



JOINT BOARD OF MODERATORS

EMPLOYER-MANAGED WORK-BASED FURTHER LEARNING

PROGRAMMES FOR COMPLETION OF THE EDUCATIONAL BASE FOR

INCORPORATED ENGINEER

1. Introduction

- 1.1 These guidelines set out the Joint Board of Moderator (JBM) guidelines for approved Employer-Managed Work-Based Further Learning Programmes (FLPs) intended to complete the educational base for an Incorporated Engineer for holders of a HNC, Foundation Degree or HND in Civil Engineering. The guidelines comply with UK-SPEC and its supporting documents.
- 1.2 The guidelines are published by the JBM and have been approved by the Institution of Civil Engineers (ICE), the Institution of Structural Engineers (IStructE), the Institution of Highways and Transportation (IHT) and the Institute of Highway Incorporated Engineers (IHIE).
- 1.3 The formation of professional engineers in the UK has three stages:
- Attainment of an appropriate educational base, followed by
 - A period of postgraduate industrial development known as Initial Professional Development (IPD), culminating in a
 - Professional Review to assess and confirm that the required standards have been met.
- 1.4 Under the UK Standard for Professional Competence (UK-SPEC) (2004), published by the Engineering Council UK (EC^{UK}), one way for a candidate that holds approved qualifications but not at the appropriate level to satisfy the educational base for registration as an Incorporated Engineer (IEng) is to complete a period of Further Learning.
- 1.5 Further Learning comprises the additional educational achievement necessary to bridge the gap between an accredited IEng degree and an approved Higher Certificate, Higher Diploma or Foundation degree. Where appropriate, elements of Further Learning can be integrated with IPD but must be recorded and assessed separately.
- 1.6 These guidelines set out a procedure for Further Learning to Bachelors level: the Employer-Managed Work-Based Further Learning Programme (FLP), for approval by the JBM. They are based upon the UK-SPEC document "The Accreditation of Higher Education Programmes"

(AHEP) published in 2004. Where appropriate, the guidelines draw upon earlier guidance issued by EC^{UK}, JBM and others following the publication by EC^{UK} of SARTOR 3 in 1997.

- 1.7 These guidelines are intended for employers who wish to gain, via the JBM, approval from ICE/IStructE/IHT/IHIE to provide structured programmes of Further Learning to Bachelors level for Higher Certificate, Diploma or Foundation Degree candidates and for the candidates who have chosen the Employer-Managed option. Separate guidelines for candidates undertaking Self-Managed Further Learning, which is not part of an approved Employer-Managed Work-Based Programme, are available on the JBM website www.jbm.org.uk. The same basic principles apply as set out in these guidelines.
- 1.8 These guidelines refer only to Further Learning to Degree level and assume that all candidates have achieved a JBM-approved Higher Certificate, Diploma, Foundation Degree or equivalent (contact the relevant institution for further information on the equivalence of qualifications). For confirmation that a candidate needs to complete Further Learning in order to complete the educational base for Incorporated Engineer, please contact the relevant institution (ICE, IStructE, IHT or IHIE).
- 1.9 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 UK-SPEC defines general and specific learning outcomes for bachelor degree programmes. Further Learning is required where a candidate has already achieved and demonstrated Higher Certificate, Diploma, Foundation Degree or NVQ level learning, but has not achieved and demonstrated the learning to Bachelor degree level.
- 2.2 Degree accreditation is undertaken by the JBM, which is appointed by the member institutions of ICE, IStructE, IHT and IHIE. ICE, IStructE, IHT and IHIE are licensed by EC^{UK} to accredit degree programmes. To ensure that the same rigour and standards apply across all the Further Learning routes, responsibility for approving Employer-Managed Work-Based FLPs lies with the JBM.

- 2.3 Candidates who successfully complete a Further Learning Programme (FLP), which is JBM-approved according to these guidelines, will be deemed to have completed the educational base for registration as an Incorporated Engineer.
- 2.4 These guidelines will be reviewed periodically in the light of feedback. The JBM Secretariat welcomes comments. Please contact them by email at jbm@ice.org.uk.

3. Roles and Responsibilities

3.1 Supervising Engineer

- (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 manage the FLP on behalf of the employer and be the point of contact for the JBM.
- (c) The SE should be at least an Incorporated or Chartered Engineer.
- (d) This is an extremely important and rewarding role. The SE is likely to be acting as mentor, professional adviser, tutor and monitor of standards, and they may also act as an assessor. Carrying out these responsibilities will contribute to the SE's Continuing Professional Development (CPD).
- (e) SEs will need to undergo an induction to the Further Learning process, which will be offered by the JBM.
- (f) The employer will also need to appoint an Assessor and an Internal Verifier.

3.2 Assessor

- (a) The assessor will make judgements on the evidence provided by the candidate, to assess whether standards have been met. Depending on the size of the employer and number of candidates, the SE and the assessor may or may not be the same person e.g. a small employer in one location with few candidates, may need one person 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) Normally, Assessors should be Chartered or Incorporated Engineers. Essentially, however, they must be competent in the field they are assessing and competent to assess. An assessor who is not chartered or incorporated must have credibility in the candidate's area of activity that they are assessing.
- (d) All Assessors will be trained according to these revised guidelines.

- 3.3 Whilst the roles of SEs and Assessors differ from Supervising Civil Engineers (ICE) and Mentors (IStructE, IHT, IHIE), employers will want to make most efficient use of their resources, and therefore these roles may overlap.
- 3.4 Internal and External Verifiers
 - (a) The Internal Verifier ensures that the Further Learning process has been properly administered and also ensures that there is internal consistency between the Assessors. Although normally an employee of the Company, the Internal Verifier may be someone from outside the Company as long as they have agreed to the principles contained in these guidelines. The Internal Verifier may not also be the SE or an Assessor.
 - (b) The process will be externally verified normally every five years by two JBM-appointed External Verifiers. The role of the External Verifiers is to ensure that the Employer-Managed FLP meets the required standards.
- 3.5 Details of the Further Learning verification process are given later. The following diagram sets out the framework for Further Learning achievement. Assessments should be internally verified by different people.

| | | |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| The JBM | External Verifier audits the process on behalf of the JBM and makes recommendations to the JBM about approval of the scheme | |
| The Employer | Internal Verifier audits the process on behalf of the employer | |
| | Supervising Engineer manages the FL programme | Assessors make judgements on the candidate's evidence |
| | Candidate generates and presents evidence of Further Learning | |

4. Designing a Programme

- 4.1 Candidates and their employers will need to be clear about the key criteria for these programmes described overleaf.
- 4.2 When designing FLPs, employers should seek to ensure that there is a balance between the following requirements:

- Recognition of candidates' first qualification achievement, i.e. an approved HNC, HND or Foundation Degree.
- Candidates' individual career aspirations.
- The business requirements of the employer.
- The input, process, learning outcome and assessment requirements of the FLPs.

5. Learning Outcomes not Inputs

- 5.1 With the publication of UK-SPEC came the shift in emphasis for the professional body accreditation process from specifying inputs (such as A-level points or numbers of hours) to learning outcomes.
- 5.2 It will be essential to ensure that the level of learning is to Intermediate (bachelors) level. Learning that is 'additional' but not at I-level, or that is more of the same, or a duplication of learning already undertaken at the Certificate or Diploma level, is not Further Learning.
- 5.3 AHEP sets out the learning outcomes for IEng degree programmes. The learning outcomes for IEng, beyond those for Higher Certificate, Higher Diploma, Foundation Degree or NVQ are summarised in **Appendix 1**.
- 5.4 **Appendix 1** indicates that this level is more advanced than *knowledge and understanding*; in many cases it requires *ability* and *application*, and points towards *competence*. Bachelors level learning is also about support know-how when applying technology to future engineering problems and processes. The workplace provides many opportunities for all these types of learning to take place.
- 5.5 The descriptors for Intermediate (I) level published by the Qualifications Assurance Agency (QAA) are summarised below and are included here as further assistance to employers in understanding the requirement for Further Learning to be at I-level:

Holders of qualifications at this level will have developed a sound understanding of the principles in their field of study, and will have learned to apply these principles more widely. Through this, they will have learned to evaluate the appropriateness of different approaches to solving problems. Their studies may well have had a vocational orientation, enabling them to perform effectively in their chosen field. They will have the qualities necessary for employment in situations requiring the exercise of personal responsibility and decision-making.

Understanding Qualifications: the Frameworks for
Higher Education Qualifications, QAA

- 5.6 Prior learning may be taken into account only if it can be confirmed to be to Bachelors degree level. The candidate must provide evidence of the Intermediate (Bachelors) level learning outcomes.

6. Learning Time

- 6.1 There is no prescriptive requirement for programme length, or minimum quantum of learning time. However, the quantum of FLPs will need to be broadly equivalent to the last year of an IEng accredited bachelor degree course.

- 6.2 Learning time will comprise both contact time (i.e. learning in a structured environment) as well as other learning. Based on JBM research, it is expected that for holders of an HNC some 300 - 400 hours of a Candidate's total learning will be contact time, i.e. formal learning in a structured environment, and 200-300 hours of contact time if they are holders of an HND. This might equate, say over a three to four year structured training programme, to some 10 days education/training per year. It is therefore unlikely that a Work-Based FLP will be completed in less than three years for a holder of a HND, for example. This is consistent with, and will complement, graduate employer training schemes approved by professional bodies. This contact time will vary depending on the base academic qualification held by the candidate. For guidance on contact time refer to the leaflet "Further Learning: Completing the Educational Base" available on the JBM website. www.jbm.org.uk.
- 6.3 A greater proportion of the total work-based Further Learning will be derived from other learning, including evidence from the workplace to show that a candidate has reflected on structured learning and put this into practice.
- 6.4 The figures shown in **Appendix 3** are approximate and are included to assist employers and candidates when planning their FLPs. The key principle is that learning programmes are being judged on outcomes, not inputs.
- 6.5 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 learning outcomes have been achieved in order to satisfy audit requirements.

7. Learning Opportunities

- 7.1 There will be many opportunities in the workplace for candidates 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 sorts of activities which might result in Further Learning include data collection/analysis/evaluation that ultimately lead to making recommendations, research for a report or for a presentation on a new area of knowledge, project work and team working. Some examples related to IEng Bachelor degree learning outcomes are shown in **Appendix 2**.

8. Prior Learning

- 8.1 Some candidates 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 IEng Bachelor degree level. Such Assessed Prior Learning (APL) must be suitably recorded and should stand up to external verification by the Individual Case Committee.
- 8.3 If candidates submit evidence of prior learning as contributing to their Further Learning, this will be assessed by the FL Assessor (from the Individual Case Committee). In order for this to contribute, it should be learning that is clearly to IEng Bachelor degree level.
- 8.4 Candidates seeking the assessment of Prior Learning must map their evidence against the appropriate Learning Outcomes.

9. Learning Plan: Individual Candidate

- 9.1 Each candidate 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 is shown in **Appendix 4** 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 4 and 5** are suggested formats for a Learning Plan summary and for a portfolio summary sheet.

10. Candidate Evidence

- 10.1 Before embarking on a FLP, the candidate must provide documentary evidence to the SE to confirm their Higher Certificate/Diploma or a Foundation degree. This will normally be a degree certificate and a copy should be included in the portfolio. If the qualification is not approved by JBM, or not listed on the EC^{UK} database, the candidate will first need to be assessed by the Individual Case Committee of the JBM member professional body.
- 10.2 In order to ensure that an FLP is broadly equivalent to the final year of an IEng degree programme, 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 tests (e.g. a relevant Health & Safety test).
 - Documents produced by the candidate (e.g. 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 candidate's Learning Plan summary is shown in **Appendix 4**, and an individual portfolio summary in **Appendix 5** of this booklet

11. Assessment

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

11.2 Assessment of the candidate's Further Learning will be according to the assessor guidelines set out in **Appendix 6**. 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 candidates using a range of methods".

11.3 A template for recording the assessment is available from the Institutions

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 page 4.

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 candidates' evidence and Assessors' records to confirm the standards 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 candidates' portfolios of evidence and will also wish to meet the candidates who are on or who have completed an FLP.

12.5 An FLP will normally be approved for a period of five years. Once approved, there will be a monitoring visit, normally after one year and further visits annually 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 at www.jbm.org.uk. 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 candidates, 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 candidate numbers and a statement of how any short courses taken by the candidate 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; they should 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 candidates or development of I-level learning modules tailored to the employer and candidates' needs. Where a Further Learning alliance between an employer and university is established, it may be possible for the JBM accreditation visit to the university to also include verification of those parts of an employer scheme with University 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.

Supporting Reading Material

- 14.1 These Guidelines should be read in conjunction with the following publications as appropriate:-
- JBM Guidelines for MEng degree programmes
 - Self-Managed Work-Based Further Learning Programmes for Completion of the Education Base for a Chartered Engineer www.jbm.org.uk.
 - UK-SPEC – The Accreditation of Higher Education Programmes – <http://www.engc.org.uk/UKSPEC>.

APPENDIX 1 – SUMMARY OF LEARNING OUTCOMES EXPECTED OF IENG GRADUATES

The following enhanced learning outcomes expected of IEng graduates, beyond those of Higher Certificate/Diploma, Foundation Degree or NVQ graduates, have been derived from the UK-SPEC document “The Accreditation of Higher Education Programmes” (AHEP), published by EC^{UK} in 2004:

- The ability to monitor, interpret and apply the results of analysis and modelling in order to bring about continuous improvement.
- The ability to apply quantitative methods and computer software relevant to civil, structural and highway engineering, frequently within a multidisciplinary context;
- The ability to use the results of analysis to solve engineering problems, apply technology and implement engineering processes;
- The ability to apply a systems approach to engineering problems through know-how of the application of the relevant technologies.
- The knowledge, understanding and skills to define a problem, identify constraints and design a solution according to customer and user needs.
- The knowledge, understanding and skills to use creativity and innovation in a practical context, ensure fitness for purpose (including operation, maintenance, reliability etc) and adapt designs to meet their new purposes or applications
- Knowledge and understanding of commercial and economic context of engineering processes;
- Knowledge of management techniques which may be used to achieve engineering objectives within the commercial and economic context of the engineering process;
- Understanding of the requirements for engineering activities to promote sustainable development;
- Awareness of the framework of relevant legal requirements governing engineering activities, including personnel, health, safety, and risk (including environmental risk) issues;
- Understanding of the need for a high level of professional and ethical conduct in engineering.
- Understanding of and ability to use relevant materials, equipment, tools, processes, or products;
- Knowledge of context in which engineering knowledge can be applied (e.g. operations and management, application and development of technology etc);
- Ability to use and apply information from technical literature;
- Ability to use appropriate codes of practice and industry standards;
- Understanding of the principles of managing engineering processes;
- Awareness of quality issues and their application to continuous improvement.

APPENDIX 2 – SCHEDULE OF IENG FLP LEARNING OUTCOMES AND EXAMPLES OF LEARNING OPPORTUNITIES

| | IEng FLP Learning Outcomes | Indicative Learning Opportunities & Comments |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | The ability to monitor, interpret and apply the results of analysis and modelling in order to bring about continuous improvement. | Assessment and interpretation of data collected throughout the lifespan of a project to revise and update project review procedures. |
| 2 | The ability to apply quantitative methods and computer software relevant to civil engineering, frequently within a multidisciplinary context. | Use and application of standard packages for the production of a building services maintenance manual in conjunction with other architectural, engineering and construction professionals. |
| 3 | The ability to use the results of analysis to solve engineering problems, apply technology and implement engineering processes. | Application of site investigation and soil analysis data to temporary works design. |
| 4 | The ability to apply a systems approach to engineering problems through know-how of the application of the relevant technologies. | Use and application of a design manual. |
| 5 | The knowledge, understanding and skills to define a problem, identify constraints and design a solution according to customer and user needs. | Use and application of best practice in the production of healthy buildings. |
| 6 | The ability to use creativity and innovation in a practical context, ensure fitness for purpose (including operation, maintenance, reliability etc) and adapt designs to meet their new purposes or applications | Application of resource efficient products, services and solutions particularly with respect to water, energy and waste. |
| 7 | Knowledge and understanding of commercial and economic context of engineering processes; | Awareness and application of whole life cycle costing to the design, construction and use of infrastructure. |
| 8 | Knowledge of management techniques which may be used to achieve engineering objectives within the economic and commercial context of engineering processes; | Application and use of environmental management systems. |
| 9 | Understanding of the requirements for engineering activities to promote sustainable development; | Appraising the social, economic and environmental impacts of projects' in local, regional and global contexts. |
| 10 | Awareness of the framework of relevant legal requirements governing engineering activities, including personnel, health, safety, and risk (including environmental risk) issues; | Study of SHE legislation and its impact in the workplace. |
| 11 | Understanding of the need for a high level of professional and ethical conduct in engineering | Awareness of human capital and its role in the creation of wealth and the maintenance of infrastructure. |

| | | |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| 12 | Understanding of and ability to use relevant materials, equipment, tools, processes, or products; | Study of concrete site practice. |
| 13 | Knowledge of context in which engineering knowledge can be applied (eg operations and management, application and development of technology etc); | Appraisal and selection of appropriate technologies and methodologies. |
| 14 | Ability to use and apply information from technical literature; | Ongoing application of appropriate technologies. |
| 15 | Ability to use appropriate codes of practice and industry standards; | Application of appropriate best practice. |
| 16 | Understanding of the principles of managing engineering processes | Awareness of the integration of design, construction and operational activities. |
| 17 | Awareness of quality issues and their application to continuous improvement. | This can link to 1 above. |

APPENDIX 3 – APPLICATION FOR APPROVAL OF AN EMPLOYER’S WORK-BASED FURTHER LEARNING PROGRAMME: SUGGESTED FORM AND EXEMPLAR TEXT

Employer:**Supervising Engineer:****Assessors:****Internal Verifier:****Programme Overview (*exemplar text*)**

Since our main business is contracting, learning will be focussed on site activities. These are likely to include (but not be limited to) setting out, temporary works design, site programming, site supervision, measurement for record/payment purposes, materials reconciliation, etc. The JBM learning outcomes form the framework of the Further Learning programme. The learning gained through on-site activities will be supplemented by in-house and external courses. Learning time estimates are indicative only. Plans for individual candidates will reflect their own learning requirements. Candidates will build up their portfolios of evidence which will be continually assessed. Records of the assessment judgements and comments by the internal verifier will be retained in these portfolios.

The details of the FLP may be revised at any time to take account of the changing needs of the business, and any staff changes.

Plan summary

| No. | JBM Further Learning outcome <i>(Note to employers: these are prescribed and are not amendable)</i> | Learning Activity <i>(exemplar details)</i> | Estimated overall learning time (days) | Estimated overall learning period (months) | Candidates’ evidence and assessment methods |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 1 | The ability to monitor, interpret and apply the results of analysis and modelling in order to bring about continuous improvement. | Achievement and interpretation of data collected throughout the life cycle of a project. | 10 | Sep 06 – Sep 09 | Preparation of revisions and update to company project review procedures. Assessed by line manager. |
| 2 | The ability to apply quantitative methods and computer software relevant to civil engineering, frequently within a multidisciplinary context. | Use and application of standard packages | 10 | “ | Production of building services maintenance manual. Assessed by line manager. |

| No. | JBM Further Learning outcome (Note to employers: these are prescribed and are not amendable) | Learning Activity (exemplar details) | Estimated overall learning time (days) | Estimated overall learning period (months) | Candidates' evidence and assessment methods |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| 3 | The ability to use the results of analysis to solve engineering problems, apply technology and implement engineering processes. | Application and use of SI data. | 15 | Sep 06 – Sep 09 | Soil analysis for use in temporary works design. Assessed by line manager. |
| 4 | The ability to apply a systems approach to engineering problems through know-how of the application of the relevant technologies. | Use and application of design manual. | 15 | " | Design of permanent works. Assessed by line manager. |
| 5 | The knowledge, understanding and skills to define a problem, identify constraints and design a solution according to customer and user needs. | Use and application of best practice. | 10 | " | Presentation to in-house staff on healthy buildings. Peer assessment and by line manager. |
| 6 | The ability to use creativity and innovation in a practical context, ensure fitness for purpose (including operation, maintenance, reliability etc) and adapt designs to meet their new purposes or applications | Application of resource efficient products and services. | 5 | 06 – 09 | Preparation of Appendix to design manual. Assessed by line manager. |
| 7 | Knowledge and understanding of commercial and economic context of engineering processes; | Awareness of whole life cycle costing. | 5 | 06 – 09 | Application to single project. Assessed by Line Manager. |
| 8 | Knowledge of management techniques which may be used to achieve engineering objectives within the economic and commercial context of engineering processes; | EMS course | 2 | 06 – 09 | Exercises during course. |

| No. | JBM Further Learning outcome (Note to employers: these are prescribed and are not amendable) | Learning Activity (exemplar details) | Estimated overall learning time (days) | Estimated overall learning period (months) | Candidates' evidence and assessment methods |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|----------------------------------------|--------------------------------------------|------------------------------------------------------------|
| 9 | Understanding of the requirements for engineering activities to promote sustainable development; | EIA course | 2 | 06 – 09 | Exercises during course. |
| 10 | Awareness of the framework of relevant legal requirements governing engineering activities, including personnel, health, safety, and risk (including environmental risk) issues; | Study of SHE legislation. | 12 | 06 – 09 | University module. |
| 11 | Understanding of the need for a high level of professional and ethical conduct in engineering | Presentation at ICE Branch meeting. | 5 | 06 – 09 | Peer Assessment |
| 12 | Understanding of and ability to use relevant materials, equipment, tools, processes, or products; | In-house courses | 3 | 06 – 09 | Application in design office. Assessed by line manager. |
| 13 | Ability to use and apply information from technical literature; | Selection of appropriate technologies. | 4 | 2007 | Assessed by line manager. |
| 14 | Ability to use appropriate codes of practice and industry standards; | Application of appropriate technologies. | 4 | 2007 | Assessed by line manager. |
| 15 | Understanding of the principles of managing engineering processes | Best practice review | 4 | 2007 | Assessed by Supervising Engineer. |
| 16 | Awareness of quality issues and their application to continuous improvement. | Appraisal of project delivery. | 4 | 20 07 | Assessment by Supervising Engineer. |
| 17 | Understanding of the need for a high level of professional and ethical conduct in engineering | Role and responsibilities of candidate. | 4 | 2006 - 2009 | Assessed by HR manager Periodic staff appraisals. |

Total estimated planned contact learning time: 57 days (c 399 hours)
Total estimated planned overall learning time: 114 days (c 798 hours)
This is consistent with the guidelines for Bachelors programmes of 1200 hours per year.

APPENDIX 4 – SUGGESTED FORMAT FOR AN INDIVIDUAL CANDIDATE’S FURTHER LEARNING PLAN SUMMARY

Candidate: _____ **Employer:** _____ **Supervising Engineer:** _____ **Assessors:** _____ **Internal Verifier:** _____

Plan Overview

The JBM learning outcomes form the framework for this FLP. 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 | Estimated overall learning period (months) | Assessment methods/other comments |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------|
| 1 | The ability to monitor, interpret and apply the results of analysis and modelling in order to bring about continuous improvement. | Assessment and interpretation of project data. Preparation of report on findings and recommendations | Sep 2006 – Sep 2009 | Interview by line manager based on report. |
| 2 | The ability to apply quantitative methods and computer software relevant to civil engineering, frequently within a multidisciplinary context. | Use and output from standard packages. | Sep 2006 – Sep 2009 | Approval of output by line manager. |
| 3 | The ability to use the results of analysis to solve engineering problems, apply technology and implement engineering processes. | Interpretation of soil data and design of temporary works. | Autumn 2006 2006-2008 2006-2008 | Approval of design by line manager. |

| No. | JBM Further Learning outcome | Learning Activity and Evidence Plan | Estimated overall learning period (months) | Assessment methods/other comments |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------|------------------------------------------------------------------|
| 4 | The knowledge, understanding and skills to define a problem, identify constraints and design a solution according to customer and user needs. | Use of design manual. | 2006-2009 | Approval of wide range of design by line manager. |
| 5 | The ability to use creativity and innovation in a practical context, ensure fitness for purpose (including operation, maintenance, reliability etc) and adapt designs to meet their new purposes or applications | Study of best practice. | 2007 2008-2009 | Peer assessment on in-house presentation. |
| 6 | The ability to use creativity and innovation in a practical context, ensure fitness for purpose (including operation, maintenance, reliability etc) and adapt designs to meet their new purposes or applications | Application of resource efficient products, services and solution to infrastructure projects. | | Assessment of designs in accordance with BREEAM by line manager. |
| 7 | Knowledge and understanding of commercial and economic context of engineering processes; | Whole life cycle costing applied to various projects. Project evaluated. | | Assessment by line manager. |
| 8 | Knowledge of management techniques which may be used to achieve engineering objectives within the economic and | Attendance at 2 day external course on Environmental Management Systems. | | End of course exercise. |

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| | commercial context of engineering processes; | | | |
| No. | JBM Further Learning outcome | Learning Activity and Evidence Plan | | Assessment methods/other comments |
| 9 | Understanding of the requirements for engineering activities to promote sustainable development; | Attendance at 2 day expert course on Environmental Impact Assessment. | | End of course exercise. |
| 10 | Awareness of the framework of relevant legal requirements governing engineering activities, including personnel, health, safety, and risk (including environmental risk) issues; | Study of SHE legislation by enrolling on University module. | | Examination. |
| 11 | Understanding of the need for a high level of professional and ethical conduct in engineering | Investigation into and formal presentation relating to human capital at ICE Branch evening meeting. | | Peer assessment at Branch meeting. |
| 12 | Understanding of and ability to use relevant materials, equipment, tools, processes, or products; | Attendance at in-house company presentations into concrete site practice. | | Use in design and construction practice formally assessed by line manager. |
| 13 | Ability to use and apply information from technical literature; | Study into appropriate technologies. | | Inclusion of appropriate technologies into current project design formally assessed by line manager. |
| 14 | Ability to use appropriate codes of practice and industry standards; | Application of appropriate technologies. | | Inclusion of appropriate technologies into current project design formally assessed by line manager. |
| 15 | Understanding of the principles of managing engineering processes | Study into best practice through the section. | | Interview by Supervising Engineer. |
| 16 | Awareness of quality issues and their application to continuous improvement. | Study into integration of design construction and operational activities. | | Interview by human resources manager. |

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| 17 | Understanding of the need for a high level of professional and ethical conduct in engineering | See 1 above. | | Annual staff appraisal. |
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APPENDIX 5 – SUGGESTED FORMAT FOR AN INDIVIDUAL CANDIDATE’S FLP PORTFOLIO SUMMARY SHEET

Candidate: **Employer:** **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 2008. 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 for our candidates is as least as effective as the BSc route. The full comments from the assessor and the internal verifier are recorded in the evidence portfolio.

Portfolio summary

| No. | Further Learning outcome | Learning undertaken | Portfolio details | Name of Assessor | Assessor comments | Internal Verifier comments |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------|------------------|-------------------------------------------|----------------------------|
| 1 | The ability to monitor, interpret and apply the results of analysis and modelling in order to bring about continuous improvement. | Assessment and interpretation of project data for the Preparation of report on findings and recommendations | See section xxx pages x-x | xxx | Xxx report was of an acceptable standard. | |
| 2 | The ability to apply quantitative methods and computer software relevant to civil engineering, frequently within a multidisciplinary context. | | | | | |
| 3 | The ability to use the results of analysis to solve engineering problems, apply technology and implement engineering processes. | | | | | |
| 4 | The knowledge, understanding and skills to define a problem, identify constraints and design a solution according to customer and user needs. | | | | | |

| No. | Further Learning outcome | Learning undertaken | Portfolio details | Name of Assessor | Assessor comments | Internal Verifier comments |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------|------------------|-------------------|----------------------------|
| 5 | The ability to use creativity and innovation in a practical context, ensure fitness for purpose (including operation, maintenance, reliability etc) and adapt designs to meet their new purposes or applications | | | | | |
| Etc. | | | | | | |

APPENDIX 6 – GUIDELINES FOR THE ASSESSMENT OF FURTHER LEARNING PROGRAMMES

1. Introduction

Assessors must confirm that the educational base to certificate or diploma 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 Candidates

Assessors must be able to:

- Develop and agree Learning Plans with candidates.
- Check that candidates 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 candidates' past achievement can contribute to the FLP.
- Agree when assessment will take place.
- Agree with candidates how their progress will be reviewed against the Learning Plan.
- Update and revise learning plans to take account of any change in circumstances.
- Advise candidates 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 candidates' evidence.
- Ensure that the evidence comes from candidates' own work.
- Make safe, fair, valid and reliable decisions about candidates' achievements against the requirements of the FLPs.
- Explain and resolve any inconsistencies in the candidates' 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 Candidates on Assessment Decisions

Assessors must be able to:

- Give candidates feedback at an appropriate time and place.
- Give candidates 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 candidates' evidence of achievement is good enough.

- Give candidates advice, when they cannot prove their achievement, on how they can develop the necessary skills or provide more evidence.
- Encourage candidates to get advice following assessment decisions.
- Identify and agree the next steps in the assessment process, and how candidates 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 candidates' prior achievements.
- How to develop and agree learning and assessment plans.
- How to involve the candidates in the planning and assessment processes.
- How to give candidates constructive feedback and help them develop their knowledge and ability.
- How to follow quality assurance procedures.
- How to ensure that the evidence is the candidates' own work.
- How to make valid and reliable assessments of candidates' achievements, based on their evidence.
- How to encourage candidates 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 candidates using a range of methods".