



# **GUIDANCE NOTES ON THE APPLICATION PROCESS FOR CHARTERED ENGINEER**

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# GUIDANCE NOTES ON THE APPLICATION PROCESS FOR CHARTERED ENGINEER

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## SECTION 1: INTRODUCTION AND BACKGROUND TO CENG REGISTRATION WITH THE ENGINEERING COUNCIL

### The Engineering Council

The Engineering Council has, amongst its prime objectives, improvement of both the quality and standing of professional engineers in the UK and the reputation of UK engineering worldwide. As part of this function it keeps a Register of qualified professionals who meet clearly defined standards of education, training and experience. It awards three grades namely Engineering Technician (EngTech), Incorporated Engineer (IEng), and Chartered Engineer (CEng).

### Engineering Council Registration Criteria

The requirements for Registration are set out in the *UK Standard for Professional Engineering Competence* or UK-SPEC, which can be viewed via [www.engc.org.uk](http://www.engc.org.uk)

### CIHT as a Licensed body

CIHT is licensed by the Engineering Council to conduct professional reviews at Incorporated and Chartered Engineer levels for the standard and individual routes.

### Occupational Standards

The criteria against which candidates are assessed at professional review are set down by the Engineering Council in Competence and Commitment Statements, which are extensively cross-referenced to National Occupational Standards. These statements, under the headings listed below, are contextualised by individual licensed institutions to reflect the different engineering disciplines (See [Appendix A](#) Guidance Core Objectives).

Competence	A	Knowledge and Understanding
	B	Application to Practice
	C	Technical and Commercial Leadership
	D	Interpersonal Skills
Commitment	E	Personal Commitment

Health and safety, risk assessment and environment and sustainability are embedded within the headings above.

### UK-SPEC requires candidates to produce evidence that they have achieved the required

- **Education:** Underpinning knowledge and understanding
- **Initial professional development (IPD):** The bridge between achieving the required educational standard and full professional competence
- **Professional competence and personal commitment to professional codes:** Practical experience assessed through professional review.

In addition, all candidates must also show evidence of **continuing professional development** and their commitment to lifelong learning through a **professional development plan**.

## SECTION 2: ROUTES TO CENG PROFESSIONAL REVIEW

**Note:** To undertake a professional review via CIHT you must be a member of CIHT. .

To access the most up-to-date membership information and application form, go to: <http://www.ciht.org.uk/en/membership/index.cfm>

There are two routes to Chartered Engineer – the standard route and the individual route.

### Standard Route

You can progress to professional review via the standard route if you have

- an accredited Bachelors degree with honours in engineering or technology, plus either an appropriate Masters degree accredited or approved by a professional engineering institution, or appropriate further learning to Masters level
- or an accredited integrated MEng degree.

There are exceptions to this depending on the date of the qualification(s). Please contact the education department in case of queries ([education@ciht.org.uk](mailto:education@ciht.org.uk)) .

### Individual Route

If you do not have accredited qualifications, you may demonstrate that you have achieved the same level of knowledge and understanding in other ways, including:

- Writing a technical report or further learning report, which demonstrates knowledge and understanding of engineering principles (See [Section 7](#));
- Demonstrating that the learning outcomes of the qualifications that you hold match those of an accredited MEng through submission of a further learning report (See [Section 8](#));
- Following an assessed work-based learning programme approved by CIHT;
- Taking further qualifications specified by CIHT.

When your educational base has been assessed and approved (see [Section 3](#) Initial Assessment), you may follow the process to Professional Review (see [Section 5](#) Professional Review Process).

## SECTION 3: INITIAL ASSESSMENT OF EDUCATIONAL BASE

The first stage of the application process for professional review is the initial assessment of your educational base. All candidates seeking to sit their professional review with CIHT must submit an application for initial assessment to establish which route – standard or individual - they need to follow.

Please go to: <https://www.ciht.org.uk/professional-development/get-qualified/>

An **application for initial assessment** must include:

- a) A CV outlining formal educational qualifications and workplace experience, including training, key achievements and levels of responsibility;
- b) Copies of certificates for any formal qualifications achieved. For overseas applicants where certificates are in a language other than English, an approved English translation must be provided;
- c) Authenticated details of any industry based training scheme undertaken (if applicable);
- d) Copies of letters of any assessments undertaken by other institutions (if applicable).

### **Outcome of initial assessment**

CIHT will review the information submitted and:-

- confirm that you hold accredited qualifications and that you may proceed to professional review via the standard route, or
- accept that the evidence of learning achieved through non-accredited qualifications satisfies the Engineering Council requirements and that the you may proceed to professional review; or
- request further information or an interview to confirm details in the application, or
- request additional evidence of learning, for example
  - A technical report or further learning report, which demonstrates knowledge and understanding of engineering principles; or
  - Further academic study; or
  - Specific further learning in a workplace environment

### **The next stage**

Once CIHT has confirmed that you have satisfied the educational requirements, either for the standard or the individual route and you have gained sufficient practical experience, you may proceed to professional review. (See [Section 5](#) The Professional Review Process).

## SECTION 4: 'DISCIPLINES' OR AREAS OF WORK

The Engineering Council identifies four competences, and one commitment in its listing of the generic standards that all candidates must demonstrate to succeed at professional review:

### Competences

- A Knowledge and Understanding
- B Application to Practice
- C Technical and Commercial Leadership
- D Interpersonal Skills

### Commitment

- E Personal Commitment to Professional Standards

**Note: Health and Safety, Risk Assessment and Environment and Sustainability are embedded within the headings above.**

CIHT has contextualised the generic standards for eight typical highways and transportation related disciplines to assist your understanding of what is required to succeed in professional review. These contextualised standards are referred to as Guidance Core Objectives (see [Appendix A](#)).

The requirements for technical competencies in A and B are different for each of the eight disciplines listed below, but the requirements for competencies C and D, and the one commitment E, are common to all disciplines.

The eight disciplines are:

1	Transport Planning
2	Materials and Geotechnics
3	Traffic Management/Safety and Systems Engineering
4	Infrastructure Planning, Design, Construction and/or Maintenance
5	Transport Related Structures
6	Academic Background including Teaching & Training
7	Background in Research
8	Intelligent Transport Systems

If you have worked in more than one of these areas, you may identify more than one specialism on your professional review application form. However, as your selection is used to appoint appropriate reviewers, you are advised to consider your selection carefully.

## SECTION 5: THE PROFESSIONAL REVIEW PROCESS

The professional review process involves the submission of a portfolio of evidence (PoE) and attendance at an interview conducted by two trained reviewers who are professionally qualified highways and transportation practitioners. Professional review interviews are held twice a year in the UK. For details of submission deadlines and dates for professional review interviews please see:

<http://www.ciht.org.uk/en/education--cpd/professional-qualifications/chartered-engineer/Diary-dates.cfm>

### **The Portfolio of Evidence (PoE)**

An application for professional review takes the form of a portfolio of evidence (PoE). On receipt of a PoE, CIHT checks the submission to ensure that all of the required sections are present; if there are any omissions you will be notified immediately. (See [Appendix E](#) of these guidance notes for the PoE checklist and [Appendices C-I](#) for forms).

### **The Professional Review Interview**

The professional review Interview allows you to demonstrate that you have achieved the required level of competence and commitment appropriate to the level to which you aspire, in this case CEng.

### **Actions Required Prior to the Interview**

CIHT will notify you of the date, venue and time of your professional review interview.

You should inform CIHT of any health or other matter that should be taken into account at your interview.

### **On the Day**

It is essential that you bring your **original** qualification certificates with you to the interview for verification. If you have difficulties with this, please contact CIHT.

You will also need to bring an item of identification, such as a passport or driving licence which must include your photograph.

You will be expected to present yourself in a business-like manner, appropriate to the professional status that you are seeking.

**Interviews normally last around 75 minutes and start with a presentation on a project by you. The interview is a structured discussion which allows your experience and attainments to be clarified in such a way that the reviewers, CIHT and you have full confidence in the recommendation which results.**

You are advised to think carefully about how you use visual aids. You should be ready to start your presentation when you enter the interview room and if you wish to use a laptop, you should ensure that it is switched on with the presentation ready.

### **Confirmation and Notification of Outcome**

Both reviewers complete a reviewer's report form and together they agree a recommendation for each candidate. These recommendations are considered by CIHT's Engineering Professional



Standards Panel and the Membership and Skills Strategy Board, which confirms the results of the reviews. You will be notified of the outcome by letter, usually within six weeks of the interview.

If you are unsuccessful, you will be given clear reasons for this with some guidance about where you need to improve.

### **Engineering Council Registration**

The names of successful candidates are notified to the Engineering Council by CIHT for inclusion on the appropriate Register. A certificate and registration pack will be issued by the Engineering Council to successful candidates approximately six weeks after the results are released. Successful candidates are required to pay an initial registration fee and yearly registration renewal fees to the Engineering Council via CIHT. Failure to pay the annual registration fee could result in your name being removed from the Register. In the event of this happening, you may need to re-take the professional review to regain CEng status.

### **Re-sitting your Professional Review**

Candidates who are re-sitting their professional review should ensure that they have addressed all of the points raised by the reviewers at their previous interview and that their portfolio is updated to reflect this.

Re-sit candidates may request one of the reviewers who interviewed them previously. Whilst the Institution will attempt to comply with any such request, timetable constraints and reviewer availability may make this impossible.

## **SECTION 6: CONTINUING PROFESSIONAL DEVELOPMENT (CPD) RECORD**

As part of your professional review submission, you will need to show that you have undertaken a minimum of 25 hours a year of continuing professional development (CPD) for the two years prior to making your application. CPD records should be authenticated and signed by an appropriate sponsor

CPD does not only apply to time gained from formal training events. CPD is about recording learning events. Learning happens in many ways.

Some examples of CPD, in addition to formal training events, are: -

- structured reading focusing on new techniques, procedures, processes or legislation
- self-study to help you deal with a type of project you have never dealt with before, e.g. by learning new computer software
- technical discussions with colleagues where you learn new approaches, or you pass on your knowledge to others
- presentations which require you to research the topic area first. Participation in meetings which you don't normally attend i.e. where you must carry out additional background reading or research to add value to the meeting

**CIHT has a sample pro-forma for the recording of CPD (see [Appendix H](#)).**

## SECTION 7: INDIVIDUAL ROUTE – TECHNICAL REPORT OPTION

### Eligibility

You must be a member of CIHT at Member Grade or above, or in the process of seeking membership before submitting a technical report for CEng. For more information about applying for membership of CIHT, please see [Appendix A](#).

### Introduction

These guidance notes should be read in conjunction with the UK Standard for Professional Engineering Competence, (UK-SPEC) available at [www.engc.org.uk](http://www.engc.org.uk).

The experience-based technical report offers one option for candidates who do not meet the educational base. A technical report should cover an aspect of engineering practice in the highways and transportation industry. You must demonstrate that you have acquired the equivalent knowledge and understanding of scientific and engineering principles to underpin the UK-SPEC competence standards to the same level as those who have gained accredited qualifications.

### **You must demonstrate the knowledge and understanding UNDERPINNING the following A & B competences in UK-SPEC:**

*A Use a combination of general and specialist engineering knowledge and understanding to optimise the application of existing and emerging technology*

A1 Maintain and extend a sound theoretical approach in enabling the introduction and exploitation of new and advancing technology and other relevant developments

A2 Engage in the creative and innovative development of engineering technology and continuous improvement systems

*B Apply appropriate theoretical and practical knowledge to the analysis and solution of engineering problems*

B1 Identify potential projects and opportunities

B2 Conduct appropriate research, and undertake design and development of engineering solutions

B3 Implement design solutions, and evaluate their effectiveness

Candidates should also consider that typically, holders of an Engineering Master's degree with Honours will be able to:

- Deal with complex issues both systematically and creatively; make sound judgements in the absence of complete data and communicate their conclusions clearly to specialist and non-specialist audiences
- Demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks to a professional or equivalent level.

- Continue to advance their knowledge and understanding, and to develop new skills to a higher level

Source: The framework for higher education qualifications in England, Wales and Northern Ireland (August 2008) [QAA 264 08/08] [www.qaa.ac.uk](http://www.qaa.ac.uk)

## Procedure

### Technical Report – Stage 1

Candidates must send their Stage 1 application to [education@ciht.org.uk](mailto:education@ciht.org.uk) as one continuous PDF file for an admin check. This should include:

- a) A stage 1 technical report application form (see [Appendix J](#))
- b) A copy of the initial assessment e-mail from CIHT stating that a Technical Report may be submitted
- c) A 500-1000 word synopsis of the technical report that you plan to submit
- d) A detailed CV
- e) CPD record (25 hours for each of the two previous years)
- f) Mentor details

### Format of the Synopsis

The synopsis should clearly outline what is to be covered in the full technical report, using a few carefully selected real life projects to demonstrate knowledge and understanding to Master's degree level. The assessors will need to be convinced that the technical report will have sufficient depth and technical content.

The synopsis must set out clearly how you intend to demonstrate your knowledge and understanding of engineering principles, stating what the principles are. The focus of your report must be **technical** – your competence as a manager will be assessed at the professional review.

It is recommended that you wait for approval of the synopsis before starting the full technical report.

### The Mentor

You should advise CIHT of the name and credentials of the mentor who will support you through the process. The mentor should:

- Advise on the content and subject matter of the report;
- Comment on final drafts of the synopsis and the report;
- Advise on interview presentation, style and technique;
- Provide challenges to assumptions/conclusions and discuss these with the candidate in a formal 'mock interview' situation.

The mentor must not contribute directly to the content of the report.

### Assessment Process

A panel of assessors drawn from CIHT's trained pool of individual case assessors, assisted by the Qualifications Manager will evaluate the potential of the technical report to be a sufficiently rigorous academic test, establishing the same underpinning knowledge and understanding in full as a candidate with accredited qualifications.

Assessment decisions are communicated in writing, normally within six weeks of receipt of the submission.

If the outcome of the assessment process described is satisfactory, you will be invited to submit the technical report, within 12 months, in the format prescribed below. This is technical report - stage 2

### **Technical Report - Stage 2**

Technical report interviews are held twice a year in the UK: <http://www.ciht.org.uk/en/education--cpd/professional-qualifications/chartered-engineer/Diary-dates.cfm>

When putting together your technical report, the following structure is advised:

- **Title Page**

Name, address, membership number, project title, the purpose of the report, e.g. application for CEng registration and any other useful information.

- **Summary**

Summarise the main conclusions/findings and achievements.

- **Contents page**

- **Introduction**

This should state concisely the form that the report will take and indicate the main topics, developments and points to be covered.

- **Main body of the Report:**

This may be divided into relevant sub sections. Here you must show that you are familiar with the subject and give sufficient detail to demonstrate an understanding of the issues, with the application of highway and transportation engineering principles underpinning the arguments.

### **Tips**

- The theme should be developed in each section and ideas or information presented in a logical way and backed up with acknowledged sources, technical data or literature referenced wherever appropriate
- It may be useful to demonstrate links between ideas and to compare different sources of evidence.
- Analytical comment should be demonstrated when appropriate.
- Keep focused on the title and subject chosen and make sure that the information given is relevant.
- Ensure the aims specified in the synopsis have been achieved.
- Illustrative diagrams, tables, drawings, calculations and statistics can be included in an Appendix to the main report to support the development of the point. If used, they must be referred to in a logical way, correctly applied, clearly presented and where necessary properly explained so that the underlying theory can be followed. You **must** be able to demonstrate your understanding and interpretation of them.
- Any lengthy, detailed, calculations should be attached as an Appendix.

## ▪ **Discussion**

This is where the threads of the developments and arguments in the Report are drawn together. The main points will need to be summarised and a demonstration of the logical development of how the points led towards a view regarding the Report's subject. It can take a variety of forms, for example:

- Summarise the results of your research, which point to a particular view on one or a number of issues.
- Outline recommendations for action in a particular field, activity or engineering process
- Show how these views on the topic have consolidated or diverged because of the progress of the investigation.

## ▪ **Conclusions**

You should:

- Provide considered opinion on your work.
- Identify lessons learned, with recommendations for further development or action.
- Identify what changes you would have made or things you would have done differently, on reflection.

## ▪ **Appendices**

These should only contain:

Essential evidence e.g. published papers, historical data, research or drawings (including rough drawings and calculations) that support or explain the background, a principle or development.

## ▪ **General Presentation**

You should ensure that:

- Spelling and grammar are correct as badly spelt and ungrammatical reports will be rejected.
- The report is presented in a logical and focused format.
- There are no more than 8000 words excluding acknowledgements, references, footnotes, bibliography and appendices.
- The report is type written (double spacing), printed on both sides of A4 paper and securely bound.
- Your report is authenticated. Authentication should take the form of signatures on your application form of Chartered Engineers who have worked with you and can verify that your assertions and evidence are a true reflection of your professional experience.
- Three copies of the report are submitted, within 2 years of having the synopsis accepted.
- A stage 2 technical report application form is submitted (see [Appendix K](#))
- You include an updated CPD record with your submission.

The report will normally be assessed by the assessors who considered your synopsis and, if it is judged to be satisfactory, you will be invited to attend a technical report Interview which will normally be carried out by the same assessors.

## **The Interview**

The technical report interview is intended to test your range and depth of knowledge and understanding of engineering principles. An observer may attend the interview in a monitoring capacity.

## **The next stage**

Assessment decisions are communicated in writing, normally within six weeks of receipt of the submission.

If you successfully complete the technical report interview stage, you will be invited to proceed to professional review, following the procedures set out by CIHT in [Section 5](#) of these guidance notes.

## SECTION 8: INDIVIDUAL ROUTE – FURTHER LEARNING REPORT OPTION

### Eligibility

You must be a member of CIHT at Member Grade or above, or in the process of seeking membership before submitting for assessment for CEng. For more information about applying for membership of CIHT, please see [Appendix A](#).

### Introduction

These guidance notes should be read in conjunction with the UK Standard for Professional Engineering Competence (UK-SPEC) available at [www.engc.org.uk](http://www.engc.org.uk)

You should submit all information relating to your formal qualifications to CIHT for an initial assessment (see [Section 3](#)). If you are advised that the further learning report (FLR) option for CEng is available to you, you may use this to demonstrate further learning to Masters level in order to satisfy the CEng academic benchmark and progress to professional review. The emphasis of the FLR must be on new learning which is beyond the level of your first degree.

In general, MEng programmes are characterised by the requirement for deeper and broader technical and non-technical knowledge than that covered in a BEng (Hons) programme, plus additional project work, and a wider appreciation of the economic, social and environmental context of engineering. These 'enhanced' learning outcomes are described in the Quality Assurance Agency (QAA) for Higher Education's benchmark statements for MEng programmes which can be found at <http://www.qaa.ac.uk/publications/information-and-guidance/publication?PubID=2910#.V0RmTnomj1g>

As the comparison is an academic one, the evidence supplied by you in the FLR must exhibit suitable rigour and measurability through recognised assessment processes. The requirement can be met either through conventional qualifications or examinations, or through work-based assessment based on verifiable and certified achievements.

### Mentor support

You are advised to find a mentor, ideally professional qualified to the level being applied for, who will support you through the process.

The mentor must not contribute to the content of the Report.

### Learning Plan

FLR applicants are advised to draw up a learning plan setting out how the additional learning outcomes are to be achieved and the proposed timescale for their achievement. Applicants whose applications are largely based on prior learning do not need to submit a learning plan but will need to demonstrate clearly how their prior learning relates to the learning outcomes.

### Structure of the FLR

The following structure is advised:

- A completed FLR application form (see [Appendix L](#))
- A copy of the initial assessment letter from CIHT stating that a further learning report may be submitted
- A brief career summary



- A brief description of your current job role and responsibilities
- A learning plan (where available)
- Details of how learning to Master's level has been achieved. One way of presenting this is in the form of a table listing the QAA MEng benchmark statements and giving details of the knowledge and understanding that has been acquired against each statement, including verification of each item of evidence provided. For a template of this table please see [Appendix M](#)
- An up-to-date CPD record

### **FLR Assessment Process**

Three full copies should be submitted. You may submit your FLR application at any time.

An FLR is assessed by two assessors drawn from CIHT's panel of trained Individual Case Assessors.

The Assessors may:-

- accept that the evidence provided in the FLR meets Engineering Council requirements; or
- ask for more information, and/or
- request that you attend an interview to discuss your application
- request that you submit a technical report on specific aspects
- suggest that you consider further formal study or gain further learning in the workplace environment in order to fulfill all of the requirements

Assessment decisions are communicated in writing, normally within six weeks of receipt of the submission.

### **The next stage**

Once you have satisfied the requirements, you will be invited to proceed to professional review, following the procedures set out by CIHT and detailed in [Section 5](#) of these Guidance Notes.

## SECTION 9: APPEALS PROCEDURE

Professional review candidates have the right of appeal if they consider their result to have been unjust.

***An appeal must be received by CIHT within six weeks of the candidates being notified the results.***

### **Procedure**

Appellants should set out their grounds for appeal in writing to the Director of Education and Membership (DEM), together with a cheque for the current appeals fee, payable to CIHT. This fee is refundable only if the appeal is upheld. Details of the current fee can be found on the CIHT website ([www.ciht.org.uk](http://www.ciht.org.uk)).

On receipt of the letter, the DEM will check the review file, resolve any queries, and ensure that the grievance meets the appeals criteria.

Normal grounds for appeal are where:

- 1) the candidate has failed in **no more than one** of the assessment categories below:
  - Knowledge and understanding
  - Application to practice
  - Leadership/management/supervision
  - Interpersonal skills
  - Personal commitment

**Note:** Candidates who fail to demonstrate sufficiently their knowledge of and personal involvement in Health and Safety issues will be judged to have failed their professional review, whether or not they have failed in any other category.

- 2) there have been serious administrative failings on CIHT's part which the appellant believes prejudiced their chances of success
- 3) an unforeseen event at the time of the Review.

If the appeal does not meet the criteria, it will not be accepted and the reasons will be explained in a letter to the appellant.

If the appeal meets the criteria, a copy of the appeal letter, the fail letter, the reviewer report form and the appellant's CV will be sent to the appellant's reviewers, who will be asked to provide a short report addressing the grievances raised. The appellant's sponsors may also be contacted at this stage and their written views, together with any evidence of adverse circumstances not known at the time of the review, will be requested.

All relevant documentation will be presented to the Appeals Panel.

### **Appeals Panel**

The Appeals Panel consists of two senior reviewers selected by the DEM and is chaired by the Chair or Vice Chair of the Membership & Skills Strategy Board or a senior Fellow of the Institution.

The Chair of the Panel must be an Engineering Council registrant. Neither reviewer will have been involved in the original review, and care is taken in their selection to avoid any possible conflict of professional interest with the appellant.

The Panel may decide to interview the appellant, who will have to meet their own associated travel and subsistence costs.

The Appeals Panel will make one of the following recommendations:

- to uphold the original recommendation;
- to invite the appellant to re-sit at no cost;
- to reverse the original decision. In this instance only, the appeal fee will be refunded together with any reasonable interview costs incurred where applicable.

All appeals will be processed as quickly as possible, ideally within three months of receipt of the appeal letter. Appellants will be notified of the Panel's decision, which is final, by CIHT's Chief Executive.

## **SECTION 10: WHERE TO GO FOR HELP AND ADVICE**

For help and advice, contact:

**Education Department**

**CIHT**

**119 Britannia Walk**

**London**

**N1 7JE**

**Email: [education@ciht.org.uk](mailto:education@ciht.org.uk)**

**Tel: 0207 336 1571**

## APPENDIX A

### **GUIDANCE CORE OBJECTIVES: AS DETAILED FOR EACH 'DISCIPLINE' OR AREA OF WORK**

#### **1 Transport Planning**

##### **1A: USE A COMBINATION OF GENERAL AND SPECIALIST ENGINEERING KNOWLEDGE AND UNDERSTANDING to optimise the application of existing and emerging technology.**

- Understand trends and the current position with Government policies for the environment, planning and transport; and be able to interpret their significance within a more local application.
- Be familiar with Regional Planning Guidance, the development planning system and Local Transport Plans.
- Be aware of the sources and trends in national environment and transport statistics, and be able to interpret their significance.
- Understand the statutory procedures and practices within which transport planning activities operate. Be able to plan and modify such activities to be consistent with the regulatory and best practice framework.
- Have a comprehensive understanding of survey techniques and analysis, data synthesis, validation, predictive tools, calibration, appraisal methods, telematics, audit procedures.
- Be able to extend and develop established methods to new situations and opportunities.
- Be competent with appropriate statistical methods to plan and interpret data collection/analysis.
- Understand the capabilities, shortcomings and development of techniques to identify and interpret the future operational, economic and environmental impacts of a range of multi-modal transport projects.
- Be able to deepen one's knowledge base through appropriate research and investigation.
- Be able to promote innovation and creativity in technical areas.

# 1 Transport Planning

## 1B: APPLY APPROPRIATE THEORETICAL AND PRACTICAL METHODS to the analysis and solution of engineering problems

- Be able to identify and describe, in both quantifiable and qualitative terms, complex problems and opportunities, and the significant factors that have a bearing on them.
- Use imagination, flair, and experience to develop solutions to problems and take advantage of opportunities.
- Be familiar with relevant design guidance, advice, and best practice to promote measures that are practical, affordable, and deliverable, and identify the constraints that influence the application of such measures.
- Be able to select, develop and apply the appropriate techniques to assess the future operational, economic, environmental, social and other impacts of suggested measures.
- Be able to make and explain reasoned recommendations about the assessment and selection of measures, and a tactical plan for their implementation including an analysis of the risks involved.
- Have ability to assess critically and constructively measures suggested by others, through mechanisms such as safety or user audits.
- Use up to date research to generate and evaluate solutions.
- Demonstrate responsibility for the delivery of transport planning projects, from project feasibility studies and outline concepts, through initial design studies, public consultation and inquiry, detailed design and implementation stages.
- Design and execute methods to elicit reliable opinions from interested and involved parties.
- Design and implement methods of assessing the performance of measures against objectives and targets.

## 2 Materials and Geotechnics

### **2A: USE A COMBINATION OF GENERAL AND SPECIALIST ENGINEERING KNOWLEDGE AND UNDERSTANDING to optimise the application of existing and emerging technology.**

- Understand trends and the current position relating to Government/International policies for the environment and infrastructure and be able to interpret their significance within a more local application.
- Be familiar with relevant codes of practice and specifications applicable to the nature of the work and environment in which it is performed.
- Be aware of the sources and trends in local, national and international utilisation of material resources, their exploitation and sustainability and be able to interpret the significance of these factors in relation to construction and maintenance of the infrastructure.
- Understand the statutory procedures and practices within which the foregoing activities are undertaken. Be able to plan and modify such activities to be consistent with the regulatory and best practice framework.
- Have a comprehensive understanding of data collection and interpretation, use of predictive analyses and the limitations thereof. Be able to extend and develop established methods to new situations and opportunities.
- Be competent with appropriate statistical methods to plan and interpret data collection/analysis.
- Be able to deepen one's knowledge base through appropriate research / investigation and monitoring of existing processes.
- Be able to promote innovation and creativity in technical areas.

## 2 Materials and Geotechnics

### 2B: APPLY APPROPRIATE THEORETICAL AND PRACTICAL METHODS to the analysis and solution of engineering problems

- Be able to identify and describe, in both quantifiable and qualitative terms, complex problems and opportunities, and the significant factors that have a bearing on them.
- Use imagination, flair and experience to develop possible measures that will influence problems and opportunities.
- Be familiar with relevant design guidance, advice, and best practice to promote measures that are practical, affordable and deliverable, and identify the constraints that influence the application of such measures.
- Be able to predict the likely consequences resulting from the use and potential misuse of materials,
- Be able to make and explain reasoned recommendations about the procedures to be adopted in construction and maintenance operations including an analysis of the risks involved.
- Have ability to assess critically and constructively measures suggested by others, through mechanisms such as safety or user audits.
- Use up to date research to generate and evaluate solutions.
- Demonstrate innovation in the use of such research and its transfer into practical application.
- Assist with the resolution of conflict in the workplace.



### 3 Traffic Management/Safety and Systems Engineering

#### **3A: USE A COMBINATION OF GENERAL AND SPECIALIST ENGINEERING KNOWLEDGE AND UNDERSTANDING to optimise the application of existing and emerging technology.**

- Understand trends and the current position with Government policies for the environment, planning and transport; and be able to interpret their significance within a more local application.
- Be familiar with Regional Planning Guidance, the development planning system and Local Transport Plans.
- Be aware of the sources and trends in national environment and transport statistics, and be able to interpret their significance.
- Understand the statutory procedures and practices within which traffic management and system engineering activities operate. Be able to plan and modify such activities to be consistent with the regulatory and best practice framework.
- Have a comprehensive understanding of survey techniques and analysis, data synthesis, validation, predictive tools, calibration, traffic engineering, appraisal methods, traffic control systems, intelligent transport systems, design tools and techniques, audit procedures, scheme costing and contract documents.
- Be able to extend and develop established methods to new situations and opportunities.
- Be knowledgeable of engineering solutions to road and rail transport problems.
- Be competent with appropriate statistical methods to plan and interpret data collection/analysis.
- Understand the capabilities, shortcomings, and development of appraisal techniques to identify and interpret the future operational, economic and environmental impacts of a range of multi-modal transport projects.
- Be able to deepen one's knowledge base through appropriate research and investigation.
- Be able to promote innovation and creativity in technical areas.

### 3 Traffic Management/Safety and Systems Engineering

#### 3B: APPLY APPROPRIATE THEORETICAL AND PRACTICAL METHODS to the analysis and solution of engineering problems

- Be able to identify and describe, in both quantifiable and qualitative terms, complex problems and opportunities, and the significant factors that have a bearing on them.
- Use imagination, flair and experience to develop possible measures that will influence problems and opportunities.
- Be familiar with relevant design guidance, advice, and best practice to promote measures that are practical, affordable and deliverable, and identify the constraints that influence the application of such measures.
- Be able to select, develop and apply the appropriate techniques to assess the future operational, economic, environmental, social and other impacts of suggested measures and to design appropriate engineering solutions to road and rail transport problems.
- Be able to make and explain reasoned recommendations about the assessment, selection and design of measures, and a tactical plan for their implementation including an analysis of the risks involved.
- Have ability to assess critically and constructively measures suggested by others, through mechanisms such as safety or user audits.
- Use up to date research to generate and evaluate solutions.
- Demonstrate some responsibility for the delivery of traffic management/system engineering projects, from project feasibility studies and outline concepts, through initial design studies, public consultation and inquiry, detailed design and implementation stages.
- Design and execute methods to elicit reliable opinions from interested and involved parties and to consult with the public on road transport problems and proposed solutions.
- Design and implement methods of assessing the performance of measures against objectives and targets.

## **4 Infrastructure Planning, Design, Construction and/or Maintenance**

### **4A: USE A COMBINATION OF GENERAL AND SPECIALIST ENGINEERING KNOWLEDGE AND UNDERSTANDING to optimise the application of existing and emerging technology.**

- Be aware of, and able to implement the forward planning process for transport infrastructure projects in economic, social and environmental terms.
- Understand the current design and construction standards for new transport infrastructure projects and the maintenance of existing transport infrastructure.
- Be aware of, and be able to undertake and/or commission the assessment techniques available to establish the condition of existing transport infrastructure and be able to interpret the results obtained.
- Be aware of emerging techniques and options for the design, construction and maintenance of transport infrastructure projects.
- Be able to extend and develop established methods to new situations and opportunities.
- Be competent with data collection and interpretation.
- Be able to extend one's knowledge base through appropriate research and investigation.
- Be able to promote innovation and creativity in technical areas.

## **4 Infrastructure Planning, Design, Construction and/or Maintenance**

### **4B: APPLY APPROPRIATE THEORETICAL AND PRACTICAL METHODS to the analysis and solution of engineering problems**

- Be familiar with the processes required to progress a new transport infrastructure scheme through the forward planning, legal order, design, contract and construction stages.
- Be able to select and apply appropriate current standards, techniques and statutory requirements to the process.
- Be innovative in progressing solutions to non-standard situations.
- Be able to explain the rationale behind decisions taken.
- Be able to undertake a risk assessment of options being evaluated.
- Demonstrate responsibility for the delivery of new transport infrastructure projects through part of the process from forward planning, legal order, design, contract and construction stages.
- Demonstrate responsibility for the assessment of the condition of elements of existing transport infrastructure and the evaluation and commissioning of appropriate maintenance solutions.
- Demonstrate the use of project management techniques.
- Demonstrate experience of good practice in cyclic, routine and emergency highway and rail maintenance.

## 5 Transport Related Structures

### **5A: USE A COMBINATION OF GENERAL AND SPECIALIST ENGINEERING KNOWLEDGE AND UNDERSTANDING to optimise the application of existing and emerging technology.**

- Understand trends and the current position with relevant Government/International policies for the environment and infrastructure and be able to interpret their significance within a more local application.
- Be familiar with relevant codes of practice and specifications applicable to the nature of the work and environment in which it is performed with particular reference to Structural Safety e.g. SCOSS reports and advice.
- Be aware of the opportunities and problems associated with the creation and maintenance of sustainable structures.
- Understand the statutory procedures and practices within which the foregoing activities are undertaken. Be able to plan and modify such activities to be consistent with the regulatory and best practice framework.
- Have a comprehensive understanding of data collection and interpretation, use of predictive analyses and the limitations thereof. Be able to extend and develop established methods to new situations and opportunities.
- Be competent with appropriate model and other analysis techniques to predict behaviour of structures under expected and exceptional loading configurations
- Be able to deepen one's knowledge base through appropriate research / investigation and monitoring of existing processes.
- Be able to promote innovation and creativity in technical areas.

## 5 Transport Related Structures

### 5B: APPLY APPROPRIATE THEORETICAL AND PRACTICAL METHODS to the analysis and solution of engineering problems

- Be able to identify and describe, in both quantifiable and qualitative terms, complex problems and opportunities, and the significant factors that have a bearing on them.
- Use imagination, flair and experience to develop possible measures that will influence problems and opportunities.
- Be familiar with relevant design guidance, advice, and best practice to promote measures that are practical, affordable and deliverable, and identify the constraints that influence the application of such measures.
- Be able to predict the likely consequences resulting from change in environment or utilisation of structures
- Be able to make and explain reasoned recommendations about the procedures to be adopted in construction and maintenance operations including an analysis of the risks involved.
- Have ability to assess critically and constructively measures suggested by others, through mechanisms such as safety or user audits.
- Use up to date research to generate and evaluate solutions.
- Demonstrate innovation in the use of such research and its transfer into practical application.

## 6 Academic background including Teaching and Training

### 6A: USE A COMBINATION OF GENERAL AND SPECIALIST ENGINEERING KNOWLEDGE AND UNDERSTANDING to optimise the application of existing and emerging technology

- Be able to evaluate and review the current development of policy and practice in relation to the fundamental principles of transport and related theory
- Be able to develop and implement a programme of study to meet teaching and learning objectives in the field covered by the programme, having regard to the health and safety of students and teachers
- Underpin teaching and training, whether in engineering or multidisciplinary programmes, with engineering principles and mathematical and statistical competence
- Understand and apply appropriate academic standards and principles of equity and justice in the selection, tutoring, assessment and qualification of students and trainees
- Conceive, lead and contribute to systematic investigation at the frontiers of knowledge and communicate the resulting findings effectively
- Supervise project work giving students and trainees the experience of original investigation
- Understand the importance of moving towards sustainability and be able to take account of its implications for the application of technology
- Be able to extend and develop established methods to new situations and opportunities
- Be able to deepen one's knowledge base through appropriate research and investigation and by monitoring existing situations and processes
- Be able to promote innovation and creativity in technical areas

## **6 Academic background including Teaching and Training**

### **6B: APPLY APPROPRIATE THEORETICAL AND PRACTICAL METHODS to the analysis and solution of engineering problems**

- Be able to identify and describe, in both quantifiable and qualitative terms, complex problems and opportunities, and the significant factors that have a bearing on them
- Use imagination, flair and experience to develop possible measures that will influence problems and take advantage of opportunities
- Be familiar with relevant design guidance, advice and best practice to promote measures that are practical, affordable and deliverable, and identify the constraints that influence the application of such measures
- Be able to select, develop and apply the appropriate techniques to assess the future operational, economic, environmental, social and other impacts of suggested measures and to design appropriate engineering implementations
- Use media of oral, audio and visual presentation, print and guided activity to provide students and trainees with effective learning experience
- Implement procedures of assessment through coursework, project work and written and oral examination
- Develop contacts with employers of students and trainees and understand their requirements
- Be aware of sources of and where necessary seek funding for teaching and training initiatives, for student support and for research
- Carry out original investigations leading to achievement of stated objectives and reporting of findings to sponsors and clients and by publication
- Use up to date research to generate and evaluate solutions and update content of teaching and training
- Demonstrate innovation in the use of such research and its transfer into practical application



## 7 Background in Research

### **7A: USE A COMBINATION OF GENERAL AND SPECIALIST ENGINEERING KNOWLEDGE AND UNDERSTANDING to optimise the application of existing and emerging technology**

- Be able to ascertain and summarise the current state of knowledge on any relevant topic and identify the need and scope for further investigation
- Be able to conceive practicable and effective ways of addressing questions that have been identified for investigation
- Lead and contribute to systematic investigation at the frontiers of knowledge
- Communicate the resulting findings effectively to employer, client or sponsor and by publication
- Recognise limitations in one's own skills and knowledge, and when effective investigation depends on additional skill or knowledge either acquire this or seek help from those who possess it
- Understand the importance of moving towards sustainability and be able to take account of its implications for the application of technology
- Be able to extend and develop established methods to new situations and opportunities
- Be able to deepen one's knowledge base through appropriate research and investigation and by monitoring existing situations and processes
- Be able to promote innovation and creativity in technical areas

## 7 Background in Research

### **7B: APPLY APPROPRIATE THEORETICAL AND PRACTICAL METHODS to the analysis and solution of engineering problems**

- Be able to identify and describe, in both quantifiable and qualitative terms, complex problems and opportunities, and the significant factors that have a bearing on them
- Use imagination, flair and experience to develop possible measures that will influence problems and take advantage of opportunities
- Be familiar with relevant design guidance, advice and best practice to promote measures that are practical, affordable and deliverable, and identify the constraints that influence the application of such measures
- Be able to select, develop and apply the appropriate techniques to assess the future operational, economic, environmental, social and other impacts of suggested measures and to design appropriate engineering implementations
- Be able to specify, plan and execute lines of investigation that will confirm or refute stated hypotheses and/or measure or estimate unknown quantities to a required accuracy
- Be able to carry out programmes of measurement or other data collection and the appropriate mathematical and statistical analysis of the resulting data
- Be able to apply sound judgement in interpreting the results of investigations by oneself and others
- Use up to date research to generate and evaluate solutions
- Demonstrate innovation in the use of such research and its transfer into practical application

## 8. Intelligent Transportation Systems (ITS)

### **8A: USE A COMBINATION OF GENERAL AND SPECIALIST ENGINEERING KNOWLEDGE AND UNDERSTANDING to optimise the application of existing and emerging technology.**

- Understand trends and current position with Government policies for the environment, planning and transport and be able to interpret their significance within a more local application
- Be familiar with National, Regional and Local Transport Plans
- Have an understanding of the key UK ITS organisations and the relationships between them
- Be aware of the EC ITS Action Plan, able to use and propose extensions to the ITS standards
- Have an understanding of system architectures in all forms and how they are used as system design tools
- Be able to establish 'User Needs', interpret them as system requirements and evaluate the extent to which a proposed systems meets the stated requirements
- Be able to identify the appropriate communications and communication architecture for a system or function, including identifying where there are potential issues that need to be resolved or managed
- Be able to identify systems, sub-systems, methods or techniques and technology that will meet system requirements and ensure that the complete system will function as designed for all relevant modes of transport
- Understand the capabilities and shortcomings of the ITS systems and services and undertake measures to maintain benefits under abnormal conditions
- Be able to identify emerging techniques and technologies and understand the conditions under which they are applicable
- Be able to deepen one's knowledge base through appropriate research and investigation
- Be able to promote innovation and creativity in technical areas
- Understand the principles of cost-benefit assessment, including determining the business case and economic viability of a proposal

## 8. Intelligent Transportation Systems (ITS)

### 8B: APPLY APPROPRIATE THEORETICAL AND PRACTICAL METHODS to the analysis and solution of engineering problems

- Be able to identify and describe, in both quantitative and qualitative terms, complex problems and opportunities and the significant factors that have a bearing on them
- Understand and be able to describe the main building blocks of ITS including sensors and actuators, computing and memory, positioning technology, communications technology and human interfaces
- Use innovation to develop methods and measures that will influence problems and opportunities, with particular reference to the human element
- Be able to select the appropriate systems and functions to deliver the required services which will enable the delivery of policies, whether social or environmental
- Be able to make recommendations for ITS functions and explain the reasons and facilities to stakeholders
- Be able to assess critically and constructively measures suggested by others and develop them into viable and deliverable services
- Use up to date research and development to generate and evaluate solutions and system requirements
- Demonstrate responsibility for delivery or management of ITS systems at feasibility study, outline design, system requirements, system testing and commissioning, system operation
- Demonstrate the ability to involve stakeholders and other network managers in co-operative development of operational procedures
- Develop and implement valid performance measures
- Be able to design and perform evaluations of an installed ITS system

## **C: Provide Technical and Commercial Leadership**

- Plan, negotiate, resource and secure agreement to the development of a project, using appropriate contractual arrangements where necessary.
- Plan, budget, organise, direct and monitor tasks and resources that contribute to the delivery of a project. Plan and take corrective action when the need arises.
- Exercise leadership over the contribution of other technical staff.
- Identify the training needs of others; help to develop and review the training plans for subordinates.
- Contribute to the implementation of quality systems, and help gain the acceptance of subordinates to them.
- Help to develop working practices that promote safety, and secure the compliance of subordinates.
- Understand how continuous improvement in service delivery can be secured, and implement measures to help bring this about.
- Be aware of the implications of the management imperatives and systems of the organisation, and be able to apply these in the team environment.
- Understand the ingredients of effective teams, apply and monitor some measures in the workplace that improve performance.

## **D: Demonstrate effective Interpersonal Skills**

- Communicate fluently in written and oral expression with a wide range of other people, in English.
- Participate in focussed discussions about technical matters.
- Prepare and present technical reports to senior personnel and to the public.
- Present, listen and discuss ideas using a range of communication methods.
- Understand the principles of client and customer care.
- Understand negotiation skills and have experience of their application.
- Be able to resolve conflict in the workplace.
- Understand the motivation of others, and the factors that influence your own performance.
- Be able to counsel others in a sensitive manner.
- Play an active part in building and maintaining an effective team environment.
- Identify collective goals and responsibilities.
- Issue clear and accurate instructions to subordinates.

**E: Demonstrate a personal commitment to professional standards recognising obligations to society, the profession and the environment**

- Understand and comply with CIHT's Code of Conduct.
- Work constructively within all relevant legislation and regulatory frameworks, including social and employment legislation.
- Understand and comply with all obligations of current health and safety legislation.
- Help to develop, manage and apply safe systems at work.
- Undertake technical work in a manner that complies with the codes of practice on risk and the environment.
- Undertake engineering activities in a way that contributes to sustainable development.
- Undertake and record professional development to a minimum of 25 hours a year, in accordance with a current Personal Development Plan covering the next two years, and monitor output.
- Participate in the affairs of the CIHT at national and/or regional level and encourage subordinates to participate in its work.

## APPENDIX B

### PORTFOLIO OF EVIDENCE (POE) CHECKLIST

- 1 Contents Page at the beginning of the portfolio of evidence
- 2 Application form for professional review with endorsed, passport-sized photographs and current fee
- 3 Sponsors' authentication forms
- 4 CV and organisational chart indicating your position within your company. If you are self employed please provide a brief note outlining your level of responsibility and leadership in projects undertaken
- 5 Copy of initial assessment letter from CIHT confirming that you are can proceed to professional review
- 6 Copies of educational certificates (Note: originals need to be produced when you attend the professional review Interview for verification)
- 7 Training & experience record forms (authenticated with line manager or mentor's signature on each objective).
- 8 Authentication of training and experience record sheets
- 9 Project synopsis
- 10 Continuing professional development record (min. past 2 years)
- 11 Planning your future  
Professional development plan (personal profile, SWOT analysis, personal progression plan, PPP, for next 2 years)
- 12 Appendices containing evidence to back up statements made in training and experience record forms. These should be cross-referenced to aid the reviewers to understand your contribution to schemes etc. where appropriate.

**NB** You must submit three hard copies of the document individually collated and suitably bound and a full copy of the submission on CD

Bulky, oversized folders should be avoided and you should note that submissions may be rejected if they are excessively large.



## APPENDIX C

### APPLICATION FORM FOR PROFESSIONAL REVIEW

All candidates must complete this form. You must attach a recent passport sized photograph of yourself, **endorsed and dated** on the back by one of the sponsors “I certify that this is a true likeness of .....

Endorsed copies of all certificates relating to educational qualifications should be attached endorsed and dated by one of the Sponsors “I certify that this is a true copy of the original certificate” and the **original certificates must be brought to the professional review interview**

***You will also need to bring an item of identification, such as a passport or driving licence which must include your photograph.***

The application must be accompanied by the current professional review fee, details of which can be found on the CIHT website <http://www.ciht.org.uk>

Please staple a passport sized photo-graph here endorsed on the back as a true likeness by one of your sponsors

## APPLICATION FOR PROFESSIONAL REVIEW CHARTERED ENGINEER

### PERSONAL INFORMATION *(Type or print in BLOCK CAPITALS)*

Title:	Forenames:
Surname:	Date of Birth:
Nationality:	Male <input type="checkbox"/> Female <input type="checkbox"/>
Full Postal Address:	
	Postcode
Telephone:	E-mail:
CIHT Membership No: 0000	Member <input type="checkbox"/> Fellow <input type="checkbox"/>
Employer's name:	
Employer's address:	
	Postcode:
Telephone:	E-mail:
Job Title:	
Membership of other Professional Engineering Institutions:	
Your Engineering Council Registration No: <i>(if applicable)</i>	

### SPONSORS

Your sponsors must be Engineering Council Registrants at CEng level and should ideally be Members or Fellows of CIHT. Sponsors must be familiar with the requirements of professional registration, as set out in the UK standard for Professional Engineering Competence (UK-SPEC), and their support indicates that, in their professional judgment, you have the knowledge and experience to meet the stated requirements.

*Name and initials in BLOCK CAPITALS*

<b>SPONSOR 1</b>	Signature	CEng <input type="checkbox"/>
Member <input type="checkbox"/> Fellow <input type="checkbox"/>	Membership No. 0000	Engineering Council Reg. No <i>(if known)</i>
<b>SPONSOR 2</b>	Signature	CEng <input type="checkbox"/>
Member <input type="checkbox"/> Fellow <input type="checkbox"/>	Membership No. 0000	Engineering Council Reg. No <i>(if known)</i>

**CANDIDATE’S TRAINING AND EXPERIENCE**

Please indicate your area of specialism; you may tick more than one box.

- Transport Planning  Transport Related Structures
- Materials & Geotechnics  Academic Background including Teaching and Training
- Traffic Management/Safety & Systems Eng.  Background in Research
- Infrastructure Planning, Design, Construction and/or Maintenance  Intelligent Transport Systems
- Othe (please specify) .....

**QUALIFICATIONS**

Please list **all** of your Further/Higher level qualifications (eg. HND/C, degree, MSc)

Qualification title and place of study	to/from dates of study	Engineering Council Accredited Course Number
.....	.....	.....
.....	.....	.....
.....	.....	.....

Please indicate your preferred location/s to attend a Professional Review interview. Whilst we will seek to accommodate your preferred location/s, this will be subject to venue and reviewer availability.

- London
- Birmingham
- Edinburgh
- Hong Kong

**Candidate Checklist**

- Application Form (with endorsed photo)
- Sponsor Authentication Forms x2
- CV & Organisational Chart
- Copy of Initial Assessment Outcome
- Authenticated Copies of Certificates
- T&E Forms (Objectives A-E)
- T&E Authentication Forms
- Project Synopsis
- Authenticated 2 Year CPD Record
- Professional Development Plan
- SWOT Analysis
- 2 Year Personal Progression Plan

**IMPORTANT UNDERTAKING TO BE SIGNED BY THE CANDIDATE**

I declare that the information provided in this form and the enclosed documents is, in every respect, complete and accurate.

**SIGNATURE** ..... **DATE** .....

Please submit an electronic copy of your Portfolio of Evidence as one continuous PDF file to [education@ciht.org.uk](mailto:education@ciht.org.uk) for an administrative check. Once completed, you will be requested to send in three bound hard copies and provided with details on how to pay the Professional Review assessment fee.

**GDPR:** This Privacy Notice relates to the collection and processing of your personal data for the purpose of CIHT Professional Review Chartered Engineer application. We use the information that you provide about yourself to fulfil your requests, queries, updates and orders. We do not share this information with outside parties except to the extent necessary to complete your requests. Full details on how CIHT uses its data are available at <https://www.ciht.org.uk/privacy-statement/>

## **APPENDIX D**

### **SPONSORS' AUTHENTICATION OF PORTFOLIO OF EVIDENCE**

The portfolio of evidence submission must be signed by you and your sponsors. Copies of certificates should be endorsed by one of the sponsors "I certify that this is a true copy of the original".

The sponsors must be Registrants of the Engineering Council at CEng level and should ideally be Members or Fellows of CIHT.

It is the responsibility of the sponsor to ensure that the candidate is able to demonstrate in full the standards required for this professional qualification. The sponsors also need to understand fully the current requirements for CEng so that they are able to support the application with confidence. It is therefore important that the sponsors are given sufficient time to look through the whole of the proposed submission and provided with any 'refresher' information on the standards by the candidate prior to authenticating the documentation. UK-SPEC is a good example of a suitable 'refresher' document.

Following the professional review interview, you will be notified of the results within 6 weeks. The sponsors will also receive a copy of this letter directly from CIHT so that they are aware of the results. In the event of you being unsuccessful at review, the letter should form the basis of discussions between you and the sponsors to identify the most appropriate way to address any issues raised.

## SPONSORS' AUTHENTICATION OF PORTFOLIO OF EVIDENCE

### Professional Review Sponsor Form

The role of a sponsor is to confirm the accuracy of the information that the candidate has recorded in their portfolio of evidence with regard to their qualifications, training, experience and achievements. Sponsors themselves must be registrants of the Engineering Council at the same level (or above) as that for which the candidate is applying.

**Please complete this form and return it to the candidate for inclusion in their portfolio.**

I have agreed to act as sponsor for: (Name of applicant).....  
in their application for: CEng / IEng / EngTech (delete as appropriate.)

		Please ✓ to confirm
Current relationship with candidate:	Line Manager / Client	
	Professional or Business Associate / Peer	
	Other: (Specify)	

I have known the candidate for:	1-3 years	
	4-10 years	
	>10 years	
I have read the candidate's portfolio of evidence.		
I am familiar with the candidate's field of practice and vouch and verify that, to the best of my knowledge, their portfolio of evidence represents a true and accurate record of their knowledge, training and experience.		
I am familiar with the candidate's professional role and responsibilities and can vouch and verify that, to the best of my knowledge their competencies are commensurate with those specified in the Engineering Council's <a href="#">UK-SPEC</a> guidelines.		

Sponsor's Details	
Forename:	Surname:
Job Title:	Company:
Company Address:	
Email:	Telephone:
Membership of Professional Bodies (Body & Grade):	

Engineering Council registration level and number (if known):	CEng / IEng (delete as appropriate)
Signature:	Date:

## APPENDIX E

### TRAINING AND EXPERIENCE (T&E) RECORD FORMS

Please refer to the standards as set out in the UK-SPEC document. This document can be viewed via [www.engc.org.uk](http://www.engc.org.uk)

**The training and experience (T&E) record forms must describe *clearly and concisely* your highways and transportation engineering background, professional achievements and responsibilities.**

If you have completed a training scheme accredited as satisfying Engineering Council requirements, you should find completion of the T&E forms a straightforward task. You may enclose a copy of your training record with the completed forms as an appendix.

You must present your T&E records on the forms provided under the five headings set down in the Engineering Council *Competence and Commitment Statements*. To assist you, the first two *layers* of the general statements are summarised at the top of each form. CIHT has also “contextualised” the standards to areas of knowledge and awareness relating to the disciplines in which typical CIHT members are employed, namely Transport Planning, Materials and Geotechnics, Traffic Management/Safety and Systems Engineering, Infrastructure Planning, Design, Construction and/or Maintenance, Transport Related Structures, Academic Background including Teaching and Training, Background in Research and Intelligent Transport Systems at IEng level (see [Appendix A](#)). You can use these bullet point lists to help you to consider all your experience to date against the requirements for your specialist area(s), A and B as well as the general areas of C, D and E. You should then be able to identify the most appropriate examples to demonstrate the competences and commitment required.

It is essential that all evidence is presented clearly and concisely, including the position occupied by you, your contribution and the extent of your technical and managerial responsibility.

You are encouraged to include your role in identifying any problems encountered and the evaluation and implementation of an appropriate solution. You should be able to draw on a number of examples to demonstrate your competence and commitment, not just one major example.

You and your sponsors should ensure that all component elements of the submission are grammatically correct and free of spelling mistakes.

The T&E forms should be signed by you and at least one of your sponsors. Copies of certificates should be endorsed by one of your sponsors “I certify that this is a true copy of the original”.

***Wherever possible, sections of the record should be initialed by your line manager or mentor at that time; it is essential that in such cases the relationship between you and each signatory should be clearly stated on copies of the “authentication of training and experience record” form provided.***

**The T&E forms should not be more than 2500 words in total. This should be broadly broken down into 500 word sections relating to the four key competences and one commitment listed in the Engineering Council *Competence and Commitment Statements*.**

**Limited Appendices may be included** to provide support to the assertions made in the T&E forms. Information included in these Appendices will not form part of the 2500 word limit but the Appendices should be used as an opportunity to provide clearly referenced and pertinent additions rather than general extra information.

Examples of useful appendices are:-

- Photographs
- Sketches
- An extract of a calculation to demonstrate understanding of the fundamental principles of an engineering solution
- An Executive summary of a report
- A specific part of a contract document
- An example of health and safety risk assessments
- An example of measures taken to mitigate the environmental impact of a scheme
- A section of a public consultation document
- Technical drawings
- Programme of works

**NB** This list of examples is not exhaustive.



## CIHT: RECORD OF TRAINING AND EXPERIENCE (CEng)

Name:.....Number of words used in Section A:.....

*The T&E forms should not be more than 2500 words in total.*

*This should be broadly broken down into 500 word sections.*

**Objective A: Illustrate how you have used a combination of general and specialist engineering knowledge and understanding to optimise the application of existing and emerging technology. In particular, demonstrate how you have:**

- a) maintained and extended a sound theoretical approach in enabling the introduction and exploitation of new and advancing technology and other relevant developments;
- b) engaged in the creative and innovative development of engineering technology and continuous improvement systems
- c) identified constraints and exploited opportunities for the development and transfer of technology within your own chosen field

## CIHT: RECORD OF TRAINING AND EXPERIENCE (CEng)

**Name:**..... **Number of words used in Section B:**.....

*The T&E forms should not be more than 2500 words in total.*

*This should be broadly broken down into 500 word sections.*

**Objective B: Illustrate how you have applied appropriate theoretical and practical methods to the analysis and solution of engineering problems. In particular, illustrate how you have:**

- a) identified potential projects and opportunities;
- b) conducted appropriate research and undertaken design and development of engineering solutions
- c) Implemented design solutions, and evaluated their effectiveness

## CIHT: RECORD OF TRAINING AND EXPERIENCE (CEng)

**Name:**..... Number of words used in Section C:.....

*The T&E forms should not be more than 2500 words in total.*

*This should be broadly broken down into 500 word sections.*

**Objective C: Provide technical and commercial leadership. In particular, show how you have:**

- a) planned for effective project implementation;
- b) planned, budgeted, organised, directed and controlled tasks, people and resources;
- c) lead teams and developed the capabilities of staff to meet changing technical and managerial needs;
- d) brought about continuous improvement through quality management.

## CIHT: RECORD OF TRAINING AND EXPERIENCE (CEng)

**Name:**..... Number of words used in Section D:.....

*The T&E forms should not be more than 2500 words in total.*

*This should be broadly broken down into 500 word sections.*

**Objective D: Demonstrate effective interpersonal skills. Evidence is required of your ability to:**

- a) communicate in English with others at all levels;
- b) present and discuss ideas and proposals;
- c) demonstrate personal and social skills.

## CIHT: RECORD OF TRAINING AND EXPERIENCE (CEng)

**Name:**..... Number of words used in Section E:.....

*The T&E forms should not be more than 2500 words in total.*

*This should be broadly broken down into 500 word sections.*

**Objective E: Demonstrate a personal commitment to professional standards, recognising obligations to society, the profession and the environment, in particular give examples of how you have:**

- a) complied with relevant codes of conduct
- b) managed and applied safe systems of work
- c) undertaken engineering activities in a way that contributes to sustainable development.
- d) Carried out the continuing professional development necessary to maintain and enhance competence in own area of practice

## APPENDIX F

### AUTHENTICATION OF TRAINING AND EXPERIENCE RECORD FORMS

The training and experience record forms should be signed by you and at least one of your sponsors. Copies of certificates should be endorsed by one of the sponsors "I certify that this is a true copy of the original".

***Wherever possible, sections of the record forms should be initialed by your line manager or mentor at that time. It is essential that the relationship between the candidate and each signatory should be clearly stated on copies of the "authentication of training and experience record" form provided.***

**AUTHENTICATION OF TRAINING AND EXPERIENCE RECORD**

*NB: A copy of this form MUST be completed by each signatory on the training and experience record forms and included in the portfolio when it is submitted to CIHT.  
The signatory is being asked to confirm that your submission is factually correct in terms of your role and responsibilities. They are NOT being asked to comment on how well you performed your duties.*

**Candidate's Name**.....

**Mentor/Manager's Name (PRINT)**.....

**Address**.....

.....

.....

**Postcode**..... **Tel No**.....

**I confirm that at the time, the working relationship between the candidate and myself was as follows:**

**Working Relationship with Candidate**

.....

.....

.....

**During our working relationship I can confirm that the candidate carried out the work as claimed. I have shown the relevant sections by authorising the appropriate assertions.**

**Signed**..... **Date**.....

## **APPENDIX G**

### **PROJECT SYNOPSIS FORM**

You must submit a one page summary, on the form provided, detailing your role and contribution to a project of your choice (exceptionally two projects if you have only worked on very small projects). You will be required to give a 15 minute presentation on the project, to your two reviewers at the beginning of your professional review interview. The reviewers may stop you if you exceed fifteen minutes.

You may make the presentation on an A3 or A4 flip chart or on your own laptop, and/or bring illustrative materials such as charts, drawings, photographs and calculations, but no facilities for slide, overhead or other projectors will be made available, nor will such presentations be allowed.

You are not required to use a laptop to make your presentation and are advised to think carefully about how you use visual aids. You should be ready to start your presentation when you enter the interview room and if you wish to use a laptop, you should ensure that it is fully charged and switched on with the presentation ready.



**Project Synopsis Form**

You are required to give a 15 minute presentation at the start of your professional review interview. Please summarise the content of your presentation below.

Name .....

Project Summary:

## APPENDIX H

### CPD PRO-FORMA

CIHT provides a sample pro-forma for the recording of CPD. **However, you can use an alternative system for recording CPD activity, for example one used by your employer or another professional body, as long as it fulfills the key requirements of basing CPD on an assessment of development needs; reviewing the usefulness of the outputs against your development needs; and being at least 25 hours a year of relevant development activity.**



**CIHT CPD Record Sheet (this form may be copied onto multiple pages)**

<b>Full Name:</b>
<b>Membership Number:</b>

DATE	PLAN What did I plan to develop?	ACT Details of CPD Activity (What/Where?)	RECORD Number of CPD Hours	REFLECT Knowledge/skills gained/applied

## APPENDIX I

### PLANNING YOUR FUTURE

#### PROFESSIONAL DEVELOPMENT PLAN – PERSONAL PROFILE, SWOT ANALYSIS, 2 YEAR PERSONAL PROGRESSION PLAN (PPP)

You must submit a Professional Development Plan as part of your professional review portfolio.

The Professional Development Plan should include

- A **personal profile** giving details of qualifications, experience and career aspirations in broad terms (see pro-forma, attached)
- A **SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis** to help identify professional development priorities (See pro-forma attached)
- A **2-year Personal Progression Plan**. To show planned professional development activities over the next two years (See pro-forma attached).

## **Professional Development Plan**

### **Personal Profile**

**Name**

**Membership Number**

**Aspirations with timescales where appropriate**

**1.**

**2.**

**3.**

**Qualifications**

**Experience**

**'Gaps' Identified**

<p style="text-align: center;"><b>STRENGTHS</b></p> <p>What do you do well?          What unique resources can you draw on?          What do others see as your strengths?</p>	<p style="text-align: center;"><b>WEAKNESSES</b></p> <p>What could you improve?          Where do you have fewer resources than others?          What are others likely to see as weaknesses?</p>
<p style="text-align: center;"><b>OPPORTUNITIES</b></p> <p>What good opportunities are open to you?          What trends could you take advantage of?          How can you turn your strengths and weaknesses into opportunities?</p>	<p style="text-align: center;"><b>THREATS</b></p> <p>What trends could harm affect your role?          What is your competition doing?          What threats do your weaknesses expose you to?</p>

**Personal Progression Plan (PPP) for <year>**

***Aims and Aspirations:***

- 1)
- 2)
- 3)

<b>Skills/experience/knowledge required to achieve aims</b>	<b>How to fulfil</b>

## **APPENDIX J**

### **TECHNICAL REPORT ROUTE APPLICATION FORM – STAGE 1**

All candidates submitting a technical report synopsis must complete this form.

Your application form must be signed by a line manager or mentor who can confirm the authenticity of the synopsis.

The application must be accompanied by the current technical report assessment fee, details of which can be found on the CIHT website <http://www.ciht.org.uk> This fee covers the assessment of the synopsis, full report and interview fee.



Please insert a  
passport sized  
photograph here



## Chartered Engineer Technical Report Application Form – Stage 1

**PERSONAL INFORMATION** *(Type or print in BLOCK CAPITALS)*

Title:	Forenames:
Surname:	Date of Birth:
Nationality:	Male <input type="checkbox"/> Female <input type="checkbox"/>
Full Postal Address:	
	Postcode
Telephone:	E-mail:
CIHT Membership No: 0000	
Member <input type="checkbox"/>	Fellow <input type="checkbox"/>
Employer's name:	
Employer's address:	
	Postcode:
Telephone:	E-mail:
Job Title:	

**I am hoping to achieve Chartered Engineer status via the CIHT**

**My main area of work is:**

- |                                                                  |                          |                                                     |                          |
|------------------------------------------------------------------|--------------------------|-----------------------------------------------------|--------------------------|
| Transport Planning                                               | <input type="checkbox"/> | Transport Related Structures                        | <input type="checkbox"/> |
| Materials & Geotechnics                                          | <input type="checkbox"/> | Academic Background including Teaching and Training | <input type="checkbox"/> |
| Traffic Management/Safety & Systems Eng.                         | <input type="checkbox"/> | Background in Research                              | <input type="checkbox"/> |
| Infrastructure Planning, Design, Construction and/or Maintenance | <input type="checkbox"/> | Intelligent Transport Systems                       | <input type="checkbox"/> |
| Other (please indicate) .....                                    |                          |                                                     | <input type="checkbox"/> |

**I enclose the following information for Stage 1 of my Technical Report assessment:**

- |                                                           |                          |
|-----------------------------------------------------------|--------------------------|
| CV and brief career history                               | <input type="checkbox"/> |
| Copy of initial assessment letter from CIHT               | <input type="checkbox"/> |
| Synopsis of what is to be covered in the Technical Report | <input type="checkbox"/> |
| Mentor name and contact details                           | <input type="checkbox"/> |
| 2 Year CPD record (25 hours per year)                     | <input type="checkbox"/> |

**IMPORTANT UNDERTAKING TO BE SIGNED BY THE CANDIDATE**

I declare that the information provided in this form and the enclosed documents is, in every respect, complete and accurate.

**PRINT NAME**..... **Membership Number 0000**.....

**SIGNATURE** ..... **DATE** .....

**Please submit an electronic copy of your Stage 1 Technical Report as one continuous PDF file to [education@ciht.org.uk](mailto:education@ciht.org.uk) for an administrative check. Once completed, you will be provided with details on how to pay the Technical Report assessment fee.**

**GDPR:** This Privacy Notice relates to the collection and processing of your personal data for the purposes of your CIHT Technical Report Chartered Engineer application.

We use the information that you provide about yourself to fulfill your requests, queries, updates and orders. We do not share this information with outside parties except to the extent necessary to complete your requests. Full details on how CIHT uses its data are available at <https://www.ciht.org.uk/about-us/about-ciht/privacy-policy/>

## **APPENDIX K**

### **TECHNICAL REPORT ROUTE APPLICATION FORM – STAGE 2**

All candidates submitting a technical report synopsis must complete this form.

Your application form must be signed by a line manager or mentor who can confirm the authenticity of the synopsis.

When submitting your full technical report, you must ensure that you include an updated CPD record.

Please staple a passport sized photograph here, endorsed on the back as a true likeness by your sponsor



## Chartered Engineer Technical Report Application Form – Stage 2

**PERSONAL INFORMATION** *(Type or print in BLOCK CAPITALS)*

Title:	Forenames:
Surname:	Date of Birth:
Nationality:	Male <input type="checkbox"/> Female <input type="checkbox"/>
Full Postal Address:	
	Postcode
Telephone:	E-mail:
CIHT Membership No: 0000	Member <input type="checkbox"/> Fellow <input type="checkbox"/>
Employer's name:	
Employer's address:	
	Postcode:
Telephone:	E-mail:
Job Title:	

**IMPORTANT UNDERTAKING TO BE SIGNED BY THE CANDIDATE**

I declare that the information in my submission is, in every respect, complete and accurate.

**SIGNATURE** ..... **DATE** .....

**AUTHENTICATION**

I fully endorse the technical report attached by the candidate and can verify that the candidate's assertions and evidence are a true reflection of their professional experience.

Name in BLOCK CAPITALS	Signature	CEng <input type="checkbox"/>
Member <input type="checkbox"/> Fellow <input type="checkbox"/>	Membership No. 0000	Engineering Council Reg. No (if known)

**Please submit an electronic copy of your Stage 2 Technical Report as one continuous PDF file to [education@ciht.org.uk](mailto:education@ciht.org.uk) for an administrative check. Please also include an updated CPD record, demonstrating a minimum of 25 hours per year for the two years prior to your submission. Once the administrative check has been completed, you will be requested to send three bound hard copies of your Technical Report to CIHT.**

**GDPR:** This Privacy Notice relates to the collection and processing of your personal data for the purposes of your CIHT Chartered Engineer Technical Report application.

We use the information that you provide about yourself to fulfill your requests, queries, updates and orders. We do not share this information with outside parties except to the extent necessary to complete your requests. Full details on how CIHT uses its data are available at <https://www.ciht.org.uk/about-us/about-ciht/privacy-policy/>

## **APPENDIX L**

### **FURTHER LEARNING REPORT ROUTE APPLICATION FORM**

All candidates submitting a further learning report must complete this form.

Your application form must be signed by a line manager or mentor who can confirm the authenticity of the report.

The application must be accompanied by the current further learning report assessment fee, details of which can be found on the CIHT website <http://www.ciht.org.uk>

Please staple a passport sized photograph here, endorsed on the back as a true likeness by your sponsor



## Further Learning Report Application Form

**PERSONAL INFORMATION** (Type or print in BLOCK CAPITALS)

Title:	Forenames:
Surname:	Date of Birth:
Nationality:	Male <input type="checkbox"/> Female <input type="checkbox"/>
Full Postal Address:	
	Postcode
Telephone:	E-mail:
CIHT Membership No: 0000	
Member <input type="checkbox"/>	Fellow <input type="checkbox"/>
Employer's name:	
Employer's address:	
	Postcode:
Telephone:	E-mail:
Job Title:	

**I am hoping to achieve CHARTERED ENGINEER status via CIHT**

**My main area of work is:**

- |                                                                  |                          |                                                     |                          |
|------------------------------------------------------------------|--------------------------|-----------------------------------------------------|--------------------------|
| Transport Planning                                               | <input type="checkbox"/> | Transport Related Structures                        | <input type="checkbox"/> |
| Materials & Geotechnics                                          | <input type="checkbox"/> | Academic Background including Teaching and Training | <input type="checkbox"/> |
| Traffic Management/Safety & Systems Eng.                         | <input type="checkbox"/> | Background in Research                              | <input type="checkbox"/> |
| Infrastructure Planning, Design, Construction and/or Maintenance | <input type="checkbox"/> | ITS                                                 | <input type="checkbox"/> |
| Other (please specify) .....                                     |                          |                                                     | <input type="checkbox"/> |

**Candidate Checklist:**

- |                                                             |                          |                                        |                          |
|-------------------------------------------------------------|--------------------------|----------------------------------------|--------------------------|
| CV                                                          | <input type="checkbox"/> | Details of any employer-based training | <input type="checkbox"/> |
| Authenticated copies of certificates                        | <input type="checkbox"/> | QAA Summary table                      | <input type="checkbox"/> |
| Syllabus for all courses taken (for non-accredited degrees) | <input type="checkbox"/> | CPD                                    | <input type="checkbox"/> |
| Notice of performance (for HND/C)                           | <input type="checkbox"/> | Verification statements and signatures | <input type="checkbox"/> |
| Abstract of dissertation (for MSc/PhD)                      | <input type="checkbox"/> |                                        |                          |

**IMPORTANT UNDERTAKING TO BE SIGNED BY THE CANDIDATE**

I declare that the information in my submission is, in every respect, complete and accurate.

**SIGNATURE** .....

**DATE** .....

**SPONSOR**

The sponsor must be a Member or Fellow of CIHT and a Chartered Engineer.

As sponsor I fully endorse the further learning report attached by the candidate.

Name and initials in BLOCK CAPITALS	Signature	CEng <input type="checkbox"/>
Member <input type="checkbox"/> Fellow <input type="checkbox"/>	Membership No.    0000	Engineering Council Reg. No <i>(if known)</i>

**Please submit an electronic copy of your Further Learning Report (FLR) as one continuous PDF file to [education@ciht.org.uk](mailto:education@ciht.org.uk) for an administrative check. Once completed, you will be requested to send in three bound hard copies of your FLR and provided with details on how to pay the FLR assessment fee.**

**GDPR:** This Privacy Notice relates to the collection and processing of your personal data for the purpose of CIHT Chartered Engineer - FLR application.

We use the information that you provide about yourself to fulfill your requests, queries, updates and orders. We do not share this information with outside parties except to the extent necessary to complete your requests. Full details on how CIHT uses its data are available at <https://www.ciht.org.uk/about-us/about-ciht/privacy-policy/>

## **APPENDIX M**

### **FURTHER LEARNING REPORT ROUTE QAA TABLE**

The QAA table should be kept brief with the details contained in the accompanying report. The table should be used as a 'front sheet' to your application, with additional pages supplied to provide examples and evidence of how you have gained the knowledge that you have referred to.

Wherever (in the table) you have claimed that you have gained the necessary knowledge, you will need to back this up with evidence. Therefore, if you have gained the knowledge through your academic studies, you can simply complete the table by putting which module covered this criterion and then include the full course information in as an appendix. Where a criterion has been met through work experience, you should put brief details into the table and then provide examples to support this on an additional sheet. This should then be authenticated by your mentor or line manager.

In the table you should be specific and reference where the supporting evidence for each competence can be found within your report. For example, if you believe that you gained the necessary knowledge to satisfy the first competence 'The ability to learn new theories, concepts, methods etc in unfamiliar situations' through attending a course or completing a qualification you should complete the 'formal learning' column of the table by stating which course this was covered in or which module of the qualification covered this area. Further information on the course attended/qualification should be put into the appendix of the report and referenced appropriately.



## Further Learning Report QAA Table

Name \_\_\_\_\_

Membership Number \_\_\_\_\_

		Formal Learning	Learning in the Work Place
	<b>BEng (Hons)/MEng Level Attributes</b>		
	<b>General Learning Outcomes</b>		
1	The ability to learn new theories, concepts, methods etc in unfamiliar situations		
2	The ability to monitor and adjust a personal programme of work on an on-going basis, and to learn independently		
3	The ability to develop, monitor and update a plan, to reflect a changing operating environment		
4	An understanding of different roles within a team, and the ability to exercise leadership		
	<b>Specific Learning Outcomes in Engineering</b>		
	<b>Underpinning science and mathematics, and associated engineering disciplines, as defined by the relevant engineering institution</b>		
5	Knowledge and understanding of scientific principles and methodology necessary to underpin their education in their engineering discipline, to enable appreciation of its scientific and engineering context, and to support their understanding of historical, current, and future developments and technologies		
6	A comprehensive understanding of the scientific principles of own specialisation and related disciplines		
7	An awareness of developing technologies related to own specialisation		

		Formal Learning	Learning in the Work Place
8	Knowledge and understanding of mathematical principles necessary to underpin their education in their engineering discipline and to enable them to apply mathematical methods, tools and notations proficiently in the analysis and solution of engineering problems		
9	A comprehensive knowledge and understanding of mathematical and computer models relevant to the engineering discipline, and an appreciation of their limitations		
10	Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of their own engineering discipline		
11	an understanding of concepts from a range of areas including some outside engineering, and the ability to apply them effectively in engineering projects		
	<b>Engineering Analysis</b>		
12	Understanding of engineering principles and the ability to apply them to analyse key engineering processes		
13	Ability to use fundamental knowledge to investigate new and emerging technologies		
14	Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques		
15	Ability to apply quantitative methods and computer software relevant to their engineering discipline, in order to solve engineering problems		
16	Ability to apply mathematical and computer-based models for solving problems in engineering, and the ability to assess the limitations of particular cases		

		<b>Formal Learning</b>	<b>Learning in the Work Place</b>
17	Ability to extract data pertinent to an unfamiliar problem, and apply in its solution using computer based engineering tools when appropriate		
18	Understanding of and ability to apply a systems approach to engineering problems		
	<b>Design</b>		
19	investigate and define a problem and identify constraints including environmental and sustainability limitations, health and safety and risk assessment issues		
20	Understand customer and user needs and the importance of considerations such as aesthetics		
21	Identify and manage cost drivers		
22	Use creativity to establish innovative solutions		
23	Ability to generate an innovative design for products, systems, components or processes to fulfill new needs		
24	Ensure fitness for purpose for all aspects of the problem including production, operation, maintenance and disposal		
25	Manage the design process and evaluate outcomes		
26	Wide knowledge and comprehensive understanding of design processes and methodologies and the ability to apply and adapt them in unfamiliar situations		

		Formal Learning	Learning in the Work Place
	<b>Economic, social, and environmental context</b>		
27	Knowledge and understanding of commercial and economic context of engineering processes		
28	The ability to make general evaluations of commercial risks through some understanding of the basis of such risks		
29	Knowledge of management techniques which may be used to achieve engineering objectives within that context		
30	Extensive knowledge and understanding of management and business practices, and their limitations, and how these may be applied appropriately		
31	Understanding of the requirement for engineering activities to promote sustainable development		
32	Awareness of the framework of relevant legal requirements governing engineering activities, including personnel, health, safety and risk (including environmental risk) issues		
33	Understanding of the need for a high level of professional and ethical conduct in engineering		
	<b>Engineering Practice</b>		
34	Knowledge of characteristics of particular materials, equipment, processes, or products		
35	Extensive knowledge and understanding of a wide range of engineering materials and components		

		<b>Formal Learning</b>	<b>Learning in the Work Place</b>
36	Workshop and laboratory skills		
37	Understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, technology development, etc)		
38	A thorough understanding of current practice and its limitations, and some appreciation of likely new developments		
39	Understanding use of technical literature and other information sources		
40	Awareness of nature of intellectual property and contractual issues		
41	Understanding of appropriate codes of practice and industry standards		
42	Awareness of quality issues		
43	Ability to work with technical uncertainty		
44	Ability to apply engineering techniques taking account of a range of commercial and industrial constraints		