

## Assessment Plan

### Civil Engineer Non-Integrated Degree Apprenticeship Level 6

#### Introduction

This End Point Assessment Plan (EPA) is to accompany the Civil Engineer Level 6 Degree Apprenticeship Standard.

The Civil Engineer Degree Apprenticeship provides an integrated programme of knowledge and skills acquisition alongside developing confidence and maturity. Successful achievement of the Apprenticeship Standard demonstrates that the apprentice has the skills knowledge and behaviours to work competently as a Civil Engineer.

Civil Engineers provide technical and management input to develop design solutions for complex civil engineering problems. They will work as part of a team of engineers and other construction professionals through all lifecycle stages of development, design, construction, commissioning, operation, maintenance, and decommissioning of civil engineering infrastructure. A Civil Engineer will be required to have a broad skills base to work in areas including sustainable construction, structural integrity, geotechnics, materials, tunnelling, marine and coastal engineering, water, waste management, flood management, transportation, and power. A Civil Engineer might work in public and private sector organisations including local authorities, central government departments and agencies, engineering consultancy practices, contracting firms and research and development organisations.

This End Point Assessment Plan ensures that successful apprentices will have satisfied the requirements for registration as an Incorporated Engineer with the relevant Professional Engineering Institution. Incorporated Engineer is an internationally recognised benchmark of competence with associated professional title – IEng.

The apprentice's training provider, employer, and Professional Engineering Institution, working in partnership, will provide guidance to support the apprentice throughout the various stages.

Prior to taking the EPA, the apprentice must meet the following criteria:

- Achieved a level 2 English and Maths as per the standard and general apprenticeship requirements
- Completed the formal training plan agreed with their employer
- Completed an accredited civil engineering degree
- Have sufficient evidence to demonstrate competence in all knowledge, skills and behaviours as described in the standard (Annex A) including their CPD records.

The end point assessment will be in two stages and typically undertaken in the last two months of the apprenticeship. In summary, the two stages (more detail provided later in the plan) are:

#### **STAGE 1 – Preparation of the structured interview.**

**1 Written Report (4500 - 5000 words)** – the apprentices will submit a report in their own words which demonstrates that they have achieved the knowledge, skills and behaviours as set out in Annex A. The report will be accompanied by a two-page CV, Continuing Professional Development (CPD) records and appendices to support the content of the report. The CV, CPD records and appendices are not included in the word count. An example CPD record template can be found in Annex B.

A registered member of a Professional Engineering Institution (IEng or CEng) who works with the apprentice will sign to verify that the work described in the written report has been carried out by the apprentice.

The written report will be submitted electronically to the Professional Engineering Institution who will pass it on to the Assessor Panel at least four weeks ahead of the date of the interview. The panel's role is to assess the apprentice's knowledge, skills, and behaviours across the apprenticeship standard

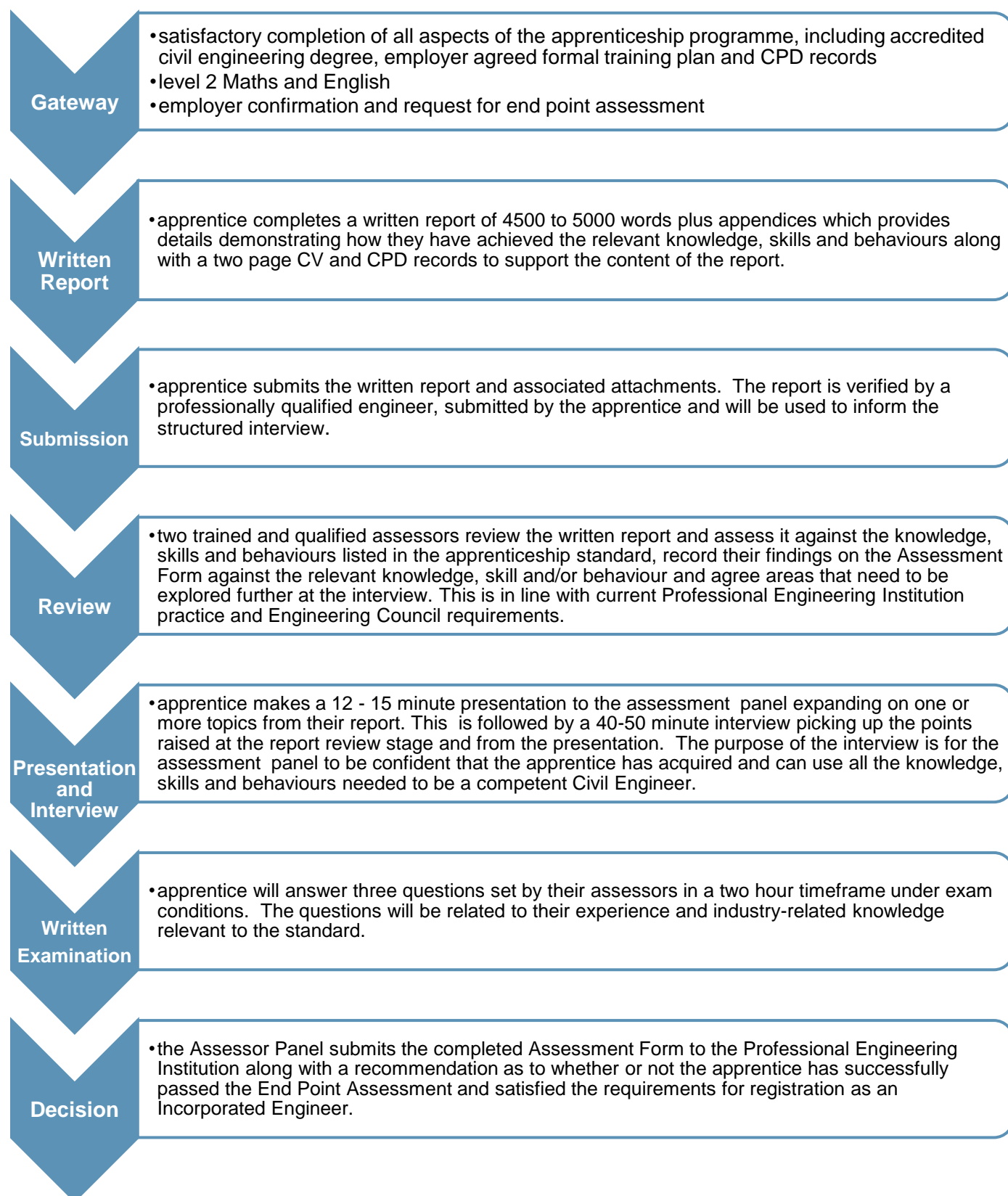
**STAGE 2** - anticipated time from submission to interview and written examination will be about four weeks. The presentation, interview and written examination will all take place on the same day.

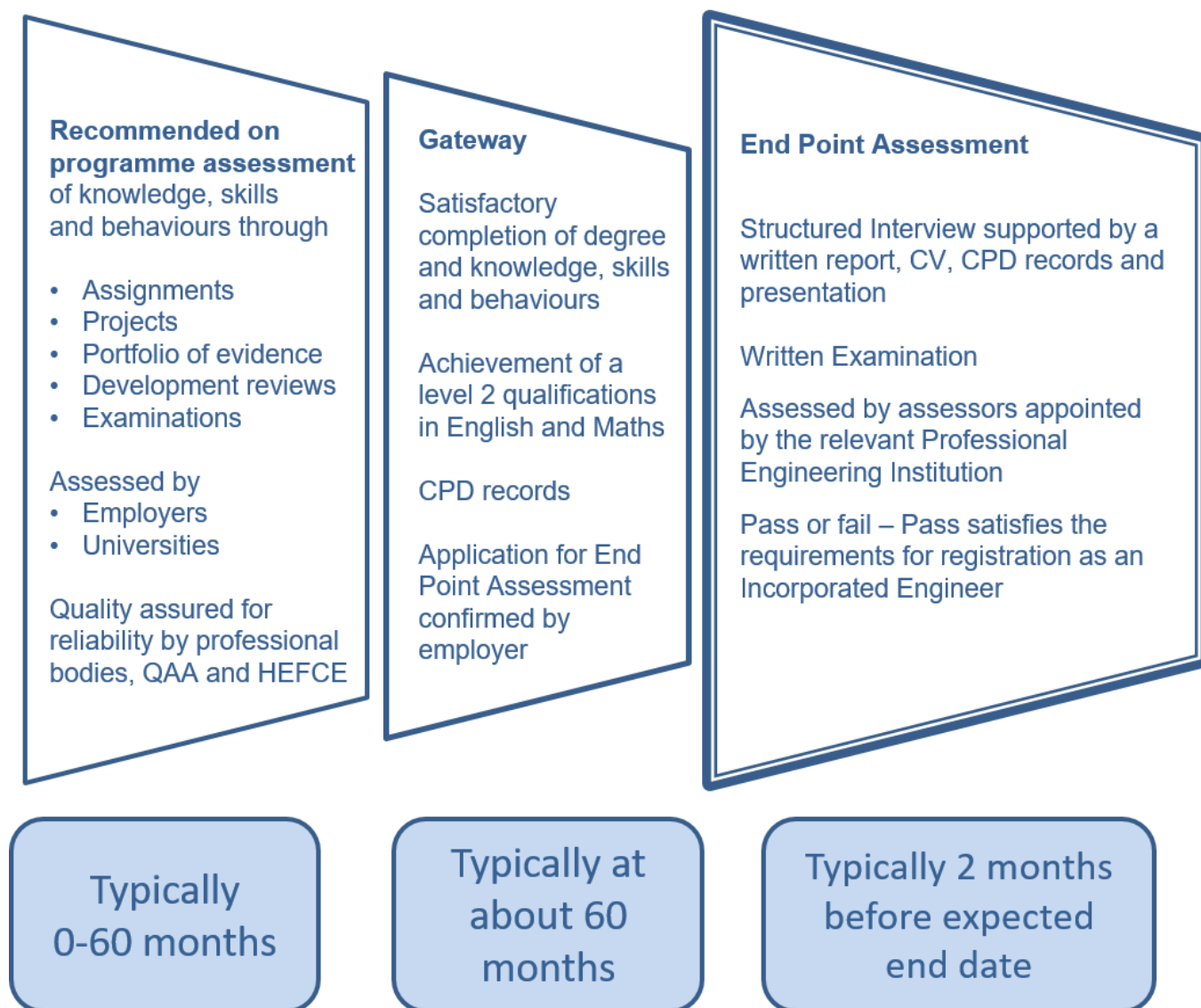
**1 Presentation and interview** - the apprentice will give a 12 – 15-minute presentation to their assessors highlighting achievements and expanding on aspects of the work they have done in more detail than they were able to provide in their written report. This is followed by an interview, which will seek to confirm that the apprentice has achieved the required level of competence, as stated in their report. The interview will last approximately 40-50 minutes. The apprentice will not know the outcome of this part of the assessment process before they proceed to the written examination.

**2 Written examination** –the apprentice will be set three unseen questions by their assessors and must answer all three in the allotted two-hour timeframe. Questions will be set based on their experience as outlined in their CV and Written Report, and industry-related knowledge relevant to the standard. The written examination must be passed.

The assessment will satisfy the requirements for registration as an Incorporated Engineer as set out by the Engineering Council. The Assessor Panel will consist of two experienced, qualified Civil Engineers nominated by the relevant Professional Engineering Institution who have been trained to carry out assessments. Benchmarking the end point assessment against the Engineering Council UK-SPEC requirements for IEng means that the assessment outcomes will be consistent and reliable, allowing a fair and proper comparison between apprentices employed across the UK in different types and sizes of organisations.

## Process Summary





<b>Assessment Overview</b>			
<b>Assessment method</b>	<b>Area Assessed</b>	<b>Assessed by</b>	<b>Grading</b>
<b>Structured interview supported by written report, CV and CPD records and presentation</b>	Knowledge, skills, and behaviours from across the Apprenticeship Standard	An Assessor Panel of two assessors appointed by the Professional Engineering Institution	<b>Pass/fail</b>
<b>Written Examination</b>	Details for each method can be found in Annex A		<b>Pass/fail</b>

## On Programme Assessment

The recommended approach is that the apprentice will demonstrate their progress through a combination of written/online examinations, assignments, documented development reviews with experienced professionals, completion of work based projects, and the maintenance of a portfolio of evidence. It is recommended that these will be supervised by in-company mentors and tested by external assessors. To achieve the apprenticeship the apprentice will have to have successfully passed a BSc or BEng Civil Engineering degree accredited by the Joint Board of Moderators and listed on the Engineering Council website and have documentary evidence that they have completed the knowledge, skills and behaviours as set out in the standard. Once all the evidence is in place the employer will sign off completion of the on programme assessment and apply to the relevant professional engineering institution for the end point assessment.

## Assessment Gateway

The apprentice will need to demonstrate that they have successfully passed an accredited BSc or BEng civil engineering degree, confirmed by the university, and satisfactorily completed all aspects of their apprenticeship including Knowledge, Skills and Behaviours, employer agreed formal training plan, and their CPD records before they are able to undertake the End Point Assessment. Apprentices must have also achieved a Level 2 qualification in Maths and English. Once satisfied that the apprentice is ready to undertake the End Point Assessment, the employer will submit an application to the relevant Professional Engineering Institution for the End Point Assessment.

## End Point Assessment

### What will be assessed

The apprentice will be expected to demonstrate through a written report, presentation, structured interview, and written examination that they have acquired the knowledge, skills and behaviours as described by the statements in the standard and can, through their integration, competently undertake the role of a Civil Engineer.

### How will it be assessed

The End Point Assessment will use the relevant Professional Engineering Institution's Incorporated Engineer review process, which is an existing and well-respected synoptic assessment that covers the broad areas of knowledge, skills and behaviours identified in the Standard using a range of assessment methodologies outlined below.

The assessment will be in two stages

### STAGE 1 – preparation for the Structured Interview

**1 Written Report (4500- 5000 words)** – the apprentices will submit a reflective account in their own words, which provides details demonstrating how they have achieved the relevant knowledge, skills and behaviours as set out in Annex A. The written report will:

- 1** Emphasise their responsibilities and experience for each statement in the standard in accordance with the grading criteria. They should expand on decisions made, problems encountered, and in particular highlighting occasions when they gained unusual or extensive experience and learned valuable lessons.
- 2** Focus on one or two projects in which they had a significant role. They must clearly indicate their role in any relevant aspects of the project they have worked on by giving background and insight into the important decisions they were responsible for, or made a significant contribution to. They must demonstrate where they have exercised independent judgement – as an engineer and a practising professional.

- 3** Have appendices (of no more than 12 sides of A4) to support the content of their report, which could include numerical analyses, cost data, drawings (no more than three A3 drawings), or other relevant additional documentation. Appendices are not included within the word limit.
- 2** A brief **two-page CV**, which gives
- An indication of the size and financial value of the projects undertaken
  - Their role and responsibilities in each project.
- This will not be included within the word limit.
- 3 CPD Records** – these must include
- A Development Action Plan (DAP) which details their objectives for the current/forthcoming year
  - A Personal Development Record (PDR) for a minimum of three years (with a minimum of 30 hours of learning per year). These records must include current formal training related to health safety and welfare.
- An example of a CPD Records Template can be found in Annex B.  
The CPD records are not included within the word limit.

A registered member of a Professional Engineering Institution (IEng or CEng) who works with the apprentice will sign to verify that the work described in the written report has been carried out by the apprentice.

The written report will be submitted electronically to the Professional Engineering Institution who will pass it on to the Assessor Panel at least four weeks ahead of the date of the interview. The assessors will review the written report against the knowledge, skills and behaviours listed in the apprenticeship standard, record their findings on the Assessment Form against the relevant knowledge, skills and behaviours and agree areas to be explored further as part of the structured interview.

**STAGE 2** - anticipated time from submission to presentation, interview, and written examination will be about four weeks. The structured interview and written examination will take place on the same day. The apprentice will not know the outcome of the structured interview ahead of taking the written examination.

### **1 Structured interview supported by written report and presentation**

The apprentice will give a 12 - 15-minute **presentation** to the Assessor Panel on one or more topics of their choice covered within their written report. They should provide an in-depth description of what they have done which expands on their report and highlights their involvement.

This is followed by an **interview**, lasting approximately 40-50 minutes, which will seek to confirm that the apprentice has achieved the required level of competence as set out in the Apprenticeship Standard. The assessors will pose specific questions to make sure that the apprentice can demonstrate achievement of knowledge, skills and behaviours that have not been sufficiently evidenced in the written report and presentation. There will be at least one question on each of the following topics which will be contextualised to the individual apprentice's experience."

- 1** Knowledge and understanding of engineering principles – questions about engineering principles such as structural and ground responses, the properties of materials and their behaviour as part of integrated systems, civil engineering design and mathematical modelling
- 2** Technical and practical application of engineering – questions about the use and validation of digital solutions and data gathering tools such as building information modelling, site investigation and construction techniques, provision of integrated solutions.
- 3** Management and leadership – questions about planning for effective project implementation, planning, budgeting, and organisation, managing teams and developing staff, best practice methods of quality management and continuous improvement.
- 4** Commercial ability – questions about managing the balance between quality, cost and time, client and end user needs, budgeting, procurement, contract management, commercial and financial risks, satisfying legal and statutory obligations,
- 5** Health, safety, and welfare – questions about safe systems of work, assessing and controlling risk, health safety and welfare legislation and best practice.



- 6 Sustainability and environment – questions about the impact of civil engineering infrastructure in its construction, management and use and the tools used to assess sustainability and environmental impact
- 7 Interpersonal skills and communication – questions exploring examples of technical and non-technical presentations, reports, working as part of a team, presenting, and discussing proposals
- 8 Professional commitment – questions about client confidentiality, codes of conduct, continuing professional development

## 2 Written examination

The apprentice will answer three questions set by their assessors in a two-hour timeframe. The questions will be on

- Management
- Health and Safety
- Sustainability and Environment

and based on the apprentice's experience as outlined in their CV and written report, and industry-related knowledge relevant to the standard. The questions will be checked and approved internally by the Professional Engineering Institution in advance of the interview. This is to make sure that the questions and relevant mark schemes are comparable in terms of difficulty and so maintain quality standards over time. The apprentice will complete their written examination with other apprentices attending the same assessment centre under exam conditions and supervised by an invigilator. (If the apprentice advises that they have Specific and Defined Learning Disabilities (SDLD) reasonable adjustments will be made to the arrangements for the written examination to accommodate their needs. The written examination must be passed.

### *What will apprentice have to do?*

- Submit a written report and supporting documentation, a two-page CV, CPD records, **which** must include a Development Action Plan (DAP) which details their objectives for the current/forthcoming year and a Personal Development Record (PDR) for a minimum of three years (with a minimum of 30 hours of learning per year). These records must include current formal training related to health safety and welfare.
- Attend an interview
  - Make a 12 - 15-minute presentation
  - Take part in a 40 – 50-minute structured interview
- Undertake a 2-hour written examination

### *Where will the assessment take place?*

The Interview will be set up by the Professional Engineering Institution in a suitable venue to minimise travel wherever possible by the apprentice and their assessors. In exceptional circumstances, for example if the apprentice is working in a remote location, the option of an interview by the use of video conferencing facilities may be considered. In this case it is envisaged the written exam would take place in the same building, with an invigilator appointed by the Professional Engineering Institution.

## Who

### *Who will carry out assessment and who will be on the Register?*

The End Point Assessment will be carried out by two assessors appointed by the relevant Professional Engineering Institution which has the capability to assess applicants as Civil Engineers and award the status of IEng.

### *Minimum requirements for assessors*

The members of the Assessor Panel are required to be professionally qualified members of a Professional Engineering Institution and must have been trained to carry out their role as assessors. Applicants must either be working in the industry or, if not currently working in the industry or recently retired (up to two years), will need to demonstrate that they have maintained links with the industry and current practices. Each application to become an assessor will be evaluated on its own merits. The evaluation process will

consider all relevant factors such as a minimum of three years industry experience, professionally qualified to at least IEng and having post-professional qualification experience. Once appointed the assessor will undertake training as required by the Professional Engineering Institution and be subject to the Professional Engineering Institution's quality assurance process including maintaining and submitting CPD records on request. This training includes how to undertake assessments, marking standardisation, questioning techniques, and observing interviews and is a tried and tested process within the Professional Engineering Institutions which are licensed by the Engineering Council, the UK regulatory body for the engineering profession. All assessors are asked to confirm their current industry specialism, this is the area of expertise that they are competent to assess e.g. they may be no longer able to assess apprentices whose written report will focus on a detailed transportation scheme but can assess where the report relates to the design of a bridge.

The Professional Engineering Institution will be on the Register of Apprentice Assessment Organisations.

*How will the panel work and who will have the casting vote?*

Following receipt of the End Point Assessment application the Professional Engineering Institution will check that all is in order and then appoint the Assessor Panel which will comprise of two assessors at least one of whom will have similar experience or specialist knowledge to the apprentice. They will be matched to reflect the subject area of the apprentice's submission.

Both the assessors and the apprentice will be informed of the details of the interview and will make the Professional Engineering Institution aware of any conflict of interest. This could be that they work for the same company but in different offices or previously worked together or are related in any other way. If a potential conflict of interest is identified an alternative assessor will be provided.

To be successful the apprentice must demonstrate that they have met all of the knowledge, skills, and behaviours in the standard in accordance with the grading criteria. The assessors will record their findings on an Assessment Form marking each assessment method as pass or fail and backing their decision up with evidence from the various elements of the End Point Assessment.

The assessors should reach a common agreed decision about the apprentice's result i.e. pass or fail. If the assessors cannot agree then the outcome is a fail and the completed Assessment Forms will be submitted to the quality assurance panel for audit.

### **Final judgement**

*Who makes the final decision about whether the apprentice has passed?*

Assessors from the relevant Professional Engineering Institution which will be registered and listed on the Register of End Point Assessment Organisations (RoEPAO).

If the apprentice has been unsuccessful they will have to apply to resit/retake the entire End Point Assessment taking into account Assessor feedback on areas where they did not demonstrate competence as evidenced in the summary report on the Assessment Form.

The feedback will be provided in writing at the same time as the apprentice is informed that they have failed the End Point Assessment. The apprentice will be required to resit/retake both the structured interview and the written examination. The resit/retake must be taken within 12 months of the original End Point Assessment.

### **Independence**

*Who is providing the independent End Point Assessment?*

The Professional Engineering Institution will coordinate the entire End Point Assessment process completely independently of the employer and any training providers. The assessors appointed will not be from the apprentice's employer or related to the apprentice in any other way.

*How is this deliverable for all employers?*

The interview arrangements will ensure that all apprentices are within reasonable travelling distance of the venue for the professional interview. In exceptional circumstances, i.e. the apprentice is working in a remote location then the option of an interview by the use of video conferencing facilities may be considered.



### Summary of roles and responsibilities

Employers will submit the application for the End Point Assessment once the apprentice has satisfactorily completed all aspects of their apprenticeship programme.

The Professional Engineering Institution will be responsible for coordinating the entire End Point Assessment completely independently of the employer and training provider. This includes

- The recruitment and training of assessors
- Administration associated with the carrying out of the End Point Assessment
- The End Point Assessment itself
- Quality control of the assessment process
- Informing apprentice of the outcome of the End Point Assessment
- Dealing with any issues or appeals that arise
- Arranging re-sits/retakes for those who are unsuccessful
- Applying for the apprenticeship completion certificate

### Quality Assurance – internal

The Professional Engineering Institution will have its own internal quality assurance procedures to ensure that the assessment process is valid and reliable. These procedures are in accordance with the Engineering Council requirements from which it gets its license in the first place.

The End Point Assessment will be conducted by Assessors who are trained, approved, and reviewed by the relevant Professional Engineering Institution.

The Professional Engineering Institution will sample all failures and 10% of passes of the End Point Assessment results for consistency and reliability. Regular meetings will be held with assessors at least annually to provide an update and feedback on the assessment process.

The Professional Engineering Institution has an appeals process if an apprentice wishes to challenge the assessment.

### Quality Assurance – external

External Quality Assurance will be delivered by the Engineering Council, working in partnership with the Institute for Apprenticeships.

## End Point Grading

A grading exemption has been applied for in relation to the Civil Engineer Standard

End point assessment method	Pass criteria	Fail Criteria
<p><b>Structured interview</b> supported by the written report, CV, CPD records and presentation</p>	<p>Using Annex A provides evidence of knowledge, skills and behaviours required to</p> <ul style="list-style-type: none"> <li>• Maintain and extend a theoretical approach to the application of technology and engineering practice (K1, K2, S3)</li> <li>• Use an evidence based approach to problem solving and be able to contribute to continuous improvement (K4, S5)</li> <li>• Identify, review and select techniques, procedures and methods to undertake engineering tasks (K1, S4)</li> <li>• Contribute to the design and development of engineering solutions (K3, S4)</li> <li>• Implement or construct design solutions and contribute to their evaluation (K1, S1)</li> <li>• Plan for effective project implementation (K8, S8)</li> <li>• Manage the planning and organization of tasks, people and resources (K6, S8)</li> <li>• Manage teams and develop staff to meet changing technical and managerial needs (K7, S9)</li> <li>• Manage quality processes (K5, S8)</li> <li>• Identify the limits of personal knowledge and skills (B7)</li> <li>• Exercise independent engineering judgment and take responsibility (S1, S9)</li> <li>• Prepare and control budgets (K6, S8)</li> <li>• Use knowledge of statutory and commercial frameworks within own area of responsibility and have an appreciation of other commercial arrangements (K8, S6, S8)</li> <li>• Maintain a knowledge of legislation, hazards and safe systems of work (K5, S2, S6)</li> <li>• Manage risks (K6, S7)</li> <li>• Manage health, safety and welfare within own area of responsibility (S7, B5)</li> <li>• Maintain a knowledge of sustainable development best practice (K1, S2)</li> <li>• Manage engineering activities that contribute to sustainable development (S1, S2)</li> </ul>	<p>Fails to provide evidence to meet all the knowledge, skill and behaviour requirements as required in Annex A for this assessment method</p>

	<ul style="list-style-type: none"> <li>• Communicate well with others at all levels including use of English orally and in writing. (K8, S10, B4)</li> <li>• Discuss ideas and plans competently and with confidence (K8, S10)</li> <li>• Maintain personal and social skills (S9, B3, B4)</li> <li>• Manage diversity issues (S9, B1)</li> <li>• Understand and comply with the Professional Engineering Institution's code of conduct (K9, B6)</li> <li>• Plan, carry out and record Continuing Professional Development and encourage others (S11, B8)</li> <li>• Engage with the Professional Engineering Institution's activities (K9, S11)</li> <li>• Demonstrate appropriate professional standards, recognizing obligations to society, the profession and the environment (K9, B1, B2, B6)</li> <li>• Exercise responsibilities in an ethical manner (K9, B6)</li> </ul> <p>To pass the apprentice must demonstrate achievement of all these grading criteria.</p>	
<p><b>Written examination</b></p>	<p>Using Annex A provides evidence of knowledge, skills and behaviours required to</p> <ul style="list-style-type: none"> <li>• Communicate well with others at all levels including use of English orally and in writing (K8, S10)</li> <li>• Discuss ideas and plans competently and with confidence (K8, S10)</li> <li>• Plan for effective project implementation (K8, S8)</li> <li>• Manage the planning and organization of tasks, people and resources (K6, S8)</li> <li>• Manage teams and develop staff to meet changing technical and managerial needs (K7, S9)</li> <li>• Prepare and control budgets (K6, S8)</li> <li>• Use knowledge of statutory and commercial frameworks within own area of responsibility and have an appreciation of other commercial arrangements (K8, S6, S8)</li> <li>• Maintain a knowledge of legislation, hazards and safe systems of work (K5, S2, S6)</li> <li>• Manage risks (K6, S7)</li> <li>• Manage health, safety and welfare within own area of responsibility (S7, B5)</li> <li>• Maintain a knowledge of sustainable development best practice (K1, S1, S2)</li> </ul>	<p>Fails to provide evidence to meet knowledge, skills and behaviours as required in Annex A for this assessment method</p>

	To pass the apprentice must demonstrate achievement of all these grading criteria.	
<b>Implementation</b>		
<p><i>Affordability</i></p> <p>The cost of the End Point Assessment is based on the overall costing</p> <ul style="list-style-type: none"> <li>• Logging applications for end point assessment</li> <li>• Setting up the interview and appointment of assessors</li> <li>• Venue costs</li> <li>• Assessor travel and subsistence costs</li> <li>• Quality assurance to ensure consistency and rigour</li> <li>• External quality assurance payment</li> <li>• General administration of the process</li> </ul> <p>This is estimated to be of the order of 4% of the total cost of the apprenticeship. In drawing up these costs the affordability and feasibility of the End Point Assessment were taken into account including the option of undertaking the interviews by video conferencing where the apprentice is working in a remote location.</p>		
<p><i>Professional body recognition</i></p> <p>This is embedded in the process – the End Point Assessment will be carried out by the relevant Professional Engineering Institution and the outcome is that the apprentice has satisfied the requirements needed to apply for registration as an Incorporated Engineer. The BSc or BEng civil engineering degree that the apprentices are awarded must be accredited by the Joint Board of Moderators which is made up of the Institution of Civil Engineers, the Institution of Structural Engineers, the Chartered Institution of Highways and Transportation, and the Institute of Highway Engineers. The Board assesses and makes recommendations on the accreditation and approval of relevant educational programmes that it will accept as meeting the requirement to register as a professional engineer with the Engineering Council. IEng registration is linked to membership of the Professional Engineering Institution and so on successful completion of the End Point Assessment, the apprentice is also eligible to apply for membership of the Institution.</p>		
<p><i>Consistent</i></p> <p>Benchmarking the End Point Assessment against the Engineering Council UK-SPEC requirements for IEng and the internal and external quality assurance processes mean that the assessment outcomes will be consistent and reliable, allowing a fair and proper comparison between apprentices employed in different types and sizes of organisations and at different geographical locations.</p>		
<p><i>Volumes</i></p> <p>In the first year of delivery starting September 2017 - it is estimated that 300 apprentices will be starting on the programme. It is anticipated that this will rise to a figure of approximately 400 apprentices a year in future years. Universities already deliver part-time accredited academic qualifications for the industry and so there are no issues with capacity and scalability. Similarly, Professional Engineering Institutions already deliver their professional review assessment processes and have the required infrastructure in place.</p>		

## Civil Engineer

### MAPPING OF EPA METHODOLOGY TO STANDARD

#### Mapping Grid

Ref	Core knowledge to be assessed	Interview	Written Exam
K1	The principles and techniques used to evaluate the impact of civil engineering infrastructure on society and the environment taking account of its construction, management and use. This includes the importance of welfare, health, safety and sustainability. Examples include: knowledge and understanding of environmental impact assessment, building information modelling taking into account the context of sustainability, CEEQUAL (a sustainability assessment tool used for the assessment of all types of civil engineering, infrastructure, coastal protection works, coastal landslides, sewerage and drainage systems, and public realm projects and contracts) the environmental impact of materials, integrated transport systems, water quality and supply as well as urban drainage systems for a sustainable built environment.	✓	✓
K2	The mathematical, scientific and engineering principles, methods and modelling that underpin the design and construction of civil engineering infrastructure. This will include understanding structural and ground responses, properties of materials and their predicted behaviour as part of integrated systems. Examples include, knowledge of the design and construction of buildings, transportation systems, water and wastewater networks, foundations and temporary works, coastal protection, understanding slope stability, retaining walls, ground water movement, elastic/plastic and failure behaviour of materials such as concrete, steel, asphalt and timber, behaviour of structural elements such as beams, land surveying and formulating applicable mathematical solutions through suitable software.	✓	
K3	The use and validation of digital solutions to model, evaluate, design, build and manage civil engineering infrastructure. Examples include: knowledge of software packages including building information modelling, structural engineering design and analysis, computational fluid dynamics and finite element modelling software.	✓	
K4	A range of research techniques used to develop innovative solutions to civil engineering problems and the use of current and emerging technologies and products. Examples include: knowledge of site investigation techniques, flood risk management, materials testing, physical and numerical modelling, transport analysis, road traffic flow, growth, traffic management and safety.	✓	
K5	The design and quality standards, codes of practice, legal and regulatory frameworks, such as those of asset owners and regulatory bodies, that govern the life cycle of civil engineering infrastructure. Examples include: British Standards, Construction (Design and Management) policies,	✓	✓

	building regulations, Eurocodes, Network Rail, and nuclear industry standards,		
K6	The principles and techniques of effective project management including resources, cost management and risk assessment. Examples include: knowledge of project and contract management in terms of cost, quality, performance and continuous improvement; procedures and processes involved in procuring projects, producing tenders and estimates and factors that affect profitability; management structures and relationships involved in project delivery; commercial and financial risks; project management systems and procedures for forecasting, planning, allocating and controlling human, material and financial resources; continuous quality improvement strategy.	✓	✓
K7	How to manage teams and develop staff to meet changing technical and managerial needs. Examples include: knowing how to build teams, effective team working, time management, reviewing and appraising performance in relation to delivery of civil and infrastructure engineering projects and related wider operations. Using change-management techniques to address client changes and impacts on civil engineering design and delivery.	✓	✓
K8	How to communicate effectively through reports, drawings, specifications, presentations, digital media, and discussions with those both inside and outside the industry.	✓	✓
K9	The professional and ethical codes of conduct and associated responsibilities as set out by the relevant professional engineering institution.	✓	



Ref	Core skills to be assessed	Interview	Written Exam
S1	Evaluate the impact of civil engineering infrastructure on society and the environment taking account of its construction, management and use. Examples include: the ability to use the CEEQUAL toolkit, carry out environmental impact assessments, designing and constructing the built infrastructure to ensure that it is safe, usable, appropriate and cost effective.	✓	✓
S2	Proactively consider welfare, health, safety, and sustainability in the life cycle of civil engineering infrastructure	✓	✓
S3	Apply mathematical, scientific and engineering principles, methods and modelling to the design and construction of civil engineering infrastructure. Examples include: the design, construction and maintenance of buildings, transportation systems, water and wastewater networks, foundations and temporary works, understanding slope stability, retaining walls, ground water movement, coastal works, elastic/plastic and failure behaviour of materials such as concrete, steel, asphalt and timber, behaviour of structural elements such as beams, land surveying	✓	
S4	Use and validate digital solutions to model, evaluate, design, build and manage civil engineering infrastructure. Examples include: ability to use building information modelling, structural engineering design and analysis, computational fluid dynamics and geospatial information systems software.	✓	
S5	Develop innovative solutions to civil engineering problems through the use of research techniques, market intelligence and best practice. Examples include: ability to use of range of research methods to collect and analyses data to draw well-founded practical conclusions for implementation, applicable research strategy and methodology, literature searches.	✓	
S6	Interpret and apply design and quality standards including codes of practice, legal and regulatory frameworks, in the development of civil engineering solutions. Examples include: planning, designing, construction and maintenance of buildings and infrastructure in compliance with current codes, standards and legislation, industry regulations, the use of Risk Assessment Method Statements,	✓	
S7	Manage and apply safe systems of work including taking responsibility for own obligations for health, safety, and welfare issues, assessing and controlling risk, working with health, safety and welfare legislation and best practice. Examples include: recognise the health and safety aspects of civil and infrastructural projects as well as assess associated risks and identify appropriate safety measures in site work and for undertaking construction works. Apply the principles of civil engineering and construction business risk management	✓	✓
S8	Manage the planning, budgeting and organisation of tasks, people and resources through the use of appropriate management systems, working to agreed quality standards, project programme and budget, within legal, contractual and statutory requirements.	✓	✓

S9	Manage teams and develop staff to meet changing technical and managerial needs.	✓	
S10	Communicate effectively through reports, drawings, specifications, presentations, digital media, and discussions with those both inside and outside the industry	✓	✓
S11	Carry out and record the continuing professional development necessary to maintain and enhance knowledge and competence as a civil engineer.	✓	

Ref	Core behaviours to be assessed	Interview	Written Exam
B1	Be aware of the needs and concerns of others, especially in relation to diversity and equality.	✓	
B2	Demonstrate reliability, integrity, and respect for confidentiality.	✓	
B3	Be confident and flexible in dealing with new and changing interpersonal situations.	✓	
B4	Create maintain, and enhance productive working relationships	✓	
B5	Demonstrate a strong commitment to health, safety and welfare.	✓	
B6	Demonstrate a personal commitment to professional and ethical standards, recognising one's obligations to society, the profession and the environment	✓	✓
B7	Demonstrate self-awareness of knowledge and skills and only undertake work that they are competent to do	✓	
B8	Take responsibility for personal development, demonstrating commitment to learning and self-improvement and be open to feedback.	✓	

## Template for CPD development action plan

Name:								
Job role and responsibilities:								
Review of learning needs					Development plan			
Date	Ref	In what area do I need to improve my performance?	How does this link to other objectives (e.g. employer, ICE, etc)?	What do I need to learn in order to achieve this?	What will I do to achieve this?	What are the likely resources and support that I will need?	How will I evaluate a successful outcome?	What are my deadlines for meeting this target?

## Template for CPD personal development record

Name:						
Job role and responsibilities:						
Development activity				Evaluation		
Details of CPD activity	Dates	Effective learning time	Dev. Plan ref.	Key Learning Points	Key Benefits/Value added	Further comments: Was the plan successful? How can I improve it in future?