scheme across the UK and Ireland;
- An increase in the quality of bridge inspections resulting from improved levels of consistency both in the training provided to Bridge Inspectors and the reported results from inspections leading to a greater level of confidence;
- A reduction in risk for bridge owners due to evidence of competence and best practice,
- Costs savings as a consequence of minimised rework and the ability to better prioritise limited maintenance budgets,
- Increased flexibility for organisations in moving inspection staff around and sharing them with other sectors.

Please note that where the term 'bridge' or 'bridges' appears in this manual that is deemed to cover highway structures within the boundaries of the highway or which otherwise materially affect it. These typically include: bridges, footbridges, cycleway bridges, bridleway bridges, accommodation bridges, occupation bridges, subways, underpasses, culverts, retaining walls, sign gantries and cantilever road signs.

# 1. Introduction

This document will help you to understand the **Bridge Inspection Competence Scheme** and will provide guidance on your role and responsibilities, as well as those who are available to support you, through your journey to become a certified Bridge Inspector. This document also contains useful reference material and templates to assist you in satisfying the required competences.

## 1.1. Routes to Certification

The route to becoming a certified Bridge Inspector involves three key phases, which are:

- **Phase 1** - Achievement of the required knowledge and experience competences, as outlined in the Core Modules
- **Phase 2** - Successful External Interview
- **Phase 3** - Continued consolidation/broadening of one's experience

There are two levels of certified Bridge Inspector which are:

- **Inspector**
- **Senior Inspector**

The two roles have been developed to reflect the current roles and responsibilities commonly adopted within the bridge inspection community.

Both roles require certified inspectors to have the necessary competences to undertake both Principal Inspections i.e. typically those inspections undertaken within touching distance, as well as General Inspections. The primary differences between the two competence requirements for a Senior Inspector (SI) and Inspector are that an SI must be able to demonstrate broader experience of the relevant areas and of having advised others. This is reflected in the Achievement Rating definitions.

## 1.2. Competences

The Bridge Inspection Competence Scheme consists of seven Core Competences, which themselves each comprise of a number of sub-competences. Outline descriptions of the subject material for each Core Competence are detailed below:

### Unit C1 - Introduction to Inspections

This unit outlines the background to the importance of undertaking inspections. Fundamental to effective management is an inspection regime that provides timely, accurate and appropriately detailed information on asset condition and performance. The overall purpose of inspection, testing and monitoring is to check that structures are safe for use and fit for purpose and to provide the data required to support effective maintenance management and planning.

### Unit C2 – Structures Types and Elements / Behaviour of Structures

This unit outlines common types of structures, their key elements and materials. It also covers background information and guidance on the fundamentals of structural behaviour, the basic principles of structural mechanics and material properties.

### Unit C3 - Inspection Process

This unit outlines the fundamentals of the inspection process, including scheduling, planning, undertaking, reviewing and interpreting the results. It also includes consideration of environmental impacts, selection of appropriate access equipment and safe working practices. In addition, it highlights the importance of accurate, reliable data capture and storage post the inspection.

### Unit C4 - Defects Descriptions and Causes

This unit outlines the importance and requirements for describing and categorising defects. Emphasis is placed on principal defects that are likely to be encountered in concrete structures, steel and steel/concrete composite structures, masonry structures and structures built of other materials.

### Unit C5 - Investigation and Testing

This unit outlines the background to the range of different testing techniques available. A candidate is required to understand the purpose of undertaking testing, what it involves, the outputs and any other relevant considerations.

### Unit C6 – Repair Techniques

This unit outlines the importance of understanding the range of repair techniques available for different structure types and the significance of undertaking effective routine maintenance.

### Unit C7 - General Aptitude

This unit outlines the general aptitude skills required by an inspector.

In addition to the Core Competences, it is planned to develop a range of Specific Competences which will cover particular areas of expertise required by some sectors of the Bridge Community.

### **1.3. Advice to Existing Inspectors**

It is recognised that there are a significant number of staff currently undertaking inspections who have been doing so for a large number of years and who thus have extensive knowledge and experience. They are highly valued and it is critical to the Bridge Community that these people are not 'lost' through the introduction of **The Bridge Inspection Competence Scheme**. Consequently, it is noted that for those of you to whom this applies, demonstration of the required competences should not be too onerous and will be facilitated through support and guidance from your Mentor.

It is anticipated that the majority of existing inspectors will be able to demonstrate adequate competence to meet the requirements of the Core Modules, utilising their experience to date, or may only need to supplement their skills in a number of targeted areas. The Core Modules have not been designed to 'catch you out' but to ensure that you have the necessary skills to undertake your role effectively and consistently.

### **1.4. People to Help You**

People who can support you in achieving the skills and experience required to satisfy the Core Modules include your Mentor, who may be a colleague employed by the same Company or a different Company, if appropriate, as well as the Scheme Administrator and Training Providers.

Each of them fulfils a different role and they will complement your own capture and review of your personal experience, as well as assisting you in the planning of your continuing professional development, so as to meet the necessary competence requirements.

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## 2. Scheme Parties

### 2.1. Different Roles

The Bridge Inspection Competence Scheme has a number of different parties who undertake complementary roles. These roles include:

- Trainee Inspector
- Employer
- Assessor
- Administrator
- Training Provider

Further details on each of these roles and the associated responsibilities are detailed in the following section.

### 2.2. Roles and Responsibilities

#### 2.2.1. Trainee Inspector

##### *Role*

The role of the Trainee Inspector is to ensure that he/she fully understands and is able to demonstrate the competence requirements of the Core Modules and maintains the required competence levels, whilst continuing to undertake bridge inspections.

##### *Responsibilities*

The responsibilities of a Trainee Inspector are to:

- Familiarise himself with the competences laid down in the Core Modules
- Understand the achievement ratings required to satisfy the Core Modules
- Have an overview of the operation of the Bridge Inspection Competence Scheme
- Complete Training Agreement paperwork
- Review knowledge/experience to date and record evidence on Competence Record sheets
- Identify Competences requiring further knowledge/experience
- In conjunction with Mentor, outline development action plan to achieve the outstanding competences
- Organise regular meetings with Mentor to review progress
- At appropriate time, submit draft Competence Records (for Core Modules C1-C6) for internal review by Internal Assessor
- Submit final Competence Records for external interview
- Undertake appropriate advance preparation and attend external Bridge Inspection Competence Scheme interview
- Undertake relevant continuing professional development and record it accordingly
- Undertake reassessment at appropriate time to maintain certified inspector status

## 2.2.2. Employer

### *Role*

The role of the Employer is to proactively support a Trainee Inspector and to facilitate the opportunities for him to gain the knowledge and experience necessary to achieve the required competence levels. It is assumed that usually a Trainee Inspector's Mentor will usually be a colleague from the same organisation but this is not mandatory.

### *Responsibilities*

The responsibilities of an Employer are:

- Appoint (internally or externally) an appropriate Mentor for the Trainee Inspector

The responsibilities of a Mentor are:

- Undertake an initial meeting with Inspector to provide an overview of the **Bridge Inspection Competence Scheme**
- Assist Trainee Inspector with completing the Training Agreement paperwork
- Review Trainee Inspector's initial evidence of knowledge/experience to date on Competence Record sheets and provide feedback as appropriate
- Support Trainee Inspector with the drafting of an outline development action plan to achieve the outstanding competences
- Attend regular review meetings with Trainee Inspector to check on progress
- **Undertake internal review of Trainee Inspector's draft complete Competence Records**
- Support Trainee Inspector with advance preparation for external interview
- Provide ongoing support/guidance to Inspector post certification

## 2.2.3. Assessor

### *Role*

The role of the Assessor is to review and verify whether a Trainee Inspector can demonstrate the competences laid down in the Core Modules. This will be undertaken through a review of the evidence presented in the candidate's submitted Competence Records and the external interview.

### *Responsibilities*

The responsibilities of an Assessor are:

- Review submitted Competence Records and verify whether sufficient evidence has been provided to satisfy the competences laid down in the Core Modules
- Undertake an interview with the candidate
- Confirm whether a candidate has met the requirements to achieve certified Inspector status. (Inspector or Senior Inspector, as appropriate)
- To draft feedback summary to unsuccessful candidates, outlining areas where they have failed to demonstrate adequate competence
- Undertake Appeals and Re-examination interviews, if required

## 2.2.4. Administrator

### *Role*

The role of the Administrator is to maintain the **Bridge Inspection Competence Scheme** and to advise and support the candidates through the certification process.

### ***Responsibilities***

The responsibilities of the Administrator are to:

- Design and maintain website for the scheme
- Maintain scheme templates and update as necessary
- Process scheme Training Agreement applications
- Process submitted completed Competence Records and forward to allocated Assessor
- Arrange external interviews
- Produce and forward Inspector and Senior Inspector Certificates to successful candidates
- Forward feedback to unsuccessful candidates
- Arrange re-examination/appeals, as required
- Maintain Inspectors Public Register
- Maintain register of relevant training courses and reference material
- Liaise with selected stakeholders and undertake 6 monthly and periodic reviews, as required and report recommendations to UKRLG /UKBB. Subsequent updates to be drafted and published.

???? Any interface with Mentors???????

## **2.2.5. Training Provider**

### ***Role***

The role of a Training Provider is develop appropriate training courses and associated material to assist candidates in gaining the necessary knowledge requirements of the Core Modules.

### ***Responsibilities***

The responsibilities of a Training Provider are to:

- Develop appropriate training courses and associated material
- Deliver appropriate training courses
- Provide examinations to verify candidates have gained adequate knowledge
- Issue attendance and achievement certificates

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## 3. Inspector Levels and Competences

### 3.1. Inspector Levels

Certification via the **Bridge Inspection Competence Scheme** can be awarded at one of two levels:

- **Inspector**
- **Senior Inspector**

There are different attributes for each level which need to be demonstrated through the capture of evidence and an external interview. Deciding which level is most appropriate for you will depend upon your experience to date and your current role. This decision will most likely be taken following discussions with your Mentor. He should be able to advise you on the most suitable route, in light of your current experience and the experience you will be realistically be able to gain in the near future.

Guidelines have been drafted which outline **advisory** entry qualifications to the different levels. They have been drafted primarily to assist Employers with the recruitment of individuals who do not necessarily have any relevant experience. In addition, guidelines are also provided on the number of inspections an individual is expected to have undertaken and the number of years of relevant experience gained prior to submitting their application to become certified. Again, these are not mandatory and very much depend upon the range of inspections undertaken by the individual. The guidelines are located in **Appendix A**.

### 3.2. Competences

As outlined in Section 1.2 earlier, the scheme consists of six Core Modules containing the competences and associated sub-competences required for achieving inspector certification. These are shown in **Table 1** overleaf. Details of the assessment criteria for each sub-competence and both Inspector levels are detailed in **Appendix B**.

The required achievement rating to satisfy the competence adequately depends upon the inspector level you wish to attain. Further details on the achievement ratings are given in the following section.

### 3.3. Achievement Ratings

The achievement rating describes the level of knowledge and experience required for a specific level. There are four ratings, which are listed below:

- **A** – Awareness
- **K** – Knowledge
- **E** – Experience
- **P** – Proficiency

The first two ratings demonstrate the level of **knowledge** which you require in order to satisfy the adequate competence, whilst the latter two require a candidate to have had **practical experience**, in conjunction to the theoretical knowledge, in order to satisfy the competence requirements.

Detailed descriptions of the nature of the skills required to satisfy each of the achievement ratings are detailed overleaf in **Table 2**.

**Table 1 – Achievement Ratings**

Achievement Rating		Description	
A	<b>Awareness</b>	General <b>understanding</b> of the competence, including an <b>appreciation</b> of its relevance.	<i>These apply to <b>theory</b> only</i>
K	<b>Knowledge</b>	Knowledge and understanding of the competence with an ability to <b>demonstrate</b> its relevance/application.	
E	<b>Experience</b>	Knowledge, understanding and <b>experience</b> of undertaking the competence.	<i>These apply to <b>practical application</b>, as well <b>theory</b></i>
P	<b>Proficiency</b>	Knowledge, understanding and <b>experience</b> of undertaking the competence and <b>competent to advise others</b> .	

**Table 2 –Core Competences**

<b>Ref</b>	<b>Core Module Description</b>
<b>Unit C1</b>	<b>Introduction to Inspections</b>
C1.1	Purpose of Inspections
C1.2	Inspector Roles, Responsibilities and Competences
C1.3	Inspection types
C1.4	Codes of Practice
<b>Unit C2</b>	<b>Structures Types and Elements / Behaviour of Structures</b>
C2.1	Bridges
C2.2	Other Structure Types
C2.3	Structural Mechanics
C2.4	Properties of Common Construction Materials
C2.5	Properties of Specialist Construction Materials
<b>Unit C3</b>	<b>Inspection Process</b>
C3.1	Scheduling Inspections
C3.2	Planning and Preparing for Inspections
C3.3	Performing Inspections
C3.4	Recording Inspection Findings
C3.5	Interpreting Inspection Findings
C3.6	Maintenance Planning Process
C3.7	Obligations of Current Health and Safety Legislation
C3.8	Other Skills
<b>Unit C4</b>	<b>Defects Descriptions and Causes</b>
C4.1	Principal Causes of Defects
C4.2	Concrete Defects
C4.3	Steel Defects
C4.4	Masonry Defects
C4.5	Defects in Miscellaneous Materials

**Table 2 –Core Competences**  
(continued)

<b>Ref</b>	<b>Core Module Description</b>
<b>Unit C5</b>	<b>Investigation and Testing</b>
C5.1	The Testing Process
C5.2	Common Testing Techniques
<b>Unit C6</b>	<b>Repair Techniques</b>
C6.1	Repair techniques for concrete structures
C6.2	Repair techniques for metal structures
C6.3	Repair techniques for masonry structures
C6.4	Repair techniques for 'other' structures e.g. timber
C6.5	Importance of Routine Maintenance
<b>Unit C7</b>	<b>General Aptitude</b>
C7.1	Practical Aptitude
C7.2	Working with people
C7.3	Communication skills
C7.4	Personal skills
C7.5	Obligations of Current Health and Safety Legislation
C7.6	Management / Supervision

### 3.4. Theoretical v Experience

It is appreciated that a number of the competences can be achieved solely through background reading and/or courses. These are the areas where it is felt that the skill required does not necessitate practical experience but is adequately achieved by a candidate extending his theoretical knowledge. However, there are areas where it is deemed to be fundamental to successfully achieving the adequate competence that practical experience is necessary. Consequently, competences requiring achievement ratings of ‘E’ or ‘P’ compel a candidate to demonstrate practical experience in order to satisfy the competence adequately.

### 3.5. Specific Modules

In addition to the Core Modules, some bridge owners may require Inspectors to satisfy the competence requirements of a number of Specific Modules. These have yet to be fully developed but can be grouped into a number of areas:

- **Materials**
- **Industry Specific**
- **Health and Safety**
- **Structure Type Specific**

A number of suggested possible Specific Modules are listed below in **Table 3:**

**Table 3 – Specific Modules**

<b>Materials</b>	<b>Industry Specific</b>	<b>Health and Safety</b>	<b>Structure Type Specific</b>
Tests on concrete Tests on metal Tests on masonry Tests on timber Tests on advanced composites	Network Rail Access  British Waterways structures  Scour Critical Structures  PROW Experience  M&E Experience	Specialised form of access – diving  Specialised form of access – abseiling  Confined spaces entry and rescue  Operation of MEWPs  Signing and guarding of traffic management	PTSI's  Moveable Structures

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## 4. Scheme Operation – Trainee Inspector

### 4.1. Getting Started

Your **Bridge Inspection Competence Scheme** training agreement is a partnership between you and your Employer and is designed to help you achieve Bridge Inspector Certification. Under the training agreement, your Employer is committed to expanding your knowledge and expertise through enabling you to undertake suitable work experience, appropriate training, as well as providing you with mentor support on an individual basis. Similarly, you are committed under the training scheme to work to the best of your abilities, through planning and capturing your competence records, arranging regular meetings with your Mentor and ensuring that your continuing professional development (CPD) is maintained.

Learning on the **Bridge Inspection Competence Scheme** does not require attendance at numerous training courses and there is minimal classroom teaching. Instead, you will learn through direct experience of working in teams, both in the office and on site. You will also have the opportunity to develop your knowledge and understanding in discussion with your colleagues and in regular reviews with your Mentor.

The achievement of becoming a Certified Inspector through the **Bridge Inspection Competence Scheme** can be broken down into three phases, as shown in **Figure 1** overleaf. These phases are now outlined in more detail below.

### 4.2. Phase 1 – Achievement of Competences

#### 4.2.1. Initial Administration

The initial tasks involved in embarking on a **Bridge Inspection Competence Scheme** training agreement include the following activities:

- Allocation of Mentor
- Review of experience to date
- Decision as to which Certification Route is most appropriate (i.e. Inspector or Senior Inspector)
- Completion of training agreement form
- **Submission of form to Scheme Administrator**

#### 4.2.2. Previous Relevant Experience

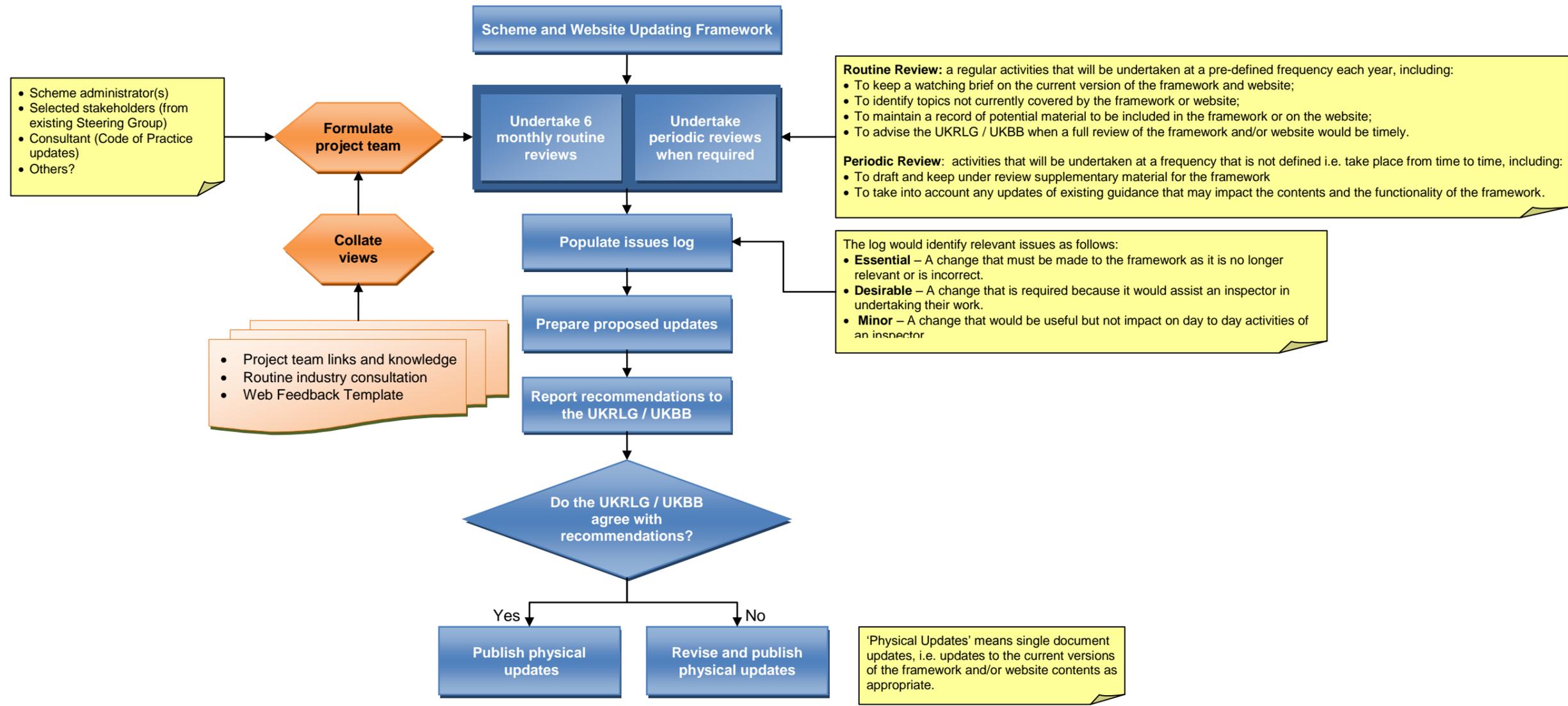
Relevant experience gained prior to embarking on the **Bridge Inspection Competence Scheme** can be recorded as evidence towards achievement of the Core Modules. This may be particularly relevant to many of you during the initial introduction of the scheme. As a priority, it is prudent to familiarise yourself with the content of the Core Modules in order that you can decide where you may need additional support and further learning.

Once you have undertaken an initial review of the competences contained in the Core Modules and the assessment criteria, the next step is to record the relevant evidence from your experience on the Competence Evidence sheets, in order that it can be reviewed by your Mentor. The blank Competence Evidence templates are contained in **Appendix C**. It is envisaged that your Mentor will assist you in undertaking this task during the early stages of your training agreement but,

please note, that it is expected that you should be able to do this with ever decreasing support, as you become more familiar with the process.



# Bridge Inspection Competence and Training – Draft Training Framework



### 4.2.3. Completion of Competence Evidence Sheets

In order to demonstrate adequate evidence that you have the necessary competence to undertake the skills outlined in each competence, it is essential to record this in writing on the evidence sheets.

In order for your Mentor to be able to sign you off as competent, he needs to see evidence that you have the necessary skills listed in the assessment criteria and also at the required achievement rating. As explained earlier, achievement rating levels 'A' and 'K' only require theoretical knowledge, which can be achieved through background reading or through courses etc., whereas achievement rating levels 'E' and 'P', require you to have had practical experience. This requirement is **mandatory** and is to ensure that you gain the necessary experience to undertake the role of an inspector adequately.

A number of completed competence evidence sheets have been included to assist you and can be found in **Appendix D**. For clarity, the evidence which you have collated relating to the **theoretical** aspects of the competence should be recorded in the **upper** section, whilst your evidence relating to the **practical** aspects should be recorded in the **lower** section. These sheets have been designed so that should you decide to advance to a Senior Inspector later in your career, then you are able to use the same sheets, but with the addition of further evidence to satisfy the higher achievement ratings for the affected range of competences.

In order to assist you with completing your evidence sheets, it is recommended that you maintain a written diary of your progression. It does not need to contain daily entries but it is recommended that an entry should be made at least once a week. The entry should contain details of activities undertaken, such as inspections, training, presentations, background reading etc.

### 4.2.4. Quarterly Reviews

The quarterly reviews with your Mentor are a fundamental part of the training agreement. It is your opportunity to meet regularly with your Mentor to:

- Create a working relationship
- Demonstrate your understanding of the knowledge and experience you have gained since your last meeting
- Review progress of your evidence sheets
- Receive feedback from your Mentor
- Determine jointly what your short-term and longer-term goals are

### 4.2.5. Training Agreement Sign-off

Once you have completed the evidence sheets for all the Core Modules and they have been signed off by your Mentor as demonstrating adequate competence, an Internal Assessor (who may also be your Mentor) will undertake an internal review with you. This interview is a 'check' to ensure that you are ready to submit your competence evidence records to the Scheme Administrator and that you are also adequately prepared to undertake an external interview to verify your competences. Your Mentor will only sign-off your Training Agreement if he feels that you are ready to undertake an external interview.

## **4.3. Phase 2 – External Review**

### **4.3.1. Submission of Final Competence Records**

Following a successful internal review with the Internal Assessor, it is your responsibility to submit your completed competence evidence sheets and completed Training Agreement to the Scheme Administrator. They will allocate you an Assessor who will firstly review your completed evidence sheets to satisfy **himself/herself** that they contain adequate evidence and will then subsequently undertake your external interview.

### **4.3.2. External Interview**

All candidates who wish to become certified via the **Bridge Inspection Competence Scheme** will be required to have an external interview with an Assessor. The format of the review will consist of an informal interview with an Assessor who will ask a range of questions in order that he can satisfy himself that you have the necessary competences. The level of competence required will depend upon which certification level (i.e. either Inspector or Senior Inspector) you have submitted your application for.

### **4.3.3. Certification**

If you successfully demonstrate that you have the required competences for your chosen certification level, you will then be awarded certified inspector status. Each candidate will receive a certificate clearly stating the achieved inspector status (i.e. either Inspector or Senior Inspector) and **the time period for which it is valid**. Details of your certified status will be displayed in a public register which is maintained and updated by the Scheme Administrator.

If you are, unfortunately, unsuccessful in satisfying the requirements of the external Assessor, there is the opportunity of appealing or re-sitting the interview at a later date.

## **4.4. Phase 3 – Continued Consolidation/Broadening of Experience**

### **4.4.1. CPD**

Achievement of Certified Inspector status is not the end of your journey. You are required to maintain a record of your Continuing Professional Development (CPD) in order to demonstrate how you are keeping up-to-date and maintaining your levels of competence.

### **4.4.2. **Renewal Process****

**TBC**

## 5. Scheme Operation - Employer

### 5.1. Mentor Assignment

The role of an Employer is to proactively support a Trainee Inspector and to facilitate opportunities for him to satisfy the required competences and hence achieve certified status. The primary means by which this is implemented is through the allocation of an appropriate Mentor to the Trainee Inspector.

Initial responsibilities of a Mentor are to assist a trainee with the completion of their Training Agreement paperwork, undertake a review and capture of their experience to date and subsequently draft an outline action plan to assist the trainee with understanding how they can achieve the outstanding competences.

### 5.2. Progress Monitoring

Once a trainee has been put on a Training Agreement under the **Bridge Inspection Competence Scheme**, the role of the Mentor is to attend regular meetings arranged by the trainee to review progress. Progress will be monitored through discussions with the trainee in conjunction with reviews of their draft completed evidence sheets. The Mentor will be responsible for providing constructive feedback on the trainee's submitted material, so as to guide them for future submissions.

### 5.3. Internal Review

Once a Mentor has signed-off all competences to the appropriate level, they are then required to arrange for the trainee to have an internal review. This meeting acts as an additional check that the trainee is ready to undertake an external review with an independent Assessor. The internal review should ideally be undertaken by a different person to that who fulfils the role of the trainee's Mentor but this is not mandatory.

### 5.4. Training Agreement Sign-off

Upon completion of a successful internal review, the Mentor will then sign-off the Training Agreement for that individual. Upon submission of the completed Training Agreement and competence evidence sheets, the Mentor's role is to support their trainee with their preparation in the lead-up to their external interview.

### 5.5. Post Certification Support

A Mentor's role does not finish once the candidate successfully achieves certified status since, if they have achieved Certified Inspector status, they may wish to progress to Senior Inspector in due course. Even those you have achieved Senior Inspector status still require ongoing support to ensure that they are regularly challenged to question their own ongoing competence levels. The past bridge collapses clearly highlight that the industry cannot afford to become complacent with regards to the competence of bridge inspectors.

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## 6. Scheme Operation - Assessor

### 6.1. The Role of an Assessor

An Assessor is an experienced, professionally qualified Member of a relevant Institution with good interviewing skills, who assesses the suitability of candidates to become Certified Inspectors. They will fulfil this role through undertaking a review of the evidence presented to them in the candidate's submitted Competence Records, in conjunction with a 'face-to-face' interview with the candidate.

### 6.2. Assessor Registration

The process by which an individual can become a registered Assessor is as detailed below:

- **Stage 1** – applicants will attend an Assessor's Training Seminar. This will involve a theoretical session followed by a number of practical 'mock' interviews to provide the applicant with the opportunity to put their training into practice. If they demonstrate satisfactory competence in undertaking these interviews, they will then be given the opportunity to progress to Stage 2.
- **Stage 2** – applicants will then be invited to offer themselves as Assessors for future external reviews. They will be 'shadowed' by a registered Assessor (Lead Assessor) for a minimum of four reviews – this period will be known as their 'trial period'. If after these reviews, the Lead Assessor confirms that the individual has performed satisfactorily, they will then be added to the Assessors Register for the **Bridge Inspection Competence Scheme**.

All Assessors will be expected to attend a refresher training seminar **every five years** in order to maintain their competence and their status on the Register.

### 6.3. Responsibilities

The responsibilities of an Assessor include the following key tasks:

- Review submitted Competence Evidence Records and verify whether sufficient evidence has been provided to satisfy the competences laid down in the Core Modules
- Undertake an interview with the candidate
- Confirm whether a candidate has met the requirements to achieve Certified Inspector status. (Inspector or Senior Inspector, as appropriate)
- To draft feedback summary to unsuccessful candidates, outlining areas where they have failed to demonstrate adequate competence
- Undertake Appeals and Re-examination interviews, if required

### 6.4. Guidelines

A set of guidelines have been drafted which are designed to steer and advise Assessors on the most effective way of fulfilling their role. This document can be found in **Appendix E**.

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# 7. Scheme Operation - Administrator

## 7.1. Administration

The role of the Administrator is to maintain the **Bridge Inspection Competence Scheme** and to ensure that all parties fulfil their roles and are provided with the necessary tools to do so. The role is currently undertaken by **XXXXXXXX (TBC) [include????]** To summarise, the Administrator is responsible for the administrative tasks involved in ensuring the smooth running of the scheme. The primary day-to-day tasks include:

- Design and maintenance of website for the scheme
- Maintenance of scheme templates
- Processing of scheme Training Agreement applications
- Processing of submitted completed Competence Records and forwarding them to an allocated Assessor
- Maintenance of Assessors Register
- Arranging of external interviews
- Production and forwarding of Inspector and Senior Inspector Certificates to successful candidates
- Forwarding feedback to unsuccessful candidates
- Arranging re-examination/appeals, as required
- Maintenance of Inspectors Public Register
- Maintenance of register of relevant training courses and reference material

## 7.2. Review/Improvements

In conjunction with those tasks listed in Section 7.1 above, the Administrator is also responsible for regularly challenging the processes involved in running the scheme to ensure that any necessary improvements are acted upon. The Administrator is responsible for implementing any improvements/amendments and for ensuring that any associated documentation is updated accordingly.

## 7.3. Liaison with UKRLG/UKBB

A further role for the Administrator involves liaison with selected stakeholders and the organisation of periodic reviews, as required, to report recommendations to the UK Roads Liaison Group (UKRLG) and the UK Bridges Board (UKBB). These may lead to subsequent updates needing to be drafted and published. It is the role of the Administrator to ensure that these are undertaken.

## 7.4. Assessors Register Owner

In order to allocate suitable Assessors to candidates it is essential that the Administrator maintains and takes ownership of the Assessors Register. The Administrator must ensure that they are aware of the progress of trainee Assessors through their registration process. The information which they need to capture includes:

- Names of individuals who have completed the Assessor training seminar successfully
- Details of the number of 'shadowed' interviews which an individual has undertaken
- Notification from Lead Assessor of a trainee Assessor having successfully completed his 'trial period'. This will be the individual's registration date.
- Date of refresher training required for each registered Assessor.

## 7.5. Inspectors Public Register Owner

A critical role of the Administrator is to ensure that the Certified Inspector Register is maintained in order that any third party can seek reassurance/confirmation that an individual does have a valid Inspector or Senior Inspector certificate.

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## 8. Scheme Operation – Training Provider

### 8.1. Development of Training Course and Materials

The role of a Training Provider, with reference to the **Bridge Inspection Competence Scheme**, is to develop appropriate training courses and associated material to assist candidates in gaining the necessary knowledge requirements/competences as outlined in the Core Modules and/or Specific Modules.

### 8.2. Delivery of Courses

In conjunction with the preparation of the training course material and any associated reference documentation, it is anticipated that the function of the Training Provider will also include the actual delivery of the courses as well.

If a Training Provider wishes to be acknowledged by the **Bridge Inspection Competence Scheme** they will need to submit relevant documentation, as requested by the scheme Administrator, in order for them to be listed on the register on the scheme website.

Details required for the register will include the following information:

- Competences covered
- To what level
- Cost
- Programme of dates
- Location of course
- Contact details

Training Providers will be required to issue joining instructions to applicants. In addition, they will also be required to employ a test/exam as part of their course delivery, so as to verify that candidates have successfully gained adequate knowledge.

### 8.3. Issue of Attendance and Achievement Certificates

An administration task which Training Providers will be required to undertake will be the issue of attendance and achievement certificates.

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## 9. Templates

For simplicity, a list of the key templates provided for the roles of the Trainee Inspector, Mentor and Assessor are detailed below.

### 9.1. Templates for Trainee Inspector

Templates required by a Trainee Inspector are listed in **Table 4** below:

**Table 4 – Trainee Inspector's Templates**

Template Description	Located in:
Competence evidence sheets	Appendix C
Training agreement application	Appendix F
Application for certification review	Appendix G
CPD record	Appendix H
To-do Checklist for Inspector	Appendix I
Inspector Certificate / Senior Inspector Certificate	Appendix J

## 9.2. Templates for Mentor

Templates required by a Mentor are listed in **Table 5** below:

**Table 5 – Mentor’s Templates**

Template Description	Located in:
Mentor Allocation Form	Appendix K
To-do Checklist for Mentor	Appendix L

## 9.3. Templates for Assessor

Templates required by a Mentor are listed in **Table 6** below

**Table 6 – Assessor’s Templates**

Template Description	Located in:
Assessor Review Sheet	Appendix M
Assessor Guidelines	Appendix E

# 10. Model Submissions

To be inserted following scheme administrator input

## 10.1. Xxxx

Xxx

## 10.2. Xxxxx

Xxx

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# 11. Background Information

## 11.1. References

- Management of Highway Structures: Code of Practice, TSO, 2005
- Inspection Manual for Highway Structures – Volume 1: Reference Manual, TSO, May 2007
- Inspection Manual for Highway Structures – Volume 2: Inspector’s Handbook, TSO, May 2007
- Guidance Document for Performance Measurement of Highway Structures: Part B1: Condition Performance Indicator, 2007
- BD 63 Inspection of Highway Structures, DMRB 3.1.4, TSO
- BD 27 Materials for The Repair of Concrete Highway Structures, DMRB 3.2.2, TSO
- BA 35 Inspection and Repair of Concrete Highway Structures, DMRB 3.2.2, TSO
- Manual of Bridge Engineering, The Institution of Civil Engineers, Thomas Telford Publishing, 2000
- EIRSPAN, The Irish Structure Management System, System Manual No.2 – Inventory, Revision C, January 2008
- British Waterways Direction: Asset Inspection Procedures (AIP 2008), June 2008
- Network Rail - NR/L3/CIV/006 – 1D – Level 3 Handbook for the examination of structures – Part 1D: Competency, preparation for examinations and other common requirements, September 2009
- Network Rail - NR/SP/CTM/017 – Specification – Competence & Training in Civil Engineering, June 2006
- London Underground - Category 1 Standard – 1-050 – Civil Engineering – Common Requirements, Issue No: A3, July 2010
- London Underground - Manual of Good Practice – G-050 - Civil Engineering – Common Requirements, Issue No: A3, December 2009
- London Underground Guidance Note – G1056  
Unit 6 - Inspect the condition of Bridges and Structures (Knowledge, Understanding and Observation)  
Assessment Checklist for Bridges and Structures Inspectors, Issue: A1, May 2011]

## 11.2. Xxxxxx

\*\*\*\*\* Any other info required????\*\*\*\*\*

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## 12. The Future

### 12.1. Benefits

The development of this new training scheme for Bridge Inspectors demonstrates the importance the industry places on the role currently undertaken by a large number of individuals. The significance of having reliable, accurate inspection data for bridges cannot be underestimated and has become increasingly more apparent in recent years. Good practice has already been initiated through the publication of the following key documents:

- Bridge Condition Indicators, County Surveyors' Society, 2002 and 2004
- Management of Highway Structures: A Code of Practice, UK Roads Liaison Group, 2005
- Inspection Manual for Highway Structures, Highways Agency, 2007
- EIRSPAN Principal Inspection Manual, National Roads Authority of Ireland, 2008

These documents demonstrate the importance of bridge inspections, and subsequently the quality of bridge inspectors, as a part of the management processes employed by bridge owners to ensure that their assets are safe for use and fit for purpose.

Studies by the ADEPT Bridges Group have identified a lack of consistency in inspection reporting, while the use of asset management plans and decision support tools have created a greater need for better quality inspection data, both in terms of consistency and accuracy. International, high-profile bridge collapses in the United States, Canada and China have increased the importance of rigorous inspection routines.

The benefits of the scheme are anticipated to include:

- An increase in the profile of Bridge Inspectors via the introduction of a recognised training scheme across the UK and Ireland;
- An increase in the quality of bridge inspections resulting from improved levels of consistency both in the training provided to Bridge Inspectors and the reported results from inspections leading to a greater level of confidence;
- A reduction in risk for bridge owners due to evidence of competence and best practice;
- Costs savings as a consequence of minimised rework and the ability to better prioritise limited maintenance budgets;
- Increased flexibility for organisations in moving inspection staff around and sharing them with other sectors.

### 12.2. Way Forward

The successful implementation and adoption of the **Bridge Inspection Competence Scheme** across the wider Bridge Community will lead to benefits, both to the individuals themselves, as well as bridge owners. It is recognised that refinements will invariably be required as part of the implementation process but the systems have been put in place to ensure that improvements can be captured and put into practice.

To ensure that the specific requirements of some sectors of the Bridge Community are covered adequately, it is planned to develop a range of Specific Competences. These will be developed once the core **Bridge Inspection Competence Scheme** has been adopted widely.

To those of you who currently undertake inspections, or to those of you who are aspiring inspectors, the introduction of the **Bridge Inspection Competence Scheme** will lead to a more structured career path and the certification process will lead to an increase in the status of the Inspector.

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# 13. Glossary

<b>Achievement Rating</b>	This is the level of knowledge (and experience, if appropriate), required to satisfy a defined competence.
<b>Administrator</b>	This is the body which is responsible for the day-to-day running and maintenance of the <b>Bridge Inspection Competence Scheme</b> .
<b>Assessor</b>	This is the individual who verifies whether a Trainee Inspector can demonstrate the required competence levels, through a review of their submitted Competence Evidence Sheets and an external interview.
<b>Competence</b>	This is the attainment of knowledge skills and abilities at a level of expertise sufficient to be able to perform in an appropriate work setting.
<b>Competence Evidence Sheet</b>	This is the template used to capture details of the knowledge and experience attained in order to satisfy the required Achievement Rating.
<b>Core Competence</b>	These are the Competences which are deemed to be fundamental to attaining Bridge Inspector Certification.
<b>Employer</b>	This is the person or company who commits to supporting a Trainee Inspector, both technically and financially, through their Training Agreement under the <b>Bridge Inspection Competence Scheme</b> .
<b>Lead Assessor</b>	This is the individual who oversees or ‘shadows’ an Assessor during their ‘trial period’, before they become registered.
<b>Mentor</b>	This is the individual who supports a Trainee Inspector on a ‘one-to-one’ basis during their Training Agreement under the <b>Bridge Inspection Competence Scheme</b> .
<b>Specific Competence</b>	These are Competences which are deemed not to be mandatory in order to become a Certified Inspector but which may be required by some bridge owners. They include, typically, industry specific knowledge, specialist material knowledge and/or experience and specialised access requirements.
<b>Trainee Inspector</b>	This is the title given to an inspector prior to attaining certification. A TI is the name given to an individual during the period when they undertake activities in order to satisfy the necessary competence levels, prior to undertaking an external certification interview.
<b>Training Provider</b>	Under the <b>Bridge Inspection Competence Scheme</b> , a Training Provider is a company who has been acknowledged by the Scheme as being competent to deliver training which satisfies all or a clearly defined selection of the Core Competence Modules and/or Specific Competence Modules.

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## 14. Abbreviations

<b>ACoP</b>	Approved Code of Practice
<b>ADEPT</b>	Association of Directors of Environment, Economy, Planning and Transport
<b>CPD</b>	Continuing Professional Development
<b>DfT</b>	Department for Transport
<b>I</b>	Inspector
<b>LoBEG</b>	London Bridges Engineering Group
<b>MEWP</b>	Mobile Elevated Working Platform
<b>NRA</b>	National Roads Authority (Irish)
<b>PPE</b>	Personal Protective Equipment
<b>SI</b>	Senior Inspector
<b>TfL</b>	Transport for London
<b>TI</b>	Trainee Inspector
<b>TRL</b>	Transport Research Laboratory
<b>TSA</b>	Thaumasite Sulphate Attack
<b>UKBB</b>	UK Bridges Board
<b>UKRLG</b>	UK Roads Liaison Group

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# Acknowledgements

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UK Bridges Board / Irish National Roads Authority

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Limerick County Council

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London Borough of Hounslow

London Borough of Lambeth

London Borough of Waltham Forest

London Bridges Engineering Group

London Underground

Lincolnshire County Council

Malachy Walsh

MGWSP Northamptonshire Highways

Midland Expressway Ltd

Mouchel on behalf of Essex

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Network Rail

Norfolk

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University College Dublin

University of Cambridge

Up and Under (Infrastructure Management)

URS Scott Wilson

Warwickshire County Council

Waterways Ireland

Welsh Government

West Yorkshire Bridges Group

Bridgeway Consulting

Bridgezone Ltd

Chartered Institution of Highways and Transportation

CITB – Construction Skills

Highways Agency

Institute of Highways Engineers

Institution of Civil Engineers

Lantra

National Forum for Transportation Skills (NFTS)

Oxfordshire County Council

Sheffield Hallam University

Symmons Madge Associates

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## QUERY LOG

- What should the scheme be called? **Bridge Inspection Competence Scheme?**
- The term 'bridge' has been used throughout the documentation - should a more generic term (such as 'structure') be used?
- Following the iterations of the Inspector Types, is there now sufficient difference between the two roles with respect to competence requirements and day-to-day responsibilities?
- Is it felt necessary to provide further guidance on the minimum requirements for a Mentor, for example, 5 or 10 years experience of having carried out bridge inspections?
- Should there be a requirement for a candidate to submit an example of one of their own PI reports as part of Core Module C3 – to be appended to Competence Evidence Sheet?
- Internal sign-off of draft Competence Records to be done by Mentor or Another?
- External assessment – will clear 'pass' submissions require a visual check of submission only i.e. no face-to face external interview ? Only 'borderline' submissions to have external interview?
- Format of external interview? Candidate to give presentation? Practical ? Written exam?
- Should a candidate be required to identify defect codes/extent/severity ratings in response to photographs of 'real' defects as part of the external interview ?
- Are Mentors to have any interface with the Administrator?
- Is the Administrator going to be responsible for liaising with stakeholders for 6 monthly and periodic reviews and for making recommendations to UKRLG/UKBB?
- Specific Modules – to be developed later????
- Format of External Review?
- Renewal time period for certification?? Minimum inspection experience to be maintained post certification?
- Certified Inspector status – is a card or certificate to be issued? Details to be viewable on website in a public register?
- What Assessor training/registration process will there be? Guidelines only? Professional membership of a relevant institution required? How will initial Assessors be trained/registered ?
- CPD – is this to be recorded online?

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