JOINT BOARD OF MODERATORS

EMPLOYER-MANAGED WORK-BASED FURTHER LEARNING PROGRAMMES FOR COMPLETION OF THE EDUCATIONAL BASE FOR INCORPORATED ENGINEER

1. Introduction

1.1 This Joint Board of Moderators (JBM) guidance sets out how engineers can complete a work-based Further Learning Programme. It's for engineers who want to achieve the educational base for Incorporated Engineer (IEng) and have a JBM-accredited Higher National Diploma, Foundation degree or equivalent. The guidelines comply with the UK Standard for Professional Engineering Competence (UK-SPEC) and its supporting documents.

1.2 The guidelines have been approved by the five professional bodies which make up the JBM. These are the Institution of Civil Engineers (ICE), the Institution of Structural Engineers (IStructE), the Chartered Institution of Highways and Transportation (CIHT), the Permanent Way Institution and the Institute of Highway Engineers (IHE).

1.3 There are three stages in becoming a professional engineer in the UK:

- Getting the appropriate academic qualifications, known as the educational base.
- A period of postgraduate work-based development, known as Initial Professional Development (IPD),
- A Professional Review to assess whether the participant has developed the skills, knowledge and experience needed to become a professionally qualified engineer.

1.4 Under the UK-SPEC guidance, published by the Engineering Council UK (EngC), one way for an engineer who holds relevant qualifications but not at the appropriate level to achieve the educational base to register as an Incorporated Engineer (IEng) is to complete a period of Further Learning.

1.5 Further Learning comprises the additional academic learning required to bridge the gap between the accredited qualification held by a participant and the educational base needed to register as an incorporated or chartered engineer. Where appropriate, elements of Further Learning can be integrated with IPD but must be recorded and assessed separately.

It can comprise work based learning and/or further academic study leading to another qualification.

1.6 These guidelines are intended for employers and programme providers who wish to gain, via the JBM, approval from ICE/IStructE/IHE/CIHT/PEI to provide structured programmes of Further Learning to IEng level for their engineers. They should be read in conjunction with the JBM Requirements and Guidance documents for Further Learning Programmes (FLPs) to IEng as appropriate. Separate guidelines for participants undertaking the Self-Managed Further Learning Route are available from the JBM.

1.7 These guidelines refer to Further Learning to an appropriate Bachelors level for IEng and assume that all participants have achieved an appropriate base qualification acceptable to their target Institution for the type of further learning they wish to pursue. (Contact the relevant institution (ICE, IStructE, IHE, PWI or CIHT) for further information on the acceptability and equivalence of qualifications).

1.8 The guidelines cover:

- Educational and regulatory context for Further Learning.
- Roles and responsibilities.
- Learning outcomes.
- Learning time.
- Learning opportunities
- Prior learning.
- Learning plan.
- Candidate evidence.
- Assessment.
- Verification.
- Application process
- Supporting reading material.

2. Educational and Regulatory Context for Further Learning

2.1 The primary regulatory requirements for the educational and professional requirements for IEng are defined by the Engineering Council. Responsibility for approving Employer-Managed Work-Based programmes rests with the member institutions that form the JBM (ICE, IStructE, IHE, PWI or CIHT). The JBM's member institutions – ICE, IStructE, CIHT, PWI and IHE – are licensed by the Engineering Council to accredit degrees, which they do under the auspices of the JBM. These member institutions are also responsible for approving further learning programmes; a responsibility which is likewise discharged through the JBM.

2.2 If participants successfully complete a Further Learning Programme to IEng level, they are deemed to have achieved the educational base for that level.

These guidelines are reviewed periodically. If you have any feedback on them, please email the JBM Secretariat at jbm@ice.org.uk.

3. Roles and Responsibilities

3.1 The following diagram sets out a framework for the operation of Further Learning Programmes.

<table>
<tr><td rowspan="3">The Employer</td><td colspan="2">Participant

Undertakes further learning from a range of sources. Generates evidence of further learning on the planned topics and presents it to the Assessors.</td></tr>
<tr><td>Supervising Engineer (SE)

The Lead SE manages the FL programme and serves as the point of contact with JBM. They may be supported by other SEs e.g., in larger organisations.</td><td>Assessors

The assessors undertake detailed assessment of the participants' evidence to judge how well it demonstrates the planned learning outcomes at the appropriate level.</td></tr>
<tr><td colspan="2">Internal Verifier

The Internal Verifier audits the process on behalf of the employer</td></tr>
<tr><td>The JBM</td><td colspan="2">The JBM provides support and advice to employers wishing to establish an FLP, appoints External Verifiers, reviews their conclusions and makes recommendations to the JBM Institutions about the FLP.

External Verifier

The JBM External Verifier audits the process on behalf of the JBM and makes recommendations to the JBM about approval of the scheme. External Verifiers may also be asked to carry out a monitoring visit when an FLP is first established to give advice and help ensure that the programme is on track to deliver the necessary learning at an appropriate level.</td></tr>
</table>

3.2 As identified above there are five key roles in an employer managed Further Learning Programme (FLP).

- Participant
- Supervising Engineer (SE)
- Assessor
- Internal Verifier
- External Verifier

3.3 Participant

The participant is responsible for their learning. As a professional engineer seeking IEng registration, they have a responsibility to support their employer in the operation of the FLP and to engage in it with professional commitment.

3.4 Supervising Engineer (SE)

(a) Each employer will need to appoint a Supervising Engineer (SE) to manage the FLP; to provide advice, guidance and support to the candidate; to oversee the candidate's progress through the FLP, and to manage the assessment process.

(b) The SE will be the principal point of contact for the JBM. Where the employer has several offices, there may be more than one SE, but one SE should be nominated to lead management of the FLP on behalf of the employer and be the point of contact for the JBM.

(c) The SE should be either a Chartered Engineer or, for IEng participants an experienced Incorporated Engineer. They would need to have or undertake appropriate assessor training or development.

(d) This is an extremely important and rewarding role. The SE is likely to be acting as an assessor, professional adviser, tutor and monitor of standards, and they may also act as a mentor. Carrying out these responsibilities will contribute to the SE's Continuing Professional Development (CPD).

(e) SEs will normally need to undergo an induction to the Further Learning process, which will be offered by the JBM.

3.5 Assessor

(a) The assessor(s) will make judgements on the evidence provided by the candidate, to assess whether the target standards have been met. Depending on the size of the employer and number of participants, the SE and the assessor may or may not be the same person e.g., a small employer in one location with few participants, may find one person well suited to perform both roles.

(b) It is likely that a candidate will have more than one assessor covering different aspects of the programmes, perhaps technical and managerial aspects, depending on the breadth of learning taking place.

(c) Assessors should be Chartered Engineers or experienced Incorporated Engineers. Essentially, however, they must be competent in the field they are assessing and at the level required. An assessor who is not chartered must have credibility in the area of activity that they are assessing and the level at which the learning outcomes must be achieved.

(d) All assessors must be appropriately trained. Such training can be internal, involving the SE, but is also available periodically from the JBM.

3.6 Internal Verifiers

(a) The Internal Verifier audits that the Further Learning process has been properly operated and administered and also that there is reasonable internal consistency between the Assessors. Although normally internal to the employer, the 'Internal' Verifier may be someone from outside the employer's organisation, as long as they operate in accordance with these guidelines. The Internal Verifier must not be the SE or an Assessor for the scheme that they are verifying.

(c) Details of the Further Learning verification process are given in the JBM Further Learning guidelines, FLJBM11 – Guidelines for an Audit Visit; FLJBM12 – Guidelines for Monitoring Visits; FLJBM15 – External Verifier Guidelines and FLJBM19, Guidance for SEs, Assessors and Verifiers, which can be found on the JBM website

3.7 External Verifiers

The process will be externally verified by JBM, normally every five years by two JBM-appointed External Verifiers. The role of the External Verifiers is primarily to audit that the Employer-Managed FLP meets the required standards, but also to provide information on good practice elsewhere that could assist the employer in the operation of their programme.

3.8 Whilst the roles of SEs and assessors differ from Supervising Civil Engineers (ICE) and Mentors (IStructE, CIHT and IHE), employers will want to make most efficient use of their resources, and therefore these roles may overlap and be undertaken by the same people.

Because participants, supervising engineers (SEs), assessors and internal verifiers can all be from the same organisation there is potential for conflicts of interest to arise. To avoid this, it is essential that the Internal Verifier is not also the SE or an Assessor in the employer-managed scheme that they are verifying.

4. Designing a Programme

4.1 Each participant is required to demonstrate further learning to the appropriate level in the six broad areas of learning outcomes defined by the Engineering Council in the most recent edition of *'The Accreditation of Higher Education Programmes'* (AHEP). All parties to the FLP should be familiar with this document.

4.2 Guidance for employers and participants on what constitutes IEng level learning, including examples of activities and evidence that may enable participants to show they meet the required standard, are available in the FLJBM22b - *JBM Guidance on providing evidence for programmes of further learning to an appropriate level for IEng***.**

4.3 An example application form for an employer's work based IEng FLP highlighting appropriate learning activities and how they might be assessed is given in Appendix 1.

4.4 When designing and operating FLPs, employers will need to take account of a number of factors, notably:

- Recognition of individual participants' existing qualifications and learning.
- Participants' career aspirations.
- Participants' work situations and opportunities
- The business requirements of the employer.
- The input, process, learning outcome and assessment requirements of the FLPs.

5. Learning Outcomes not Inputs

5.1 The emphasis of assessing competence for registration as a professional engineer is on learning outcomes, rather than on specifying inputs (such as A-level points or numbers of hours training/development)

5.2 It will be essential that the learning is at an appropriate level, that is Bachelors level for IEng. Other learning that is 'additional' but not at the necessary level, whilst usually beneficial, does not contribute to the further learning to the required level.

5.3 Prior learning may be taken into account only if it can be confirmed to be at an appropriate level. The participant must provide evidence of the learning outcomes and clearly demonstrate how they have been achieved at the appropriate level.

6. Learning Time

6.1 There is no prescriptive requirement for programme length, or minimum quantum of learning time. However, the quantum of learning in FLPs will need to be broadly equivalent to that of a full time, taught FL programme.

6.2 Learning time will usually comprise both contact time (ie. learning in a structured environment) as well as other learning, including private study by the participant. Based on JBM research, it is expected that of the order of 360 hours of a participant's total learning time will be contact time, ie. formal learning in a structured environment. This might equate, say over a three-to-four-year programme, to some 10 to 15 days education/training contact per year. It is therefore unlikely that a Work-Based FLP will be completed in less than three years. This is consistent with, and will complement, employer training schemes approved by professional bodies. This contact time may vary, often influenced by the base academic qualification held by the participant. For guidance on contact time refer to the JBM website. www.jbm.org.uk.

6.4 An employer's JBM-approved work-based FLP may be integrated with a company approved training scheme. It must, however, be distinguished in content from a training scheme, and where an activity is undertaken that meets requirements for both, it must be recorded **separately and specifically** for the FLP, demonstrating how the appropriate educational learning outcomes have been achieved.

7. Learning Opportunities

7.1 There will be many opportunities in the workplace for participants to achieve the required learning outcomes, by a mix of contact time and other learning including private study. Contact time may include short courses, modules offered by a university department or attending presentations on new techniques. Site visits may be included, but only where they clearly identify and relate to learning outcomes; logging hours of attendance with no explanation of the learning and learning outcomes will not be accepted.

7.2 Other activities which could be used as further learning include:

- Data collection, analysis or evaluation at an appropriate level
- Research for a report or for a presentation on a new area of knowledge
- Project work
- Team working and interviewing.

Examples of activities that might provide the necessary learning outcomes and the level at which they need to be assessed are given in the document FLJBM22b - *JBM Guidance on providing evidence for programmes of further learning to an appropriate level for IEng.*

8. Prior Learning

8.1 Some participants may have spent some time working in the civil engineering industry before they decide to prepare their Learning Plan. During this time, they may have attended a number of short courses or developed their work-based Further Learning by the achievement of appropriate knowledge and skills. This time is referred to as prior learning i.e., learning gained prior to the development of the Learning Plan.

8.2 Please note that prior learning can only be taken into account if it can be confirmed to be to the appropriate level. Such Assessed Prior Learning (APL) must be suitably recorded and should stand up to external verification by the Individual Case Committee of the JBM member Institution through which qualification is sought.

8.3 If participants submit evidence of prior learning as contributing to their Further Learning, this will be assessed by the Further Learning Assessor (from the Individual Case Committee). In order for this to contribute, it should be learning that is clearly to the required level.

8.4 Participants seeking the assessment of Prior Learning must map their evidence against the appropriate Learning Outcomes.

9. Learning Plan: Individual Candidate

9.1 Each participant shall, with the help of colleagues and the approval of the Supervising Engineer, produce a Learning Plan. This plan will set out the means through which the learning outcomes are to be achieved (courses, projects, etc.); the timescale for their achievement; and the proposed evidence and arrangements for assessment. There is no standard template for a Learning Plan; the employer/learner is free to devise their own. However, a suggested format for an Employer-Managed Work-Based Further Learning Programme for an IEng applicant is shown in **Appendix 1** of this document.

9.2 The Learning Plan may change and develop along the way. Depending on experiences, the plan may be developed in stages or phases perhaps of 6 or 12 month duration and should be re-assessed periodically to identify any gaps and agree future learning priorities.

9.3 The SE must approve any changes to the Learning Plan.

9.4 **Appendices 2 and 3** are suggested formats for an individual's IEng Learning Plan summary and portfolio summary sheet.

10. Participant Evidence

10.1 Before embarking on an FLP, the participant must provide documentary evidence to the SE to confirm their existing academic qualifications. This will normally be a diploma and/or degree certificate and a copy should be included in the portfolio. If this base qualification is not accredited by JBM, or not listed on the EngC database, the participant will first need to be assessed by the Individual Case Committee of the relevant JBM member Institution through which qualification is sought.

10.2 In order to ensure that an FLP is broadly equivalent to JBM accredited academic programmes, comparable evidence will be desirable. This evidence has to demonstrate that the appropriate learning outcomes have been achieved. This might include:

- Preparation and presentation of reports on work-based projects and assignments.

- Achievement gained on in-house and external courses.
- Appropriate assessments at the necessary level (eg. relevant Health & Safety assessments).
- Documents produced by the candidate (eg. diaries, logs, correspondence, minutes of meetings, etc.).
- Testimony from senior colleagues in the workplace.

10.3 A template for a Learning Plan summary is available on the JBM website. A suggested framework for an individual participant's Learning Plan summary is shown in **Appendix 2,** and an individual portfolio summary in **Appendix 3** of this guidance note.

11. Assessment

11.1 The Supervising Engineer will manage the assessment of the participant. It will be a part of the Learning Plan and will take account of the portfolio of evidence that the participant has assembled. Assessment should be both formative i.e., taking place as the learning progresses, as well as summative i.e., when a particular piece of learning has been completed. Thus, assessment should encourage and guide the participant as well as providing judgements on achievement. Appropriate learning outcomes should be signed off along the way. The Assessor will assess the participant's evidence (see Section 3).

11.2 Assessment of the participants Further Learning will be according to the assessor guidelines set out in **Appendix 4**. Assessors must be trained in the assessment process, and this will be offered by the JBM. Verification of assessor training will be a part of the external verification process. It is recommended that assessors be qualified to the National Standard Unit A1 "Assess participants using a range of methods".

11.3 A template for recording the assessment is available from the JBM.

12. Verification

12.1 The assessment carried out by the Assessor will be subject to verification. Verification is a check on both standards as well as process. Both internal and external verification are required. See the diagram on P3.

12.2 The approving body, the JBM, will define the internal verification requirements with the employer when the first Work-Based Further Learning Programmes are approved.

12.3 External verification will be carried out by the approving body, the JBM. This will be a visit to the employer, normally by a team of two appointed by the JBM, lasting up to one day. It will include checking that due processes are in place and inspecting participants' evidence and assessors' records to confirm the standards, that assessments are at an appropriate level and ensure that they accurately cross reference.

12.4 Employers shall ensure that their FLPs, Learning Plans and assessment records are available for inspection on request by the external verification panel. The external verifiers will need to see participants' portfolios of evidence and will also wish to meet the participants who are on or who have completed the FLP.

12.5 An FLP will normally be approved for a period of five years. Once approved, there will normally be annual monitoring visits to check on progress, followed by a full external verification visit after 5 years. Thereafter, audit visits will be every 5 years.

13. Application for Approval of an Employer-Managed Further Learning Programme

13.1 Application for approval of an Employer-Managed Work-Based FLP should be made to the JBM Secretariat (jbm@ice.org.uk). Forms are available on the JBM website. Employers will be required to give details of proposed SEs/assessors/internal verifiers, the mode and content of the learning, the assessment methodology, the level of support for their participants, and any external links with universities and/or industry in the delivery of the further learning. To support the application, CVs of all SEs, Assessors, Internal Verifiers; an estimate of potential participant numbers and a statement of how any short courses taken by the participants meet the learning outcomes, should be included in the applications as Annexes.

13.2 If employers anticipate difficulties in any aspect of the assessment, for example providing their own assessors, managing the process or understanding assessment issues such as the level at which the assessment is required; they may wish to consider engaging with external agencies such as a local college or university or training provider, and exploring opportunities for liaison on their scheme. This may cover, for example, assistance with assessment of participants or development of learning modules at an appropriate level tailored to the employer and participants' needs. Where a Further Learning alliance between an employer and college or university is established, it may be possible for the JBM accreditation visit to the college or university to also include verification of those parts of an employer scheme with this academic input.

13.3 In marketing the scheme, the employer may refer to it being JBM approved on condition that the requirement for periodic audit and the possibility of withdrawal of approval is made clear.

13.4 It will be the responsibility of the employer to apply for a further period of approval beyond the initial period. It is recommended that employers indicate their intention to do so at least 12 months before the end of their current period of approval if they wish to avoid a lapse in JBM approval.

14. Supporting Reading Material

14.1 These Guidelines should be read in conjunction with the following publications as appropriate: -

- UK-SPEC – The Accreditation of Higher Education Programmes.

APPENDIX 1 – APPLICATION FOR APPROVAL OF AN EMPLOYER'S WORK-BASED IEng FURTHER LEARNING PROGRAMME: SUGGESTED FORM AND EXEMPLAR ACTIVITIES

Employer: **Supervising Engineer:**

Assessors: **Internal Verifier:**

Programme Overview

By definition learning will be carried out in the workplace and as such will reflect the activities of the Participant's Employer and the Role and Responsibilities that the Participant undertakes in any combination of the inception, design, delivery and maintenance of a project. The requirement is for the Further Learning Plan (FLP) to identify specific work activities that an individual might undertake through which the learning outcomes required by the Engineering Council can be achieved and how this learning will be assessed to ensure that it is at the required level. The necessary breadth and depth of this learning is set out below in the JBM Further Learning Outcomes (FLOs), together with examples of the type of activity that may be suitable for achieving these FLOs and how it might be assessed. The FLP should be tailored to suit each Participant and may be revised at any time to take account of the changing needs of the business, and any staff changes. Detailed examples of typical activities for a specific individual are shown in Appendix 2.

Further learning can be gained through any combination of:

- Self study
- Research
- Internal courses and "on the job" learning
- Mentoring

As the FLP is bespoke to the Participant it is applicable to those engaged in any engineering-based activity that delivers learning to the required level. It is therefore applicable to:

- Designers (D)
- Contractors (C)
- Local Authorities (LA)
- Asset Owners and Maintainers (AO)

Plan summary

No.	JBM Further Learning Outcomes By the end of the programme Graduates will be able to demonstrate the following: *(Note to employers: these are prescribed and are not amendable)*	Learning Activity *(exemplars)*	Suggested evidence of learning and examples of how it might be assessed
	Science and Mathematics		
B1	Apply knowledge of mathematics, statistics, natural science and engineering principles to broadly-defined problems. Some of the knowledge will be informed by current developments in the subject of study.	The Participant can demonstrate their knowledge through their ability to use mathematics, statistics, scientific and engineering principles through activities which require: • Computation of lengths, areas, volumes and section properties (All) • Using principles of statics or dynamics to analyse problems (All) • Computation requiring statistical analysis of data (All) • Applying appropriate knowledge of Structures, Material Properties, Geotechnics, Fluid Mechanics, Surveying, Highway Engineering etc in the analysis of a problem • Development of spreadsheets using advanced formulae (All) • Using mathematics to derive data for setting out, or evaluate survey information (All)	Discussion of reports written by the participant where mathematical modelling and analysis techniques have been used. Typical examples: • Reports, field book entries, logs, calculation sheets, spreadsheets associated with delivery of an activity. • Reference to include commentary on appropriateness of techniques used and identify any improvements from lessons learned. • A report of the design and execution of a quantitive or qualitative survey explaining what needed to be measured, how it was measured, what the measurements meant, and measures to help check data validity or to manage errors or anomalies. Critical evaluation of results and any anomalies. • Monitoring reports which include conclusions based on interpretation of data supported by review of the background to the data and the project. • Design of surveys and survey data acquisition, assessment of site constraints, time/ cost constraints, how measurements taken, validity, management of errors, use and interpretation of software • An appraisal of mathematics used in design to achieve compliance with specs, DMRB, Codes of Practice, Eurocodes, Building Regs etc. • Verifying and demonstration of use of software including an interpretation of the outcomes.

Engineering Analysis			
B2	Analyse broadly defined problems reaching substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles.	The role and responsibilities of the participants during the period of the programme in activities that require a detailed analysis to be carried out will provide the basis for this learning. Such activities might include: • Feasibility studies for project or activity option development (All) • Design of highways, structures, water treatment, flood defences (D) • Load capacity checks (D) (LA) (AO) • Design of temporary works such as cofferdams, trench support, Traffic management (C) • Quality control measures such as concrete cube analysis to determine likely failure rates (C) • Design of traffic calming, minor highway Improvement, urban realm (LA) • Analysis of traffic flows, growth predictions and control (LA) • Design of asset remedial measures (AO) • Analysis of Health and Safety Statistical data (All) • Analysis of performance data and production of KPIs (All) • Determination of embedded carbon within structural elements and projects (All) • Qualitative and Quantitive Risk Analysis (All) • Implementation of observational techniques for the construction of designs based on these measurements (e.g., propped retaining walls) including application of trigger levels for interventions. (All) • Sensitivity analyses and 'sense/reality' checks of proposed designs / construction methods (All)	Discussion of reports and calculations prepared by the participant where mathematical modelling and analysis techniques were selected by the participant and used in the solution of a problem. Typical examples: • Design reports for temporary works showing assumptions made, options compared, and how uncertainty and limitations have been dealt with. • Comparison of software output with 'hand' calculations. • Design of complex or bespoke temporary works including appraisal of uncertainty and limitations. • Design of interim solutions as temporary measures in situations of uncertainty. • Reports on construction processes and their design when strongly influenced by external constraints. • Calculations /drawings, spreadsheets to demonstrate design speed, horizontal/ vertical alignment, sight lines, overtaking, roundabout, junction design, etc. • Accident data analysis spreadsheets. • Traffic count data analysis and interpretation. • Risk Registers and evidence of their analysis (use of software, e.g., Monte Carlo, etc.) • Calculations illustrating statistical analysis and application, relating to quality data (safety, concrete strength, etc.)

B3	Select and apply appropriate computational and analytical techniques to model broadly defined problems, recognising the limitations of the techniques employed.	The role and responsibilities of the participants during the period of the programme in activities which involve the selection and use of appropriate computation and analysis in determining solutions will provide the basis for this learning. Activities might comprise: • Feasibility studies for project or activity option development (All) • Design of highways, structures, water treatment, flood defences (D) • Load capacity checks (D) (LA) (AO) • Design of temporary works such as cofferdams, trench support, temporary traffic management (C) • Quality control measures such as concrete cube analysis to determine likely failure rates (C) • Design of traffic calming, minor highway improvements, urban improvement schemes (LA) • Analysis of traffic flows, growth predictions and control (LA) • Design of asset remedial measures (AO) • Analysis of Health and Safety Statistical data (All) • Analysis of performance data and production of KPIs (All) • Determination of embedded carbon within structural elements and projects (All) • Determination of embedded carbon within structural elements and projects (All) • Qualitative and Quantitive Risk Analysis (All) • Design and specification of an investigation to determine critical project data such as Site Investigation, NDT survey or Intrusive structural survey (All) • Selection of appropriate Design Codes and Standards (All) • Determination of material properties from GI data or laboratory test results (All)	Discussion of reports and calculations prepared by the participant where mathematical modelling and analysis techniques were selected and applied by the participant in the solution of a problem including recognition of limitations and approximations inherent in the analysis. Typical examples: • Analysis and/or modelling used in the design. • Load capacity checks • Analysis and/or modelling used in the design of temporary works. • Analysis of traffic flows, growth predictions and control. • Design of asset remedial measures. • Analysis of Health and Safety Statistical data. • Analysis of performance data and production of KPIs. • Determination of embedded carbon within structural elements and projects • Determination of embedded carbon within structural elements and projects. • Qualitative and Quantitive Risk Analysis. • Independent monitoring reports and/or check calculations to confirm third party designs and proposals. • Calculations for pilot studies of new proposals. • A report that discusses the planning and/or implementation of BIM models. • Analysis of data from site investigations, material testing or topographical surveys etc.

B4	Select and evaluate technical literature and other sources of information to address broadly defined problems.	The role and responsibilities of the participants during the period of the programme in activities which involve the sourcing of data and detailed information from technical literature, both written and digital, will provide the basis for this learning. Activities might comprise: • Planning and implementing an investigation to gather and analyse data for a project. (All) • Evaluation of manufacturers technical literature to identify appropriate materials, their properties and any constraints on their use (All) • Evaluation of plant manufacturers technical literature to identify appropriate equipment, performance and outputs and any constraints on its use. (C) • Ability to interpret data from documents such as British Standards or the Design Manual for Roads and Bridges (DRMB), NBS, technical specifications, SMM7 etc. and the ability to apply them to work-based problems. • Review research literature to identify innovative methods, products and techniques that could address a problem (All) • Research and selection of new software to aid problem analysis. (All) • Review and understand project specification content. (All) • Review of research into failures and their causes (All) • Self-analysis and study of technical literature and available software packages to formulate new solutions to work based problems (All)	Discussion of reports, presentations and calculations prepared by the participant where new information was obtained from literature or research and applied by the participant to the solution of a problem including recognition of limitations. These could include: • Selection of design parameters based on design criteria. • Product, equipment or software selection used in developing a solution. • Report on appropriate and innovative technologies and how they might be applied in situations pertinent to the experience of the participant. • Forensic reports of activities or events that have not gone to plan or have produced unexpected data. • Proposals for the plant required for a specific project. • Planning and use of site surveys and investigation data. • Ground investigation reports and together with an interpretation of their findings. • Selection of appropriate models, methods of analyses, and input parameters. • Method statements and accompanying risk assessments for novel construction techniques proposed following a desk study of possible approaches. • Contribution to road or bridge design. • Research for an individual investigative project.

Design and Innovation			
B5	Design solutions for broadly defined problems that meet a combination of societal, user, business and customer needs as appropriate.	The role and responsibilities of the participants during the period of the programme will provide the basis for this learning. It is anticipated that the participant will demonstrate not only a knowledge of engineering principles, but also how to balance the technical requirements with wider issues such as those of society, environmental, user, business and customer needs. This process will not necessarily include detailed design but should result in the selection of an appropriate solution. Activities might comprise: • Development of sift criteria to evaluate potential solutions with appropriate weighting to meet defined needs (All) • Consideration of constraints arising from Planning Permission, DCO or Public Inquiry decisions (All) • Consideration of implications of UNSDGs on project solution and delivery Methodology (All) • Development of methods to deliver Customer societal objectives for community engagement, apprenticeships and employment (All) • Participation in project exhibitions and analysis of feedback obtained (All) • Preparation of an asset maintenance / upgrade programme recognising operational requirements (AO) • Use of CEQUAL (All)	Discussion of reports, calculations and scheme solutions prepared by the participant where a range of options has been considered in relation to a problem and a clear rationale developed to for the selection of a preferred solution. Assessed by discussion of activities as described and critically evaluated in: • Reports detailing justification for sift criteria and option selection. • Reports detailing how constraints are addressed through design or delivery methodology. • Summaries of assessments made, and measures taken in relation to example activities with justification of the decisions made. • An options study of various design solutions. • Calculations and drawings of a proposed solution together with a report demonstrating how it meets the required societal, user, business and/or customer needs as appropriate. • A reflective report of the application of CEQUAL and a demonstration of the impact that this has on the proposed solution.

B6	Apply an integrated or systems approach to the solution of broadly-defined problems.	The role, responsibilities and involvement of the participants during the period of the programme in activities which demonstrate solutions to problems are developed, checked and implemented in a systematic manner will provide the basis for this learning. Activities might comprise:
		• Definition of problem and solution requirements through design briefs to external designers, internal temporary works engineering or supply chain (All)
		• Develop a solution using a system approach such as used by: (All)
		  • National Highways PCF
		  • Network Rail GRIP
		  • RIBA Stage processes
		• Inter disciplinary reviews to assess impact of a design solution on other aspects of the overall design (D)
		• Specification of requirements for testing of components, development of prototypes or trial structures to verify design assumptions (All)
		• Definition of specialist supply chain input to design / methodology and process to manage interfaces (All)
		• The application and implementation of BIM (All)
		• Use of Project Management software, dynamic risk assessment techniques and decision-making tools in the supervision and management of site work (C)
			Assessed by discussion of activities as described and critically evaluated in reports, design outputs, and/or reviews. These should include reflection of the benefits / dis-benefits of a staged approach using examples from the participant's experience. Typical examples might include:
			• Designs, Method Statements or reports detailing each stage of the process and justification of the decisions taken.
			• Output from design activities and/or stage gate review of any of the typical stages:
			  • Definition of Scope / Design Brief
			  • Options Identification
			  • Option Selection and Prelim Design
			  • Approval / Statutory Process
			  • Detailed design and Delivery
			• Reports of interdisciplinary reviews and their outcome.
			• Appraisal of processes and methodologies employed and how they have been utilised to address unforeseen events.
			• An assessment and the implementation information modelling techniques to enhance the design/execution of a construction process with which the participant has been involved
			• Optioneering/Value Engineering report
			• Programming schedules, milestone reports, critical path analysis, GANTT charts
			• Details of the application of BIM
			• Evidence of site supervision problem solving and the management of design changes
			• Evidence of communication with contractors, sub-contractors, designers and statutory bodies, including service providers, HSE, Emergency Services, Local Authorities, Pollution Control, Environment Agency and/or general public to resolve an engineering issue/problem.

The Engineer and Society			
B7	Evaluate the environmental and societal impact of solutions to broadly defined problems.	The role and responsibilities of the participants during the period of the programme in activities which consider and evaluate the impact of a project, or project activity, on the environment and society will provide the basis for this learning. Activities might comprise: • Preparation of Environmental Impact Assessments / Environmental Statements (D) (LA) (AO) • Preparation of Construction Stage Environmental Management Plan (C) • Preparation of plans to reduce and manage embedded carbon (All) • Preparation of assessments to determine the impacts of activities on society or plans to deliver benefits (All) • Management of environmental and societal risks (All) • Design, specification or implementation of monitoring regimes to assess baseline criteria or control impacts (All) • Design incorporating specific environmental impact mitigation such as SUDS, Run Off Control, Environmental Net Gain (D) (LA) (AO) • Working to BREEAM and CEEQUAL standards (All) • Project management of Quality, Cost, Time, End User requirements, sustainability and environmental impact (All) • Demonstration of compliance with environmental and societal legislation, e.g. The Well Being and Futures Generations Act, United Nations Sustainability Goals, Net Zero Carbon initiatives (All) • Participation in public enquiry/consultation into the environmental and societal impacts of a project undertaken as part of a planning process (D, LA, AO)	LO will be assessed on the basis of evidence that demonstrates knowledge of how sustainability, environmental and societal issues influence projects and the day-to-day activity of project teams. Output should also demonstrate the application of processes and techniques to address these issues and might comprise plans, assessments, calculations, reports and method statements prepared by the participant. Typical evidence might include: • Reports and calculations for sustainability studies • Discussion paper on appropriate alternative low carbon or recycled materials • Output from BREEAM and CEEQUAL assessments • Participation in public participation exercises, Public Inquiries, etc. • Calculations relating to Environmental Impact assessments and Risk Management registers/ reports • Outputs from carbon calculations • Noise, vibration, etc. calculations and assessments • Proposals for alternative fuels for plant and equipment • Consideration of impact of Traffic Management Schemes • Report on the impact of Site Deliveries and development of Delivery Schedules • Proposals for the use of logistics hubs, consolidation centres or just in time delivery

B8	Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct.	The role and responsibilities of the participants during the period of the programme in activities which demonstrate a level of awareness of how to conduct their work in an ethical manner. Activities might comprise: • Demonstrating an ethical approach in the workplace in accordance with Prof. Codes of Conduct (All) • Demonstrating an understanding of Diversity and Inclusivity in the workplace (All) • Demonstrating an understanding of personal competency and planning learning to remove gaps in required knowledge (All) • Knowledge of applicable legislation e.g., Bribery Act, Inclusivity and Diversity, Data Protection and processes to ensure compliance (All) • Resolving conflicts of interest (All) • Attendance on courses concerning ethics (All) • Understanding of moral responsibilities as an engineer in terms of level of responsibility of role undertaken, health and safety and ethics (All) • Awareness of financial irregularity issues, bribery and funding streams (All) • Understanding of confidentiality (All)	Assessed by discussion of activities that demonstrate that the participant has fully understood the requirements and demonstrated them in their workplace. Evidence might comprise: • Record of discussion with an Assessor about where specific Codes of Conduct topics have been applied. • Record of discussion with an Assessor where specific the principles of Inclusivity and Diversity have been applied. • Evidence of resolving disputes \ conflicts impartially. • Evidence of applying learning from courses. • Coursework and examinations associated with CPD and academic studies. • Shadowing opportunities together with a feedback report. • Evidence from DAP and CPD records where measures have been planned and implemented to ensure competency.

B9	Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity.	The role of the participants during the period of the programme will provide the basis for this learning. The participant is expected to demonstrate an ability to use a risk management process to identify, evaluate and mitigate risks from activities undertaken in the context of their responsibilities. The process can be applied to technical, commercial, environmental and health and safety risks. Activities might comprise: • Knowledge of legislation requiring risk management processes to be applied, e.g., CDM, Environmental Management, Design Standards (All) • Knowledge of processes to identify, evaluate and manage risk including the hierarchy of mitigation (All) • Application of risk management processes to technical solutions, commercial and schedule preparation, health and safety and environmental management (All) • Methods for communicating identified and residual risks effectively (All) • Methods and software to compute quantitative risk analysis (All) • Input to project risk registers including mitigation measures and measures to manage residual risks (All) • Attendance on courses where risk management forms part of the content (All) • Self-study / research into specialist techniques for management and quantitative analysis of risk (All)	Assessment will be of evidence that demonstrates that the participant has knowledge of the techniques used to assess and manage all project risk and that these are applied in the course of their duties. Typical Examples: • Application of risk management as required by legislation e.g., Designer Risk assessment under CDM. • Methods statements to manage and control residual risks. • Quantitative Commercial Risk Assessments using statistical methods such as Monte Carlo Analysis. • Quantitative Schedule Risk Assessments using statistical methods available in planning software. • Compiling and maintaining risk registers and communicating with all relevant team members. • Environmental assessments calculations/reports highlighting risks. • Application of dynamic risk appraisal techniques • Delivery of toolbox talks, start of shift briefings etc where project specific risks are highlighted, and control measures explained. • Output from exercises on courses • Discussion of strengths and weaknesses of using a risk matrix to qualitatively and categorise risks. • Management of health risk from issues such as fatigue • Participating HAZOP, HAZID workshops to identify evaluate and mitigate hazards. • Records of discussions with Assessor of risk evaluation and mitigation. • Risk assessment of Traffic Management plans.

B10	Adopt a holistic and proportionate approach to the mitigation of security risks.	The role of the participants during the period of the programme will provide the basis for this learning. The participant is expected to demonstrate an ability to recognise, undertake assessments and develop appropriate mitigation strategies for the range security risks that might be encountered on a project. Activities are likely to require knowledge of: • Legislation covering security of data (All) • Insurance requirements for security of premises, people, material and plant (All) • Business and operational security (All) • Security of computer systems and data storage (All) • Security and protection of Intellectual Property (All) • Project solutions which ensure security of operations when in use (All) • Systems for Protection Against Forced Entry – Design of buildings and critical functions essential to the operation of an asset – e.g., consideration of access points into any structure (portals, walls, doors, windows and roofs) (D, LA) • Digital Built Environment - Understanding the interaction between personnel, process, physical and cyber security domains in the protection of the built environment, built assets, their occupiers and/or users, and the services provided. (All) • Understanding of the different security roles and domains, and the need for adoption of a security-minded culture (All) • Ability to work in an interdisciplinary environment to identify risks and solutions associated with technology, process or human factors. (All) • Ability to survey, assess relevance and communicate the emerging threats to the design and operation of the built environment across the lifecycle of a built asset (All) • Risk assessments, and formulating, collating and assessing potential countermeasures or controls to manage and minimise security risks. (All)	Assessment will be of evidence that demonstrates that the participant has a holistic and proportionate appreciation of the techniques used to assess and mitigate security risks in the course of their duties. This might comprise assessment of reports or by interview of the participant's knowledge. Typical Examples: • Knowledge of the requirements of General Data Protection Regulation and how they apply to role and responsibilities. • Application of insurance requirements for security in areas of responsibility. • Disaster and Recovery Planning and use of back up systems. • Knowledge of how computer system security systems are designed and implemented and how third parties can interface with company systems. • Security of digital transmissions such as email sending and receipt and virus threats • Security of BIM models and incorporation of multiple organisations in a federated model • Employing processes to ensure security of supply of services and materials • Security of Premises and Personnel Entry Control • Project designs which address security of operations through backup systems, duplication of safety critical processes or fail to safe and secure. • Involvement in audits of security processes. • Use of Risk management frameworks (e.g., ISO31000, BS 16000) for management of security issues • Security risk management and reduction strategies (e.g., risk acceptance, risk reduction, risk avoidance, risk transfer etc.) • Ref. to standards and guidelines (i.e., Secured by Design) • Drawings, schematics, specifications and layouts that address security issues. • Stakeholder sign-off of security considerations – design team, client, regulatory bodies, insurers.

B11	Recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion.	The participant is expected to show an awareness and understanding of legislation relating to Equality and Diversity, Modern Slavery and Mental health issues and how these may impact on everyday business operation. Activities may include: • Research and application of regulations such as Bribery, Diversity, Equality Acts. (All) • Involvement in training of self and others. (All) • Activities associated with people management. (All) • Mentoring. (All) • Equality, Diversity, Inclusion and Unconscious Bias training. (All) • Application and implementation of organisational policies to support equality, diversity and inclusion. (All) • Identification and prevention of unconscious biases. (All) • Awareness of indirect discrimination. (All)	Evidence should demonstrate knowledge of the responsibilities, benefits and importance of supporting equality, diversity and inclusion. This might comprise: • Formal accreditation of courses attended. • Discussion of course learning and application. • Submissions and reports associated with learning activities. • Recorded discussion with Assessor of learning activities. • Presentation to colleagues of activities undertaken and conclusion reached. • Annual Appraisal report. • CPD record. • Evidencing project social inclusion and cultural diversity.

Engineering Practice			
B12	Use practical laboratory and workshop skills to investigate broadly defined problems.	The participant is expected to have an advanced level of understanding of how materials and techniques encountered within their specialism behave and how to use practical laboratory and workshop skills to enhance this understanding and its application in design, construction, quality control and assurance. Activities may include: • Practical investigation into material failures. (All) • Laboratory research to facilitate selection and specification of new materials. (D, LA, AO) • Identification of how recycled materials can be used effectively and efficiently. (All) • Research into material durability and performance. (D, LA, AO) • Research into material problems in construction. (All) • Experience as earthworks engineer on site. (C) • Working in a laboratory or site-based laboratory. Collection and analysis of samples from construction works (e.g., site investigations, material testing). (All) • Selection and justification of alternative materials. (All) • Material technology short courses. (All) • Engagement with third party material accreditation and certification schemes and involvement in accreditation of laboratories and test houses. (All) • Site techniques and procedures for testing and assuring material properties and site welding comply with specification. (All) • NDT testing techniques and equipment to ensure materials, components and procedures comply with specification. (All) • Witness testing and control of off site fabrication. (All)	Assessment will be of evidence that demonstrates that the participant has used practical laboratory and workshop skills to procure and verify that materials and components comply with specifications and standards and/or to acquire a detailed knowledge of the materials, components and techniques used in their area of specialism. This may include: • Formal reports on studies and investigations. • Laboratory reports on materials testing and conclusions reached. • Records of discussions with Assessor on material selection. • Presentation to colleagues on new materials and/or techniques. • Justification of alternative material selection criteria. • Evidence of discussions with Suppliers and Third Parties to confirm that goods and services comply with specifications and standards. • Production of specifications for materials and/or components. • Evidence of applying learning from courses. • Coursework and examinations associated with CPD and academic study. • Laboratory site data, records and reports compiled from the data collected. • Specifications prepared for work packages/contract documents. • Reports on off-site verification testing.

B13	Select and apply appropriate materials, equipment, engineering. technologies and processes.	The role and responsibilities of the participants during the period of the programme will provide the basis for this learning. Activities might comprise: • Preparation and/or interpretation of material specifications for construction. (D, LA, AO) • Preparation of a construction programme. (All) • Cost planning. (All) • Preparation of activity plans and method statements (All). • Specific material technology courses (All). • Courses and demonstrations on plant and equipment, processes and products (All). • Raising order requests for materials and services with Specification compliance requirements (C, AO). • Selection of appropriate plant and equipment to deliver required programme outputs (C). • Selection of appropriate plant and equipment to meet site, planning or environmental constraints (C). • Value engineering proposals to use / reuse alternative materials to reduce waste and/or increase recycling (All). • Literature review and research on latest materials, plant and equipment (All).	Assessment will be of evidence that demonstrates that the participant has a thorough knowledge of how to select and apply appropriate materials, equipment, engineering technologies and processes. This might include: • Reports produced on site assessed by site Management. • A project programme with key points such as milestones and critical path highlighted. • Cost plan / completed tender documentation. • Activity plan/method statements/health & safety plan. • Value Engineering exercises. • Exercises during courses. • Relevant documents demonstrating knowledge and competence in an appropriate activity. • Reflective report on learning from courses or literature reviews and how learning can be implemented.

B14	Recognise the need for quality management systems and continuous improvement in the context of broadly defined problems.	The role of the participants during the period of the programme will provide the basis for this learning. The participant is expected to demonstrate an ability to identify the need for quality management systems and continuous improvement from activities undertaken in the context of their responsibilities. Activities may include involvement in works relating to: • Implementation of quality testing and monitoring procedures (All). • Demonstration of compliance with Specification and/or Project Quality Management Plans (All). • Quality registers and management plans (All). • Approval and signing-off procedures (All). • Approval of design stages (D, LA). • Adoption of quality standards and ISO 9001 certification of Quality Management Systems (All). • Closing out non-compliance and investigating root cause of defect (All). • Checking and / or approving Supply Chain quality procedures (C). • Audit of Quality Systems and Procedures either internal or external (All). • Developing an improvement plan (C).	Assessment will be of evidence that demonstrates the participant's ability to recognise the need for quality management systems and continuous improvement in the context of broadly defined problems and could comprise: • Continual assessment by line manager. • Review and assessment through an interview with an assessor. • Production of quality procedures and contribution to the creation of a Quality Management Plan. • Supervision of juniors and mentoring in the context of quality management processes. • Records of quality management and progress reviews. • Non-conformance reports and remedial actions. • Records of project feedback meetings / lessons learnt. • Records of input to system audits. • Project management assessment records.

B15	Apply knowledge of engineering management principles, commercial context, project management and relevant legal matters.	The role and responsibilities of the participants during the period of the programme will provide the basis for this learning. A knowledge of engineering principles on its own is not sufficient to ensure delivery of a successful project and the participant will be required to demonstrate their knowledge of how a project is managed. They need to demonstrate that the techniques that they have adopted have recognised that engineering solutions are not developed and implemented in isolation but are subject to a wide range of constraints including commercial, programme, quality, safety and sustainability issues. They need to demonstrate that their solutions have achieved an acceptable balance between such constraints. Activities that can demonstrate this might comprise: **Engineering Management** (All) • Experience in role of Design Manager • Checking of Supply Chain / Third Party Designs • Statutory duties of a Designer under CDM • Assessment of risk profiles associated with design and construction options • Application and use of environmental management systems **Commercial Management** (All) • Budget control and management • Systems for cost and value management - Site accounts, measurement, valuation, profit & loss • Managing change • Maintaining Site records • Sub-contract payment - checking and agreeing • Preparation of cost estimates and budgets • Implementing procedures to subcontract works • Understanding constituent parts of Bill of Quantities Rates	Assessment will be of evidence that demonstrates the participant's ability to apply their knowledge of management techniques in a practical situation that recognises the influence of business constraints. This may comprise: • Formal reports detailing the analysis that has been carried out to justify a particular solution. • Discussions with line manager at annual review • Recorded discussions with an Assessor on why a particular solution / technique was adopted. • Documents and reports produced by the participant in their day-to-day activities. • Production of Design Briefs and Agreement of design proposals. • Cost v benefit study for a range of solutions. • Cost allocation records • Method statements for construction activities. • Evidence of involvement within a contractual process. • A Works estimate/ tender/ remeasure. • Programme management. • A section in the participant's Further Learning Report that can be assessed at interview. • Action plans for career progression. • Reflective report on course learning and how it can be applied in present and future roles.

		• Understanding of how company turnover and Head Office costs are delivered / recovered through a project. **Project Management** (All) • Understanding and implementation of contractual procedures • Understanding of site project management roles, responsibilities and accountabilities • Understanding and use of Systems to control, deliver and enable project delivery • Managing and Mentoring team member **Legal** (All) • Implementing forms of contract • Issuing EWN and CE on NEC contracts • Understanding project insurance provision and extent • Understanding Performance Bonds **General** (All) • Attending courses on relevant subjects • Engagement with annual appraisal and development and maintenance of competency frameworks	

B16	Function effectively as an Individual and as a member or leader of a team.	Participants should demonstrate their understanding of their role and responsibilities within their organisation and how this interfaces with other team members. Activities should also show how they use their experience to identify and undertake tasks that contribute to the effectiveness of the team and demonstrate responsibility for achieving desired outcomes. Activities may include: • Undertaking specific roles as part of a team e.g risk manager, section engineer, quality manager, temporary works designer, design engineer (All). • Awareness of the integration of design, construction and operational activities. (All) • Preparing an organogramme for a project. (All) • Defining roles and responsibilities for a team. (All) • Undertaking a secondment to another function e.g., Human Resources, Training, Procurement, Design, Estimating, Measurement, Maintenance. (All) • Identifying innovation and implementing within team \ office \ project \ organisation (All) • Formal appointments of responsibility (All) • Chairing meetings (All) • Leading in the production of controlling documents for the works (All) • Carrying out safety and environmental inspections (All) • Delivering team briefings (All) • Leadership of or involvement with team member activities in the community (All) • Undertaking an in-house and/or external management training course (All)	Assessment will be of evidence that demonstrates the participant's knowledge of how teams are structured and the roles and responsibilities of the members. They must also demonstrate that they have successfully undertaken a team role. This may be achieved by: • Discussion of role and progression with Assessor. • Reports detailing experience in a particular role with appreciation of the interface with other disciplines. • Case studies detailing innovations that have been implemented as a result of teamwork. • Organogramme showing own and team roles with a description of responsibilities. • Annual appraisals. • Continual assessment by line manager. • Reflective report demonstrating multi-disciplinary approach. • Commitment to Joint venture processes. • Secondment records highlighting lessons learnt. • Minutes of meetings. • Completed briefing and inspection records. • Reflective report demonstrating learning. • Evidence of applying learning from courses. • Coursework and examinations associated with CPD and academic study.

B17	Communicate effectively with technical and non-technical audiences.	In addition to many of the activities identified to address previous requirements, this LO requires the participant to demonstrate an ability to manage information and data and to use IT systems effectively. Activities are likely to include: • Preparation of method statements (C) • Undertaking staff \ workforce \ stakeholder briefings and/or toolbox talks. (All) • Preparation of materials for stakeholder consultation. (D, LA, AO) • Setting up electronic document filing systems. (All) • Use of common IT systems for document production, spreadsheets, presentations. (All) • Handling data from BIM \ GIS models. (All) • Implementing data security. (All) • Use of standard programmes for scheduling, estimating and costing. (C) • Preparation of drawings, sketches, activity plans and risk assessments, method statements, safe systems of work. (All) • Raising technical queries and early warnings. (C) • Preparation of company feedback reports. (C, D) • STEM activity. (All) • Construction Ambassador visits to schools. (All) • Public Inquiries. (All)	Assessment will be of evidence that demonstrates that the participant can apply their theoretical knowledge to solve practical problems. It should also demonstrate that they can communicate their solutions to others and are able to use IT effectively in all aspects of their work. This evidence may include: • Copies of documents produced when undertaking workplace activity. • Record of discussion of data handling issues \ solutions with Assessor. • 3D models, BIM output, GIS output. • Discussion of IT systems used in the course of their duties and their effectiveness. • Records of briefings delivered. • Formal Reports. • Technical queries and early warnings. • Risk assessments and activity plans. • Reflective report summarising what candidate has learnt through work undertaken. • Public participation/consultation records. • Public consultation surveys / questionnaires and analysis of the findings. • Discussion of presentations given with line manager / assessor and consideration of how they might be improved in the future. • Records of STEM/Construction Ambassador or equivalent activities.

B18	Plan and record self-learning and development as the foundation for lifelong learning/CPD.	This requires the participant to prepare and monitor a personal Further Learning Plan that reflects the opportunities afforded within their workplace and to adjust the identified learning opportunities in response to changes in workload or work type. The participant should reflect on their learning needs in order to undertake more complex tasks, use more advanced analysis techniques or manage larger teams or projects and as a consequence plan learning and development to bridge any gaps or deficiencies in knowledge. Activities could include: • Preparation and updating of an individual Further Learning plan to deliver required LOs. (All) • Discussing learning needs with line manager and colleagues. (All) • Annual performance reviews with line manager. (All) • Career appraisal and development reviews with line manager. (All) • Preparation of Development Action Plans. (All) • Seeking feedback from colleagues to measure performance. • Carrying out 'gap analyses'. (All) • Preparation of reflective reports. (All) • Carrying out self-learning by attending professional meetings, lectures, taking short courses and reading/studying professional journals and publications. (All)	Assessment will be of evidence that demonstrates a commitment to further learning and an ability to recognise areas where development is required. This evidence will include: • Further Learning Plan, DAP and personal development records. • Formal reports associated with undertaking activity e.g., DAP, CPD. • Records of coaching sessions, mentoring interviews and staff appraisals. • Records of discussions with Assessor and identified actions. • Records of feedback from colleagues. • Record of courses undertaken and key learning points. • Reports prepared following attendance at professional body events. • Reflective report demonstrating learning. • Discussion of journal articles / learning activities with Assessor / Supervising Engineer

Total estimated planned contact learning time: 48 days (c360 hours)

Total estimated planned overall learning time: 160 days (c1200 hours)

This is consistent with the guidelines for IEng programmes of study of 1200 hours, including 360 hours contact time.

APPENDIX 2 – SUGGESTED FORMAT FOR AN INDIVIDUAL CANDIDATE'S IENG FURTHER LEARNING PLAN SUMMARY

Employer:

Candidate:

Supervising Engineer:

Assessors:

Internal Verifier:

Plan Overview

The JBM learning outcomes form the framework for this FL Plan. My role for the next three years will be site based, and therefore my learning activities are likely to include (but not be limited to) setting out, temporary works design, site programming, site supervision, measurement for record/payment purposes and materials reconciliation. This work-based learning will be supplemented by in-house and external courses. I will retain evidence of all this learning in a portfolio. The learning will be regularly assessed, and records of this assessment will also go into the portfolio. The details of the FLP may be revised at any time to take account of the changing needs of the business.

Plan summary

No.	JBM Further Learning outcome	Learning Activity and Evidence Plan	Est. o/a learning period (months)	Assessment methods/other comments
Science and Mathematics				
B1	Apply knowledge of mathematics, statistics, natural science and engineering principles to broadly-defined problems. Some of the knowledge will be informed by current developments in the subject of study.	Learning activities will include: • Calculation of lengths, areas, volumes to quantify project or activity scope. • Calculation of centre of gravity, section modulus. • Use of advanced formulae in Spreadsheets. • Selection of appropriate computational techniques to analyse engineering problems. • Selection of appropriate statistical techniques to analyse engineering data. • Using mathematics to derive data for setting out or evaluate survey information. • BEng-level CPD acquired through in-house short courses.	36 months 3 months	The LO will be assessed by: • Discussion of the evaluation methods used in calculations and checking processes to ensure accuracy. • Discussion of the computational techniques selected and checking processes to ensure accuracy of output. • Discussion of the statistical techniques selected and checking processes to ensure accuracy of output. • Reports giving a critical appraisal of the techniques used to evaluate survey information and derive the data required for setting out. • Coursework and examinations associated with CPD.
B2	Analyse broadly defined problems reaching substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles.	Learning activities will comprise: • Design of temporary works such as cofferdams, trench support. • Selection and justification of plant outputs • Quality control measures such as concrete cube analysis to determine likely failure rates. • Analysis of Health and Safety Statistical data. • Analysis of performance data and production of KPIs • Determination of embedded carbon within structural elements • Qualitative and Quantitative Risk Analysis • BEng-level CPD acquired through short courses.	36 months 2 x 3 months	The LO will be assessed by: • Reports, calculation sheets, spreadsheets, drawings and relevant output detailing analysis carried out including checking and effectiveness of the process. • Discussion of the statistical analysis techniques selected and conclusions that can be drawn from the output. • Discussion of the conclusions that can be drawn from the KPI data. • Risk Registers and evidence of their analysis (use of software, e.g., Monte Carlo, etc.). • Coursework and examinations associated with CPD

Engineering Analysis				
B3	Select and apply appropriate computational and analytical techniques to model broadly defined problems, recognising the limitations of the techniques employed.	Learning activities will include: • Design of temporary works such as cofferdams, trench support. • Selection and justification of plant outputs • Quality control measures such as concrete cube analysis to determine likely failure rates. • Analysis of Health and Safety Statistical data. • Analysis of performance data and production of KPIs • Environmental assessments • Qualitative and Quantitive Risk Analysis • BEng-level CPD acquired through short courses and/or part-time academic study	36 months 3 months	Assessed by discussion of activities as reported in: • Design reports for temporary works showing assumptions made, options compared, and how uncertainty and limitations have been dealt with. • Discussion of critical appraisal of the validity of assumptions in the decisions made on site. • Design of interim solutions as temporary measures in situations of uncertainty. • QA/QC reports on testing to determine material properties from GI data or laboratory test results. • Statistical reports for Project KPis, Project Dashboards, Quality Control, Health and Safety Performance including identification of trends • Reports for noise calculation, and environmental compliance. • Coursework and examinations associated with CPD and academic study.
B4	Select and evaluate technical literature and other sources of information to address broadly defined problems.	Learning activities will comprise: • Planning and implementing SI to gather data to plan and implement a project. • Analysis of this data, including dealing with uncertainty • Selection and use of software packages • Systematic, reasoned selection of parameters with audit trail, and use in development of new site working methods, with sensitivity analyses • Critical appraisal of the potential for the adoption of new construction methods, measures that can enable them and an appropriate risk assessment of them. • Incorporation of information from specialist suppliers, or subcontractors into designs or delivery methodology. • BEng-level CPD acquired through short courses and/or part-time academic study	36 months 3 months	Reports and presentations, some of which will be assessed through an interview based on these reports. These will include: • Selection of design parameters based on design criteria e.g., for temporary works • Ground investigations and their interpretation. • Selection of appropriate models, methods of analyses, and input parameters. • Forensic reports of activities or events that have not gone to plan or have produced unexpected data. • Method statements and accompanying risk assessments for novel construction techniques. • Coursework and examinations associated with CPD and academic study.

Design and Innovation				
B5	Design solutions for broadly defined problems that meet a combination of societal, user, business and customer needs as appropriate.	Learning activities will comprise: • The development of sift criteria to evaluate potential solutions weighted to meet defined needs. • Consideration of implications of UNSDGs on project solution and delivery methodology. • Consideration of constraints arising from Planning Permission, DCO or Public Inquiry decisions. • The development of methods to deliver Customer societal objectives for community engagement, apprenticeships and employment. • Participation in project exhibitions and analysis of feedback obtained.	36 months	Assessed by discussion of activities as described and critically evaluated in: • A reflective report on detailing justification for sift criteria and option selection. • A reflective report of how UNSDGs have been incorporated into design solution and delivery methodology. • Report detailing how constraints are addressed through delivery methodology. • Summary of measures taken to address community engagement including contributions to newsletters produced, presentations of delivery methodology to public bodies and local groups and involvement in local recruitment and apprenticeship training. • A reflective report of involvement in exhibitions and how feedback both positive and negative is addressed.
B6	Apply an integrated or systems approach to the solution of broadly defined problems.	The primary activity for this LO will be work undertaken in the temporary works design team including: • Definition of problem and solution requirements through design briefs to external designers, internal temporary works engineering or supply chain • Inter disciplinary reviews to assess impact of a specific solution on other aspects of the overall project. • The development of solutions using a robust Plan, Do, Check, Act cycle. • Involvement in testing of components, prototypes and trial structures. • Coordination of specialist supply chain input to construction methodology. • BEng-level CPD acquired through short courses and Professional Institution technical meetings.	36 months 3 months	Assessed by discussion of activities as described and critically evaluated in a reflective report based on experience gained, including: • Designs, Method Statements and reports detailing each stage of the process and justification for decisions taken. • Details of the problems encountered, and the design solutions used to address them. • Output from design activities and stage gate review of detailed design and delivery. • Reports of interdisciplinary reviews and their outcome • Details of a solution developed using a Plan, Do, Check, Act cycle. • Coordination of specialist supply chain input. • Evidence of appropriate risk appraisal of testing of components and the development of prototypes and trial structures. • Coursework and examinations associated with CPD

The Engineer and Society				
B7	Evaluate the environmental and societal impact of solutions to broadly defined problems.	Activities will include: • Preparation of Construction Stage Environmental Management Plan • Preparation of plans to reduce and manage embedded carbon. • Preparation of assessments to determine the impacts of activities on society or plans to deliver benefits. • Management of environmental and societal risks • BEng-level CPD acquired through short courses.	36 months 3 months	Evidence will comprise: • Reports and calculations for sustainability studies. • Discussion paper on appropriate alternative low carbon or recycled materials. • Report on participation in public consultation exercises, community engagement, etc. • Calculations relating to Environmental Impact assessments and Risk Management registers • Outputs from carbon calculations • Noise and vibration calculations and assessments • Coursework and examinations associated with CPD.
B8	Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct.	Activities will include: • Adopting an ethical approach in the workplace in accordance with Professional Codes of Conduct • Demonstrating an understanding of Diversity and Inclusivity in the workplace • Demonstrating an understanding of personal competency and planning learning to remove gaps in required knowledge. • Knowledge of applicable legislation e.g., Bribery Act, Inclusivity and Diversity, Data Protection and processes to ensure compliance • Attendance on courses concerning ethics	36 months 3 months	Assessed by discussion of activities that demonstrate an understanding of the requirements of this LO and their application in the workplace. Evidence will include: • Formal reports on how the activities identified are implemented in practice. • Records of discussions on specific topics with Assessor. • Reports of studies of professional Codes of Conduct • Details of how Suppliers and Subcontractors are managed ethically • Details of discussions of ethical concerns with colleagues and mentoring of junior staff • Evidence of applying learning from courses

B9	Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity.	Activities will include: • Study of legislation requiring risk management processes to be applied. • Adoption of processes to identify, evaluate and manage risk including the hierarchy of mitigation • Application of risk management processes to technical, commercial, schedule, health and safety and environmental management scenario. • Effective communication of identified and residual risks • Use of software to undertake quantitative risk analysis • Input to project risk registers of mitigation measures and measures to manage residual risks • Study and evaluation of methods of risk quantification and evaluation • Risk management CPD	36 months 3 months	Assessment will be of evidence that demonstrates knowledge of the techniques used to assess and manage all project risks and their application. This will comprise: • Records of discussions with Assessor of risk evaluation and mitigation • Records of the application of risk management as required by legislation • Compiling and maintaining risk registers and communicating with all relevant team members • Delivery of toolbox talks, start of shift briefings etc where project specific risks are highlighted, and control measures explained. • Compiling and maintaining risk registers and communicating with all relevant team members • Method statements detailing risk mitigation • Coursework and output from studies
B10	Adopt a holistic and proportionate approach to the mitigation of security risks.	Activities will include: • Undertaking a study of the legislation covering security of data. • Producing a report on the insurance requirements for the security of premises, people, material and plant. • An investigation of the security of employer's computer systems and data storage. • CPD relating to business and operational security and the protection of Intellectual Property.	36 months	Evidence will comprise: • Formal accreditation from courses attended. • Report of study into the legislation covering security of data and its impact on role and responsibilities. • Evidence of application of insurance requirements for security in areas of responsibility. • Report of involvement in security audits. • A study of the security of BIM models and the incorporation of multiple organisations in a federated model. • Discussion of course learning and application. • Submissions and reports associated with activities. • Recorded discussion with Assessor on activities. • Presentation to colleagues on activities undertaken and conclusion reached.

B11	Recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion.	Activities will include: • Research and application of regulations such as Bribery, Diversity, Equality Acts. • Involvement in training of self and others. • Activities associated with people management. • Mentoring. • Equality, Diversity, Inclusion and Unconscious Bias training. • Application and implementation of organisational policies to support equality, diversity and inclusion. • Identification and prevention of unconscious biases.	36 months	Evidence will comprise: • Formal accreditation of courses attended. • Discussion of course learning and application. • Submissions and reports associated with learning activities. • Recorded discussion with Assessor of learning activities. • Presentation to colleagues of activities undertaken and conclusion reached. • Annual Appraisal report. • CPD record. • A report on how social inclusion and cultural diversity considerations are addressed in projects undertaken.

Engineering practice				
B12	Use practical laboratory and workshop skills to investigate broadly defined problems.	Activities will include: • A project to identify how recycled materials can be used effectively and efficiently. • Site experience as an earthworks engineer. • Working in a site-based laboratory. Collection and analysis of samples from construction works including site investigations and material testing. • Site techniques and procedures for testing and assuring construction material properties. • Material technology short courses.	36 months 12 - 24 months	Assessment will be of evidence included in: • Formal reports on studies and investigations. • Laboratory reports on materials testing and conclusions reached. • Records of discussions with Assessor on recycled materials. • Presentation to colleagues on new materials and/or techniques. • Evidence of discussions with Suppliers and Third Parties to confirm that goods and services comply with specifications and standards. • Coursework and examinations associated with CPD and evidence of applying learning from courses. • Laboratory site data, records and reports compiled from the data collected.
B13	Select and apply appropriate materials, equipment, engineering technologies and processes.	Activities will comprise: • Preparation of a construction programme. • Preparation of activity plans and method statements. • Courses and demonstrations on plant and equipment, processes and products. • Raising order requests for materials and services with Specification compliance requirements. • Selection of appropriate plant and equipment to deliver required programme outputs. • Selection of appropriate plant and equipment to meet site, planning or environmental constraints. • Value engineering proposals to use alternative materials to reduce waste and increase recycling.	36 months	Evidence will include: • Reports produced on site assessed by site Management. • A project programme with key points such as milestones and critical path highlighted. • Activity plan/method statements/health & safety plan. • Order requests for materials and services. • Value Engineering exercises exploring use of alternative materials to reduce waste and increase recycling. • Report and discussion with project team justifying selection of appropriate plant and equipment to meet site and environmental constraints and deliver required programme outputs. • Reflective report on learning from courses and demonstrations and how learning can be implemented.

B14	Recognise the need for quality management systems and continuous improvement in the context of broadly defined problems.	Activities are expected to include: • Implementation of quality testing and monitoring procedures. • Demonstration of compliance with Specification and/or Project Quality Management Plans. • Involvement in approval and signing-off procedures, closing out and investigating root causes of non-compliances. • Checking and approving Supply Chain quality procedures. • Participation in audit of internal Quality Systems and Procedures.	36 months	Assessment will comprise: • Continual assessment by line manager. • Review and assessment through an interview with an assessor. • Records of quality testing and monitoring procedures. • Records of quality management and progress reviews. • Non-conformance reports and remedial actions. • Records of project feedback meetings / lessons learnt. • Records of Supply Chain quality audits. • Records of input to internal system audits.
B15	Apply knowledge of engineering management principles, commercial context, project management and relevant legal matters.	Activities are expected to include: • Application and use of environmental management systems • Systems for cost and value management - Site accounts, measurement, valuation, profit & loss • Maintaining Site records • Sub-contract payment - checking and agreeing • Understanding of site project management roles, responsibilities and accountabilities • Use of Systems to control and enable project delivery • Mentoring of team members • Issuing EWN and CE on NEC contracts • Understanding the provision and extent of project insurance • Engagement with annual appraisal and development and maintenance of competency frameworks • Engineering Management CPD	36 months 12 – 24 months	This evidence will include: • Formal reports detailing and justifying the environmental management system adopted. • Discussions with line manager at annual review • Recorded discussions with an Assessor on site project management roles, responsibilities and accountabilities • Documents, reports and site records produced in day-to-day activities. • Cost allocation records. • Method statements for construction activities. • Evidence of involvement within a contractual process including EWN and CE on NEC contracts. • A critical appraisal of Programme management. • A section in Further Learning Report that can be assessed at interview. • Reflective report on CPD and how it can be applied in present and future roles

B16	Function effectively as an Individual and as a member or leader of a team.	Activities will include: • Undertaking specific roles as part of the team (risk manager, section engineer, quality manager, temporary works designer). • Preparation of an organogramme for the project. • Defining roles and responsibilities for the section's team. • Undertaking a secondment to other functions (Estimating and Procurement). • Chairing meetings • Carrying out safety and environmental inspections • Delivering team briefings • Involvement with team member activities in the community • Undertaking an external management training course	36 months 12 months	Assessment will be of evidence that includes: • Discussion of roles and progression with Assessor. • Reports detailing experience as risk manager, quality manager and section engineer with appreciation of the interface with other disciplines. • Organogramme showing own and team roles with a description of responsibilities. • Annual appraisals. • Continual assessment by line manager. • Secondment records highlighting lessons learnt. • Minutes of meetings. • Completed briefing and inspection records. • Reflective report of team activities in the community • Reflective report demonstrating learning from CPD • Evidence of applying learning from courses. • Coursework and examinations associated with CPD and academic study
B17	Communicate effectively with technical and non-technical audiences.	Activities will include: • Preparation of method statements • Undertaking staff, workforce, stakeholder briefings and toolbox talks. • Handling data from BIM \ GIS models. • Use of common IT systems for document production, spreadsheets, presentations. • Use of standard programmes for scheduling, estimating and costing. • Preparation of sketches, method statements, risk assessments, and safe systems of work. • Raising technical queries and early warnings. • STEM activity. • Construction Ambassador visits to schools.	36 months	Assessment will be of evidence that includes: • Copies of documents produced when undertaking workplace activity. • Records of discussion of data handling issues \ solutions with Assessor. • BIM output, GIS output. • Discussion of IT systems used in the course of their duties and their effectiveness. • Formal Reports and records of briefings delivered. • Technical queries and early warnings. • Risk assessments and activity plans. • Reflective report summarising what candidate has learnt through work undertaken. • Discussion of presentations given with line manager / assessor and consideration of how they might be improved in the future. • Records of STEM/Construction Ambassador or equivalent activities

B18	Plan and record self-learning and development as the foundation for lifelong learning/CPD.	Activities will include: • Preparation and updating of an individual Further Learning plan to deliver required LOs. • Discussing learning needs with line manager and colleagues. • Annual performance reviews with line manager. • Career appraisal and development reviews with line manager. • Preparation of Development Action Plans. • Seeking feedback from colleagues to measure performance. • Carrying out 'gap analyses'. • Preparation of reflective reports. • Carrying out self-learning by attending professional meetings, lectures, taking short courses and reading/studying professional journals and publications.	36 months	Achievement of this LO will be based on evidence that will include: • Further Learning Plan, DAP and personal development records. • Formal reports associated with undertaking activity e.g., DAP, CPD. • Records of coaching sessions, mentoring interviews and staff appraisals. • Records of discussions with Assessor and identified actions. • Records of feedback from colleagues. • Record of courses undertaken and key learning points. • Reports prepared following attendance at professional body events. • Reflective reports demonstrating learning. • Discussion of journal articles / learning activities with Assessor / Supervising Engineer

APPENDIX 3 – SUGGESTED FORMAT FOR AN INDIVIDUAL CANDIDATE'S IENG FLP PORTFOLIO SUMMARY SHEET

Employer:

Candidate:

Supervising Engineer:

Assessors:

Internal Verifier:

Evidence Overview by Internal Verifier

All the learning outcomes have been achieved within the planned timeframe. The Further Learning Plan worked well, despite having undergone a major revision when the candidate was promoted to new duties. In fact, this helped to enrich the range of learning opportunities, and the assessors are pleased to report that this enhanced the quality of the outcomes. It is the Employer's view that this route to IEng represents an effective work-based learning alternative to the traditional BEng route. The full comments from the assessor and the internal verifier are recorded in the evidence portfolio.

Portfolio summary

No.	Further Learning outcome	Activities undertaken	Portfolio details	Name of Assessor	Assessor comments	Internal Verifier comments
Science and Mathematics						
B1	Apply knowledge of mathematics, statistics, natural science and engineering principles to broadly defined problems. Some of the knowledge will be informed by current developments in the subject of study.	• Calculation of lengths, areas, volumes to quantify project or activity scope. • Use of advanced formulae in Spreadsheets. • Selection of appropriate computational techniques to analyse engineering problems. • Selection of appropriate statistical techniques to analyse engineering data. • Using mathematics to derive data for setting out and evaluating survey information. • BEng-level CPD acquired through in-house short courses.	See summary report on page xx plus records of coursework and exams associated with CPD on p.xx. Individual reports in supporting documents.	ABC	A good report well supported at interview. Appropriate coursework and exam results	Candidate and assessor records in order. The standards have been met.
B2	Analyse broadly defined problems reaching substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles.	• Design of cofferdams and trench support. • Quality control measures such as concrete cube analysis to determine likely failure rates. • Analysis of Health and Safety Statistical data. • Analysis of performance data and production of KPIs • Determination of embedded carbon within structural elements • Qualitative and Quantitative Risk Analysis • BEng-level CPD acquired through short courses.	See records on p. xx See records on p. xx See records on p. xx See records on p. xx See records on p. xx	DEF DEF DEF DEF DEF DEF	• Approved by temporary works design lead. • Approved by Site Manager. • Exercises and coursework passed.	Candidate and assessor records in order. The standards have been met.

Engineering Analysis						
B3	Select and apply appropriate computational and analytical techniques to model broadly defined problems, recognising the limitations of the techniques employed.	• Design of cofferdams and trench support. • Quality control measures such as concrete cube analysis to determine likely failure rates. • Analysis of Health and Safety Statistical data. • Analysis of performance data and production of KPIs • Environmental assessments • Qualitative and Quantitive Risk Analysis • BEng-level CPD acquired through short courses and/or part-time academic study	See records on p. xx See records on p. xx See records on p. xx See records on p. xx See records on p. xx	DEF DEF DEF DEF DEF DEF	• Approved by temporary works design lead. • Approved by Site Manager. • Exercises and coursework passed.	Candidate and assessor records in order. The standards have been met.
B4	Select and evaluate technical literature and other sources of information to address broadly defined problems.	• Planning and implementing an SI to gather data and analyse it, including dealing with uncertainty • Selection and use of software packages • Systematic, reasoned selection of parameters with audit trail, and use in development of new site working methods, with sensitivity analyses • Incorporation of information from specialist suppliers, or subcontractors into designs or delivery methodology. • BEng-level CPD acquired through short courses and/or part-time academic study	See summary report on page xx plus records of coursework and exams associated with CPD on p.xx. Individual reports in supporting documents.	ABC GHI	Good coaching and mentoring by colleagues.	Candidate and assessor records in order. The standards have been met.
Etc.						

APPENDIX 4 – GUIDELINES FOR THE ASSESSMENT OF WORK-BASED FURTHER LEARNING PROGRAMMES

1. Introduction

Assessors must confirm that the educational base to the appropriate level has been achieved before starting to develop a Further Learning plan with a candidate. The training that will be offered to employers will be based on the following summary of the assessor's responsibilities.

2. Develop Plans for Assessing Participants

Assessors must be able to:

- Develop and agree Learning Plans with participants.
- Check that participants understand the assessment process involved, and the support available to them.
- Agree fair, safe, valid and reliable assessment methods.
- Plan for using different types of evidence.
- Identify how participants' past achievement can contribute to the FLP.
- Agree when assessment will take place.
- Agree with participants how their progress will be reviewed against the FLP.
- Update and revise learning plans to take account of any change in circumstances.
- Advise participants on the preparation of their portfolios.

3. Judge Evidence against Criteria to make Assessment Decisions

Assessors must be able to:

- Use agreed assessment methods (see third bullet point above) to assess participants' evidence.
- Ensure that the evidence comes from participants' own work.
- Make safe, fair, valid and reliable decisions about participants' achievements against the requirements of the FLPs.
- Explain and resolve any inconsistencies in the participants' evidence.
- Record the outcomes of the assessment so that they can be verified.
- Seek advice if there are any disagreements about the assessment.

4. Provide Feedback and Support to Participants on Assessment Decisions

Assessors must be able to:

- Give participants feedback at an appropriate time and place.
- Give participants feedback in a constructive and encouraging way, which meets their needs and is appropriate to their level of confidence.
- Clearly explain their assessment decision on whether participants' evidence of achievement is good enough.
- Give participants advice, when they cannot prove their achievement, on how they can develop the necessary skills or provide more evidence.
- Encourage participants to get advice following assessment decisions.
- Identify and agree the next steps in the assessment process, and how participants will achieve these.

5. Contribute to the Verification Process

Assessors must be able to:

- Ensure that assessment records are accurate and up to date and provide an audit trail of evidence.
- Contribute to standardisation arrangements (internal verification) agreed with the JBM approving body so that their assessment decisions are in line with others.
- Contribute to the agreed quality assurance processes.

6. Knowledge Requirements

Assessors need to know:

- How to identify and use different types of evidence when carrying out assessments.
- How to use evidence from participants' prior achievements.
- How to develop and agree learning and assessment plans.
- How to involve the participants in the planning and assessment processes.
- How to give participants constructive feedback and help them develop their knowledge and ability.
- How to follow quality assurance procedures.
- How to ensure that the evidence is the participants' own work.
- How to make valid and reliable assessments of participants' achievements, based on their evidence.
- How to encourage participants to ask questions and get advice.
- How to record, store and pass on assessment decisions within an agreed system.

Note: These assessor guidelines are based upon the National Standard Unit A1 "Assess participants using a range of methods".