CEEQUAL – The Civil Engineering Environmental Quality Assessment and Award Scheme

Scheme Manual for Projects

Version 3.1

Web Download Copy – See note overleaf

June 2007

CEEQUAL Scheme Manual for Projects – Web Download Version

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Which Version of CEEQUAL is right for you?

This **Scheme Manual for Projects** is directed at the assessment of civil engineering *projects* with a clearly defined project boundary and timescale.

A Term Contracts* Version of the Scheme is currently being developed and is anticipated to be available in 2008. That version is aimed at the assessment and recognition of environmental performance on work such as highway or sewer maintenance or minor works in a geographical or operational area over a number of years.

If you are interested in finding out more about the Term Contracts Version, email the CEEQUAL Technical Support Team at ceequal@crane-environmental.co.uk.

* Term Contracts is the present working title of the new version.

Contents List

Glossary

AGLV	Area of Great Landscape Value (local authority designation)
AONB	Area of Outstanding Natural Beauty
BAP	Biodiversity Action Plan
BAT	Best Available Technology
BRE	Building Research Establishment
C&D	Client & Design
C&OD	Client & Outline Design Interim Award
CDM	Construction (Design and Management) Regulations
CIRIA	Construction Industry Research and Information Association
CL:AIRE	Contaminated Land: Application in Real Environments
CLEA	Contaminated Land Exposure Assessment
COSHH	Control of Substances Hazardous to Health Regulations 2002
D&B	Design & Build
DCLG	Department for Communities and Local Government
DEFRA	Department for Environment, Food and Rural Affairs
DETR	Department of the Environment, Transport and the Regions (before reorganisation in 2001)
EA	Environment Agency (for England & Wales)
ECI	Early Contractor Involvement
EIA	Environmental Impact Assessment
EHS-NI	Environment & Heritage Service, Northern Ireland
EMS	Environmental Management System
EPA	Environmental Protection Act 1990
EWC	European Waste Catalogue
HAZOP	Hazard and Operability Studies
ICE	Institution of Civil Engineers
ICRCL	Interdepartmental Committee on the Redevelopment of Contaminated Land
IEMA	Institute of Environmental Management and Assessment
IPPC	Integrated Pollution Prevention and Control
IT	Information Technology
LMS	Landscape Management Strategy
LWP	Landscape Works Plan
NE	Natural England
NSO	Question cannot be scoped out
ODPM	Office of the Deputy Prime Minister
PFI	Private Finance Initiative
QRA	Quantitative Risk Assessment
RBCL	Risk-Based Clean-up Levels
SEMP	Site Environmental Management Plan
SEPA	Scottish Environment Protection Agency
SGV	Soil Guideline Values
SiLC	Specialist in Land Condition
SMR	Sites and Monuments Record
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
SWMP	Site Waste Management Plans
TPO	Tree Preservation Order
WPA	Whole Project Award

0 Introduction

0.1 What CEEQUAL is and the Awards available

CEEQUAL is the assessment and awards scheme for enhancing and publicly rewarding exemplary environmental quality on civil engineering works. This Version of the Scheme is for the assessment of *projects* with a clearly defined project boundary and timescale. A Term Contracts* Version of the Scheme is currently being developed and is anticipated to be available later in 2007. That version is aimed at the assessment and recognition of environmental performance on work such as highway or sewer maintenance or minor works in a geographical or operational area over a number of years. (*working title, June 2007)

In the three-legged model of sustainable development, which seeks to achieve economic, social and environmental success at the same time and may thus be connected to triple-bottom-line reporting, CEEQUAL complements the planning system and clients' financial and economic models by assessing a very wide range of environmental issues. This includes some issues (such as Nuisance to neighbours and Community Relations) that may be regarded as social issues, and some (such as Energy, Materials and Waste) that can significantly influence the financial outcome of a project. In promoting environmental best practice and measuring environmental performance, CEEQUAL is thus a tool that assists significantly in the drive in the civil engineering industry and profession for more-sustainable development and construction.

CEEQUAL builds on current guidance and environmental good practice in construction and supports UK Government strategy by providing the civil engineering industry with an incentive and protocol for assessing, benchmarking and 'labelling' the environmental quality of projects as part of the industry's contribution to sustainable development. The Scheme is operated through CEEQUAL Ltd, to which CIRIA and Crane Environmental are contracted to administer the company and Scheme.

The Awards available are:

- Whole Project Award (WPA), to be applied for jointly by or on behalf of the client, designer and principal contractor(s);
- WPA with Interim Client and Outline Design Award
- Client & Design Award, to be applied for jointly by the client and designer
- Design-Only Award, to be applied for by only the principal designer;
- Construction-Only Award, to be applied for by the main (or principal) contractor(s);
- Design & Construction Award for project teams that do not include the client, on design & construct and other partnership contracts.

The Client & Design Award is available before construction has started as an award for a client and designer, perhaps in a situation where the contractor has not yet been appointed or does not wish to participate in a Whole-Project-Award. An Interim Client & Outline Design Award is available on the way to a Whole Project Award.

The last three awards are offered for situations where the client does not wish to participate in a Whole-Project Award or where the individual team members wish to apply separately for an award that is related directly to their own contribution to a project.

0.2 What is in this Manual

This Introduction (Section 0) explains the purpose of the CEEQUAL scheme, why it was developed, what it covers, how it relates to the process and outputs of environmental impact assessments, how it has been developed and who has been involved. The rest of the Manual comprises:

- Section 0 on 'How projects are to be assessed using this Manual';
- Sections 1 to 12 covering
    - § background to each main issue covered;
    - § the assessment questions and, for each of these, an explanation of the question, the range of possible scores, guidance on how they are to be assessed and examples of evidence that might be acceptable.

Excel spreadsheets for each of the Award types are sent to Award applicants once they have applied for an assessment to be undertaken and settled the first instalment of the fee. These are used to record the scores awarded by the Assessor and confirmed by the Verifier, and automatically calculate the percentage total score.

0.3 What is different in Version 3.1 of the Manual?

Version 3.1 of the CEEQUAL Manual has been produced in response to queries and issues arising during assessments carried out since the launch of Version 3 and to take account of changes in practice, guidance and legislation. The explanations and guidance provided for each of the questions have thus been amended and/or expanded where appropriate.

The important thing to note is that for this upgrade (Version 3.1) of the Manual ***no questions have been added, removed or substantially changed***. Assessors who have been using Version 3 will not have to re-train, and the scoring spreadsheets will remain the same until such time that a Version 4 of the Manual is produced. Work on Version 4, which will include changed questions and scores, is currently anticipated to start in late Summer 2007 for publication in 2008.

0.4 Why CEEQUAL? and Why use it?

Civil engineering shapes and influences the environment in which we live, for the benefit of society and to deliver its expected quality of life. Many civil engineering schemes, such as sewerage schemes, wastewater treatment plants, city metros, contaminated land remediation schemes and flood alleviation schemes, intrinsically improve environmental quality and human well-being.

Yet civil engineering projects are still often perceived by society to have a damaging effect on the living environment and there has been for some years now substantial and ever-increasing pressure to reduce their environmental impact during construction and whole-life performance. Schemes not built to exacting environmental standards, or using environmentally intrusive and damaging construction processes, risk alienating communities and bringing the whole construction process and industry into disrepute. The CEEQUAL scheme seeks to improve the environmental quality of civil engineering projects by providing an incentive to clients, designers and contractors to adopt best environmental practice and to deliver more-sustainable construction. The assessment questions can also be used as a checklist to significantly influence design and/or construction decisions made as a project progresses from concept to completion.

Promoters of major civil engineering projects are required to undertake a regulatory Environmental Impact Assessment (EIA) and consequently to prepare an Environmental Statement (ES), normally at the preliminary or outline design stage. However, this does not extend to smaller projects or to a post-construction evaluation of the environmental quality and performance of the project as actually implemented. The CEEQUAL scheme is intended to complement the statutory requirement, by operating during and (for Whole Project, Construction Only and Design & Build Awards) after design and construction, checking what is actually built and how it is built, but not how it is actually operated when complete.

The objectives of the Scheme are

- to recognise the attainment of good, very good or excellent environmental practice in civil engineering projects;
- to deliver improved environmental performance in project specification, design and construction; and
- to create a climate of environmental awareness and continuous improvement in the industry.

In this, CEEQUAL complements and helps to deliver current UK Government sustainable development policy and other government initiatives. These tie in with CEEQUAL in that they set a framework by which to deliver environmental performance on individual construction projects. Sustainability Action Plans are being used to assist in procurement and set goals at the outset of the project, while CEEQUAL measures performance in design and during project construction, and rewards excellence. In this context, CEEQUAL is given in the Office of Government Commerce's Common and Minimum Standards alongside BREEAM and DREAM as the assessment tool for civil engineering projects.

The benefits of undertaking CEEQUAL Awards have been reported by users in three main areas:

- **enhanced reputation** with clients, stakeholders and the wider community as socially and environmentally responsible organisations;
- **enhanced team working**, bringing project teams together to pursue a positive and shared environmental agenda and motivating them to perform well;
- **costs** - saving money as well as delivering improved environmental performance through a wide range of actions such as whole-life costing, reduced energy and water consumption, waste minimisation as well as minimising the costs of environmental incidents and the costs of dealing with protesters.

One user has reported that actions prompted by the CEEQUAL questions resulted in savings of over three times the CEEQUAL fee just part-way through the project.

The Interim Award on the way to a Whole project Award allows public recognition of the Client and Design Team early in the project (especially useful when the construction period is long), rewards the efforts of the team up to that point in the project, and can provide a 'target' for the project delivery team to aim for, as well as pointers to the action the delivery team could undertake to achieve a high score.

0.5 Relationship between CEEQUAL and Environmental Impact Assessment and Environmental Management Systems, and its use as a checklist

The CEEQUAL scheme complements any statutory requirement or voluntary decision to undertake an Environmental Impact Assessment or prepare an Environmental Statement or Environmental Commentary. The Whole Project Award and Design & Build Award operate during design and construction, checking what is actually built and how it is built.

CEEQUAL does not assess the environmental *need* for the project nor its social acceptability, but supports clients, designers and contractors in dealing positively with environmental quality issues relevant to the project, and helps to integrate such thinking into the design and construction processes. This integration includes issues such as protection of the surrounding natural environment, mitigation measures, landscape design, nature and source of construction materials, use of recycled materials, energy consumption, and environmental management of the construction site. The CEEQUAL question set can thus be used to influence the issues that are addressed in regulatory Environmental Impact Assessments or more-informal environmental commentaries on project proposals. CEEQUAL can also be used to *demonstrate* that actions proposed or recommended in an Environmental Statement or environmental commentary have actually been delivered on the project.

An environmental management system (EMS) is a mechanism for managing the environmental impacts and opportunities of a business, development project or operational process. Its complexity and scope are dependent on:

- the extent of environmental risk and opportunity associated with the situation the system is used to manage; and
- its importance to the organisation with responsibility for that risk or opportunity.

In addition to being an awards scheme, CEEQUAL can be used at any point throughout a project's duration as a checklist, either as part of the specification for delivery of high environmental quality, and/or to develop an EMS. For example:

- clients may use it to set standards and uphold the prescribed environmental quality through the design and construction processes;
- designers may use it as a tool to aid decision-making on environmental issues and as a differentiator of their services;
- contractors may use it to fulfil their obligation to deliver the permanent works to the required environmental quality or to fulfil their desire to enhance standards, creating differentiation for their services.

Experience with the Scheme so far suggests that the ideal point for CEEQUAL to be used in these ways is at the outset of the project, led by the client for the project. A full project environmental plan, with targets set for each phase of the project, sets the scene for the supply chain to respond. Such a comprehensive project environmental management plan can only be set in motion by the client. It signals the client's intent to deliver a project with defined environmental standards. It provides a framework for managing this intention and carrying out reviews of its success. It sets out the levels of engagement expected of each party. In this case, CEEQUAL would provide partly a specification for the project's environmental management processes and, partly, a checklist for environmental issues that the Project Plan should cover.

Please note that, while CEEQUAL standards are expected to be used as a benchmark against which target standards of contract performance can be set and assessed, achievement of a CEEQUAL score or award cannot be made a *contract condition* in publicly procured contracts and, in the view of the team that developed the CEEQUAL Scheme, should not be made a contract condition or used as a financial bonus/penalty measure in private contracts. In either case, however, the Scheme can and may be used in specifications, for example 'the project should seek to achieve a CEEQUAL Very Good or Excellent standard', in the same way as BREEAM is used.

0.6 Who now runs the Scheme?

Administration of CEEQUAL Ltd and the running of the Scheme have been contracted by the non-Executive CEEQUAL Board of Directors to CIRIA and Crane Environmental acting together, collectively called the 'CEEQUAL Scheme Managers'.

General enquiries about the Scheme, and how to participate in it, should be addressed to The CEEQUAL Team at CIRIA, Classic House, 174-180 Old Street, London EC1 9BP, UK, Tel: +44 (0)20 7549 3300, Fax: +44 (0)20 7253 0523, E-mail: ceequal@ciria.org.

For technical and process queries about the operation of the scheme, and to contact the Chief Executive of CEEQUAL Ltd, please contact The CEEQUAL Team at Crane Environmental Ltd, 12 Cranes Drive, Surbiton, Surrey KT5 8AL, Tel: +44 (0)20 8399 4389, Fax: +44 (0)20 8390 9368, E-mail: ceequal@crane-environmental.co.uk.

Further revisions of the Manual will be undertaken by CEEQUAL Ltd, and will reflect legislative changes, new guidance, improving assessment techniques and good and best practice as they evolve.

0.7 How projects are to be assessed using the Manual

0.7.1 Introduction

The CEEQUAL award scheme is based on a self-assessment carried out by a trained CEEQUAL Assessor that is then externally and independently verified by a CEEQUAL-appointed Verifier. The Assessor can be a member of the applicant's staff or sub-contracted by the applicant from a list that can be supplied by CEEQUAL Ltd. The Verifier is independent of the organisations undertaking the project being assessed.

The clients, designers and/or contractors applying for an award will use this Manual, together with an Excel spreadsheet appropriate to the Award applied for, to assess and score the performance of their project. The assessment starts with a scoping process, which is done by the Assessor in consultation with the Verifier. The applicant(s) then need(s) to gather and provide supporting documentary evidence in order to justify each score they award themselves (for example, project records, meeting minutes, photographs, construction record file, or appropriately signed statements). ***Experience with the scheme so far indicates that the best approach is to start collecting and collating the necessary documentation from the outset of a project, or at least as soon as the intention to apply for a CEEQUAL award is known, as extracting evidence from records later will be more time-consuming and potentially difficult – if possible at all – compared to gathering evidence in parallel with project progress..*** The Verifier will use this evidence to rigorously verify that the self-assessment is accurate, and may seek changes – increasing or decreasing the score – before the Award can be given.

As thinking and practice develops on the issues covered by the Scheme, refinements to the assessment process will be made and additional questions may be included or scores for some questions changed, resulting in new versions of the Scheme. This is the third version of the Scheme, updated with extra guidance and clarifications. New versions will be issued as changes in practice warrant it and resources at CEEQUAL allow. These will be clearly labelled, and applicants will be able to choose whether to seek an award under the Scheme current at the time of their application or the latest Scheme in place at the time when they seek verification. However, this is subject to a rule that the Award will be granted on one of three possible versions: the CEEQUAL version current at the time of verification; a version no older than that current three years prior to the date of final verification; or a version dated in between these two conditions.

0.7.2 The assessment process

The following explanation applies in principle to all Awards, but with some differences when a Client and Outline Design Award is undertaken – those differences are covered in Section 0.7.4.

1. A person within the organisation applying for an award under the CEEQUAL scheme needs to be identified, either on its staff or contracted in, who has been or can be trained and certified by CEEQUAL Ltd to act as its Assessor. A list of certified Assessors can be obtained from CEEQUAL Ltd.

   The Assessor will be responsible for the self-assessment and for gathering the necessary evidence to support the scores awarded, recording this in the scoring spreadsheet and providing it to the Verifier for verification at the end of the Assessment (see below). Once the first instalment of the fee has been settled, the Assessor will be sent a copy of this Manual and the relevant Scoring Spreadsheet appropriate to the Award.

2. CEEQUAL will nominate a Verifier according to a combination of workload, availability, distance to the project and expertise relevant to the project. Note that, in principle, CEEQUAL Assessors and Verifiers have received the same initial training and that Verifiers may also act as Assessors (though obviously not on the same project). However, new Assessors cannot immediately act as Verifiers, but will need to be formally trained by CEEQUAL Ltd after they have carried out at least one assessment. Verifiers are also expected to attend regular 'refresher' workshops to keep up-to-date with revisions to the CEEQUAL Scheme and Manual.

3. The timing both of the scoping (see below) and the assessments is important to the success of the assessment and the level of Award achievable. Although it will, in principle, be possible for an award to be applied for after completion of the applicant project, the best process will involve:

   - a decision to apply at an early stage in the project's development;
   - early appointment of the Assessor and Verifier;
   - the scoping-out process being undertaken as soon as the project has progressed far enough to be able to determine whether particular questions do not apply (for example, information about contamination, results of archaeological investigations, ecological assessments etc would have to be available in order to decide whether these issues could be disregarded and the questions scoped out – see Section 0.3 below);
   - gathering of the necessary supporting evidence and information by the Assessor as the project proceeds;
   - Verification at or very soon after completion of the project, or for the Client & Design or Design-only Award at or very soon after the design is completed.

4. Once the Verifier has been appointed, the Assessor sets up the scoping-out process, which is normally undertaken by correspondence but may involve a meeting with the Verifier on large, intricate or complex projects. The purpose of the scoping-out process is to determine the issues to be assessed and any questions that are irrelevant to the project, which are then scoped out. The Assessor sends their suggestions for questions to be scoped out to the Verifier, together with sufficient descriptive information about the project to introduce it to them and enable the Verifier to make a judgement on the scoping-out proposals. The agreed scoping-out of questions is recorded by annotating the Scoring Spreadsheet, which is then emailed to the CEEQUAL Scheme Managers by the Verifier. See Section 0.7.3 below for more detail on the scoping stage.

5. The Assessor then works through the questions in the Manual, gathering all necessary supporting evidence and allocating provisional scores based on the evidence available. It is important to recognise that, in this process, two over-riding assessment rules apply:

    - if no evidence can be found to match a question, no points can be scored; and
    - partial scores for partial evidence are not possible (unless the scoring scale provides for this).

    For early applicants, the Assessment task could be a continuous process to be carried out in parallel with project progress, or, alternatively, it could be a single concentrated effort if the application is made towards the end of the design or construction period, or if the project is of modest scale and duration. The Verifier will be available throughout this time for consultation over the telephone.

    In order not to miss essential guidance and scoping-out restrictions, it is necessary to use the Manual for the assessment, and to use the spreadsheet only to record scores achieved and evidence provided.

6. Once the assessment is complete and the scores have been entered in the Scoring Spreadsheet, together with a detailed list of supporting evidence in the relevant column, the Excel spreadsheet file, including the completed introduction sheet, is emailed by the Assessor to the Verifier for review.

7. The Verifier will:
    - review the scores and the listing of supporting evidence;
    - devise a verification questionnaire querying any evidence that may be missing, any of the evidence listed that he or she would like to view, plus any other questions he or she would like to raise at the verification visit;
    - agree a date for a verification visit that normally is held on site – this should not be any later than 4 weeks after receiving the self-assessment report.

8. At the verification visit the Verifier will meet the Assessor and any other staff that may be helpful to the verification process. Occasionally, he or she may need to get expert help for specialist subjects, such as ecology or archaeology. Any site visit should be used to confirm that the self-assessment has been fair and robust, and is supported by evidence both in writing and on the ground.

9. After the verification visit, the applicant has the opportunity to provide to the Verifier any missing evidence in support of their case. This should be done within two to four weeks.

10. The final agreed Scoring Spreadsheet, which should include scoped-out questions marked up with reasons for scoping-out, the final score, the evidence listing and Verifier's comments, must be emailed by the Verifier to the CEEQUAL Technical Manager for ratification.

0.7.3 How the Scoping-out works

The scoping-out process, whether at a meeting or not, requires the Assessor and Verifier to discuss and decide whether any individual questions are not applicable / irrelevant to the project being assessed and so should be scoped out. In this process, both the Assessor and the Verifier must be aware of the difference between *not applicable* (i.e. scoped out) and *not done or able to be done* (i.e. applicable, but no points scored).

For instance, for a Construction-only award, it may be tempting to scope out questions because measures asked for were "not in the brief" or "not our responsibility". The question that should always be asked before scoping any question out is whether a measure *could* have been taken even though it was not specifically asked for – in essence, is the issue the question addresses relevant to the project or not. For example, a project to design and construct a flood defence bank will consume land and so be unable to scope out the land use questions but may use no energy during its lifetime, in which case the energy in use questions can be scoped out.

For almost all questions, guidance on scoping-out is provided along with examples of situations where they can be scoped out. However, more than 70 questions out of the total of 180 have been marked as **NSO** for 'No Scoping Out', i.e. scoping out of these particular questions has been ruled out. However, it is also acknowledged that, for very small-scale projects, refurbishment projects or unusual situations, scoping out of entire sections, including NSO questions, may occasionally be necessary. These situations will need to be

established as the project progresses and can be discussed individually with the CEEQUAL Technical Manager.

Once scoping out has been agreed, scoped-out questions will be marked as such in the Scoring Spreadsheet, the potential scores against those questions set to zero, and ***reasons for scoping out must be noted in the comments column***. The Scoring Sheet automatically adjusts to take account of scoped out questions and re-calculates the total maximum score and the percentage achieved accordingly.

It may be necessary to review the scoped-out questions as the assessment progresses, for example if the scoping-out is undertaken before it is established whether the site has any contaminated land. Changes to the initial scoping agreement can be made but only in consultation with and agreed by the Verifier.

0.7.4 Special features of the Interim Award assessment process

For a Whole Project Award with a Client & Outline Design Interim Award, the following additional process steps and guidance need to be adopted.

- There are two verifications, one of an assessment undertaken at an agreed point during the design process (the interim Award), the other as normal for a Whole Project Award, at the end of the construction stage (the final Award).
- A usual use of the Interim Award is to assess the contribution to the environmental quality of a project by the client and their overall scheme designers, for example in securing planning and other consent for the project, after which delivery of the project is handed over to a delivery team, often contractor-led and including other designers who complete the detailed design, and who then complete the Whole Project Award with the Client and other project team members
- With the Interim Award an on site scoping meeting is usually required rather than agreeing scoping out remotely, which may be the case in other awards. At this meeting, the Assessor and Verifier not only agree the scoping-out of irrelevant questions but also the proportion of all design scores that should be included in the maximum possible score for the Interim Award, with the balance being assessed in the second assessment at the end of the project.
- To undertake this design score allocation, a separate spreadsheet is used for the interim award. It contains a suggested split, but these are changeable by agreement by the Assessor and Verifier, with the reasons recorded in the Verifier Comments column of the Spreadsheet.
- The Assessment up to the agreed interim stage, and its Verification, is then undertaken in essentially the same way as any other assessment. When the Verification of the Interim Award is complete, the agreed Scoring Spreadsheet, which should include scoped-out questions marked up with reasons for scoping-out, the final score, the evidence listing and Verifier's comments, must be emailed by the Verifier to the CEEQUAL Scheme Manager (Crane Environmental) for ratification.
- After ratification, the spreadsheet is amended by the Scheme Managers to allow the completion of the Whole Project Assessment (final Award), and returned to the Assessor for addition of the remaining scores and evidence listing. It is possible, within the original spreadsheet for the WPA and Interim Award process, for the Assessor to start to forecast the final award scores. However, it should be noted that anything inserted into the forecast section will be lost once the spreadsheet has been updated after ratification of the interim award. Any such data needs to be retained by the Assessor by keeping a copy of the Interim Spreadsheet using an alternative filename.
- Some questions assessed at Interim stage will be able to be – or need to be – re-assessed. It is primarily for this reason that once the final Whole Project Award has been made, the Interim Award is null and void.

0.8 How the Scores have been weighted

The 12 sections in the Scheme have been weighted by CEEQUAL, and these weightings are embedded in the scores awarded for each question. The weightings have been based on consultation within the CEEQUAL

Project Advisory Group, the ICE, the Construction Industry Environmental Forum and a range of other stakeholder groups and interested parties.

The Weighting Factors used in this version of the Manual are as follows.

1. **Project environmental management** – which covers the need for environmental risk assessments and active environmental management, training, the influence of contractual and procurement processes, delivering environmental performance, minimising emissions, and human environment considerations: 12.0%

2. **Land use** – which covers design for minimum land-take, legal requirements, flood risk, previous use of the site, contaminated land and remediation measures: 8.2%

3. **Landscape** – which covers covering consideration of landscape issues in design, amenity features, local character, loss and compensation or mitigation of landscape features, implementation and aftercare: 6.9%

4. **Ecology & biodiversity** – which covers impacts on sites of high ecological value, protected species, conservation & enhancement, habitat creation measures, monitoring and maintenance: 8.5%

5. **Archaeological and cultural heritage** – which covers surveys, measures to be taken if features are found, and information to the public and public access: 6.2%

6. **Water issues** – which covers control of a project's impacts on, and protection of, the water environment, legal requirements, minimising water usage, and enhancement of the water environment: 8.9%

7. **Energy** – which covers life-cycle energy analysis, energy in use, and energy performance on site, but not embodied energy, which is in Section 8: 8.5%

8. **Use of materials** – which covers minimising environmental impact of materials used, minimising material use and waste, selection of timber, using re-used and/or recycled material, minimising use and impacts of hazardous materials, durability and maintenance, and future demolition: 9.5%

9. **Waste** – which covers design for waste minimisation, legal requirements, waste from site preparation, and on-site waste management: 8.7%

10. **Transport** – which covers location of a project in relation to transport infrastructure, minimising traffic impacts of a project, construction transport, and minimising workforce travel: 7.6%

11. **Nuisance to neighbours** – which covers minimising operation and construction-related nuisances, legal requirements, nuisance from construction noise and vibration, and from air and light pollution, and visual impact, including site tidiness: 7.3%

12. **Community relations** – which covers community consultation, community relations programmes and their effectiveness, engagement with relevant local groups, and 'joy in use': 7.7%

0.9 Award Grades

There are four grades for all of the types of Awards: 'Pass', 'Good', Very Good' and 'Excellent'. The percentage scores necessary for these grades of award are:

Pass	=	over 25%	Very good	=	over 60%
Good	=	over 40%	Excellent	=	over 75%.

It should be noted that a 100% score in the CEEQUAL assessment is not possible. There are issues that conflict with each other, and a high score on one aspect may mean that points will not be scored on other aspects. For example, refurbishment of an historic bridge may call for matching materials to be brought a long distance so that they match the existing, whereas another question rewards the project for minimising the distance that major materials are transported. Applicants and their Assessors have to accept this point; the grade levels take this into account.

The CEEQUAL assessment has been designed to reward efforts to go beyond the legal minima, striving for best environmental practice and "going the extra mile". Therefore a 'Pass' at 25% suggests that the project's

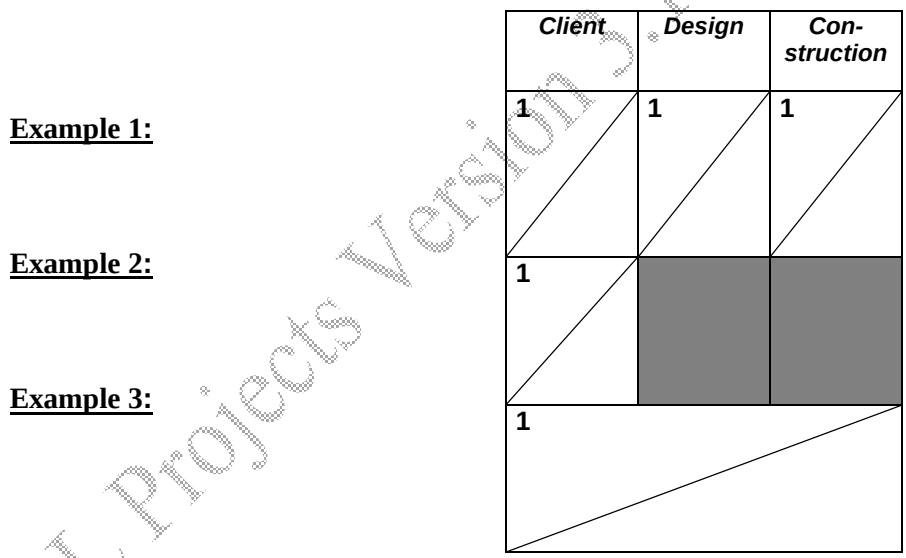
environmental performance is 25% of the way from minimum legal compliance to the pinnacle best practice represented by the highest achievable score.

Apart from Client & Design and Design-only Awards, any project that had either a major environmental pollution incident or has been successfully prosecuted for breach of environmental legislation will be barred from achieving a 'Good', 'Very Good' or 'Excellent' award regardless of the score achieved. It may still go through the CEEQUAL assessment, but can at best achieve a 'Pass', and then only if the applicant is able to demonstrate an otherwise responsible and considerate approach to environmental performance.

0.10 How the Manual works

The Manual is used for any assessment – 'Whole-Project' Client & Design, Design-only and Construction-only. The scoring column is divided into the three project roles or stages – client, design, construction – as shown below. Depending on the context of the question, the score is awarded for the client, designer or contractor undertaking the action sought by the question, or is awarded if that action is taken at the early planning & concept stage, during design or during construction, by whoever is deemed by the Project Team to be the appropriate party to do so.

Whilst the Manual applies to all the different Award types, the Excel Scoring Spreadsheets are award-specific. Each spreadsheet shows only the questions that apply to the respective Award to be assessed, but the Manual must be used to identify the distribution of scores for different project roles or stages.



Example 1: Some questions apply to all three stages and, in a joint application (Whole Project, Design & Build or Client & Design Awards), a point can be scored ***for each role or stage of the project*** where this particular requirement has been fulfilled.

Example 2: Other questions apply only to one or two roles or stages, as other project team members may have no control over this particular factor or it may be an inappropriate time for the required action to be taken. In this case the respective columns are greyed out. So in the example given above, only a Whole Project or Client & Design application can achieve a point here. The question is not applicable to a Design-only, Construction-only or Design & Build Award (and does not appear in the respective Scoring Spreadsheet for these awards).

Example 3: Other questions refer to an action that can be taken at any stage of the specification, design or construction process, and/or by any member of the Project Team, but ***only once*** throughout the project. Therefore the point for fulfilling this requirement can only be given once, even in the case of a joint application. It is also possible to gain the point in the Design-only or Construction-only awards, ***but not if the***

client (and/or the designer in the case of the construction-only award) had already undertaken the action, in which case the question would be scoped out.

Different scores are sometimes awarded for the same action at different stages in the overall project process. This reflects the environmental importance of this action being taken at the different stages of a project. Please also note that in some questions there are sliding scales of scores for different levels of compliance with the question, and these may vary for the different types of awards.

In general, the Manual has been written on the assumption that final assessment and verification take place at or close to project completion. This means that Assessors for Client & Design, Design-only Awards and Interim assessments will need to make appropriate changes to the tense where necessary.

0.11 Key to reading the Manual questions

The following table and text illustrates how the questions are presented in the Manual.

		Client	Design	Con-struction
Question number (e.g. 1.1.2)	Assessment question. If No, score 0; if Yes score 3.		3 ***The Assessor can fill in the score achieved here*.***	

**** This is an optional stage and of course uses up a copy of the Manual for each Assessment. The formal recording of scores should take place in the (Excel) Scoring Spreadsheet.***

Guidance on scoping out is given immediately under each question and is in bold italics.

Additional guidance that is essential or helpful to assessing the question is added below the question it applies to.

v Finally, this box gives guidance on the kind of evidence that would be considered acceptable or not. They are examples only and should not be considered to be comprehensive lists.

A grey line like the one above indicates the end of one assessment question and all related guidance, and the beginning of the next question. For the benefit of Assessors and Verifiers using the Manual, it has been designed to keep questions and related guidance on a single page.

To save space (and thus paper) the column headings (Client, Design and Construction – referring to the relevant stage or role at which or by whom the action is to be taken) only appear once on each page and are not repeated for every question on pages with more than one question.

1. PROJECT ENVIRONMENTAL MANAGEMENT

1.1 Basic Principles

An environmental management system (EMS) is a mechanism for managing the environmental impacts of a business, development project or operational process. Its complexity and scope are dependent on:

- the extent of environmental risk and opportunity associated with the situation the system is used to manage;
- its importance to the organisation with responsibility for that risk or opportunity.

CEEQUAL can be used at any point throughout a project's duration as a checklist, as part of the specification for delivery of high environmental quality, and/or as a checklist for an EMS.

Experience with the Scheme so far indicates clearly that the ideal start point for the CEEQUAL process to be used in any of these ways is at the outset of the project, led by the client. A full project environmental plan, with targets set for each phase of the project, sets the scene for the supply chain to respond. Such a comprehensive approach can only be set by the client and signals their intention to deliver a project with defined environmental standards. It provides a framework for managing this intention and for carrying out reviews of its success. It also sets out the levels of engagement expected of each party. In this case, CEEQUAL would function partly as a specification for the project's environmental management processes and partly as a checklist for environmental issues that the Project Plan should cover.

As indicated in the overall introduction, the CEEQUAL scheme complements any statutory requirement or voluntary decision to undertake an Environmental Impact Assessment leading to an Environmental Statement, or to prepare an environmental commentary, by operating during and (except for Client & Design and Design Only Awards) after design and construction, checking what is actually built and how it is built. It does not assess the environmental *need* for the project nor its social acceptability, but supports clients, designers and contractors in dealing positively with environmental quality issues relevant to the project, and helps to integrate such thinking into the design and construction processes. The CEEQUAL question set can thus be used to influence the issues that are addressed in regulatory Environmental Impact Assessments or more-informal environmental commentaries on project proposals. CEEQUAL can also be used to *demonstrate* that actions proposed or recommended in an Environmental Statement or environmental commentary have actually been delivered on the project.

		Client	Design	Con-struction
1.1.1 NSO	Was there a documented commitment to consider and assess the environmental aspects for each stage of the project? If No, score 0; if Yes, score as indicated for each stage.	2	1	1

v Evidence would include a written commitment from the Project's Directors, a Project Environmental Policy Statement, objectives & targets, etc. However, a general Company Environmental Policy Statement is not sufficient, unless it includes a specific commitment to consider and assess environmental aspects for every project.

		Client	Design	Con-struction
1.1.2 **NSO**	Is there clear evidence that a member of the project team was identified as responsible for managing the environmental aspects of the project and was aware of the duties and responsibilities involved? If No, score 0; if Yes, score 3 for each stage.	**3**	**3**	**3**

Every project, irrespective of size, should have someone designated as being responsible for environmental aspects. On smaller projects, a member of the Project Team may be responsible for this along with their other duties. On larger-scale projects it is likely to be a dedicated Environmental Manager or Coordinator. On partnership projects, it may be the same person at each stage.

Detailed duties and responsibilities in relation to the project must have been set out on appointment for the score to be awarded.

v Evidence could be a formal note of the appointment, records of meetings where the role is clearly set out, or reports from the identified person to the Project Team.

1.1.3 **NSO**	Have the environmental impacts and opportunities for environmental enhancements been a) identified and clearly recorded for each stage, and b) prioritised according to significance? Score 4 points for a), and 2 points for b), for the stages as indicated	**6**	**6**

All adverse environmental impacts of the project should be identified, as well as positive impacts and opportunities for environmental improvements resulting from the project.

The significance of adverse impacts is assessed by a combination of the potential severity and the likelihood of the impact occurring if no action is taken to avoid it. The result of this assessment then enables prioritisation of impacts according to significance, which assists in setting the priorities for mitigation measures.

The significance of positive impacts and opportunities is similarly assessed according to the expected environmental benefit and the likelihood of their occurring or being carried out as part of the project. This will then guide decisions on which of the opportunities the project team should concentrate.

v Evidence could be a report on the impact and opportunity assessments, minutes of project team meetings at which the process was undertaken, or the charts prepared after such discussions.

		Client	Design	Con-struction
1.1.4 **NSO**	Have appropriate mechanisms been put in place to manage the project's environmental issues, impacts and opportunities? If No, score 0; if Yes, score as indicated	**3**	**4**	**4**

At design stage, 'appropriate mechanisms' could be in the form of a Project Environmental Management Plan or Action Plan. However, the fact that an EIA was undertaken for the project cannot of itself be regarded as evidence that mechanisms for the management of issues identified in such a study are being operated effectively and appropriately.

At construction stage, 'appropriate mechanisms' could be in the form of a Site Environmental Management Plan (SEMP) or an integrated site management plan that includes coverage and management of environmental issues. Such a plan would cover the management of all significant environmental aspects of the construction process and would be specifically drawn up for the relevant site and project. It should address issues such as the management of sub-contractors' and suppliers' environmental performance and training requirements. It should also include procedures for monitoring its implementation and emergency response plans as well as operational control procedures (for example, waste disposal and spill prevention).

It is very important that designers positively seek information on, and get copies of, agreements, commitments and undertakings made during the consents process and integrate their contents into the design process. Equally, contractors need to secure and act on similar information from the consents and design processes that relate to the construction stage to ensure that commitments made earlier in the project are adhered to and that inappropriate actions are not taken.

- **Evidence could be procedures, flowcharts, checklists and/or documented control measures, and would form part of an EMS if there were one in place. However, an EMS is not a prerequisite and, in smaller companies or projects, evidence could be minutes of meetings at which these issues, and the mechanisms to be used, are discussed and agreed. Appropriate mechanisms could have been put in place without the existence of a full EMS. However, they do need to be documented in some form and should clearly state the steps to be taken and any roles and responsibilities to be assumed. They also need to match the level of complexity of environmental issues relevant to the project.**
- **The output from an environmental impact assessment that included discussion of how the project's environmental issues, impacts and opportunities are to be managed would not be sufficient evidence to gain the points for this question. Evidence is required that such EIA outputs have been translated into action.**

		Client	Design	Con-struction
1.1.5	Have regular* checks been made to ensure that these mechanisms have been implemented? If No, score 0; if Yes, score as indicated	1	3	3

This question can be scoped out only on very short-duration projects.

On longer duration and/or larger projects these checks are likely to include formal internal environmental audits. However these may not be appropriate on smaller/shorter duration projects. The important thing to demonstrate for this question is that some form of checking has taken place to ensure the mechanisms referred to in 1.1.4 have been implemented and are effective. On smaller projects this could simply be records of review in weekly meeting minutes, for instance.

*Interpretation of ***'regular'*** depends on the size of the project and in particular the length of time it is predicted to take. On the majority of projects a review on a three-monthly basis would be acceptable, but this should be more frequent on projects or project phases of 6 months or less. If the review period is longer, and this is still considered acceptable, then it should be justified. In any case, it is essential that the extent of the reviews should be appropriate to the environmental risks and scale of the project.

v Evidence could be site review meetings minutes, site inspections (checklists etc) or audit reports.

1.1.6	Is there a record of actions to be taken as a result of these checks, with individuals identified and timeframes stipulated? If No, score 0; if Yes, score 1 for each stage	1	1	1

This question can be scoped out only on short-duration projects.

This specifically refers to the checks undertaken in 1.1.5.

v Evidence could include actions shown as being closed off in minutes, close-out of audit non-conformance reports, or other evidence demonstrating completion of actions arising from site inspections.

1.1.7	Have the results (success or otherwise) of the implementation of these mechanisms been assessed? If No, score 0; if Yes, score as indicated	1	2	2

This question can be scoped out only on short-duration projects.

As opposed to the regular checks of *implementation* referred to in Question 1.1.5, this questions asks about the *review of the results of implementation*, which implies a further step and a more pro-active review, looking at the *outcome* of the implemented mechanisms, not just whether they have been undertaken.

v Evidence for this would be a review that took place routinely as opposed to being only as a result of a check that has taken place in 1.1.5. For instance, a standing item in project progress meetings or reports which routinely reports on environmental performance and success of control mechanisms established would be acceptable. Evidence could also include the achievement of appropriate project targets set for environmental performance.

		Client	Design	Con-struction
1.1.8 **NSO**	Has everyone directly engaged in the project received *general* environmental training? If No, score 0; if Yes, score as indicated	**1**	**2**	**2**

General environmental training can be carried out for all levels of responsibility and should include general environmental awareness issues such as the need to reduce waste, save energy, prevent pollution etc, as well as specific environmental aspects of construction projects and how to address them. 'Everyone directly engaged in the project' includes project management, the design team, contractors and sub-contractors, and anyone else actively engaged, but *not necessarily* suppliers of materials or services.

Note that this does not include *project-specific* environmental training. This is addressed in Question 1.3.7.

v Evidence would include training records, records of meetings at which environmental issues have been discussed etc.

1.2 Contractual and Procurement Processes

The client is a key enabler in setting and achieving high environmental standards in construction projects. The client owns their projects and is responsible for their direct and indirect impacts, which in the case of infrastructure projects can be far-reaching. There are requirements for Environmental Impact Assessments and environmental surveys at the outset of major projects, but rigorous attempts to ensure that these are fully cascaded down the supply chain, beyond the need to satisfy regulations, are regrettably rare. Approaches to procurement, costing, selection criteria, contractual agreements and team working are key factors in the client's environmental management role and provide a measure of 'EMS quality' at this stage.

Contract and procurement processes play a very influential role in determining the importance of environmental issues and how people will be motivated to minimise adverse environmental impacts and maximise positive ones, to maintain quality standards throughout the project and to play a role in enhancing standards as the project proceeds. Simply put, the greater the equity share or benefit people have throughout the supply chain, the more motivated they will be to consider the risks and opportunities associated with environmental impacts of the project.

No specific contracts are referred to in this section because none are known to include standard clauses on dealing with environmental issues in the same way that most cover health & safety issues. However, questions can be asked about the underpinning principles and intentions of the contract and procurement process, such as:

- Do they seek to increase partnership and ownership throughout the process by aiming to share both risks and rewards?
- Do they seek to extend the time scale over which parties are responsible for the outcomes of the project and over which success is to be measured?

Other key questions include the following.

- Is there evidence of environmental criteria being used in the selection of designers, contractors and operators?
- Is there provision for environmental issues to be considered throughout the supply chain?
- What targets, measures and checks are put in place to demonstrate how environmental criteria have been used in the selection?
- To what extent are environmental issues included in the project reporting and review process?

		Client	Design	Con-struction
1.2.1 **NSO**	Have all those directly engaged in the project been informed of the significant environmental impacts of their part and/or stage of the project? If No, score 0; if Yes, score as indicated	**1**	**3**	**3**

This would cover the outcome of any EIA or any similar assessment undertaken, and can be relayed via contract documents and invitations to bid, project environmental management plans, method statements, start-up and progress meetings, work instructions etc.

'All those directly engaged in the project' includes project management, design team, contractors and sub-contractors, and anyone else actively engaged, but *not* suppliers of materials or services.

Note: Assessment of impacts (see question 1.1.3) would have to have been carried out to be able to score on this question.

v Evidence for the client could include communication of environmental impacts within tender documents, specifications etc. For the designer this could include how they have briefed their team on the environmental issues which require consideration. For the contractor it could include the incorporation of environmental mitigation actions in method statements, toolbox talks or other site briefings such as communicating the requirements of the SEMP. For any stage it could also include more project workshops, such as value management and value engineering, that include consideration of the environmental impacts for the project.

1.2.2	Did the selection procedure for a) the principal designer b) the main contractor c) the *key* sub-contractor(s) consider their past environmental performance? If No, score 0; if Yes, score up to 6 for WPA, Score up to 4 for C&D or D&B, 2 for Design-Only Award or 2 for Construction, as detailed below.	**4**	**2**	**2**

Scope out only for a Design-Only Award where the designer had no input to the selection process.

- Score 2 for Client role if environmental performance was considered in selection of principal designer *and* a further 2 if the *client* considered environmental performance in the selection of the main contractor.
- Score 2 for Design role if environmental performance was considered *by the designer* (and not by the client) in selection of the main contractor i.e. these two points cannot be scored as well as the second 2 points by the client.
- Score 2 for Construction role if main contractor considered environmental performance in selection of sub-contractor(s).
- The maximum scores are therefore: WPA = 6, Design & Build = 4, Client & Design = 4, Design-only = 2 and Contractor-only award = 2.

v Evidence could include supplier appraisals, quality submissions information on environmental issues during tender stage.

		Client	Design	Con-struction
1.2.3 **NSO**	Is there evidence that the influence of procurement method on project environmental performance was a factor in the choice of procurement route (for example, ICE 7th, Design & Build, PFI, Term Contracts etc)? If No, score 0; if Yes, score 3	3		

For example:

- Conventional Contracts can be short-term, output-specific, for specific, discrete packages such as design or construction work, and may offer limited opportunity to address environmental issues unless they are included at the outset by the client.
- Design & Build contracts can also be short-term and output-specific, but inclusive packages require partnership in the delivery, thus increasing opportunity to consider environmental improvements for both final product and construction process, especially if the package includes the consents process as on Early D&B and Early Contractor Involvement (ECI) projects.
- Public Private Partnerships are more long-term, performance-output-orientated, require partnership to share risks and rewards throughout design, construction and specified operational period; as a result they offer opportunities for whole-life-costs and life-cycle analysis of environmental performance in design, construction and operation.
- Term contracts, if set up to include environmental performance, may provide a strong mechanism for the client to impose environmental requirements on the contractors over a range of projects during the term. Note that a separate Term Contracts Version of CEEQUAL is being prepared (early 2007) and will be published and used alongside this now-renamed Projects Version.

v Evidence could include output from any contract strategy meetings or reports that show consideration of environmental issues as a factor in the choice of procurement method.

1.2.4 **NSO**	Is there evidence that the principal contractor has taken steps to *actively encourage* local firms to compete for work? If No, score 0; if Yes, score 2			2

The transport impacts of construction as a whole are significant. This includes workforce travel as well as the transport of materials and construction waste. By actively encouraging the use of local firms (as suppliers, sub-contractors etc) these impacts can be minimised from the outset.

Note: On projects with more than one principal contractor it may be advisable to assess these separately.

- The definition of **'local'** in this context is dependent on the location ands, occasionally, on the nature of the project. In a remote area 'local' may be within the range of the nearest town or major settlement, whereas in a heavily built-up area it could be as close as being within the borough. For supply of specialist items or services to UK projects, it may even mean Europe, as opposed to Asia or South America. Competition rules may prevent actual selection on grounds of location or proximity, but do not prevent *encouraging* local firms to bid for work on the same terms as any other bidder.

v Evidence could be a copy of a local advert, specific wording in the suite of procurement documents or other evidence that tenders from local companies have been sought as a matter of priority. The mere fact that one or two suppliers happened to have been local cannot be considered as sufficient evidence.

1.3 Delivering Environmental Performance

Most of the other eleven sections in this Manual deal with the delivery of specific aspects of environmental performance. Therefore this section focuses on the basic systems and procedures that can be implemented to ensure that environmental performance is given a high priority in the project. Having the appropriate plans and procedures in place is considered as evidence for the ***intention*** and the ***commitment*** to deliver high environmental performance. Whether the actual steps to achieve this have subsequently been taken will then be assessed in the other sections of the CEEQUAL Manual.

Planning for lifetime operations

The first cost of a project is always important, but it can lead to problems both financially and environmentally if it is the only consideration in the design process. It is important therefore to consider the future costs of maintenance and repair of the built works, as well as the first cost. This applies in both financial and environmental terms. The assessment is therefore looking for evidence that the project has been designed with this in mind.

Application of 'Best Practice'

Some environmental statutes advise that the civil engineering industry should be looking to apply the best techniques and options to their projects in order to minimise environmental impact and to achieve stated objectives. However, these statutes also state clearly that these techniques and options have to be reasonable in terms of cost and that they should not be so leading-edge that they are not tried and tested. The terms '***Best Available Technique Not Entailing Excessive Cost***' (BATNEEC) and '***Best Practicable Environmental Option***' (BPEO) are two of the expressions that are commonly seen in environmental legislation and codes of good practice, which sum up this approach. In addition to these terms, which were primarily introduced in the Environmental Protection Act 1990, the Integrated Pollution Prevention Control (IPPC) regulations use the term Best Available Technique (BAT). In practice this is a very similar approach to BATNEEC with the only difference being that the economic viability is considered within the word 'Technique'. Overall, both methodologies are trying to balance the costs of the technique against the level of environmental protection it provides. They should be contrasted with the 'let's see what we can get away with' approach encapsulated in 'CATNAP': 'Cheapest Available Technique Narrowly Avoiding Prosecution'.

Choice of construction process

The construction process, including issues such as fabrication on or off site, use of modular construction, and minimisation of temporary works, can have a great influence on the overall environmental performance of a project. By having systems in place that examine the potential environmental impacts of alternative means of construction, the ability to select the best option for the environment and the project will be maximised. (Most of these detailed measures are dealt with under the individual issue headings.)

		Client	Design	Con-struction
1.3.1 **NSO**	Is there evidence that the design team has addressed the environmental implications of different construction methods and materials (including their whole life cycle) for the project (for example, through workshops, briefing papers or an environmental statement)? If No score 0; if Yes score 2	**2**		

v Note that the evidence here may be the same as for Question 1.1.3 but this is quite acceptable.

		Client	Design	Con-struction
1.3.2 **NSO**	Have specific targets* been set during the design process for the environmental performance of the project ***during construction*** and is progress towards them monitored? If Yes, score 3 If no targets set or not monitored, score 0		**3**	

* Targets should be quantifiable and where possible refer to timescales (SMART Targets = Specific, Measurable, Achievable, Repeatable/Realistic, within a Timeframe).

- **Evidence could include the setting of targets for achieving or exceeding compliance levels (e.g. water quality targets); specifying targets for completion of work elements to avoid "closed" seasons (e.g. nesting birds etc.). Whatever targets are set, evidence MUST also be provided to demonstrate that they were regularly monitored for the points to be gained.**

		Client	Design	Con-struction
1.3.3	Have specific targets* been set during the design process for the environmental performance of the project ***during operation*** or once in use and is there a monitoring programme in place for the operational phase? If Yes, score 5 If no targets set, or no monitoring programme in place, score 0		**5**	

Scope out when the scheme concerned is intrinsically not 'operable', e.g. flood defence banks.

Note: Targets have to be set for the operational phase *and* a monitoring programme to be undertaken once construction is complete has to be in place in order to score. Target-setting without monitoring progress is considered to be of little or no use.

Operational targets are likely to relate to quantifiable measures, such as waste production, energy consumption, carbon dioxide production, natural resource consumption or pollution prevention. For example, an operational target might state that 50% of waste produced in tonnes during the first year of operation is to be recovered through either re-use, recycling or composting. Targets may also cover maintenance issues such as paints to be used or how to deal with waste arising through maintenance. Note that *compliance with legislation cannot be regarded as an appropriate operational target.*

- **Evidence: Although any Environmental Statement (ES) may include targets or equivalent statements on a wide range of issues such as operational noise, air pollution control etc, the presence of the ES is not considered sufficient evidence here. Evidence needs to demonstrate that such targets have been positively adopted by the design team, for example through Project Team Meeting minutes or equivalent.**

		Client	Design	Con-struction
1.3.4 **NSO**	Is there clear evidence that the design team has adopted a whole-life approach to environmental aspects of the project? If No score 0; if Yes score 5		5	

For instance, has a whole-life-costing exercise been carried out?

Note: The terminology surrounding 'Whole-Life Costing', 'Life-Cycle Costing', 'Life-Cycle Analysis', 'Whole-Life Environmental Assessment' and 'Full-Life Costing' can be confusing. However, *the important feature of all of them is that impacts at different phases must be accounted for, right through to the end of the useful life of the works or facilities, and including the indirect effects such as those associated with winning raw materials and manufacture of components*. It is important in this instance to recognise that, in the context of CEEQUAL, what is being looked for is consideration of the *environmental* costs and benefits of the project from inception through design and construction, to in-use and eventual demolition. The whole-life exercise should also therefore consider indirect operational issues such as nuisance and natural environment enhancement.

Having carried out a study, additional points may follow from appropriate design to allow for efficient or reduced levels of maintenance, and for ease of deconstruction and recycling at the end of life. These aspects are assessed in Sections 8 (Materials) and 9 (Waste).

v Evidence will need to be in the form of a report from the process. There are currently no standardised techniques known to be available, but these are likely to appear over time.

1.3.5 **NSO**	Did the whole-life approach include consideration of the potential effects of predicted climate change scenarios, leading to appropriate adaptation strategies? If No, score 0; if Yes, score 3		3	

Apart from trying to reduce the release of CO_2 and other "greenhouse" gases into the atmosphere, to avert the predicted change in climate, all new construction projects should be designed in such a way that the potential impacts of climate change can be alleviated or at a minimum are not worsened, and/or that the project can be adapted to cope with changes in climate.

This might, for example, include very flexible energy and internal environment management systems that will cope easily with significant changes in outside temperatures, systems designed to cope with heavier and more frequent storms, very high wind speeds, higher rainfall in winter and longer periods of drought in summer, and precautions against flooding on the site and downstream, as well as emissions-reduction facilities.

More guidance on the potential impacts of climate change is available from the climate change programme www.ukcip.org.uk.

Note that this question raises separate issues to the specific consideration of flood risk covered by Question 2.2.2.

v Evidence could be any reference to reports of studies undertaken by or on behalf of the design team, or notes of Project Team Meetings to consider the issue.

		Client	Design	Con-struction
1.3.6 **NSO**	Is there evidence that the construction team has proposed changes to the specifications to improve the whole-life environmental performance of the project, that is, during the rest of the construction phase, during operation and/or in easing its re-use or ultimate disassembly? If No score 0; if Yes score 3			3

Whilst it must be accepted that the greatest influence on whole-life environmental impact of a project is the design, the processes adopted to construct a civil engineering project can nevertheless significantly influence its overall environmental impact.

Key issues include choice of processes and materials, pollution prevention measures, the choice of equipment, the use of information technology (IT) and the culture and attitude adopted by an organisation and its workforce. Decisions taken by the contractor prior to work starting, regarding their overall approach to the project, and a commitment to ensure that environmental impacts are considered for every aspect of the work, will be essential in minimising the environmental effects of the construction process.

In addition to their responsibility for ensuring their site activities are well managed, there is the added role of managing variations in the contract and assessing them for reaching the necessary environmental standards set by the client. In this case the contractor is responsible for both direct and indirect environmental impacts.

- **Evidence could include value-engineering reports, agreement of alternative methods within management plans (e.g. waste management plan), design change notes, and letters to the design team.**

1.3.7 **NSO**	Has there been a programme of *project-specific* environmental training at an appropriate level for those engaged in the project? If No, score 0; if Yes, score 3 for each stage		3	3

Project-specific environmental training should at a minimum cover the significant environmental impacts identified (as covered by Question 1.2.1), as well as instructions on how do deal with these. It can also include issues of material sourcing, energy performance over the whole life of the completed works, water consumption minimisation etc. These issues can be dealt with in a wide range of training sessions, including formal courses for the Project Team(s), sessions within Project Team Meetings, or via site inductions and toolbox talks. Records of these should be available.

- **Evidence could include records of site inductions or toolbox talks, more formal environmental training workshops for the project, briefings or other training on specific issues for the project (e.g. on otter holt construction or use of new equipment).**

1.4 Minimising Emissions to Air, Land and Water

Construction processes use many different pieces of equipment and plant, and import onto a site all manner of substances that potentially could pollute the environment and cause harm to human health. Minimising emissions and pollution from these is an essential part of good construction practice and in many places is governed by legislation and regulation.

		Client	Design	Con-struction
1.4.1	At design stage, was a risk assessment undertaken and/or a pollution control plan prepared to minimise emissions of the completed works to a) air, b) land and c) water? Score 1 point each for a), b) and c)	3		

Can be scoped out only for projects where no emissions occur from the completed scheme. Examples could include some flood defence schemes or footbridges. Note that it cannot be scoped out for roads!

Pollutants include any substances released into air, soil or water that can have potentially harmful impacts on the environment. In addition to the obvious and known pollutants they therefore also include the release of dust, soil or sediment.

> ∨ **Evidence could include assessments within an EIA or more-specific design stage assessments for noise, dust, liquid or air pollution. A HAZOP assessment that also specifically covers environmental issues would also be acceptable.**

1.4.2 **NSO**	Has a pollution control plan or a section of the site environmental management plan been prepared to specify actions to prevent and mitigate pollution to air, land and water during construction, and has it been implemented? If No, score 0; if Yes, score 3			3

These provisions may form part of a site environmental management plan or, where such a formal plan was not used, may be individual plans, method statements or control measures for minimising the chances of, for example, a water pollution incident, plus control measures to minimise the effects of a spillage.

> ∨ **Evidence could include coverage of these issues within a general project management plan or a more specific plan for environmental or pollution control.**
> **NOTE that an emergency plan or procedure in isolation is not adequate evidence as this does not identify proactive measures to avoid pollution occurring.**

1.5 Human Environment Considerations

There are two main impacts or implications of engineering projects on the human environment: those on the end-users, any operational staff and others affected by the project, and those on the construction workers. The end users and others affected are normally considered at the planning stage while construction workers are protected by health & safety and welfare legislation, including the CDM Regulations.

However, an environmentally responsible project should demonstrate that the needs of all people have been considered as an integral part of the design and construction processes. It is often easy to neglect the impacts on the human environment as not being engineering-driven, yet the solutions invariably are, or have an effect on our decisions.

By addressing human environmental issues at every stage, the project team should be able to avoid expensive delays in both design and construction programmes due to last minute changes or dispute resolution, and should be able to foster good community relations.

Aesthetics and visual impact have not always been considered to be of prime importance to civil engineers, particularly if an architect is involved with the project. However, with the different methods of project procurement currently being used, the role of the engineer is expanding and the aesthetics of design is becoming more important to design engineers. In any event, civil engineers should be aware of aesthetic issues in design and use their influence to achieve an environmentally sound project.

Please note that this section does not deal with issues of nuisance to neighbours, as this is covered in Section 11.

		Client	Design	Con-struction
1.5.1	Is there evidence that due consideration has been given, during the project's feasibility stage and during design, to wider social impacts and the effects of the completed project on the human environment? If No, score 0; if Yes, score as indicated.	4	4	

The question can be scoped out only on very small projects.

There are three main issues to be considered for this and the following question:

- Social impacts *during construction* on the workforce and on the local community, for example facilities for the workforce, increased traffic, congestion, influx of the workforce into the local community, and severance through the location of and arrangement for site access, air pollution, noise, dust, nuisance;
- Social impacts on the local community as a result of the *existence of the finished project*, for example, severing communities (by a road scheme), linking communities (bridge), increased traffic, greater mobility, improved services, increased employment;
- Social impacts on users and/or occupiers of the completed project, which are influenced by its *design.*

v Evidence could include a formal social impact assessment, the human factors aspects of an Environmental Impact Assessment, records of wide-ranging stakeholder consultation or similar. Any evidence provided should demonstrate consideration of all three points listed above.

		Client	Design	Con-struction
1.5.2 **NSO**	Is there evidence that the design of the project has considered the impacts of the project on the health and welfare of occupants, users and any operational staff beyond the legislative requirements of health and safety regulations such as CDM? If No, score 0; if Yes, score as indicated.	**2**	**3**	

Whilst health and safety plans do require consideration of the health of operators, this question is also looking for the less tangible health issues that do not come under the legal requirements of CDM. An example is the provision of natural light within buildings (such as covered wastewater treatment works), which will indirectly improve the well-being of operators.

- **Evidence could include the design brief, meeting minutes, and reports from assessments and/or consultation. A Health & Safety Plan and/or Health & Safety File prepared under the Construction Design & Management (CDM) Regulations that does not expressly also include future users and occupants of the completed project is not sufficient.**

2. LAND USE

2.1 Basic Principles

Land is a scarce resource. In a crowded country like the UK, the pressures on land from competing uses such as development, recreation, nature conservation, water resource management, heritage and agriculture are high.

While many civil engineering schemes intrinsically improve environmental quality and human well-being, they are still often perceived by society as having a damaging effect on the living environment. This perception is exacerbated where the land resources used for a project have agricultural, nature conservation, mineral resource, recreational or amenity value.

Careful planning and implementation of civil engineering projects can help to optimise land-use decisions, enabling safe, efficient and appropriate use of land and reducing pressure on greenfield sites. In urban areas this includes contaminated land clean-up, re-use of derelict land and urban regeneration. In rural areas it can assist with the conservation of specific land resources and ecological habitats, such as woodland or wetland.

In this section, land use in relation to brownfield and greenfield land, contaminated land and land use efficiency are assessed, and land use decisions in relation to flood risks, local amenity and soil/mineral resource preservation are touched upon. Issues relating to groundwater, surface water, ecology, archaeology, pollution prevention, waste, materials use, transport, and other issues, although related to land use, are considered in other sections.

It is acknowledged that for some non-land-based projects, land use will not be a relevant issue, for instance, the construction of an off-shore wind farm. Projects that fall into this category of not using land can therefore scope the whole of Section 2 out (including questions marked NSO). Where a formal award is being applied for CEEQUAL Ltd should be contacted for an amended spreadsheet.

Use of Brownfield Sites

Construction of civil engineering projects on brownfield sites assists with regeneration, potentially revitalising local communities, and conserving greenfield land. Land re-use is in line with government policy, current thinking on planning, and sustainable development.

However, brownfield sites, particularly in urban areas, may have special ecological interest. They may also provide temporary open space that is especially valued in a neighbourhood and may need to be replaced with permanent open space rather than be developed. To take account of this, for the purposes of this document, the definitions of the terms 'Greenfield' and 'Brownfield' have been adapted accordingly, and are given in the guidance under Question 2.1.4.

Efficiency of Land Use

Land is not only a scarce resource but also an expensive one. Scheme design is a primary influence on how efficiently land is used. Careful site layout, optimisation of the scale of buildings and structures, and selection of space-efficient processes will all minimise land take requirements.

In addition, site selection plays an important role. Selection of sites with existing infrastructure sufficient for the new site use will minimise the need for the construction of new roads, railways etc. Existing local water resources may avoid the need for additional pipeline construction.

Utilisation of a site with characteristics appropriate for the proposed project in terms of topography, geology, water features, areas of ecological importance, historical monuments, etc will also contribute to using land to the best effect.

		Client	Design	Con-struction
2.1.1 **NSO**	Have desk study and site investigation reports been prepared on past and current land uses and land quality, including soil, groundwater, gas, residual man-made structures and surrounding land uses? If No, score 0 if only partly, score 3 if comprehensive desk study, score 5 if comprehensive information thorough desk study and site investigation, score 7 if Land Condition Report, score 9	**9**		

Some investigation has to be carried out in order to establish whether or not there is a potential for a site to be contaminated. The study and investigation has to be carried out before design so that the design can take the results into account.

v Evidence would ideally be in the form of site investigation reports such as geotechnical or archaeological reports. Alternatively, desk studies could identify issues from previously completed investigations. It is possible that the EIA could provide the information.
NOTE that to score as 'comprehensive' the reports should cover all the aspects covered in the question, identify shortfalls in available information and provide a useful interpretation of findings incorporating source-pathway-receptor principles.

2.1.2	If these have suggested that contamination may be present on site, has a SiLC* been consulted? If No, score 0; if Yes, score 3.	**3**		

* Specialist in Land Condition, registered by IEMA.

v Evidence could include further reports or notes of discussions with a SiLC verifying the initial findings and where appropriate identifying strategies to deal with contamination.

2.1.3	Has the land-take of different scheme designs, process designs and layouts been calculated and have these calculations influenced the design process? If No, score 0; if Yes, score 6	**6**		

Scope out for refurbishment projects that do not involve any change to the land-take of the facilities to be refurbished.

v Evidence must be provided to demonstrate that specific attention, above normal practice, has been given to the scheme design with the express intention of enhancing land-take efficiency.

		Client	Design	Con-struction
2.1.4 **NSO**	Has the site been previously used? If Greenfield*, score 0 if >25% Brownfield*, score 3 if >50% Brownfield*, score 6 if >75% Brownfield*, score 10 Or, if refurbishment project: score 10	**10**		

* **Terminology:**

- For the purposes of this document 'Greenfield' sites are defined as those that are *essentially covered in vegetation*, with no evidence of substantive *recent* built development remaining (although they could encompass sites of archaeological importance), or where uses have been essentially restricted to agriculture, gardens, parkland or playing fields.

- 'Brownfield' sites are those that have been used for built development, and this use is still evident in the form of buildings or structures or their remains, a significant cover of made ground, or soil or groundwater pollution from activities conducted on the site. They may or may not be contaminated.

- In respect of development on previously used land, Government policy is clarified in Planning Policy Statements. PPS3 on Housing defines 'previously-developed land (often referred to as brownfield land)' as

  "Previously-developed land is that which is or was occupied by a permanent structure, including the curtilage of the developed land and any associated fixed surface infrastructure."

- However, the exclusions are important.

  "The definition includes defence buildings, but excludes:
  - *Land that is or has been occupied by agricultural or forestry buildings.*
  - *Land that has been developed for minerals extraction or waste disposal by landfill purposes where provision for restoration has been made through development control procedures.*
  - *Land in built-up areas such as parks, recreation grounds and allotments, which, although it may feature paths, pavilions and other buildings, has not been previously developed.*
  - *Land that was previously-developed but where the remains of the permanent structure or fixed surface structure have blended into the landscape in the process of time (to the extent that it can reasonably be considered as part of the natural surroundings)."*

- Hence, if a brownfield site is being developed that falls under this definition then it should be treated as a greenfield site and awarded zero points.

v Evidence could include calculations derived from site layouts or information contained in the EIA. Photographs may also provide evidence of land use.

		Client	Design	Con-struction
2.1.5 NSO	Is there evidence that the scheme has made best use of existing land resources? If No, score 0; if yes, score 5	5		

Careful planning and site selection, and adaptation of process and mechanical design to minimise the footprint of finished works will ensure that the best possible use is made of the land resource available. This includes sensible site selection and layouts, minimising the site footprint, tapping into existing infrastructure where it has the necessary capacity, and using existing site features to the advantage of the scheme.

v Evidence would be found in the brief, or in design notes, drawings and calculations.

2.1.6	Is there evidence that the project has improved the capability of the land resource? If No, score 0; if yes, score 4	4

Scope out on Construction Only awards where the contractor has had no input to the design process

This would be any clean-up or reclamation of contaminated land as part of, or intrinsic to, the project. Examples could include projects that bring previously contaminated or derelict land into productive use but also projects that result in land that was fallow rather than derelict (i.e. undeveloped land of no intrinsic benefit to the community or the public) being developed into productive use or converted into wildlife habitat.

v Evidence could include photographs, an environment plan, ground treatment strategy, or design results.

2.1.7	Apart from the actual land-take, did the design or construction of the project also take into consideration the conservation of topsoils, subsoil, and conservation or use of on-site mineral resources? If No, score 0; if yes, score 4	4

Lack of use of soils and minerals due to poor quality of these materials can still score points, but evidence of this must be presented – 'best use' can be the non-use of soils and minerals, which also minimises the environmental impacts of excavation, transport and/or disposal of the excavated material.

Note: Further scores are available for the re-use of subsoil and topsoil in Section 8.

v Evidence could be in the form of documented statements in appropriate reports or meeting notes about the optimal use of soils.

2.2 Flood Risk

Any civil engineering project has *some* flood risk associated with it and may alter the flood risk for others. The central tenet of this sub-section is for designers first to assess what the run-off is likely to be from the project once completed and then undertake any measures to deal with run-off or to reduce flood risk, whether for the project or elsewhere. No such measures may be needed; hence Question 2.2.1 is NSO but 2.2.2 is not.

		Client	Design	Con-struction
2.2.1 **NSO**	Have designers assessed run-off from the scheme (bearing in mind the possibility of increased rainfall due to climate change)? If No, score 0; if Yes, score 2		2	

Any development, whether or not situated in a floodplain, can contribute to increased flood risk. Creating additional sealed surfaces on previously open ground will increase run-off, which, if fed into existing rivers or sewerage systems, adds to the existing load. Climate change has been predicted to lead to increased rainfall including incidences of extremely heavy rains, the type of events that cause flooding as a result of sewerage systems and rivers not being able to cope with the sudden volume of water run-off.

Note that even refurbishment projects may create additional sealed surfaces and a run-off assessment should be carried out in any case, to ensure that run-off does not exceed the capacity of existing systems.

- **Evidence would include assessment or calculations of run-off or, for larger projects, consultants' reports and/or evidence of consultations with appropriate regulators. On certain types of projects, especially small ones – for example small bridges over a river or canal, and river or canal bank strengthening – a qualitative assessment may be sufficient evidence. For example, the assessment may have been made at and recorded in minutes of a design meeting.**

2.2.2	Is there evidence that the design has incorporated measures to reduce flood risk, whether within its boundaries or somewhere else? If No, score 0; if Yes, score 5		5	

This question can be scoped out if a run-off assessment was carried out (Q2.2.1) and did not require any measures to be taken.

Flood risk from new developments can be reduced by keeping the number of sealed surfaces requiring drainage to a minimum (by using permeable paving materials, greening roofs etc) and by introducing Sustainable Drainage Systems (SuDS) such as balancing ponds or wetlands wherever possible. Further guidance on these issues is available in PPS25 (PPS15 in Northern Ireland) and from CIRIA (*Sustainable Urban Drainage Systems*, 2001, *The SUDS Manual* (C697) 2007, *Site handbook for the construction of SUDS* (C698) 2007), DEFRA and the Environment Agency/SEPA/EHS-NI. Other measures could be more fundamental, such as raising the level of a road so that it is above the floodplain, with culverts incorporated to allow water to flow under it.

- **Evidence should show what measures (such as the ones mentioned above) have been incorporated into the design. This could be in the form of drawings, specifications or other design output documents.**

2.3 Contaminated Land

Land contaminated with hazardous substances originating from previous uses may need to be treated to protect human health and the environment, and enable redevelopment. The nature, distribution and hazards posed by contamination must be assessed on a site-specific basis. Hazards often include substances such as heavy metals, which can pose risks to human health, or hydrocarbons, which can pose a risk to water resources.

Hazardous gases and vapours often originate from thick fill or deposits of waste either on or near to the site, or from coal or other mining activities beneath the site, and may impact on developments. Gases of most concern are methane, which can be explosive or flammable, and carbon dioxide, which can be toxic and an asphyxiant through the displacement of oxygen. Both are, in addition, significant 'greenhouse gases' implicated in triggering global warming and therefore climate change. Other hazardous gases and vapours, such as hydrogen sulphide, hydrogen cyanide and solvents, could arise from old industrial process sites.

Hazardous gases can also derive naturally from organic deposits such as peat (for example, methane and carbon dioxide) or rocks such as granite (radon).

Remediation of land for civil engineering projects involves the same processes and technologies as remediation for other types of use. However, the 'suitable for use' principle indicates that, depending on the type of civil engineering project, clean-up may not be needed to the standard required for more sensitive land uses such as housing or schools.

The principal legislation controlling contaminated land in the UK is planning legislation, which requires developers to deal with any contamination as an integral part of planning application. Furthermore, Part IIA of the Environmental Protection Act 1990 addresses the issue of how to deal with historical contamination that may lead to significant harm. It presents a risk-based definition of what legally constitutes contaminated land. The management and reduction of risks posed by contamination are key drivers of current contaminated land policy and practice. In addition to environmental risk reduction, the sustainability of the remedial solution selected, the residual environmental risk remaining after remediation, and the durability of the solution, all need to be considered.

For the purposes of this document 'Contaminated Land' is defined as land containing hazardous substances originating from previous uses, which may, or have been proven to, cause harm or nuisance to human health, the environment or local amenity. The statutory definition of contaminated land (under Part IIA of the EPA 1990) is not used.

Note: Questions 2.3.1 to 2.3.5 can be scoped out if no hazardous substances are likely to be present on site. However, an audit and/or investigation (Question 2.1.1) must have been carried out to establish this. If an audit or investigation has not been carried out, these questions cannot be scoped out.

		Client	Design	Con-struction
2.3.1	If the site had been contaminated, were remediation requirements based on: – published guide/trigger values, score 1 – published CLEA* values + other guidelines/triggers where no CLEA exists, score 3 – published CLEA values + QRA** where no CLEA exists, score 6 – site-specific conceptual model/QRA/RBCLs***, score 7	**7**		

*CLEA = Contaminated Land Exposure Assessment
**QRA = Quantitative Risk Assessment
***RBCL = Risk Based Clean Up Levels

Target concentrations or remedial targets should be developed from a site-specific, risk-based approach. Target criteria may be developed from appropriate water quality objectives or soil criteria. To manage both risks and clean-up costs, it is now appropriate to conduct a site-specific Quantitative Risk Assessment (QRA) to assess contaminant sources and pathways, and receptors that could be harmed by the contaminants. For human health risk assessment, the recently published CLEA (Contaminated Land Exposure Assessment) methodology may be used. The model provides published risk-based intervention values for certain metals for garden, allotment, and commercial or industrial end uses, based on a specific set of assumptions about those end uses. However, it is restricted to long-term human toxicity effects and does not include acute effects or ecotoxicity. Other UK and overseas models can be used for receptors such as groundwater, surface water or ecology.

However, if other models are used as an addition to or instead of CLEA (e.g. *RiscHuman*, RBCA), these must be adjusted to reflect the context of UK legislation. This is because most US models are based on exposure to contaminants over a human lifetime (usually assumed to be 70 years) whereas UK legislation (and CLEA) is based on exposure of the likely most-sensitive human receptor – which has been assessed to be a 0 to 6-year-old female child. Fixed guideline values, such as the ICRCL target values, have been superseded by the risk-based approach and are no longer valid. The Soil Guideline Values (SGVs) set out in new guidance issued by DEFRA and the Environment Agency should now be used, replacing the old ICRCL trigger values. It should be noted though that the SGV values, like the former ICRCL values, are advisory rather than statutory. Other general criteria such as the Dutch Intervention Values are not directed towards the suitability-for-use principle but may provide general indicators on severity of contamination.

Excavation and disposal to an off-site landfill ('dig and dump') still constitutes the way many sites in the UK are remediated, but this is not a sustainable approach, except possibly on a small scale. The most sustainable approach uses technologies that can destroy contaminants in situ (bioremediation, thermal desorption etc), although this is generally restricted to organic contamination. In between there is a raft of in-situ and ex-situ technologies with varying degrees of sustainability.

v Evidence could be in the form of a remediation strategy outlining the methods and values to be achieved.

		Client	Design	Con-struction
2.3.2	If the site had been contaminated, was the remedial solution: – 'dig and dump', without regulatory agreement, score 0 – agreed with regulatory authorities as appropriate, score 6 – above the minimum requirements of the regulatory authority, including use of innovative technology, score 8	**8**		

An innovative technology is one where:

- it can be defined as a new application in the UK;
- it will be assessed as part of a CL:AIRE (Contaminated Land: Applications in Real Environments) demonstration project; or
- there is other substantial information such as reported research to demonstrate innovation.

Most remedial technologies have advantages and disadvantages. Which technology is most appropriate will depend on the site conditions, the type and extent of contamination and the intended use. 'Dig and encapsulate on site' includes cover layers and vertical barriers such as slurry walls, which can contain, but do not destroy, contaminants. Cement-based technologies (stabilisation or solidification) can immobilise contaminants for several decades or longer. Incineration can destroy organic contaminants, but can result in air emissions and ash residues that need to be landfilled. Vitrification destroys some contaminants and immobilises others. Physical remedial processes can result in concentrated residues or transfer of contaminants to an alternative media (for example, soil washing, and soil vapour extraction).

Some technologies have substantial energy and/or material requirements (e.g. vitrification), or may in themselves result in environmental impact or nuisance.

The most sustainable technology from this perspective is probably natural attenuation, but this requires management of environmental risk over substantial time periods. In each case, the most sustainable solution should be identified through an appraisal of options.

v Evidence could again be in the form of a remediation strategy and action plan, which has been approved by the EA, SEPA or EHS-NI. To score the maximum points the innovative technology must fit the criteria specified above.

		Client	Design	Con-struction
2.3.3	If ground-generated gases are present, is there evidence of risk reduction and management in place and fully implemented* If no, score 0 if yes, score 3 if yes, and design and implementation is not reliant on management and intervention that is 'fit and forget', then score 5	5		

* This includes protective measures in the ground and/or in buildings and structures.

Protection from hazardous gases can be achieved through creating barriers to prevent migration into buildings or between sites, or to create preferential pathways through which gases can be safely vented.

Verification may be required through long-term monitoring of potential pathways or accepted compliance points to ensure no further increase in the levels of contamination (for example from "bounce-back" from some remediation processes) and/or confirm reducing pollutant values, which is a particular requirement for monitored natural attenuation.

Externally verified validation of remediation is often not conducted, and there is still little information on the long-term performance of many remediation technologies.

Relevant guidance in this area includes the CIRIA Publication C659 *Assessing risks posed by hazardous ground gases to buildings*.

- **Evidence will include design details and monitoring plan.**

2.3.4	Is there evidence that the impacts of the implementation of the remedial solution have been assessed and appropriate control measures been put in place? If No, score 0; if Yes, score 4			4

All appropriate control measures should have been in place for noise, dust and pollution control during the remediation phase. For example, for transport of contaminated soil off-site, this would include wheel washing, sheeting and the provision of relevant documentation. On-site measures may include fencing off and signposting the contamination, as well as ensuring that no migration of the contamination is taking place. No significant negative impacts should result from the remediation process.

- **Control measures, monitoring data, regulatory visits and actions, waste disposal activities etc should all be documented, and this documentation should be available to demonstrate that this was the case (for example, site records, photographic or otherwise, delivery, transfer and consignment notes, invoices etc).**

		Client	Design	Con-struction
2.3.5	Is there evidence that the durability of the remedial solution, and maintenance and monitoring, have been considered over the lifetime of the project and beyond? If No, score 0 if some evidence, score 3 If warranties and insurance are in place, score 6	6		

Evidence should be available regarding the longevity of the remedial solution and normal maintenance requirements. The projected lifetime of the development must not be greater than the lifetime of the remedial solution. Long-term monitoring is required to ensure the continued effectiveness of some solutions, including natural attenuation, permeable reactive barriers, slurry walls, ongoing process-based treatments for groundwater, etc.

Monitoring arrangements will depend on the type of remediation method chosen and its projected lifetime. Where monitoring is necessary, there should also be contingency plans in case monitoring data should demonstrate any fault or deterioration in the remedial solution.

- **Evidence should demonstrate that the remedial solution appropriately meets the requirements outlined in the guidance above.**

2.3.6	Is there evidence that measures, including monitoring of any containment or contaminant, are in place to prevent any *future* contamination of the site? If No, score 0; if Yes, score 4	4

The question can be scoped out if no on-site contamination had been identified and therefore no remediation was necessary, <u>and</u> there is no new or existing use on or near the site involving any potential contaminants.

This question applies to a previous contamination from on or off the site, which has been remediated using a temporary measure (see question 2.2.5 above), a*s well as any possible contamination resulting from the new use of the site or any other potentially contaminating use adjacent to the site*. How likely this is, how severe any potential contamination would be, and what kind of preventative measures should have been taken, depends on the nature of the project and should be assessed accordingly.

For example, in the design of new facilities such as fuel tanks, waste storage areas, chemical stores or processes that include chemical use, new infrastructure should be built to current standards to prevent future contamination of ground and groundwater. Where the subject site has been cleaned up, but the neighbouring site is potentially contaminated and there is a risk of migration onto the site resulting in recontamination, evidence should be available to demonstrate that measures have been taken to control the risk.

- **Evidence could show the implementation of recommendations from any remediation strategy, including provision of appropriate monitoring facilities. Evidence could be drawings or photographs showing the installed features.**

3. LANDSCAPE ISSUES (includes rural landscape *and* townscape)

3.1 Basic Principles

The visual impacts of engineering schemes on their surroundings have long been an issue of concern in the UK, where the density of development and infrastructure can dominate the small-scale, complex and often valuable landscape and townscape settings. Guidance on the evaluation of such effects covers both the visible effects on the intrinsic qualities and value of the setting and the visual effects on people within that setting. The general assumption has been that engineering schemes will have an adverse effect on the appearance of a place. However, the guidance allows equally for the assessment of beneficial effects.

Considerable benefits can be gained from the inclusion of landscape skills in a project from the earliest stage, to provide influence on the design as well as assessment of issues. Scheme concepts and options are then developed with best "fit" into their environment as a key aspect, concerns being addressed through the basic form of the proposal and not left for expensive mitigation measures added after decisions have been made.

Landscapes and townscapes of particular value are protected and much has been written about the characteristics of these areas. The Countryside Agency (now part of Natural England) provided a definition and description of the many different rural landscape character areas to be found across England, which also reflects conservation and cultural values. Smaller-scale studies are gradually filling in the detail within these broad character areas and on the character of towns, as a background to planning policy and other strategies. CABE – the Commission for Architecture and the Built Environment – is the UK Government's advisor on architecture, urban design and public space, and deals with urban landscape in a roughly equivalent manner. Similar approaches are being adopted in other parts of the UK. It is therefore becoming possible for all engineering schemes to be assessed according to appropriate guidance and for some degree of context information to be readily available.

Landscaping works for civil engineering projects are often implemented by specialist sub-contractors and may be designed by sub-consultants. These works usually contain most of the environmental measures included with a project, such as planting, habitat creation, public space, recreation facilities, screen walls or fences, interpretation, and amenity lighting. They may also have had substantial community involvement in design development and in aspects of the implementation. These elements will have a significant influence on the public perception of the scheme as a whole. Construction and maintenance of the landscaping works may continue long after the main engineering elements have been completed and brought into use.

As with Section 2 it is acknowledged that, for some non-land-based projects, landscaping will not be a relevant issue. Projects falling into this category of not using any land and therefore not requiring landscaping can therefore scope the whole of Section 3 out (including NSO questions). However, this applies only to projects where no land-based facilities are used at all, even if only temporarily, e.g. for a site compound. Where a formal award is being applied for CEEQUAL Ltd should be contacted for an amended spreadsheet.

		Client	Design	Con-struction
3.1.1 **NSO**	Is there evidence that landscape and visual factors have been considered at each stage of the project, including the evaluation of scheme options? If No, score 0; if Yes, score as indicated	4	3	3

At design stage this includes considerations such as siting, massing, colour, texture, materials, earthworks, lighting, signs, planting and aftercare.

At construction stage measures could include site fencing (and its appearance); siting of temporary routes and structures, depots and spoil heaps; lighting; good housekeeping on site, general appearance, tidiness etc.

For a Whole-project or Client & Design award, client scores are awarded if the brief actively encourages consideration of landscape and visual factors at each stage (3 points for design and 3 for construction).

v Evidence: Project brief, landscape/townscape assessment reports and comparison of alternatives for Client & Design score. Site visits, photographs, site meeting minutes and management plans for Construction score.

3.1.2	Is there evidence that there has been consultation on, or consideration given to the balance between community and private space? If No, score 0; if Yes, score as indicated	1	1	

For sites that had no public access prior to development and/or where there was no evidence of such uses, this question can be scoped out.

When introducing a new built feature in the landscape, issues regarding public access and security need to be addressed during the planning and design stages. If a scheme results in the closing off to the public of previously accessible areas, there has to be a trade-off between the loss of accessible land and the provision of public access. This could be the provision of new access routes, such as bridleways, cycle paths or walkways, or the enhancement of existing routes or amenity features. Consideration of the balance can also result in preventing public access on health and safety grounds and to avoid nuisance.

Please note that this question applies to any site that was publicly accessible prior to development for formal *or informal* amenity use, for example, for walking, dog walking or as informal play area. Such areas, even where not formally protected, can have an important amenity value for the local community and some compensation for the loss of that amenity should be made where possible. Any such compensation scheme should also include maintenance arrangements to ensure its long-term success.

v Evidence could include consultation meetings with councils or other local groups, or evidence from drawings or other design documents that show consideration of open space/public access.

		Client	Design	Con-struction
3.1.3	Have opportunities been taken during design to introduce new public amenity features or to enhance existing ones? If No, score 0; if Yes, score as indicated	4	3	

This question must not be scoped out except in remote areas where public amenity features are of no benefit to anyone. This does not include remote beauty spots where public amenity is an important consideration.

Examples for enhancing existing amenity features could be the provision of formal and informal public open space, footpaths, extended planting schemes, consequent environmental enhancement, or the introduction of an improved lighting scheme, thus enhancing security.

v Evidence could include evidence from drawings or other design documents that demonstrate incorporation of new/enhanced public amenity.

3.1.4 NSO	Is there evidence that the project design fits the local character in terms of: – landform or levels?, Score 2 – materials?, Score 2 – planting?, Score 2 – style/detailing?, Score 2	8		

Ideally, any new project should respond to its surroundings and blend in with, or enhance, the local character. This does not imply that it has to look vernacular. A building or structure can be contemporary, yet still reflect local relationships, design elements, colour and material combinations. The way in which a scheme is set into the landform or townscape surroundings can have a major influence on its acceptability – appropriate choice is needed of levels, gradients, profiles, soil stabilisation, retention, etc. Detailing of walls (for example, regional styles in dry stone walls), facings, fences, posts, hard surfaces and lighting, etc can respond to area-specific factors.

The mere planting of 'indigenous' species or 'same as next door' is ***not*** sufficient in this context. Planting should represent or complement the truly local character of the area in terms of vegetation type and structure (for example, woodland pattern and structure, shelterbelt form, hedgerow character, coppice, designed landscape elements, meadows, heathland, wetland, urban squares and parks) as well as choice of species and the matching of species to soil type..

v Evidence could be in the form of relevant instructions in the brief, or evidence of research into and understanding of local character, all related to the design and completed scheme itself.

3.2 Legal Requirements

National Parks and Areas of Outstanding Natural Beauty (AONBs) are afforded statutory protection under the National Parks Act. These place strict controls on the extent and types of work that can be undertaken, with a general presumption against development. Regionally important areas of landscape are designated in structure and unitary plans, with presumption against some forms of development and controls on others. Conservation Areas and Green Belts are defined in the unitary and local plans around the main urban centres; Green Belts are protected primarily for their openness rather than any intrinsic landscape qualities but also include a presumption against development.

Planning documents also include policies intended to foster improvement in landscape quality outside the protected areas, often in association with development and/or with the establishment of community forests.

Most of the adverse impacts of a project on the landscape or townscape are the direct result of the choice of location or alignment and can be broadly identified from an early stage. It is therefore important that these fundamental decisions are made on the basis of appropriate design standards and evaluation of options. Poor location or alignment can also lead to a cumulative impact with other adjacent facilities, which can be greater than the sum of its parts. This should lead to some reconsideration of the design, but may not be brought out by current assessment guidance. It is a particular factor in the gradual erosion of landscape quality in rural and green belt areas.

Public access to the landscape, beyond established rights of way, confers its own added value, provided that this includes consideration of safety and security in the design of all public routes, thus avoiding the creation of publicly accessible areas that are not used by the public.

		Client	Design	Con-struction
3.2.1	Is the site in an area of high landscape value (For example, AONB AGLV, Conservation Area or similar)? If Yes, score 0; if No, score 6	6		

This question can <u>only</u> be scoped out:

- ***on projects involving existing infrastructure and remaining within the existing footprint; or***
- ***on projects that involve structures that are necessary for health & safety (for example, navigation equipment along coastlines) or to enable access to a site for public education or enjoyment.***

For example, upgrading of an existing wastewater treatment plant in an AONB could be scoped out, provided it remained essentially within its existing footprint, but road widening that was simply to increase capacity or speed generally and that involved new land take could not be scoped out.

v Evidence needs to show that local or other statutory authority plans have been viewed to establish land status. This could be included within the EIA or otherwise shown by a record on the project file. Evidence for scoping out should demonstrate that the project is within its existing footprint.

		Client	Design	Con-struction
3.2.2 **NSO**	Are the landscape proposals in accordance with the aims of applicable landscape development or enhancement policies published by the relevant local, regional or national authority? If No, score 0; if Yes, score 2	**2**		

v Evidence of compliance with authority plans could be in the form of a planning approval. If planning approval is not needed, then evidence of consultation with relevant authorities would be needed. This could be included in the EIA if one has been completed.

3.2.3	What percentage of substantial trees, trees protected by a Tree Preservation Order and/or substantial hedgerows present on the site* have been retained as part of the design? under 25%, score 0 25% to <50%, score 2 50% to <75%, score 4 75 to 100%, score 6 If under 25% retained, but at least 25% translocated, score 1	**6**		

* Excluding trees that had to be removed for health & safety reasons or because they were causing damage to a building or structure.

Scope out if no substantial trees, hedgerows or TPO trees on site.

Substantial and well-established trees or hedges are not only important landscape features, but also perform important functions such as improving air quality by filtering dust, adjusting the microclimate and producing oxygen. For instance, in order to replace one 100-year-old Beech tree, at least 2000 young trees would have to be planted to achieve a similar performance in these functions. Substantial native trees are also of considerable habitat value, especially large old trees. The definition of 'substantial' will vary according to species and location, but for most instances can be taken as trees with a girth of 600mm (190mm diameter) at 1.5m above ground.

Under the Town and Country Planning Act 1971, a Local Planning Authority can place a Tree Preservation Order (TPO) on any tree, group of trees or woodland to conserve the amenity value. There are conditions that the Local Authority can place on development regarding the removal of or works to trees in conservation areas. Trees over a certain size (over 100 mm diameter measured at a height of 1.2 m) may require a felling licence before they can be removed. Consent to fell trees under a TPO will normally require new planting in compensation. Good practice should be to avoid felling of substantial trees altogether. Where this cannot be avoided, adequate replanting should always form part of the landscape proposals, whether legally required or not.

Please note that translocation of substantial trees or hedgerows is a laudable, if inferior, alternative to felling, but can be expensive and always carries a risk of failure, especially if essential aftercare is not guaranteed. The most desirable solution should therefore always be to retain and protect existing vegetation of landscape value.

v Evidence: initial site survey, photographs, aerial photographs, vegetation survey, in comparison with design drawings.

		Client	Design	Con-struction
3.2.4	Is there evidence that trees and other vegetation that were to be retained as part of design have been adequately protected during construction, or, if translocated, that current best practice has been applied? If No, score 0; if Yes, score 4			4

Adequate protection of trees and other vegetation requires, in broad terms, a fence to be erected under the edge of the canopy or at a distance of half the height of the tree, whichever is the greater. This fence should not be broached without prior specialist consent. See BS 5837:1991 – Trees in Relation to Construction, which also provides other advice on fence locations and on fence type.

- **Evidence: Contractor invoices for translocation, photographs, site visit during construction, monitoring of protection measures, site visit of the completed scheme, etc.**

3.2.5 **NSO**	Has any other loss of valuable, distinctive or historic landscape features been: – balanced by proposals within the project?, Score 3 – exceeded or bettered by proposals in the project?, Score 5 – avoided altogether?, Score 7	7		

Landscape features include trees and other vegetation, such as shrubs and hedgerows, meadows or scrubland, but also features such as topography, rocks and boulders, ponds and brooks, swamps and wetland areas, parks and squares, views and vistas. The last two items are of particular importance in urban areas.

Note that double scoring for avoiding any loss of landscape features in this and question 3.2.3 is permissible.

- **Evidence could be in the form of a comparison of drawings or photographs showing change of land use and new landscape features. Whether what is seen as balance or betterment may be a matter of judgement and agreement between Assessor and Verifier. Avoidance of loss of landscape features could be demonstrated in some form of design brief document that shows that the project was expressly designed to avoid such loss.**

3.3 Implementation and Management

There is some concern amongst clients that the quality of implementation of landscape works has declined noticeably, due to the changes in project control brought about by the increased use of Design & Build and related forms of procurement. This may lead to an increase in the level of prescription provided in the contract specifications. Inclusion of an Environmental Management System (EMS) and its related detail in the Landscape Management Strategy (LMS) or Landscape Works Plan (LWP) should both help counter this downward trend. If a Site Environmental Management Plan (SEMP) I s drawn up to manage the environmental aspects of the construction work, this should include a section on landscape, which can then be considered equivalent to an LMS or an LWP. However, this will only work if sufficient means of control are built into the contract and carried through into implementation.

		Client	Design	Con-struction
3.3.1 **NSO**	Has a system or plan* been utilised during the construction period to ensure that current best practice was applied to avoid any damage to landscape features? If No, score 0; if Yes, score 5	**5**		

*This could be a Landscape Management Strategy (LMS), a Landscape Works Plan (LWP) or an equivalent section in a SEMP or integrated Project Plan.

Any construction work, however small, and including refurbishment, can cause damage to landscape features, through access, transport of materials and so on, and any such plan would lay down procedures for avoiding or remediating these. It should include procedures for identifying responsibilities and personnel, for minimising the impact of the construction work on landscape features, for the management of the landscape while the construction work is ongoing, as well as a monitoring and reviewing process. It is worth stressing here that 'landscape features' include both soft and hard landscape features, 'green' and 'brown', and rural and townscape.

The plan must be in place early enough to permit implementation from the start of work on site. However, as circumstances on site may change over the course of a project, the regular monitoring and reviewing process needs to take account of these changes and ensure that the plan is amended accordingly.

v Evidence of the implementation of the plan can include documentary evidence such as progress meeting minutes, photographic evidence and/or could be verified via site visits.

3.3.2	Does the plan referred to in Question 3.3.1 also reflect the commitments and proposals made during the planning consents process? If No or no plan at all, score 0; if Yes, score 4	**4**

This question can be scoped out only on projects that did not require planning consent.

v Evidence of a comparison between the plan and the planning approval needs to be shown.

		Client	Design	Con-struction
3.3.3	Have opportunities been taken for advance works, such as planting prior to construction, thus enabling plants to become established during the construction phase? If No, score 0; if Yes, score 3	3		

There are a very few reasons why this question may be scoped out.

- ***a) Scoping-out may be possible on Construction-Only awards, where the contractor genuinely had no opportunity to influence any advance works.***
- ***b) If the project was completed on a fast-track basis such that advance works were not possible, for instance a project completed for health & safety reasons.***
- ***c) If there is genuinely no requirement for landscape works on the project.***

In all these cases the Assessor and Verifier should establish and agree whether there was genuinely no opportunity.

v Evidence may include site programmes and photographs showing the extent of advance works.

3.4 Completion and Aftercare

Aftercare of landscape schemes can be as important for their success as good design and implementation. Public perception of a project is too often let down by an unkempt appearance, or by planting / habitat creation schemes not developing their full potential due to lack of appropriate management and maintenance.

3.4.1 **NSO**	Is there a programme or plan for the *ongoing management* of the landscape, to be handed to the owner or managing agent of the completed project? If No, score 0; if Yes, score 5	5		

This can either have been prepared as part of the Landscape Management Strategy / Landscape Works Plan etc, or can be a separate document (for example a Landscape Management Plan).

The programme or plan should include detailed descriptions of any maintenance tasks that have to be carried out on a regular basis (for example, grass to be cut to a particular height, grass cuttings left or collected, selective tree-felling or pruning, further planting etc) including an indication of frequency (once a fortnight, once a year, every six years etc) and, where applicable, time (for example, for meadows the right timing of cuts is crucial).

Note that this programme or plan needs to go significantly beyond the normal 3- or 5-year maintenance plan that usually forms part of a landscape contract.

v Evidence should be in the form of a plan covering landscape management measures that go beyond the normal 5-year maintenance requirements.

4. ECOLOGY AND BIODIVERSITY

4.1 Basic Principles

There is concern amongst society in general, and nature conservation organisations in particular, that wildlife habitats and the species that occupy them are continuously being damaged and destroyed. New development is often cited as one of the reasons for this destruction. As a result, the biodiversity[1] of an area, and ultimately of the UK, can be harmed.

In order to support the conservation of biodiversity at all scales, the UK government signed up to the Convention on Biodiversity at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992. This commitment has been translated into action through the publication of *Biodiversity – the UK Action Plan 1994* and, more recently, national Biodiversity Action Plans such as *Working with the Grain of Nature – A biodiversity strategy for England* and Biodiversity Action Plans (BAPs) at the local, County or District, or even company level.

However, development need not have a negative impact on biodiversity and wildlife. There are many occasions when careful planning and implementation of civil engineering projects can not only avoid damaging important habitats and harming protected species, but can also lead to the creation of new habitats or the construction of facilities to encourage certain species of animal. It can thereby assist local Biodiversity Action Plans (LBAPs) in achieving their targets. Maintaining biodiversity and, where appropriate, enhancing it, are key aspects of sustainable development and as such are important parts of Government policy.

Ecological assessment[2] of a development project at the design stage can help to identify potential adverse impacts and can also identify ways in which these can be mitigated or compensated for, or where new habitats can be created or species encouraged. Land that is of high or moderate value for wildlife is normally recognised in some way, usually by a designation such as Site of Special Scientific Interest (SSSI), which is a statutory designation, or Site of Importance for Nature Conservation (SINC) or similar, usually placed on site by the local planning authority. Wherever possible, the development of such sites should be avoided, as the opportunities to mitigate for damage to or loss of habitats or species may be strictly limited.

A major new guidance document *Working with Wildlife: A Resource and Training Pack for the Construction Industry* was published by CIRIA March 2004, supplemented in 2005 by a companion '*Site Guide*' (*C567).* These assist all involved in construction projects to better address and manage the wildlife issues on development sites.

(continued overleaf)

[1] Biodiversity represents the richness and variety of plants, birds, animals, insects, habitats and soils that exist throughout the world. However, *conservation* of biodiversity normally means the conservation of what may be called 'desirable species', that is, those species that someone, usually Natural England or an equivalent expert, has decided are desirable within a specific area or location. In the context of CEEQUAL, biodiversity has this meaning.

[2] An Ecological Assessment should, at a minimum, be a Phase 1 type of assessment, as defined in the *Handbook for Phase 1 Habitat Survey* (Nature Conservancy Council 1990), and carried out prior to any construction activity taking place on site.

		Client	Design	Con-struction
4.1.1	Had any part of the site that is adversely affected by the construction works been identified as of high ecological value*? If Yes, score 0; if No, score 6 If no surveys or desk studies carried out to identify ecological value of the site, score 0.	6		

This question must not be scoped out, except for projects that involve structures that are necessary for health & safety (for example, navigation equipment along coastlines, or improvements to waste-water Treatment plants) or to enable access to a site for public education or enjoyment.

For a Design-Only award this question can be scoped out in situations where the designer had no influence over the choice of location. Evidence for this would be in the brief.

*Land that is of 'high ecological value' is

- Land that is designated for its nature conservation value, for example, as a Site of Special Scientific Interest (SSSI), a National Nature Reserve (NNR), a statutory Local Nature Reserve (LNR) or land designated as a Site of Importance for Nature Conservation (SINC) or equivalent by an official conservation body such as Natural England, a Wildlife Trust or a local planning authority, or has been designated as an important green corridor;

and/or

- Land that has been identified by an ecological assessment of the site, carried out prior to any site clearance or other activity, as being of ecological importance. The ecological assessment should either have been carried out by a representative of the local Wildlife Trust or by a qualified consultant who is a full member of the Institute of Ecology and Environmental Management.

v Evidence would be in the EIA or some other environmental assessment as defined in note 2 on the previous page.

4.1.2 **NSO**	Has consultation with a nature conservation organisation* on the ecological impact of the proposals been undertaken and communicated to project team members at each stage of the project (planning, design and construction)? If No, score 0; if Yes, score 2 for each stage.	2	2	2

* for example, Natural England or equivalent, the local authority ecologist, or the local Wildlife Trust or equivalent.

v Evidence would be demonstration of the consultation in the form of a report, minutes or letter. Evidence of communication would be through team meeting minutes or other briefing note.

		Client	Design	Con-struction
4.1.3 **NSO**	Has an Ecological Works Plan or an ecological section in the Site Environmental Plan or Integrated Project Management Plan been drawn up and implemented during construction? If No, score 0; if Yes, score as indicated	**1**	**2**	**3**

Such a plan should include issues such as appropriate seasons for carrying out works in order to minimise adverse impacts on wildlife, the methods to be used if this proves impossible, responding to unexpectedly finding wildlife on site, control of noxious plants, communication about these issues with site staff and procedures for regular monitoring and reviewing.

An Ecological Works Plan or an ecological section in the Site Environmental or integrated Project Management Plan is designed to be implemented at the construction phase of the project. Hence more points are given for this phase. A site ecologist may need to be appointed to assist with implementation. Depending on the size of the project and the ecological issues involved, this can be full-time, part-time or on a Watching Brief basis.

Some form of plan or statement for considering ecological aspects of the project should be drawn up by the client, and a preliminary version of the plan should be drawn up at the design phase. The points for these roles are scored for drawing up the preliminary plans at the relevant stage in the project. The full score for Construction can be awarded only if there is evidence for correct implementation of the plan.

- **Evidence that ecological considerations (such as nesting seasons, protected areas of the site etc.) have been built into the project planning needs to be identified. At client and design stage this may be incorporation of requirements into project briefs and/or tender documents and specifications. At construction stage it may be a stand-alone plan or part of other, more-generic, project planning documentation. Evidence of implementation should be shown through routine project progress monitoring and reporting.**

4.2 Legal Requirements

Certain species of plants and animals and/or their nesting and roosting habitats are protected by legislation, such as the *Wildlife and Countryside Act* 1981 (WCA 1981) as amended, the *Countryside and Rights of Way Act* 2000 (CRoW Act 2000), the *Protection of Badgers Act* 1992 and the *Conservation (Natural Habitats, &c) Regulations* 1994. Failure to take adequate steps to protect such features could lead to adverse impacts and, possibly, to prosecution. The CRoW Act 2000 amends the wording of section 9(4) of the WCA 1981 to include the offence of 'recklessly' disturbing sheltering places of Schedule 5 animals (such as bats). This change now places the onus on the developer of land to demonstrate that they took all reasonable steps to identify if any protected species were present on their site and that, if they were, they were adequately protected throughout the development process.

Section 14 (2) of the WCA 1981 makes it an offence for certain species of plant (as listed in Schedule 9, Part 2 of the WCA 1981) to be planted in the wild or otherwise caused to grow in the wild. The two plants that give the most problems to civil engineering projects are Japanese knotweed (*Fallopia japonica*) and giant hogweed (*Heracleum mantegazzianum*), the removal and disposal of which requires special procedures.

Injurious weeds as defined by the *Weeds Act* 1959, such as common ragwort (*Senecio jacobaea*), may also be a problem. Other weeds may cause particular problems in wetlands. If these are defined as invasive, injurious or otherwise in need of control by an independent body such as the Environment Agency or the Centre for Aquatic Plant Management Group at the Centre for Ecology & Hydrology (http://www.ceh.ac.uk), then these also may need to be controlled on site.

The advice and views of an ecologist will almost certainly be needed to judge whether or not the following factors have been achieved.

		Client	Design	Con-struction
4.2.1	If protected species were found on site, have plans for protecting these been: – drawn up and approved?, Score 2 – monitored?, Score 3 – achieved?, Score 3 If No to all, score 0	2		6

Plans are likely to include guidance on appropriate times for carrying out work – for example, clearing vegetation outside the nesting season – together with method statements and instructions for relocation of species, and should be approved by Natural England or its equivalent, or by a qualified ecologist.

Note that 'achievement' must be assessed appropriately up to the point of assessment, not against a prediction of what is anticipated to be achieved in the long term.

Note that 8 points can be awarded for a Construction-only Award where the contractor has taken responsibility for drawing up the necessary plans and obtaining approval for them.

- **Some evidence of steps taken to safeguard protected species may be gained from documentation such as a Site Environmental Management Plan, but a site visit or detailed records including photographs may be required to see or demonstrate examples of practical measures that have been implemented. It may also be necessary to talk to relevant staff.**

4.2.2	If there were Schedule 9 plants (W&C Act 1981 or Wildlife (Northern Ireland) Order 1985) or other invasive plants or animals present on site, has: – a Method Statement (or equivalent) been drawn up and approved for their control and management?, Score 2 – has it been monitored?, Score 3 – and achieved?, Score 3 If No to all, score 0	2		6

In respect of Schedule 9 plants, it may not be possible to be sure that any measures to eradicate the plants have been wholly successful, at least not for some time after the project is completed. *Therefore the evidence to look for is whether or not all the actions that were set out in the Method Statement have been carried out.* If they have, the control of the plants should also have been achieved.

Some introduced animal species are invasive as a result of reproductive or competitive advantage, such as Signal Crayfish or Mitten Crabs. Method statements are required to prevent the spread of these species to areas where they are not already present. Note also that some species of animal are also called pest species, for example brown rat and feral pigeon. However, the occurrence of these species is not usually increased by civil engineering projects, and they are more a health and safety hazard for the workers than of strictly environmental concern. Hence they are not dealt with here.

Note that 'achievement' must be assessed appropriately up to the point of assessment, not against a prediction of what is anticipated to be achieved in the long term.

Note that 8 points can be awarded for a Construction-only Award where the contractor has taken responsibility for drawing up the necessary plans and obtaining approval for them.

- **Evidence should be in the form of method statements or other appropriate management control. Monitoring and achievement should be evidenced by demonstrating that the method statements have been adhered to.**

4.3 Conservation and Enhancement of Biodiversity

Biodiversity represents the richness and variety of plants, birds, animals, insects and soils that exist throughout the world. The UK has lost over 100 species in the last century or so, and many more have declined in number, range or both (*Making Biodiversity Happen*, DETR 1998). As a response to this issue, and in accord with its obligations under the Convention on Biological Diversity, a UK Biodiversity Action Plan was first published in 1994 and is now being implemented and developed by a partnership of the UK Biodiversity Partnership and the UK Government – see http://www.ukbap.org.uk/. Biodiversity Action Plans (BAPs) have been or are being produced at local level in response.

The construction industry has a major influence on the landscape and is bound to impact on biodiversity. The industry should be seen as a contributor to achieving the targets set out in local BAPs rather than simply as always harming biodiversity. A first step would be to avoid any reduction in biodiversity, a second to enhance biodiversity wherever possible.

Where potential damage to existing wildlife or wildlife habitat – identified in any ecological assessment of the site – is avoidable, then measures should be put in place at the construction stage to protect such features – see CIRIA *Working with Wildlife training pack* (C587, published in 2004) for guidance. Where the project being assessed will lead to the permanent loss of such wildlife features, there should be evidence that this loss will be compensated for or mitigated, preferably on the project site or as near as possible to it.

		Client	Design	Con-struction
4.3.1	Have recommendations been included in the design for the conservation and/or enhancement of existing ecological features (including BAP species and habitats) identified in an ecological assessment as being of value *? Relocation, Score 1 Conservation or protection, Score 5 Enhancement, Score 6	6		

* For example, designated land, protected species, local, regional or national BAP habitats or species. (See definitions under Question 4.1.1)

Relocation or re-instatement of existing habitats is the minimum requirement, if leaving the area untouched is not possible. This has to be carried out by, or in liaison with, a qualified ecologist. Relocation sites have to be very carefully selected and re-instatement of habitats requires careful planning and skilful implementation. Long-term aftercare and monitoring is essential to ensure that these measures have been successful – see Section 4.5.

Conservation or protection includes protection of existing habitats and other measures to ensure that existing species near the site are not harmed (e.g. protection of badger setts, bat roosts, ponds, fencing off with clear signs, staff briefings, and reptile/amphibian fences put up to ensure that species will not migrate into the construction area.)

Enhancement means 'added value' measures that go beyond mere conservation and protection measures. Examples of these measures include re-introducing appropriate vegetation such as reeds along banks of lakes or ponds, strengthening of hedgerows to improve or increase wildlife corridors, clearing intrusive vegetation (such as rhododendron or sycamore) from existing woodland, linking existing habitats (for instance via lines of trees or hedgerows, ditches etc).

- **Evidence would be in the form of drawings and specifications showing that the recommendations were incorporated into the design and, for a Whole Project or Design & Build Award, actually delivered.**

		Client	Design	Con-struction
4.3.2	Is there evidence that the implementation of these recommendations has been monitored throughout the course of the contract? If No, score 0; if Yes, Score 6	6		

If the ecological assessment identified features of value, but no measures to protect, conserve or enhance these have been recommended, Questions 4.3.1 and 4.3.2 should both score 0. They should only be scoped out if no features of ecological value were identified on the site.

v Evidence: Data that shows that monitoring has taken place or is taking place.

4.3.3	Does monitoring data show that implementation of these measures has been successful? If No, score 0; if Yes, Score 4	4

Scope out if timescale of the assessment does not allow for gathering of conclusive monitoring data.

The Assessor should judge these factors against recommendations and observations contained in any ecological assessment of the site.

Note that 'success' must be assessed appropriately up to the point of assessment, not against a prediction of what is anticipated to be achieved in the long term.

v Evidence: monitoring data that shows that measures have been successful.

4.4 Habitat Creation Measures

Civil engineering projects often present opportunities for existing wildlife habitats to be extended or new habitats to be created. Land of previously low wildlife interest can be adapted so as to provide wildlife habitat, thus enhancing biodiversity and the overall ecological interest of the area. Some projects, particularly linear ones such as roads and railways, hinder the movement of animals and create an added threat to their existence. The deliberate incorporation of features for animals can both reduce this threat and also positively encourage them to get to the new habitats the project has created.

4.4.1 NSO	Have recommendations or opportunities for creating *new* wildlife habitats (including BAP species habitat) been incorporated in the project? If No, score 0; if Yes, score 3 If includes BAP habitats or species, score 6	6

Habitat in this context means the complete natural environment for particular species, such as ponds and wetland habitats, species-rich hedgerow, broad-leaved woodland, grassland, etc. It does not include habitations such as bird boxes, bat boxes, badger setts, otter holts etc, which are covered in question 4.4.2.

v Evidence could be drawings and photographs of what has been included. To score for BAP habitats, it would be necessary to refer back to relevant authority plans or ecological assessment of the project.

		Client	Design	Con-struction
4.4.2 **NSO**	Have recommendations or opportunities for installing special structures or facilities for encouraging or accommodating appropriate wildlife (especially BAP species) been incorporated in the project? If No, score 0; if Yes, score 6	**6**		

Such structures or facilities may include artificial bat boxes or chambers, bird nest boxes, artificial badger setts or otter holts, green bridges or tunnels under roads or railways etc. Measures should be appropriate to the scale and nature of the project.

As with newly created habitats, these should have been recommended, designed and sited by, or in consultation with, a suitably qualified ecologist.

Note: To be awarded points under this section the structures need to be *in addition* to any measures either to compensate or mitigate for the loss of a structure or facility previously on site, or to protect existing species from harm (such as road tunnels where a new road crosses existing territories of animal species).

- **Evidence could be in the form of photographs or drawings that show incorporation of special facilities. Reference also needs to be made to the ecological assessment to ensure that these facilities are not being provided merely as mitigation.**

4.4.3	Is there evidence that the implementation of these recommendations is being monitored? If No, score 0; if Yes, score 5	**5**

- **Evidence in the form of site inspections or other site records, such as progress meeting minutes, which demonstrate implementation.**

		Client	Design	Con-struction
4.4.4 **NSO**	On completion of the construction stage, is there any evidence of a net *increase* in area of wildlife habitat compared to site baseline data? 5% to <10% increase, score 1 10% to <25% increase, score 2 25% to <40 % increase, score 3 40% to <55% increase, score 4 55% to <65% increase, score 5 over 65% increase, score 6	**6**		

The assessment work that needs to be undertaken to gain these points should compare the area of wildlife habitat that has been created with that which was on the site before construction works commenced. There is an assumption that, in time, the quality of the habitat will be similar to that which has been affected by the works. If this is not likely to be the case, a simple comparison in area terms may not be justified.

In respect of urban sites this can be accomplished by creating landscaping that incorporates ecological principles in its design and implementation. It can also be achieved by creating green or brown roofs or by providing nest boxes and other structures that help to accommodate wildlife.

Note: The Assessor or the Verifier may wish to seek the advice of a representative of a local Wildlife Trust or by a qualified consultant who is a full member of the Institute of Ecology and Environmental Management to assess whether the issues covered in this section have been adequately addressed.

v Evidence could be a written report by an ecologist or equivalent.

4.5 Monitoring and Maintenance

Maintaining and monitoring any habitat creation or species conservation measures is crucial not only to the success of those measures but also in helping to develop a body of knowledge about what works and what does not.

		Client	Design	Con-struction
4.5.1	Has a programme been drawn up for the *ongoing ecological management* of habitats and species conservation measures, including instructions for emergencies or abnormal events, to be handed over to the owner or managing agent of the completed project? If No, score 0; if Yes, score 6	6		

v Evidence could be a landscape management plan with specific reference to requirements of ecological habitat management or species conservation measures.

4.5.2	Is there a scheme in place (for a minimum of three years after project completion) for *monitoring* the success or otherwise of any management, habitat creation or translocation and species conservation measures undertaken on site? If No, score 0; if Yes, score 6	6

v Evidence could be a specific monitoring plan or part of a more generic maintenance plan that demonstrates the monitoring is in place.

5. ARCHAEOLOGICAL AND CULTURAL HERITAGE FEATURES

5.1 Basic Principles

The landscape today – rural and urban – is the product of thousands of years of human activity. Archaeological remains vary enormously in terms of date, condition and visibility; however, they are all finite and non-renewable. Frequently they are fragile and highly susceptible to damage and destruction. They contain unique information about the past, about past society, development of agriculture, and about the development of villages and towns, industry and/or infrastructure. The historic built environment is equally irreplaceable and incorporating historic environmental features within a 'new' project also provides a context for development and regeneration.

The principles for dealing with archaeology and the built heritage in the planning process are encapsulated in Planning Policy Guidance Notes 15 and 16 (issued by the old DETR and now available on the Department of Communities and Local Government website, http://www.communities.gov.uk/) and in the *Design Manual for Roads and Bridges* for major road schemes. English Heritage has also issued various policy and guidance documents, including a guide specific to industrial heritage (*Industrial archaeology: a policy statement*, 1995). Similar documentation has been issued for Wales, Scotland and Northern Ireland. The Institute of Field Archaeologists has also produced some useful guidance documents. Included within archaeology and built heritage are archaeological sites and remains, listed buildings, conservation areas, World Heritage Sites, locally designated heritage sites, historic parks and gardens, historic landscapes and battlefield sites. This is not an exhaustive list.

If possible, the design should have sufficient flexibility to consider incorporation of archaeological, cultural or industrial heritage features into the project. Sympathetic development of existing structures can provide positive enhancement. Relevant specialists should be consulted at the earliest stage. The design should minimise the adverse impact of the development on cultural and/or industrial heritage, and consider sympathetic re-use of buildings and the use of local materials.

A Cultural & Industrial Heritage Works Management Plan (or an equivalent section in an integrated Project or Site Environmental Management Plan) should be produced if there are any archaeological, cultural or industrial heritage aspects to the site or its vicinity, whether required by the local authority or not. If a report on the archaeological, cultural or industrial heritage work carried out has been produced, it should be available to the public. Furthermore, there needs to be active publicity for this report to ensure the public knows about it.

Note: It may be appropriate to scope out the majority of questions within this section if no features of archaeological, cultural or industrial heritage interest have been found to be on site. However, in order to establish this, the necessary studies must have been carried out. Hence Question 5.1.1 is marked as NSO.

(continued overleaf)

		Client	Design	Con-struction
5.1.1 **NSO**	Have appropriate surveys or desk studies been carried out at planning stage? If No, score 0; if Yes, score 8	**8**		

It is important that archaeological, cultural and/or industrial heritage interests are identified at a pre-design stage and the related issues are incorporated into the design and planning. Appropriate surveys should be carried out before design work starts to determine the extent, nature and significance of any archaeological remains and/or cultural or industrial heritage structures, and consider the significance of any impact. The results of these surveys should be included with the Planning Application or form part of the Environmental Impact Assessment to inform any planning decisions. Detailed and approved mitigation proposals should be developed and implemented by cultural and/or industrial heritage specialists, and adequate time and resource allocation need to be made for all archaeological or building recording and reporting.

- **Evidence could be in the form of a stand-alone Survey of Archaeological, Cultural and Industrial Heritage Features or a section of an EIA. Note that this section of CEEQUAL covers cultural and industrial heritage, so any evidence must include investigation of these aspects alongside traditional archaeological studies.**

5.2 Legal Requirements

Scheduled Ancient Monuments are protected under the Ancient Monuments and Archaeological Areas Act 1979, and Listed Buildings, Conservation Areas etc are covered under the Planning (Listed Buildings and Conservation Areas) Act 1990. There are usually policies in both Structure and Local Plans (or local development frameworks) setting out more explicit policies on a county and local base.

5.2.1	Have the requirements of Planning Policy Guidelines 15 & 16 or equivalents (e.g. PPS 6 in Northern Ireland) and Structure and Local Plans been complied with at the design stage? If No, score 0; if Yes, score 4	**4**		

Scope out only on refurbishment projects that did not involve any archaeological or cultural heritage features.

- **Evidence could be in the form of the Survey of Archaeological, Cultural and Industrial Heritage Features (or section of EIA) explicitly covering PPGs 15 and 16. Alternatively it could be evidenced by the planning application and approval, or a letter from the local authority.**

		Client	Design	Con-struction
5.2.2	Have archaeologists or conservation officers* been consulted on the impact of the proposals where appropriate? If No, score 0, if Yes, score 9 (or 2 for Construction-only award)	9		2

* E.g. Local Authority, English Heritage or equivalent, Countryside Agency or equivalent.

This should be done at design stage so that guidance or advice can be properly taken into account in the design. In this case score 9 for all except the Construction-only award.

If no previous consultation has taken place and the contractor decides to consult a relevant specialist at construction stage, this is awarded only 2 points, as it is of less benefit at this late stage.

v Evidence needs to show that a specialist has been consulted during the design phase to ensure the appropriateness of the proposed design. This could be a formal report from the specialist or notes of a meeting with them.

5.3 Design & Implementation

5.3.1	If features of archaeological, cultural or industrial heritage interest were present or likely, has an appropriate plan (or an equivalent section of an integrated Project or Site Environmental Management Plan) been produced and implemented? If No, score 0; if Yes, score 6	6

Such a Plan could cover, for instance, a listed building, an historic industrial plant or other recognised feature of historic interest such as those on the English Heritage National Monuments register.

v Evidence: Plans, toolbox talks, trial notes, choice of excavation plant and/or sequences.

		Client	Design	Con-struction
5.3.2	If features of archaeological, cultural or industrial heritage interest have been found, have appropriate measures been taken to mitigate any impacts on them, including any publication or legal requirements? If no measures taken, score 0 if visual record only, score 3 if professional excavation, score 5 if recorded and left undisturbed in-situ, but available for future access, score 6 if design changed to enable long-term public access, score 7	7		

Scoping out: the maximum potential score on this question may be reduced to 6 if archaeological experts advise that public access is inappropriate.

Guidance on appropriate levels of investigation can be found in the Highways Agency's *Design Manual for Roads and Bridges*, Volume 11. The basic principles are as follows:

- Stage 1: Undertake sufficient assessment to identify any archaeological, cultural or industrial heritage constraints associated with the site. This can be via the County Archaeologist, and information on designated sites can be found from the SMR (Sites and Monuments Record).
- Stage 2: Professionally assess the likely impact of development proposals on identified site(s) and their significance. This may lead to design changes or to agreement for early exploratory excavation to determine the nature of the sites. Field surveys and the techniques used should be recorded.
- Stage 3: Depending on the level of archaeological importance identified, the construction stage should include a Watching Brief by archaeologists during earthworks and excavations. They should be allowed to record and photograph finds and allowed the opportunity to reasonably direct works in order to carry out the required level of investigation. This may well be a commitment contained in any EIA undertaken.

v Evidence needs to be appropriate to the level of points being sought. For 3 points, the photographs of the archaeological, cultural or industrial heritage feature need to be available. For 5 points, a formal report would be needed. For 6 points and above, a formal report and evidence of design changes to allow for appropriate future access need to be available.

5.3.3	If desk studies have indicated potential for archaeological finds, a) have site staff been instructed (e.g. via toolbox talks)? – If yes, Score 2 b) has a site archaeologist been appointed on a Watching Brief basis? – If Yes, Score 4	6

v Evidence could be in the form of site briefings and associated attendance sheets for a). For b), evidence is needed that the brief was issued and that the archaeologist has visited site regularly and at appropriate times in the programme.

Note that this question applies only to archaeological finds as the work proceeds, not to cultural and industrial heritage features.

		Client	Design	Con-struction
5.3.4	If existing structures of cultural and/or industrial heritage importance have been refurbished in situ, has current best practice been applied and have historically appropriate materials been used? If no, score 0; if Yes, score 8	**8**		

Refurbishment of archaeological, cultural and/or industrial heritage features should always be carried out in accordance with current good practice.

> **v Evidence would include documentation of consultation with relevant expert organisations, receipts of material purchase, etc. If the materials have actually been used, then photographs could also be used as evidence.**

5.3.5	Have the environmental impacts of using historically appropriate materials been assessed? If No, score 0; if Yes, score 4	**4**

It is acknowledged that the most appropriate material for an historic structure may not necessarily be the best material from an environmental point of view. For instance, the material may have to be transported a long distance even though a more-local, but less historically appropriate, material might be available.

A balance has to be struck between historically appropriate refurbishment and environmental considerations, and the decision will depend on the emphasis given to the project by the stakeholders and the importance of the historical feature. However, an informed decision can only be made if an assessment has been carried out.

> **v Evidence could be in the form of a design report or notes assessing the different material options (including those that are historically appropriate). If the use of appropriate materials is considered feasible then evidence of details being incorporated into the specifications would be appropriate.**

5.4 Information and Public Access

A major project may involve an extensive and visible archaeological excavation, and/or the dismantling, refurbishment or restoration of an industrial or cultural heritage feature. There is a high level of public interest in these issues and public access via site tours, information boards, live video transmissions and other mechanisms can be established. This communication may be carried out through, or in conjunction with, local museums and other interested groups.

		Client	Design	Con-struction
5.4.1	Has information on any archaeological, cultural or industrial heritage work carried out been made available to the public? If none at all, score 0 if information board on site only, score 3 if leaflets printed or other active publicity, score 6	6		

This may be scoped out if archaeological or other appropriate experts working on the find advise against publicity.

> **v Evidence needs to be provided to support the level of points being scored. Photographs of the information boards, copies of the leaflets or copies of videos could all form appropriate evidence.**

5.4.2	If archaeological excavation was carried out for longer than one week, has the possibility of access by relevant local bodies or the public to view the site been assessed? If partitioned-off area publicly accessible at all times, score 1 If visits by appointment only, score 3 If regular, publicised guided tours, score 4	4

The possibility of allowing members of the public, via their local historical or archaeological societies, access to view the site should be considered. This will help maintain relations with the local community and forestall any criticism. The access can be at a specified time outside operating hours, although a member of the site management team will have to be present. Alternatively it can be in an area partitioned off from the rest of the site, or visits can be arranged in guided groups etc.

> **v Evidence needs to be provided to demonstrate the level of access provided. This could be in the form of visitors' books, press advertisements of access and/or tour times, or photographs of public facilities.**

6. WATER ISSUES

6.1 Basic Principles

Water resources have been of increasing concern for more than a decade and legislation has been introduced in order to minimise future impacts on these resources. The government's policies on Sustainable Development (1999, 2005) and Sustainable Construction (2000) identify water use in completed works and during construction, and prevention of pollution of the water environment, as key issues for the construction industry in particular. Legislation is in force to protect the water environment in the UK.

When looking at the impacts of civil engineering projects on water, three main aspects need to be considered: impacts on water resources (including consumption during construction and operation), protection of the water environment and enhancement of the water environment. Both design and construction stages lead to opportunities as well as threats to the water environment.

A further aspect is the water resource use that is embodied in materials. However, this aspect has not yet been researched sufficiently to supply the data necessary for assessment. It is intended that it will if possible be included within a later version of CEEQUAL, once more research has been made available.

		Client	Design	Con-struction
6.1.1 a) **NSO**	Has a plan to control the impacts of the *completed* project on the water environment been produced and implemented? If No, score 0; if Yes, score 10	**10**		
6.1.1 b) **NSO**	Has a plan to control the impacts of the project on the water environment *during construction* been produced and implemented? If No, score 0; if Yes, score 8			**8**

This plan can be part of a Project Environmental Management Plan, SEMP or equivalent, or can be a separate document. It should assess questions such as:

- What water use does the project entail?
- Are suitable water resources available?
- Are new water resources needed?
- Are they sustainable?
- Does the project endanger security of water supply to existing users?
- Is the project likely to affect the local hydrology?

Note that this question is marked as **NSO**, as it is very important that all projects should consider the impacts on water resources and control, to minimise impacts at the operational stage (i.e. through design) and the construction stages.

Some projects may use very limited water resources, but nearby water resources or groundwater may need protecting. Therefore the need for abstraction, land drainage or discharge consents and/or land drainage appraisals has to be considered as part of such a plan, as well as possible designs for drainage systems etc. As with all plans of this type, it needs to include procedures for regular monitoring and reviewing. For further guidance regarding construction impacts see *Environmental good practice on site*, CIRIA Publication C650.

v Evidence: assessment of run-off, hydrological impacts, risk assessment etc and subsequent incorporation into the design or construction plans.

6.2 Legal Requirements

Numerous acts and regulations deal with the protection of water resources and the prevention of their pollution. Of particular relevance to the construction industry are the *Water Resources Act* and *Water Industry Act* of 1991, and the *Environment Act* 1995, which established the Environment Agency (EA) and the Scottish Environment Protection Agency (SEPA).

The *Water Resources Act* 1991 made provision for the need to apply for consent to abstract or discharge water from or into controlled waters. Since their establishment through the *Environment Act* 1995 the EA and SEPA are the bodies responsible for granting these consents. The *Environment Act* 1995 also added new sections to the *Water Resources Act* (Section 161, A-D), which provide for the issue of anti-pollution 'works notices'. They empower the Environment Agency to serve notices on those responsible for actual or threatened pollution, requiring them to carry out clean-up and remedial action as necessary. Failure to do so is a criminal offence.

Also relevant to construction are the *Control of Pollution (Oil Storage) Regulations 2001*, which set minimum standards for works carried out and precautions to be taken to prevent pollution of controlled waters from oil storage facilities of 200 litres or more.

This is not an exhaustive list. Details of relevant legislation should form part of an EMS or equivalent.

		Client	Design	Con-struction
6.2.1 **NSO**	Has consultation with regulatory authorities about water issues related to the project been undertaken and the outcome communicated to project team members at each stage of the project (planning, design and construction)? If No, score 0; if Yes, score 2 for each stage.	**2**	**2**	**2**

It is advisable to consult the relevant regulatory authorities on any potential impacts a civil engineering project may have on the water environment. This includes projects where effects on water are not immediately obvious as, for example, hydro-geological issues, which are not instantly visible, may apply to the site.

> **v Evidence could be in the form of meeting notes or letters regarding obtaining consents or licences. At construction stage it could be actual applications and granting of licences. Evidence also needs to be shown for appropriate communication of the outcomes of the consultations or applications. These could be circulation of design notes, team briefings or incorporation of licence and/or consent conditions into method statements.**

6.2.2 **NSO**	Have there been regulatory actions during construction? If Yes, score 0; if No, score 2			**2**

It is acknowledged that whether or not there have been negative regulatory actions may be due to varying inspection levels, site size variations and possible variations in application of the regulations in regions. However, in principle, the number of regulatory actions (for example, proceedings against the contractor by the Environment Agency, SEPA or the Northern Ireland Environment & Heritage Service for breach of environmental legislation, or the issue of a Works Notice or equivalent) on a site is considered to be a valid way of assessing breaches of regulations.

> **v A signed statement from the applicant will be acceptable evidence for this (as it is impossible to obtain evidence of non-existence of any regulatory action).**

6.3 Minimising Water Usage

Minimising water usage is a widely accepted way of reducing human impact on water resources. At design stage, designs can be adopted for minimising water usage during operation and ought to take account of long-term water requirements. Designs for utilisation of greywater and rainwater should be encouraged if appropriate. Training on these issues should be encouraged to ensure knowledge of new designs and benefits of conservation. Guidance and research on the life-cycle assessment of new and recycled materials is required, including water requirements.

		Client	Design	Con-struction
6.3.1	Have measures to conserve water and reduce water consumption during operation of the completed project been incorporated in the design? If No, score 0; if Yes, score 9	9		

Scope out on projects where water consumption in use is not an issue, for example a flood defence bank.

- **At design stage, evidence is required of investigations into water conservation measures. This could be in various documented forms such as notes of brainstorming sessions, and notes, specifications or drawings showing measures incorporated into the design.**

6.3.2 NSO	Has a practical system been put in place to minimise consumption of mains or abstracted water during the construction process? If No, score 0; if Yes, score 3			3

At construction stage, re-use of water can be encouraged, as well as conservation measures introduced, such as the creation of settlement lagoons that will protect watercourses from pollution and that can also be used as a water supply, for example for damping down during dusty periods. It must also be noted that, in trying to minimise use of water during construction, there are potential conflicts linked to economical use of water: for instance, dust damping and wheel washes may be required for other environmental considerations and the water use involved will thus be well justified. The contractor's measures for dealing with these potential conflicts should be examined.

- **Evidence is required of positive measures to protect water resources. Site photographs are likely to be acceptable but a site visit may be required to see examples of practical measures. The conflicts mentioned above need to be acknowledged.**

6.3.3 NSO	At construction stage, has the amount of water used been measured and monitored, for example, by metering the input to the site? If No, score 0; if Yes, score 2			2

Metering water use will provide useful data for comparison and target-setting. In addition, simply by increasing the awareness among site staff and management of the amounts of water used for different aspects of the construction process, it can contribute to more conscious use of water.

- **Evidence could be assessments of expected water consumption patterns and monitoring usage to them or evidence of mitigating actions taken should the expected consumption be exceeded. It could also be targets set for reduction of water use and monitoring of their achievement.**

6.4 Protection of the Water Environment (Ground and Surface Water)

When evaluating the impact of construction on the water environment, the impact on both groundwater and surface water must be considered.

At design stage, the geological history and hydro-geological details of the area will be important, as these will determine the groundwater movement in the area. This will help decide the best design and construction method to protect the environment, including the hydro-geological regime. The design should aim to control run-off paths and drainage. The amount of run-off should be reduced wherever possible, although the quality and turbidity of the run-off is of greater concern.

At construction stage, prevention of water pollution is of extreme importance. There are a variety of potential sources of on-site groundwater and surface water contamination, including:

- operational leaks and spillage from tanks and pipes;
- accidents or spillage during storage and transport of raw materials, manufactured products and waste materials;
- storage of waste on or adjacent to the site;
- leaks from drains from process areas;
- movement of contaminated groundwater on to site from areas that are already contaminated;
- demolition of works that have contained contaminating materials;
- silt washed from the site.

Contamination of the water environment may also come from materials incorporated into the works. The potential of materials and products to leach pollutants into the environment should be assessed at design stage.

		Client	Design	Con-struction
6.4.1 **NSO**	Have specific measures been taken to prevent pollution of groundwater or existing water bodies? If No, score 0; if Yes, score as indicated	**4**		**7**

At design stage this would include the location of storage for fuels, chemicals or other polluting substances away from sensitive areas, separating foul and surface water, and inclusion of interceptors and drainage channels.

At construction stage this includes measures to prevent leakage of pollutants into the water course, such as bunding, appropriate storage, spill kits, emergency response plans etc.

v Evidence of positive measures should be documented at design stage. Evidence during construction could be in the form of photographs and other documentation or can be gained from a site visit. Note that company-wide Key Performance Indicators are insufficient as evidence for this question.

		Client	Design	Con-struction
6.4.2	Have measures (or equipment) been incorporated in the project that will allow long-term monitoring of the project's impact on the water environment? If No, score 0; if Yes, score 6	6		

Examples include measuring run-off quantities, establishing adequacy of compensation water from a dam project, monitoring hydrological impacts of projects that involve changes to existing watercourses, groundwater quality monitoring, and use of flow recorders or level monitors.

- **Evidence will vary greatly depending on the type of project being assessed. Appropriateness of measures will have to be judged and agreed by the Assessor and Verifier. However, the guidance above gives examples of the sorts of measures that could be considered.**

6.4.3 **NSO**	Is there evidence that the incorporation of Sustainable Drainage Systems* (SuDS) has been considered? If No, score 0; if Yes, score 2	2		

* For example, rainwater retention, balancing ponds, reedbed systems, etc. For guidance on SuDS refer to *Sustainable Urban Drainage Systems*, CIRIA 2001, *The SUDS Manual* (C697) CIRIA 2007, *Site handbook for the construction of SUDS* (C698) CIRIA 2007.

The incorporation of SuDS should always be actively considered at some point, even though it is acknowledged that some clients have, for the time being at least, decided against its widespread use. If the project is small and generates no significant run-off, or SuDS is found not to be beneficial or inappropriate in a particular case, this should be a conscious and informed decision, and the next question can be scoped out on that basis.

- **Evidence should be provided to demonstrate that it has been considered. This could be notes from a design meeting or part of the client's brief.**

6.4.4	Have Sustainable Drainage Systems been incorporated in the scheme where appropriate? If No, score 0; if Yes, score 6	6		

Scope out only if points have been scored on question 6.4.3 and SuDS have been deemed inappropriate (for example, river wall strengthening).

- **Evidence may include drawings, specifications or photographs showing the incorporation of SuDS**

		Client	Design	Con-struction
6.4.5 a)	At construction stage, if the site is near a water body (including aquifers), has the water quality of that water body been monitored before and regularly during construction? If only visual inspection, score 0 if on-site monitoring, score 2 if on-site monitoring and chemical analysis, score 4			4
6.4.5 b)	If this shows no adverse effect, score 2			2

May be scoped out if no significant or sensitive water bodies are within or near the site.

Visual inspection of water courses is considered to be standard industry practice on sites with water bodies on or near them due to the ease with which silt, in particular, can enter and be detected. This level of inspection is therefore not considered a sufficient level of investigation to score on this question – on-site testing must be carried out, as a minimum, to detect any potential unseen pollutants. Chemical analysis should be to a higher specification than the standard set of analyses for pH etc and should test for chemicals likely to result from pollution incidents from the site or chemicals of particular interest to regulating authorities.

Monitoring may be carried out in liaison with the EA, SEPA or EHS-NI. However, it is considered good practice for contractors to be pro-active in establishing a monitoring regime – and it may also be in their own interest to do so.

In this section, emphasis is placed on monitoring, both short-term and long-term. Evaluation of the long-term impact of materials may be difficult if materials have been used that have not had long-term research carried out on them. These may, for example, have delayed pollution characteristics, which would be costly and possibly difficult to rectify.

v Evidence can be in the form of monitoring data and other documentation showing the methods of monitoring used.

6.4.6	At construction stage, have existing water features been protected from degradation or physical damage by construction plant and processes? If No, score 0; if Yes, score 4			4

May be scoped out if no significant or sensitive water bodies are within or near the site.

The important distinction in this question compared to the pollution-related questions is of *physical damage* to the water feature. Examples of work that would cover Question 6.4.6 include protection of banks of ponds, lakes, streams, rivers and canals against damage by construction plant or processes.

v Evidence could be gained from a site visit. Further evidence can be in the form of photographs and other documentation.

6.5 Enhancement of the Water Environment

Opportunities should be taken to enhance the water environment whenever appropriate. Most of these will arise at design stage, when modifications to the design can be carried out at little or no extra cost. At the construction stage, opportunities can still occur once conditions on site are better known. However, this will require good co-operation between the project client, designer and contractor.

During assessment, it is necessary to understand reasons why an evaluation of opportunities may not have led to enhancement of the water environment, even though opportunities may have been identified. It is important to take account of costs, appropriate use of project funding, the project programme and safety issues.

Positive impacts on the water environment may not be visible for a long time, maybe well after handing over the project to the client. This is why there are no questions on the long-term success of the measures.

		Client	Design	Con-struction
6.5.1	Have opportunities to improve the local water environment been included in the design and implemented? If No, score 0; if Yes, score 8	8		

Examples of opportunities to improve the local water environment include cleaning up existing degraded or silted-up ponds or waterways, introducing plants that help cleanse the water to existing water features, and the removal of sources of water pollution.

> **v Evidence needs to demonstrate that features (such as the examples above) have been included in the works. This needs to demonstrate both design stage consideration (such as through drawings or specifications) and construction stage implementation (such as through photographs).**

6.5.2	Have existing water features been incorporated (for example as an amenity and/or for site drainage) in the design of the project? If No, score 0; if Yes, score 6	6		

Note: This question can be scoped out if there are no existing water features present on or near the site.

> **v Evidence needs to be appropriate to the type of scheme and could include drawings or photographs showing how existing features have been incorporated.**

7. ENERGY

7.1 Basic Principles

There is now a widespread belief and ever-mounting evidence that pollutants arising from human activities are contributing significantly to, or indeed may be largely responsible for, global warming and consequent climate change. The burning of fossil fuels and the subsequent release of carbon dioxide in the generation of energy is seen to be particularly important in this respect. At the 1997 Kyoto Conference, the UK Government, along with most of the developed nations, made a commitment to reduce emissions of greenhouse gases over the period 2008 to 2012. The UK agreed to a reduction target of 12.5%. In addition the Government has set itself the objective of a 20% reduction in carbon dioxide emissions by 2010, compared to 1990 levels. In order to achieve these targets all industries and individuals are called upon to recognise the need to reduce their energy consumption, especially that generated by burning fossil fuels.

The challenge for civil engineering project teams in this respect is to consider energy issues at *all* stages of their project. This includes considering the energy consumed in the production and transport to site of construction materials and components (embodied energy), the energy used during construction and the energy consumed in the operation of the completed works. Designers now have a responsibility to minimise energy consumption in buildings, as new standards and regulations for energy efficiency in buildings are being brought in. Energy-efficient solutions in design include passive systems using natural light, air movement and thermal mass, as well as solutions involving energy produced from renewable sources. In civil engineering, examples include low-energy plant in water or wastewater treatment plants, inclusion of combined heat & power in a major development, and the use of solar energy for street lighting or any small scale or remote installations.

It should also be noted that energy issues are also – indirectly – included in the transport and materials sections of CEEQUAL. It is accepted that the same actions on a project may occasionally, in effect, score twice in different sections of the scheme.

		Client	Design	Con-struction
7.1.1 **NSO**	Has a life-cycle energy analysis been undertaken for the key materials and components to be used in the project? If No, score 0; if Yes, score 9 (or 3 for Construction-Only Award)	**9**		**3**

A life-cycle energy analysis for materials and components must include balancing the impacts of embodied energy from their extraction, refinement and manufacture, distance transported and energy performance in use after their incorporation in the completed works.

This is in accord with latest government efforts and International Standards drawn up by the EU. The BRE *Green Guide to Specification*, although aimed at the building construction sector, may be of some assistance here. It needs to be recognised, however, that this type of assessment is very leading-edge and examples will be added to the Manual as they are found.

The assessment should ideally be done at design stage so that its results can be properly taken into account in the design. In this case score 9 for Whole Project or Design-only award. If this had not been done and the contractor decides to carry out such an assessment at construction stage, this is awarded 3 points, as it is considered of less benefit at this late stage.

v Evidence could be a life-cycle assessment report or equivalent.

		Client	Design	Con-struction
7.1.2 **NSO**	What percentage of the recommendations of the life-cycle analysis has subsequently been incorporated in the design and the completed works? If under 10%, score 0 if 10% to <20%, score 2 if 20% to <40%, score 4 if 40% to <60%, score 6 if 60% to <80%, score 8 if 80% to <90%, score 10 if above 90%, score 12	**12**		

v Evidence will need to reflect the points earned, and should include project records – minutes, technical reports etc – showing to what extent the results of the assessment have influenced the choice of materials, components and design solution.

7.2 Energy in Use

Considering energy consumption in use at design stage can bring significant long-term environmental (and economic) benefits.

7.2.1 **NSO**	Is there evidence that the design has considered the energy consumption of the project ***during operation***, including energy requirements in maintenance? If No, score 0; if Yes, score 5	**5**		

Examples include considering the effects of ground modulations or surface resistance. The Victoria line in London, for instance, was designed to have each station on a 'hump', thus helping trains to accelerate when leaving and slowing them down when approaching a station (in addition to reducing the length of stairs and escalators). The energy saving per individual train journey may only have been small, but accumulated over many years, this small measure will have had – and is still having – a very large impact.

Energy use in maintenance is equally important to consider. This can include frequency and type of maintenance required and accessibility issues, as well as overall durability and life span.

v Evidence could include project records, minutes of project team meetings, etc.

		Client	Design	Con-struction
7.2.2	Is there evidence of appropriate measures having been incorporated to reduce energy consumption in use? If No, score 0; if Yes, score 16	16		

Scope out if evidence to Question 7.2.1 shows that there are no energy-in-use issues to be considered (not even maintenance).

- **Evidence could include project records – minutes of project team meetings, technical reports, drawings etc**

7.2.3	Is there evidence that the design has explored opportunities for the incorporation of energy from renewable sources? If No, score 0; if Yes, score 4	4		

Scope out on projects where energy consumption in use is non-existent (for example, a flood defence scheme, land reclamation project).

- **Evidence could include project records – minutes of project team meetings, technical reports, drawings etc.**

7.2.4	Has energy from renewable sources been incorporated in the scheme where appropriate? If No, score 0; if Yes, score 9	9		

Scope out where it was considered (under Q7.2.3) and found to be not possible or inappropriate.

- **Evidence could include drawings, specifications or photographs.**

7.3 Energy performance on site

On many projects, for example wastewater treatment plants, the energy consumption during operation is very much more significant than the consumption on site during construction. However, controlling energy consumption during construction is still important and, for many other kinds of civil engineering project – for example unlit rural roads, flood defence schemes and canals – there is little or no in-use consumption, so energy consumption during construction becomes the significant energy issue on that project.

One of the main contributors to greenhouse gas emissions during the construction process is the use of construction plant, together with the transport impacts of delivering materials to site and staff travel. The latter are dealt with in the Transport section, as well as forming part of a life-cycle assessment for materials, dealt with in question 7.1.1. This section therefore focuses on the energy impacts of construction plant and machinery.

The use of the correct plant for the job, and only running that plant when needed, will assist in improving the energy performance of the construction works. Best Available Techniques Not Entailing Excessive Cost (BATNEEC) or Best Available Technique (see Section 1.3) should be in evidence in respect of plant and methods for carrying out work, in order to reduce energy use (and other environmental impacts – for example noise). Similarly, good programming of the introduction and use of certain types of plant, and where to position them on site, can avoid waste of energy through plant transport, excessive start-up and shut-down, premature arrival on site and unnecessary running.

		Client	Design	Con-struction
7.3.1 **NSO**	Is there evidence that the design has considered the energy consumption of the project ***during construction***? If No, score 0; if Yes, score 3	3		

- **Evidence could be in the form of design records considering the transportation of materials and/or waste, or the amount of on-site processing or handling of materials. Construction methods could also be considered, such as the size of components to enable efficient lifting and placing.**

7.3.2	Is there evidence that the design has incorporated appropriate measures to reduce energy consumption during construction where feasible? If No, score 0; if Yes, score 4	4		

- **Evidence could show inclusion of items considered in 7.3.1 within the specification or tender documents.**

7.3.3 **NSO**	Has an energy management plan or energy management section of a SEMP or integrated project plan been drawn up and implemented? If No, score 0; if Yes, score 5			5

- **Evidence of some considerations of energy issues in site planning is needed as a minimum, along with evidence of measures being implemented.**

		Client	Design	Con-struction
7.3.4 **NSO**	Has the procurement, maintenance and use of construction plant been influenced by consideration of their energy efficiency or energy type? If No, score 0; if Yes, score 6			6

Considering the energy consumption of construction plant and machinery before purchase will ensure that the better environmental option can be chosen, and savings on fuel can be made in the long run.

v Evidence: contract specifications and other procurement documents, plant documentation.

7.3.5 **NSO**	Has energy from renewable resources been used during construction? If No, score 0; if Yes, score 3			3

v Evidence showing the source of site energy is needed. This could be copies of agreements with electricity suppliers showing use of "green" tariffs or photographs showing use of alternative energy sources (e.g. wind turbines or solar panels).

7.3.6 **NSO**	Is there evidence that construction plant and ancillary equipment has been maintained to maximise fuel efficiency? If No, score 0; if Yes, score 6			6

Regular maintenance of plant and machinery will ensure fuel efficiency and prolong the life of machines and power tools.

v Evidence: for example, records of regular maintenance, emission testing.

7.3.7 **NSO**	Is there evidence that energy use has been monitored and controlled on site as and where possible? If No, score 0 if monitored, score 1 if monitored and evidence of control measures, score 3			3

Monitoring energy use can highlight differences in utilisation and control of energy, thus providing data for comparison and enabling energy savings in future.

v Evidence can include demonstration that energy use is assessed and then monitored, including evidence of actions to reduce consumption as appropriate. This could also include the setting of targets. Evidence could also show use of equipment to pro-actively manage consumption e.g. timers, PIR sensors etc.

8. MATERIAL USE

8.1. Basic Principles

The consumption of resources in the construction industry is very high, using over 90% of non-energy minerals extracted in Great Britain. Every year, tens of millions of tonnes of construction and demolition materials and soil end up as waste (89.6 million tonnes in 2005, according to Defra), though increasing proportions of this are re-used and recycled, and it was estimated in 2005 that approximately 30 million tonnes of this comprises materials sent to landfill.

There are many opportunities, for example through design, ordering, storage and construction practice, to reduce the use of new materials while increasing the re-use and recycling of materials. Material impacts can also be reduced through material selection, with consideration for material type, coating, durability, and maintenance issues.

It is acknowledged that there is some overlap between this section and Section 9 on Waste, and stressed that the impacts of materials' *transport* is covered in Section 10.

		Client	Design	Con-struction
8.1.1 **NSO**	Was a plan that makes recommendations for material use to minimise environmental impact* drawn up? If No, score 0; if Yes, score 3	**3**		
8.1.2 **NSO**	Has this plan been implemented? If No, score 0; if Yes, score 6		**6**	

*This includes selection of materials on the basis of a 'reduce, re-use, recycle' approach and of environmental impact (such as the potential for pollutants leaching into the environment, transport impacts and design for waste minimisation).

These questions cannot be scoped out because of the importance of the issues they address.

To score 3 points on question 8.1.1 for a construction-only award, the existing plan must be developed to fit the conditions at construction stage, or, if no plan has been prepared earlier, one must be prepared from scratch.

'Implemented' in question 8.1.2 could be at design stage by incorporation of design solutions to minimise material environmental impact, which are subsequently constructed, and/or at construction stage through procurement of low-impact materials and components.

> **v Evidence could be a specific materials plan or a specific consideration recorded within design meeting records. Implementation of the recommendations could be demonstrated by incorporation into specifications and drawings, or through physical evidence such as photographs.**

8.2. Minimising material use and waste

Minimising material use is closely linked with minimising waste and re-using materials. Section 9 addresses in detail issues arising from on-site waste management, and many of these measures will also reduce material use. Section 8.4 addresses issues specifically relating to the re-use and recycling of materials. In all cases (Q8.2.3, Q8.2.5) where materials are reused on site this should be in compliance with the Waste Management Licensing Regulations 1994.

Over-specification in design is a common phenomenon, with consequent unnecessary material consumption. It can be reduced through careful design, and discussions between the client and design team, to define better the current and future performance requirements of the structure. Examples of positive steps that can be taken include:

- use of standard lengths and repetition of elements to avoid off-cuts;
- balancing the extent of waste arising from packaging with waste through breakage due to inadequate packaging;
- pre-fabrication of elements where appropriate;
- optimising cut and fill to reduce the quantity of material brought on to the site and to reduce the quantity of excavation spoil taken from the site.

Monitoring the quantity of material specified at the design stage and comparing this with the material used during construction can provide performance indicators, which enable the assessment of the effectiveness of material reduction measures. This also provides retrospective information for the design team to feed into future projects.

The opportunities to reduce material use can be a trade-off between, for example, standard lengths, pre-fabricated components and over-specification. There is also a balance between over-specification and flexibility, which is difficult to assess.

		Client	Design	Con-struction
8.2.1 **NSO**	Is there evidence that the use of component parts* has been considered on the merit of their environmental benefits? If No score 0; if Yes score 4	**4**		

* Consider as ‘component parts’ any parts or units that can either be constructed on site or prefabricated off site, such as pre-cast concrete units, panels etc. This does not include earthworks or components that can only be bought as complete units, such as pumps, transformers and other mechanical or electrical equipment etc.

Prefabrication improves the chances of minimising material use and waste through controlled off-site processes. The higher level of quality control likely to be deliverable in a factory environment should also reduce failure and increase component durability and lifetime, with associated environmental benefits. However, there may be conflicts between these benefits of prefabrication and the environmental impacts of longer transport distances for prefabricated units, or the constraints they may place on the appearance of the completed scheme. These environmental benefits or adverse impacts should be assessed and the decision made accordingly.

v Evidence would be in design records such as meeting notes. If component parts are actually being used then evidence could be found in specifications or drawings as well as photographs.

		Client	Design	Con-struction
8.2.2	Has an assessment been made at design stage to ensure optimisation of cut and fill to reduce the quantity of excavated material to be taken off site? If No score 0; if Yes score 3		3	

'Cut and fill' is the term used to describe the whole process of profiling of the land form for the project – excavation in some parts, deposition and compaction of excavated and/or imported material in others. The balancing of these two elements leads to minimisation of the import or export of materials to/from the project. This balancing can be done by computer modelling or other, more traditional methods.

v Evidence could be in the form of calculations showing the cut/fill balance.

8.2.3	What percentage of non-contaminated excavated material has been beneficially re-used? up to 15% re-used on or near the site, score 0 15% to 30% re-used on or near the site, score 1 more than 30 to 50% re-used on or near the site, score 2 more than 50% re-used near the site, score 3 more than 50% re-used on site, score 4 more than 90% re-used near the site, score 5 more than 90% re-used on the site or 100% re-used near the site, score 6 100% re-used on-site, score 7		7	

Re-use off site includes taking material to landfill if the material is genuinely inert (it is a beneficial re-use, since landfill sites need inert waste as capping layers and to mix in with other waste.)

It may appear strange that it is possible to score for beneficial re-use at the design stage, but it is at that stage of a project when clear decisions can and need to be made about maximising re-use, especially as it is rarely possible to amend the design at construction stage to take advantage of any surplus excavation arisings.

v Evidence should include some form of calculation to demonstrate the points being awarded. This calculation could be on the basis of design calculations compared to actual waste transfer notes or some other form of quantity surveying documentation.

		Client	Design	Con-struction
8.2.4	Have subsoil and topsoil been separated and stored correctly for re-use after construction? If No, score 0; if Yes, score 5			5

Topsoil is correctly stored in stockpiles no higher than 2m. To avoid compacting of the soil, stockpiles must not be driven on by heavy machinery. Vegetating long-term stockpiles with suitable plants (for example, mustard or annual lupines) may help prevent dust blow and erosion, and should assist in preventing invasive and/or noxious weeds from invading the soil. However, the extent to which this is appropriate, and which plants should or should not be used depends on the intended use of the topsoil.

- **Evidence could be the existence of detailed instructions on soil handling for the relevant project (not a general statement), a soil handling and management strategy, or minutes of site meetings, etc, referring to the handling and storage of topsoil.**

8.2.5	Has all topsoil been re-used beneficially as topsoil on the site or on a site within a reasonable distance*? If No, score 0 if all beneficially re-used off site, score 2 if majority (over 50%) beneficially re-used on site, score 2 if all beneficially re-used on site, score 3			3

* Topsoil is an organic material and is only re-used beneficially if layers are not applied too deep as this would destroy its structure. In addition, certain types of habitats actually require very little or no topsoil at all. Re-use on site for the sake of it, in places and at a thickness that is not required, would therefore not be 'beneficial' re-use. (See BS3882:1994 *Specification for Topsoil*.)

What represents a 'reasonable distance' must be judged in the context of the project and its location. It might be 15km in a built-up area, but up to 100km if the site generating the surplus topsoil is in a remote area.

- **Evidence could be some form of calculation to support the points awarded. This could be a comparison of design calculations to waste transfer notes. The definition of reasonable distance needs to be mutually agreed between the Assessor and Verifier.**

8.2.6 NSO	Is there evidence that materials have been stored appropriately so as to avoid waste through breakage? If No score 0; if Yes score 3			3

- **This could be photographic evidence or site records etc. The Verifier should ascertain that photographs demonstrate a sustained achievement of this question for the duration of the project.**

8.3 Material Selection (Timber)

The production, use and disposal of construction materials accounts for significant quantities of energy and resources. Due to the complexity of the issues involved, it is difficult to identify one material as less environmental damaging or more-environmentally beneficial than another. At the time of writing of this guidance it is possible only to assess selection of timber, due to lack of suitable comparative data for other materials.

It is reasonably widely accepted that timber is an environmentally beneficial material, provided it is derived from a sustainably managed source and not derived from a 'timber mine' (the term used to describe a source of timber that is not being replenished). However, as with aggregates, the transport of timber can significantly contribute to embodied energy and lifecycle impacts.

Note that, whilst an EMS certified as compliant with ISO14001 may provide a very good tool for assessing and improving an organisation's environmental performance, using suppliers with an ISO 14001 certificate or equivalent does not guarantee that their products are less environmentally damaging than materials from suppliers without one. Separate analysis of such issues may be necessary. Note also that it is important to ensure beneficial use of timber that has *had* to be felled to enable a project to proceed, ideally on the project itself, although this is actually scored in section 9.3.

		Client	Design	Con-struction
8.3.1	Is there evidence that the highest possible proportion of timber and timber products used in *permanent* works has been specified to be (or, in a Construction-only Award, used) either from sustainably managed sources with recognised timber labelling (such as Forest Stewardship Council or equivalent), or from re-use? Under 10%, score 0 10% to <25%, score 2 25% to <40%, score 3 40% to <55%, score 4 55% to <70%, score 5 70% to <85%, score 6 85% and above, score 7	**7**		

Forest Stewardship Council (FSC) certification is the most widely recognised global timber labelling system. It is acknowledged that there may be other timber certificates that effectively fulfil the same criteria, and as long as this can be proven, these are also acceptable.

> **v Evidence could be a comparison of specification requirements to overall timber quantities, sub contract documents with timber suppliers, or a declaration from the timber supplier. In any case some substantiation of the percentage being claimed needs to be provided.**

		Client	Design	Con-struction
8.3.2	Is there evidence that the highest possible proportion of timber and timber products used in *temporary* works has been from re-use or certified sources? Under 30%, score 0 30% to <60%, score 3 60% to <90%, score 5 90% and above, score 7	7		

Temporary works are those used during construction processes, for example, formwork or scaffolding that will not form part of the finished structure. It is common practice to re-use timber for these types of structures; hence the banding of scores to be achieved differs from that of permanent timber structures.

A single score is given across all three roles / stages, because the client or designer may choose to specify this requirement, rather than just leave the contractor to choose to do it.

v Evidence could be in the form of comparison of specification requirements to sub-contract quantities, or a declaration from the material supplier. In any case some substantiation of the percentage being claimed needs to be provided.

8.4 Using Re-used and/or Recycled Materials

The appropriate re-use of structures and parts of structures can significantly reduce the demand for new construction materials and other environmental burdens resulting from a development. Where materials are re-used or recycled the highest grade of re-use possible will be the most environmentally beneficial. There are a number of opportunities to re-use or recycle materials:

- re-using or recycling materials already on site in the new works (which also minimises transport impacts);
- bringing in reclaimed or recycled materials from off site without imposing high transport impacts;
- seeking opportunities for use elsewhere of reclaimed or recycled on-site materials that cannot be used on site (without imposing high transport impacts);
- ensuring that opportunities for the re-use and recycling of materials at the end of the structure's lifetime are maximised.

Note that recent Quality Protocols for aggregates and composts now allow for up to a defined percentage of secondary or previously-used materials to be incorporated within an aggregate type or soil conditioner. So simply specifying 'Type 1 material' for a particular use may or may not 'automatically' include some re-used or recycled materials. See www.warp.org.uk/construction for more details.

		Client	Design	Con-struction
8.4.1	What percentage by volume of any existing *structures*, such as roads etc, have been retained and used within the project? Under 25%, score 0 25% to <50%, score 2 50% to <75%, score 4 75% and above, score 6	6		

Scope out if no existing structures on site.

Examples for this include re-use of existing foundations, roads, walls, etc or, for a flood defence project for instance, the re-use of an existing lock structure as part of new flood defence walls.

The volume of the structures would normally be worked out as part of the bills of quantities and, where re-used, as part of an assessment of their suitability for re-use.

v Evidence would include site photographs, construction drawings, bills of quantities etc, along with some form of substantiation of the percentage being claimed.

8.4.2 NSO	What percentage by volume of *materials* (*excluding bulk fill and sub-base*) used in the permanent works is made from reclaimed or recycled material, whether reclaimed from the site or elsewhere? Under 5%, score 0 5% to <20%, score 2 20% to <40%, score 4 40% to <60%, score 5 60% to <80%, score 6 80% to 90%, score 7 90% and above, score 8	8

Examples include reclaimed bricks, elements or components using recycled materials such as recycled plastics or reprocessed timber. Recycled materials must satisfy the necessary performance and quality criteria.

v Evidence could include bills of quantities, delivery notes, quantity surveyor's report etc, along with some form of substantiation of the percentage being claimed.

		Client	Design	Con-struction
8.4.3	What percentage by volume of bulk fill and sub-base material used in the project was made from previously used material, whether reclaimed from the site or elsewhere? <20%, score 0 20% to <30%, score 2 30% to <60%, score 3 60% and above, score 4 If this was generated on site (for example, demolition material crushed on site), score 2 additional points.	**6**		

Scope out if the project used no bulk fill or sub-base.

See section 9 on waste for information on use of previously-used materials.

v Evidence could be in the form of specification requirements. Any evidence needs to substantiate the percentage being claimed.

8.5 Minimising Use and Impacts of Hazardous Materials

Minimising use and impacts of hazardous materials is closely linked to health & safety considerations. However, COSHH assessments can be extended to cover environmental aspects of those materials being assessed.

An example of such an environmental issue is the pre-treatment of preserved timber: on-site treatment, which is often applied by non-specialist personnel, represents a hazard from environmental as well as health & safety considerations, compared to treatment carried out under controlled conditions by trained specialists.

8.5.1	Have all coatings and treatments been factory applied (except for cut ends)? If No, score 0; if Yes, score 4	**4**

Scope out if no coatings or treatments used or if factory application is impossible or impractical – for example if coatings to in-situ concrete are the only coatings used on the project.

Note that this question applies to all coatings, not just timber coatings and to coatings and treatments for both the permanent and temporary works (including hoardings).

v Evidence could be in the form of specification or sub-contract requirements.

		Client	Design	Con-struction
8.5.2	What percentage of all coatings and other treatments used (for temporary *and* permanent works) have been specified (or actually used even if not explicitly specified) as low-VOC and/or biodegradable? Under 10%, score 0 10% to <40%, score 1 40% to <80%, score 2 80% and above, score 3	3		

- **Evidence could be in the form of specification or sub-contract records. Any evidence needs to substantiate the percentage being claimed.**

8.5.3 NSO	a) Has the COSHH assessment process for hazardous materials been *extended* to cover the wider environmental impacts of those materials? b) Have the results of this been used in drawing up the Site Environmental Management Plan or equivalent? Score 1 for a) and 2 for b)			3

- **Evidence needs to specifically show the environmental impacts. Standard COSHH assessment sheets are not acceptable. Evidence for part b) needs to demonstrate that these requirements have been incorporated in other management documents, which could include methods statements or toolbox talks.**

8.6 Durability and Maintenance

Extending the lifetime of a structure is likely to have considerable environmental benefits as it avoids the environmental impacts associated with later refurbishment or the building of a new structure. In the same way, a low maintenance structure reduces the environmental impacts relating to maintenance and is also likely to enhance the structure's lifetime. Admittedly, there are likely to be trade-offs in this area, for example between more durable paint systems and environmentally damaging treatments.

It is important to recognise that, in the context of CEEQUAL, what is being looked for in the assessment of these options is consideration of the *environmental* cost, and a judgement about which option has the greatest lifetime environmental benefit and least adverse impact. This may, in many cases, correlate with reduced expenditure in terms of the whole life costs of the structure. Synergies between financial and environmental savings will present a particularly compelling case to clients.

		Client	Design	Con-struction
8.6.1	Is there evidence that durability and low maintenance of structures and components have been actively considered in design and specifications? If No score 0; if Yes score 3	3		

It is essential that the desired lifespan of a built structure is reflected in every detail of a structure. Often durability of a structure is compromised by minor components within it that have a shorter design life than the structure itself and were specified without bearing the overall objective in mind.

- **Evidence should be found in the specifications or a life-cycle costing analysis.**

8.6.2 NSO	Is there evidence that long-term planned maintenance has been considered properly in the design process? If No score 0; if Yes score 3		3	

This should cover, at a minimum, the nature and practicality of work expected to be needed, the timescales for this work, and the provision of safe access for maintenance to be carried out. It should be written in a plan for maintenance for the project, and delivered to the client.

- **Evidence should be found in the specifications, a HAZOP assessment (or similar), in a contract maintenance schedule or in the form of a maintenance plan to be handed to the client or managing agent.**

8.7 Future Demolition

Designing for deconstruction or disassembly will ensure that as many as possible of the structure's components can be re-used or recycled. Structures and components that can be easily dismantled will yield more materials for high-grade reclamation during future demolition. Minimising the use of composite forms will avoid the need to process the component in order to separate the materials for re-use.

Labelling of components, particularly plastics, to identify the materials used, will also make recycling more effective. In some cases there will be a trade-off between avoiding the use of composite forms and minimising material use.

8.7.1	Is there evidence that the client has actively included design for disassembly in the brief? If No score 0; if Yes score 3	3		

- **Evidence will be some form of statement or brief from the client. It could include a statement extending the requirement of the Health & Safety File to include recycling issues at disassembly.**

		Client	Design	Con-struction
8.7.2	What percentage by volume of *components* used can be easily separated on demolition into material types suitable for recycling? Under 15%, score 0 15% to <30%, score 1 30% to <45%, score 2 45% to <60%, score 3 60% to <75%, score 4 75% to <90%, score 5 90% and above, score 6	**6**		

Examples for suitable material types may include bricks, blocks, stone and concrete, treated and untreated timber, glass, PVC, different types of plastic, metal, paper and cardboard, and components (for example, sinks, toilets, radiators).

- **Evidence needs to substantiate the percentage being claimed. This can be calculated by any appropriate means that assesses how materials are utilised and combined within the works.**

8.7.3 **NSO**	Is a materials register provided to the client or future managing agent at hand-over that identifies main material types to facilitate recycling on demolition? If No score 0; if Yes score 2			**2**

- **Evidence can include a Health & Safety file, provided this has been extended to include information about material types that will enable recycling on demolition.**

9. WASTE MANAGEMENT

9.1 Basic Principles

Construction and demolition waste is a large percentage of the total controlled waste disposed of in the UK. Waste minimisation has been identified by the Government as an area where significant improvements can be made as part of a wider strategy for more-sustainable civil engineering and building. The way in which waste is generated and disposed of is one of the central issues when implementing a sustainable approach to development. Dealing with waste effectively is particularly important for conserving natural resources, avoiding dramatic changes to the landscape and minimising the risks of pollution. Statutory Site Waste Management Plans are likely to become a requirement in 2008, at least for projects over £250,000, depending on the outcome of consultation under way until July 2007 (see http://www.defra.gov.uk/corporate/consult/construction-sitewaste/index.htm).

This section is very closely related to the previous one on Material Use, and there is indeed some overlap between questions in this and the previous section. However, for the purpose of the CEEQUAL assessment this does not matter.

It is now apparent that landfill sites can have a major effect on the environment as well as being an increasingly scarce resource. The possibility of recycling waste produced on site should always be investigated. This will reduce the likelihood of, and potential for, pollution produced by waste, and will conserve resources by avoiding the need for extraction of virgin materials.

It is possible to reduce significantly the waste produced on site through correct management of personnel and materials; a reduction in the amount of materials ordered will result in a reduction in the amount of waste produced. Indeed, the very use of the word 'waste' can be misleading – when material is labelled or described as 'waste', then there is a danger that an assumption will be made that it needs to be disposed of to landfill, as opposed to consideration of options for further use or recycling.

Recent case law has prompted re-consideration by the regulators of the definitions of waste and the way surplus materials (and materials made from processing previously-used materials) should be treated under the law, so no definitions of waste are given here. However, the CEEQUAL assessment of waste management performance is essentially based on current good and best environmental practice, rather than legal provisions. To find the latest thinking on waste definitions and on how surplus materials (and materials made from processing previously-used materials) should be treated under the law, visit www.wrap.org.uk, including the construction portal at www.wrap.org.uk/construction, www.environment-agency.gov.uk, and http://www.fefco.org/index.php?id=.

Waste management issues primarily relate to the construction and operation stages of a project. Related issues during the design stage are mainly concerned with material use (see Section 8). However, depending on the nature of the project, it is possible that more waste will be produced during the operation of the facility than during its construction and, if the effects of the project are to be reduced, the way a facility is to be operated has to be considered. It is therefore important to anticipate in the design the waste that will be created during the operation of the facility; otherwise barriers may be unintentionally created that will prevent this from being reduced or recycled.

Guidance on waste minimisation can be found in CIRIA Publications 133, 134 and 135 *Waste minimisation and recycling in construction, Site Guide* (1997), *Design Manual* (1998) and *Boardroom Handbook* (1999) respectively, and in CIRIA Publication C513 *The reclaimed and recycled construction materials handbook* (1999).

		Client	Design	Con-struction
9.1.1 **NSO**	Is there evidence that the client has actively included design for waste minimisation in the brief? If No, score 0; if Yes score 4	4		

v Evidence would be a reference to waste minimisation as an objective in the project brief.

9.1.2 **NSO**	Is there evidence that the designer has incorporated the principles of waste minimisation in the design of the completed works, and/or for the construction process? If No, score 0; if Yes, score 5		5	

Examples for designing for waste minimisation include the use of arisings in works (for example as engineering fill), use of standard sizes to avoid cut-offs and/or pre-fabrication where possible, incorporation of the function of temporary works such as shuttering for concrete into elements of the permanent structures.

For operation of the completed works this would include facilities for waste segregation, sufficient storage space, etc.

For further guidance on designing for waste minimisation refer to CIRIA Publication 134 *Waste minimisation and recycling in construction, Design Manual* (1998).

v Evidence will need to include more detailed records than just cut & fill optimisation. Some other examples are included in the guidance above.

9.1.3 **NSO**	Does the principal contractor have specific documented mechanisms for adopting a 'reduce, re-use, recycle' approach to waste minimisation and for identifying and dealing with all wastes arising from the civil engineering work? If No, score 0 if Yes, score 3 If evidence that these have been adopted and adhered to, score 8			8

v Evidence for adherence would include quality or environmental management system records.

Note that this question refers to all wastes arising from the civil engineering work on the site, not just waste materials, but not to the wastes from office, catering and welfare activities, since these are not currently assessed under CEEQUAL for any member of the project team.

9.2 Legal Requirements

Waste must be recognised as a relevant issue by the management of construction companies. There is a large body of legislation relating to waste management and, as a minimum, this must be adhered to.

The main area covered by legislation is the correct disposal of waste. Under the Duty of Care Code of Practice (issued under the *Environmental Protection Act* 1990) a waste producer – normally the contractor but sometimes the client – is required to ensure that all waste is carried by a registered waste carrier and taken to a suitably licensed landfill site or waste transfer facility.

In certain circumstances an exemption from the *Waste Management Licensing Regulations* 1994 can be applied for to allow for the re-use or recycling of certain waste materials, for example, if the waste can be put to a beneficial use elsewhere without causing any environmental risk or damage. This should primarily be the responsibility of the client and/or designer in developing the scheme, as early application for the exemption will enable better project design and planning. It is, however, still possible for the contractor to apply for an exemption on projects where the client or designer has not done so, should they identify a suitable opportunity for the re-use or recycling of the waste.

Waste is now characterised under the European system as inert, non-hazardous or hazardous, and individual waste types are listed in the *European Waste Catalogue*. Each needs to be dealt with differently in accordance with the relevant regulations. In this context, please also note the guidance in Section 4.2 regarding Schedule 9 plants, some of which are classified as non-hazardous waste and need to be disposed of at suitably licensed facilities.

The introduction of the *Landfill Regulations* has meant that a landfill site will no longer be allowed to accept the following types of waste:

- liquid waste (including wastewater, but excluding sludge)
- waste that, in the conditions of the landfill site, is explosive, corrosive, oxidising, or flammable.

In addition, the *Landfill Regulations* amended the requirements in relation to the description of waste on waste transfer notes that must be completed when the waste leaves the site. A waste must now be identified on the transfer note in relation to the appropriate codes in the *European Waste Catalogue*.

Statutory Site Waste Management Plans are likely to become a requirement in 2008, at least for projects over £250,000, depending on the outcome of consultation under way until July 2007 (see http://www.defra.gov.uk/corporate/consult/construction-sitewaste/index.htm).

Finally, it must be recognised that a very few projects – for example an on-site bioremediation contract – may generate zero *construction* waste for off-site disposal, waste will still be generated from canteen facilities and plant & machinery maintenance and need to be disposed of appropriately.

		Client	Design	Con-struction
9.2.1 NSO	Has all waste taken from the construction site been carried by licensed carriers? If No, score 0; if Yes, score 2			2

v Copies of certificates should have been taken for all carriers of waste materials and a straightforward file record should be available.

		Client	Design	Con-struction
9.2.2 NSO	Is there evidence that all waste has been taken to licensed facilities (or exempt site)? If No, score 0; if Yes, score 2			2

- **Evidence could include copies of the Waste Management Licence and copies of the Waste Transfer notes (or consignment notes for any special (hazardous) wastes), together with evidence of steps taken to check that waste is being sent for recycling or disposal at a licensed facility. If a Waste Exemption Registration applies, a copy needs to be supplied.**

9.2.3 NSO	Has the disposal or transfer site been checked to ensure it is licensed to take this material? If No, score 0; if Yes, score 4			4

- **Evidence would be a simple check of the disposal or transfer site's licence and the waste produced on site. Comparison of European Waste Catalogue Codes would be sufficient for this.**

9.2.4	Has the disposal or transfer site been checked to ensure the waste was taken there? If No, score 0; if Yes, score 4			4

This can be done by way of telephone checks, following trucks, requiring completed transfer or consignment notes to be returned on a daily basis, etc.

- **Whichever way the checks are carried out, they must be documented.**

9.3 Site Preparation

The issue of waste management is particularly relevant with the current emphasis on limiting the amount of development on greenfield sites. Development on brownfield sites often requires extensive site preparation works giving rise to a range of wastes that require proper management. However, it can also offer the opportunity to re-use materials on site.

If at all possible, waste should be taken to a local waste processing or disposal facility to minimise transport impacts. The location relative to the project of landfill and reprocessing sites should be established at the start of the project to enable such judgements to be made. A balance needs to be struck – and recorded – between distance to a landfill site and a greater distance to a recycling facility.

		Client	Design	Con-struction
9.3.1	Have the most environmentally beneficial ways of dealing with clearance and disposal of existing vegetation been explored and recommendations been made? If No, score 0; if Yes, score 4		4	

Scope out may be possible for some refurbishment projects and/or if no vegetation present on the site before work starts.

The best method for dealing with and/or disposing of vegetation that needs to be cleared depends mainly on the type of vegetation involved. Options range from energy recovery, chipping for composting or to provide mulch, to leaving log piles to provide shelter for amphibians or small mammals. If the vegetation contains noxious weeds or Schedule 9 plants, safe disposal according to the relevant guidance is the only option. Note that it is important to ensure beneficial use of any timber that has *had* to be felled to enable a project to proceed, ideally on the project itself but, if that is not possible, on a suitable other project as close by as possible.

- **Evidence needs to show that the type of vegetation has been assessed and different options have been considered, leading to recommendations that take account of the environmental benefit of the suggested method.**

9.3.2	Have these recommendations been implemented for the majority of vegetation cleared? If not implemented, or only for a small proportion, score 0 if implemented for majority of cleared vegetation, score 5		5

- **Evidence will depend very much on the recommendations made, but in any case site records need to demonstrate implementation. Records could include photographs, waste transfer notes, etc.**

9.3.3	What proportion by volume of material present on site (excluding topsoil and subsoil) has been incorporated into the project, as opposed to being disposed of? <30% score 0 30 to 60%, score 3 >60 %, score 4			4

One example of possible action is the recovery of all stone in dry stone walls that were 'in the way' of a new access road to a business park. Rather than the walls being bulldozed and excavated along with other materials, the walls were dismantled, the stone stored carefully and then re-used in new boundary walls and in facings to wingwalls for culverts under the new road. A triple-win resulted: reduced off-site disposal; reduced new materials imported to the project; and the 'new' walls and wingwall facings blending more quickly into the landscape.

- **Evidence could include a comparison of design calculations with waste transfer notes or other quantity surveying documentation. In any case the percentage being claimed needs some form of substantiation.**

		Client	Design	Con-struction
9.3.4	What percentage by volume of waste from demolition has been taken to landfill? If >70% score 0 50 to 70%, score 3 from 30 and <50%, score 6 from 10 and <30 %, score 9 if less than 10%, score 10	**10**		

As an example of what has been achieved, note that the volume of waste from demolition taken to landfill for the BRE Environmental Building was 4% by volume.[3]

A single score is given across all three roles / stages, because the client or designer may choose to specify this requirement, rather than just leave the contractor to choose to do it.

- **Evidence should be found in quantity surveyors' documentation or project accounts. The evidence provided should substantiate the percentage being claimed.**

9.4 On-site Waste Management

Site management is one of the most crucial areas for the control of waste. Waste management should be part of the training for all site managers to ensure they are aware of their legal responsibilities and the possibilities that exist for the prevention and reduction of waste. It is important that all of the personnel working on site, whether directly employed by the principal contractor or a sub-contractor, are aware of their responsibilities for reducing the amount of waste produced and managing the waste that is produced in the correct manner.

9.4.1	Has an analysis of waste streams arising on site been undertaken and have appropriate disposal mechanisms been chosen? If No, score 0; if Yes, score 8			**8**

Scope out only on very small projects.

Analysing potential waste streams enables practical decisions to be taken about the materials to be segregated for recycling and/or for disposal by selling on to someone who can make beneficial use of the materials, as well as for the layout of site facilities, including waste storage. Examples include materials such as ferric metals, aluminium, timber – hard and soft, treated and un-treated – and cardboard, for all of which there is the potential to secure removal from site by brokers or by organisations such as scrap metal dealers who could use the materials as they are. The appropriate waste licensing provisions will still have to be adhered to, however.

- **Evidence could be an analysis of design or tender documents that ascertains where waste is likely to be generated, what material it is likely to be made of, and how much of it there might be. From this information, disposal strategies should be defined.**

[3] *The reclaimed and recycled construction materials handbook*, CIRIA C513 1999.

		Client	Design	Con-struction
9.4.2	Has a Waste Management Plan or waste management section of a SEMP or integrated Project Plan been drawn up on the basis of such an analysis, and implemented? If No, score 0; if Yes, score 8			8

Scope out only on very small projects.

A separate document headed 'Waste Management Plan' is not required here but, if one does not exist, waste management needs to be explicitly covered in a SEMP. As with all such plans or sections of a SEMP, the aim needs to be to clearly show the actions site staff and operatives should take when dealing with 'waste' (either surplus materials or genuine waste) in order to maximise practical re-use and recycling, and to make landfill genuinely the disposal route of last resort, not first resort as is too often the case.

v Evidence of waste planning needs to be shown within the overall construction planning, or a separate Project or Site Waste Management Plan (expected to be mandatory in England and Wales from 2008).

9.4.3	What percentage of inert or non-hazardous waste material has been segregated on site and/or sent for re-processing, or for recovery in a waste to energy plant? Under 10%, score 0 10% to <25%, score 2 25% to <40%, score 3 40% to <55%, score 4 55% to <70%, score 5 70% to <85%, score 6 85% and above, score 7			7

This question does *not* apply to bulk excavation materials – they are dealt with in Q8.2.3.

It is now quite generally accepted that segregation into inert, non-hazardous and hazardous wastes is a sensible minimum measure, rather than having all such waste placed in mixed-waste skips. It is also accepted practice for all liquid wastes to be kept in appropriate containers, not poured onto other wastes, which would make them, if nothing else, unusable or unsuitable for re-processing. Such minimal segregation will ensure that the lowest rate of landfill tax is paid on the genuinely inert material, and that hazardous wastes are dealt with at least as carefully as were the virgin materials from whence they came.

But the aim here is to reward projects that go beyond such minima, and ***either*** to capture the recyclable wastes identified in the waste stream analysis dealt with under question 9.4.1, ***or*** to take the minimum of three waste streams described above to a construction and demolition waste recycling centre nearby, where the re-usable and recyclable materials are extracted. It is acknowledged that there may be areas of the country where the commercial infrastructure for re-use and recycling is limited, but it is developing fast through a variety of initiatives such as those operated or promoted by the Waste & Resources Action Programme (www.wrap.org.uk).

It should be noted that any on-site re-use of waste must be undertaken in accordance with waste management licensing regulations.

For further guidance see CIRIA Publication 133 – *Waste minimisation in construction, Site Guide* (1997).

v Evidence could be in the form of waste transfer notes or photographs showing the different segregated groups.

		Client	Design	Con-struction
9.4.4	Is there evidence that hazardous waste has been appropriately segregated (from other controlled waste) and taken to a suitable facility? If No, score 0; if Yes, score 4			4

Scope out only on very small projects, or on projects with no hazardous waste (special waste in Scotland).

See guidance above for question 9.4.3.

- **Evidence could be within a waste management plan supported by waste consignment notes and site photographs.**

9.4.5 **NSO**	What percentage of unused materials* have been beneficially recycled or re-used (or stored for re-use)? Under 10% score 0 10% to <30%, score 2 30% to <50%, score 4 50% to <70%, score 5 70% to <90%, score 6 90% and above, score 7 No or minimal unused materials, score 8			8

* Unused materials are any construction materials not used up in the project, such as bricks, concrete, reinforcing mesh, timber, prefabricated components, but can also include bulk materials, that are not only usable without processing but are also movable to a site where such use is made of them.

They are, regrettably, almost inevitable on any civil engineering project but this question is in no way meant to encourage their accumulation, nor to encourage breakages, just to score points for their re-use elsewhere.

Some unused materials can be stored and re-used at another site or it may be possible to donate them to a local group or community project – seek advice from the EA, SEPA or EHS-NI first. For others this may not be practicable, but they may still be crushed and used as sub-base or fill (i.e. recycled in order to re-use the base material of which they were made).

The level that can be considered to be 'no surplus, or minimal surplus materials' is relevant to the scale of the project and may require discussion between the Assessor and Verifier. Deciding the percentage of recycled or reused materials will also require the Assessor and Verifier to make, and justify, a judgement on the value or volume of the project, but not necessarily calculate it.

- **Evidence can include records which show that surplus materials have been taken to another site for use, compared with waste disposal records. Any records need to substantiate the percentage being claimed. A declaration made by the contractor as to how surplus materials have been used and/or disposed of would be acceptable.**

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10. TRANSPORT

10.1 Basic Principles

Road transport is a major source of local air and noise pollution, and contributes significantly to CO_2 emissions. The World Health Organisation estimates that 7 times more people die as a result of traffic-based pollution than as a result of road collisions. Transport is the most pervasive source of noise in the environment and the EU estimates that 20% of the Union's population suffer from unacceptable noise levels.

Some civil engineering projects (for example, minor flood defence schemes) will only generate small amounts of traffic during construction and operation, and therefore have a negligible adverse effect, and the completed project produces a positive environmental impact. But some civil engineering projects (for example, roads and infrastructure schemes) will generate significant amounts of traffic in the short term, during the construction phase, and for some also in the long term.

During all phases of a civil engineering project, a full understanding and appreciation of the relevant transport issues is essential if the negative environmental impacts of the project are to be minimised. Furthermore, an understanding of the transport issues is also essential if any possible opportunities for positive environmental impacts are to be achieved as a result of the project. The planning, design and construction of any civil engineering project must include the formulation and implementation of appropriate methods and strategies to deal with the relevant transport issues.

		Client	Design	Con-struction
10.1.1	Has the scheme been designed to take account of PPG 13 (PPS3 in Northern Ireland and relevant Technical Advice Notes in Wales)? If No, score 0; if Yes, score 4	**4**		

The main aims of PPG 13 (Planning Policy Guidance Note on Transport) are:

- to reduce growth in the length and number of motorised journeys;
- to encourage alternative means of transport with less environmental impact; and
- to reduce reliance on the private car.

v Evidence could be found in the results of EIA or other planning document, or in design reports.

10.1.2	Has the location of the project been chosen to utilise or improve existing transport infrastructure? If No, score 0; if Yes, score 11	**11**		

The need for this depends on the type of project and the amount of additional traffic it generates. Scope out if the completed project does not generate any traffic or if the client has no option on project location or, for a Design Only Award, where the designer had no influence over the location.

v Evidence: location of project near existing public transport links and evidence that this was one of the criteria for site selection.

		Client	Design	Con-struction
10.1.3	If the project is not located near existing public transport links, has provision been made to create new links to existing public transport, rather than relying on private motor vehicles? If No, score 0; if Yes, score 9	9		

The need for this depends on the type of project and the amount of additional traffic it generates. The question can be scoped out for civil engineering projects that generate no additional traffic at all, for example flood defences, pipelines, and new water or sewage treatment works (where, after construction, traffic may well be reduced as fewer staff may work on the new plant).

The measures provided could be the introduction of a new bus route and could go as far as the construction of a new tram link for large-scale projects.

v Evidence could be found in planning documents that outline the development of the proposal and include transport considerations.

10.1.4	Has the design team considered measures to minimise *overall* traffic impacts of the completed project and have these been incorporated in the design? If No, score 0; if Yes, score 9	9		

The question can be scoped out for projects that generate no additional traffic at all, for example flood defences or pipelines.

Note that it may be inappropriate for road projects to score points for this question, depending on the motivation for the project. Road schemes may score if they reduce the overall volume of traffic by, for example, developing bus or cycle lanes. In addition, redesigning a junction may make that part of the road network more efficient reducing congestion and thus emissions. This is now considered to be better management of the road network so, if this can be demonstrated, then points should be awarded.

v Evidence would be documentation in the form of a Traffic Impact Assessment or similar.

10.2 Construction Transport, including Nuisance and Disruption

Transport issues that may be of concern during the construction phase should be considered in the detailed design of the project. Thus, possible problems that could result in adverse environmental impacts can be forecast, and mitigating measures designed in from the start. The sooner potential impacts are identified, the more likely it is that the mitigation measures and strategies formulated to minimise them will be effective.

Traffic and transport of goods, materials and staff to and from a construction site can cause considerable nuisance to local people. Delivery lorries, in particular, can cause local air pollution, create noise and vibration, and can spread dirt onto roads and even onto neighbouring property. They also can be a hazard to other road users and pedestrians.

A number of simple measures can help to reduce significantly the amount of nuisance and disruption caused by traffic to and from a construction site. Deliveries should be timed so as to avoid vehicles queuing up. If this is not feasible, a designated queuing area or a waiting area some distance from the site can be used to keep delivery vehicles away from buildings and offices where they would cause a nuisance, and from busy

roads where they would cause major disruption to traffic flows. Large lorries turning in narrow streets can also cause considerable disruption to traffic flow, and this should be considered when choosing the location for site access.

Another important point is the additional traffic generated by site personnel. At a minimum this can be addressed by arranging designated parking areas for staff, but ideally by promoting alternative staff transport arrangements, such as park & ride or car sharing schemes (see Section 10.3).

Mud and other deposits on access roads to construction sites are a further cause of nuisance, as well as representing a safety hazard. Ensuring that all site access roads are regularly cleaned is established good practice. Precautions to prevent dirt getting onto access roads in the first place would be even better.

		Client	Design	Con-struction
10.2.1	Have baseline studies of local traffic movements been reviewed or considered by the project team prior to the construction stage commencing? If No, score 0; if Yes, score 3	3		

Baseline studies may be carried out by the project team or the data from traffic surveys may be purchased from the local authority.

- **Evidence should be baseline study data, which could be a stand-alone report or produced as part of an EIA.**

10.2.2 NSO	Is there evidence that transport impacts during the construction phase have been considered at the design stage, and that steps have been taken to minimise these? If No, score 0; if Yes, score 6	6		

This can be achieved, for example, by assessing the transport impacts of materials and construction staff, considering options for site access and alternative means of transport for materials (other than by road), which could also determine the choice of source of materials.

- **Evidence could include, for example, a transport assessment, evidence of using material sources that reduce the need for road transport, or choosing alternative means of transport (such as water or rail) over road transport where this option exists.**

10.2.3 NSO	Have measures been put in place to minimise disruption caused by construction traffic? If No, score 0; if Yes, score 7			7

Measures could be laid out in a construction traffic management plan or equivalent. Issues to be addressed include disruption to local traffic flows, nuisance caused by delivery vehicles and severance caused by access roads. Measures can be applied to any form of transport.

- **In the absence of such a plan, other evidence is required to identify the range of measures taken and their implementation, such as copies of instructions and appropriate photographic evidence.**

		Client	Design	Con-struction
10.2.4	Have measures been successful in reducing disruption caused by construction traffic? If No, score 0; if Yes, score 4 If not monitored, score is also 0			4

- **Evidence could be comparison of actual movements to the baseline data or what was predicted in the planning stage. If appropriate, evidence may also be obtained from local authorities and police views on traffic management.**

10.2.5 NSO	Has the project team assessed possible use of other existing transport routes (other than road), such as rail, water etc, for the movement of construction materials and/or waste? If No, score 0; if Yes, score 3	3

- **Evidence will need to be shown in the client's requirements or in design and/or site records to demonstrate consideration of alternative transport methods.**

10.2.6	Has the outcome of this assessment been implemented? If No, score 0; if Yes, score 8			8

Scope out if outcome of the assessment was not to use any alternative routes.

- **Evidence will be in the form of the assessment being included into construction plans and sub-contract orders.**

10.2.7	Is there evidence of measures (and their effectiveness) to keep access roads clean? If No, score 0; if Yes, score 5			5

Appropriate measures may include, for example, use of road sweepers, paving of haulage roads, and use of wheel-washing facilities.

- **Evidence can be in the form of copies of instructions and photographs during construction. The Verifier must ascertain that what they see from photographs was sustained throughout the project duration. This could be evidenced through plant returns showing how frequently road sweepers or bowsers were on site. They may also wish to review complaints records to ensure these are consistent with other evidence.**

10.3 Minimising Workforce Travel

Major construction projects can result in a large workforce being assembled at a specific location. This workforce may be drawn from locations many miles from the project and can even outnumber the local population. Large distances may be travelled each day to and from work, generating traffic on local roads and leading to increased pollution and traffic congestion locally, as well as contributing to the overall problem of CO_2 emissions globally.

By employing local people, distances travelled to and from work can be reduced, thus minimising the disruption caused to local communities. In addition, the project may be perceived in a more positive light if it provides local employment. The provision of organised transport to deliver the workforce to the site can further reduce the number of vehicular movements. Alternatively, the provision of on-site accommodation can be considered for members of the construction staff who are not local to the site.

		Client	Design	Con-struction
10.3.1	Did the site set-up include measures to minimise travel impacts of the workforce? If No, score 0; if Yes, score 4			4

10.3.2	Have these measures been successful in reducing travel impacts during construction? If No, score 0; if Yes, score 3 If success not monitored, score is also 0			3

Appropriate measures may include, for example, access to public transport links, provision of a minibus, provision of temporary accommodation, encouraging car-pooling or prescribing specific routes for journeys.

- **Evidence for 10.3.1 needs to show what facilities the site team has provided to assist minimisation of workforce travel. These could include some of the examples listed above.**
- **Evidence for 10.3.2 could be reports on numbers of workforce travelling to work by car as opposed to public transport, car counts compared to total number of workforce employed on site or similar.**

11. NUISANCE TO NEIGHBOURS

11.1 Basic Principles

Unlike some of the other environmental issues associated with construction, nuisance to neighbours covers issues that, by and large, do not have a great or long-lasting environmental impact. They can, however, cause inconvenience and stress amongst neighbouring communities during the period of time over which they take place. They can also have an effect on animal communities, and, to a lesser extent, plant communities, in the vicinity of the works.

Nuisance to neighbours, because it is largely about disruption to human communities, however temporary, can often be one of the most important and difficult of environmental aspects for a civil engineering project to deal with and get right. A community that is antipathetic towards a construction project may also decide that everything that is done on site is a nuisance whether or not this really is the case. Overall, this makes impacts hard to define and assess. Right and wrong are often determined by the application of common law principles and legal debate over what constitutes a nuisance. However, some aspects, such as noise, are governed by statute.

For further guidance on good practice regarding the issues assessed in this section refer to the CIRIA handbook *Environmental good practice on site*, CIRIA Publication C650(2005).

Note: Some questions or sub-sections in this section may be scoped out if the site is in a remote location with no neighbours. However, some of the nuisance aspects, such as noise, vibration and light, can also disrupt nearby wildlife or cause environmental damage (for example, dust and pollution). This must be considered when deciding whether or not to scope out elements of this section.

		Client	Design	Con-struction
11.1.1 **NSO**	Does the contractor have a policy or code of practice regarding considerate behaviour (e.g. Considerate Constructors Scheme or its own Code of Practice)? If No, score 0; if Yes, score 5			5

v Evidence: Code of Practice or Policy statement, registration with Considerate Constructors Scheme or similar.

		Client	Design	Con-struction
11.1.2	Are there any measures included in the design of the scheme that go beyond those agreed at the planning permission stage that are intended to mitigate any nuisance caused by the operation of the scheme once constructed? If No, score 0; if Yes, score 5	5		

Appropriate measures could include, for example, choice of surfacing material in roads, noise bunds, sight screening and revised lighting. Note however that some measures may need regulatory approval.

v Evidence needs to be provided to show design changes made subsequent to planning approval that were not also planning conditions. The ability of these changes to mitigate nuisance needs to be mutually agreed between Assessor and Verifier.

		Client	Design	Con-struction
11.1.3 **NSO**	Has a site environmental management plan or equivalent section in a project environmental management plan considered the following: a) noise & vibration, score 2 b) site traffic, score 2 c) dust & odours, score 2 and d) light pollution?, score 1			**7**

Included in these sections should be guidance or method statements on how to avoid unnecessary noise and vibration, measures to reduce disruption caused by site traffic, measures to minimise dust and odour emissions and to avoid light pollution. Some examples of such measures are listed in the relevant sub-sections in this chapter. For further guidance see *Environmental good practice on site*, CIRIA Publication C650.

Note that this question is marked NSO. What matters is that these issues have been considered. If on consideration it was found that no specific measures are necessary your project, for any or all of the issues to be considered, the points can still be given, as long as evidence can be provided that this decision has been made consciously.

v Evidence needs to show that these areas were included within construction planning documents or as stand-alone plans.

11.2 Legal Requirements

Nuisance to neighbours is covered both by common law interpretation of what constitutes a nuisance and by statutory legislation, including the *Control of Pollution Act* 1974 and the *Environmental Protection Act* 1990. Section 60 of the *Control of Pollution Act* allows local authorities to control noise from construction sites by serving a Section 60 notice. A developer may apply for prior consent for construction works through a Section 61 consent. Provided the terms and conditions of that consent have been adhered to, this acts as a defence against prosecution under Section 60.

It is considered good practice to liaise with the local authority and any site neighbours regarding noise issues. The local authority may invite the contractor to apply for Section 61 consent prior to any potentially noisy works. Even if the consent is not required or not considered appropriate by the local authority, it will still require the contractor to consider the likely noise and vibration impacts of the development.

		Client	Design	Con-struction
11.2.1	Has the local authority been consulted regarding all noisy aspects of the construction? If consulted, score 1 if consulted and noise levels monitored, score 3 if agreed noise levels complied with, score 4			**4**

Consultation with the local authority may include the completion of a Section 61 application, or can lead to appropriate Action Plans being drawn up in liaison with the Environmental Health Officer.

It is acknowledged that it is very easy to accidentally exceed noise restrictions for short periods. What is assessed here is whether monitoring has taken place and effectively assisted in alerting site staff to breaches in noise limits so that appropriate control measures could be taken.

v Evidence would include correspondence with the local authority, the Section 61 consent (if granted), or Action Plan and site monitoring data.

		Client	Design	Con-struction
11.2.2 NSO	On completion of the contract, have any abatement notices been served and resulted in, or are likely to result in, legal action? If Yes, score 0 **for this question and for Question 11.2.1** above, if No, score 6			**6**

v A signed statement from the applicant will be acceptable evidence for this. If in any doubt the Verifier could check with the relevant local authority.

11.3 Nuisance from Noise and Vibration

Noise and vibration can have powerful effects on humans, animals and the environment. The ability of noise and vibration to disturb, annoy and cause stress should not be underestimated either during construction or in operation. Consultation should therefore be carried out and initial background noise surveys commissioned.

BS5228 provides guidance on noise levels from construction and what measures can be expected to minimise nuisance caused by noisy operations. For instance, in noise-sensitive areas, careful selection of plant is important. As a rule of thumb, older construction machinery tends to be noisier than newer models, and should be avoided on sites where noise levels are an issue.

Vibration can cause damage to buildings and other structures and its control should primarily be regarded as part of the engineering of the scheme, not its environmental management. Depending on the scale of the development and the sensitivity of the location, noise and vibration generated during construction can be a major factor in the overall environmental impact of the scheme.

Note: This entire sub-section (11.3) can be scoped out if there are no built structures, sensitive wildlife habitats (not just protected species) and/or public recreation areas that might be affected by the works or the completed project.

11.3.1a)	Have baseline noise studies been carried out for the project? If No, score 0; if Yes, score 2	**2**
11.3.1b)	Have baseline vibration* studies been carried out for the project? If No, score 0; if Yes, score 2	**2**

* Baseline vibration studies could be carried out on a site that is near a railway line or major road, or any other situation where baseline vibration exists.

v Evidence should be a written report on the results of these studies.

		Client	Design	Con-struction
11.3.2 a)	Have proposals been put forward at the design stage for mitigating noise during operation? If No, score 0; if Yes, score 2	2		
11.3.2 b)	Have proposals been put forward at the design stage for mitigating vibration during operation? If No, score 0; if Yes, score 2	2		

Scope out a) and/or b) if the completed project does not cause any noise or vibration.

Example measures could include noise bunds, orientation of plant, and siting of plant on isolating foundations.

v Evidence for this would be found in design drawings and/or specifications.

11.3.3 a)	Have proposals been put forward at the design stage for mitigating noise during the construction phase? If No, score 0; if Yes, score 2	2		
11.3.3 b)	Have proposals been put forward at the design stage for mitigating vibration during the construction phase? If No, score 0; if Yes, score 2	2		

This could include, for example, the early development of bunds that help screen construction noise and later become part of the overall landscaping of a project, or designer input in the phasing of the development or the timing of noisy works.

v Evidence for this could be in the form of instructions, drawings, project planning documentation, site meeting minutes etc

11.3.4 a)	Is there evidence that a particular working method or mode of operation has been adopted at the construction stage to reduce the amount of noise? If No, score 0; if Yes, score 2			2
11.3.4 b)	Is there evidence that a particular working method or mode of operation has been adopted at the construction stage to reduce the amount of vibration? If No, score 0; if Yes, score 2			2

For example, use of hydraulic shears instead of hydraulic impact breakers, jacking of steel sheet piles instead of driven piling, use of chemical splitters or falling weight breakers instead of pneumatic breakers and drills.

v Evidence could include photographs, and calculations of noise and/or vibration levels.

		Client	Design	Con-struction
11.3.5 a)	Is there evidence that measures have been taken during construction to minimise disruption or damage caused by noise? If No, score 0; if Yes, score 2			2
11.3.5 b)	Is there evidence that measures have been taken during construction to minimise disruption or damage caused by vibration? If No, score 0; if Yes, score 2			2

Possible measures include time restrictions to limit noisy operations to certain hours of the day (or to limit very noisy operations to short, intermittent spells), using mufflers or silencers on equipment, reducing drop heights into lorries or skips or erecting noise screens around the site.

- **Evidence can be in the form of a SEMP or other management plan documenting such measures, minutes of site meetings etc, or in absence of these, photographic evidence or, in exceptional circumstances, site visits by the Verifier during construction.**

11.3.6	On completion of the contract, has any damage been caused to buildings and structures by vibration caused by construction processes? If Yes, score 0; if No, score 4			4

In other words, have there been any complaints or legal actions about *damage* caused by vibration? (Note: This does not include complaints about nuisance vibration.)

- **Evidence of no damage can be a signed statement of that absence from the Contract Manager or appropriate alternative.**

11.4 Nuisance from Air Pollution, including Dust and Odours

Dust created by a variety of means such as soil stripping, bulk excavation, vehicle movements, cutting and handling materials, can be a source of great nuisance to local neighbours and may adversely affect the health of people, wildlife and crops. Dust is a problem on most construction sites. Odours are less of a problem, but nevertheless can be very unpleasant when they do occur.

Even low concentrations of dust can affect plant and fruit growth, especially if the dust is highly alkaline, such as limestone or cement. Construction sites in agricultural areas therefore need to take particular care to prevent dust emissions, as do construction sites near sensitive habitats such as heathland or acid grassland.

Restricting works that may cause a high level of dust in certain weather conditions (for example, wind in a certain direction) may be one way to avoid potential problems. Once dust is airborne, however, it is difficult to stop it. The most effective strategy is therefore to prevent dust being generated in the first place. Careful design of construction operations, including the location of stockpiles and batching plant, can reduce dust. Damping down, using either water or water with chemical additives or binders, is another established method to avoid dust pollution.

If dust-generating activities cannot be avoided, it may help to erect screens to act either as windbreaks or as dust screens. These can take the form of permeable or semi-permeable fences. Trees or shrubs planted early as part of site landscaping can also provide some screening, as can retention of existing vegetation.

		Client	Design	Con-struction
11.4.1	Is there evidence that appropriate measures have been taken in design to minimise emissions during operation? If No, score 0; if Yes, score 4		4	

Scope out if there are no emissions of any kind resulting from the completed project, for example a flood defence bank, small bridge or canal embankment.

Appropriate measures may include low-emission boilers for water and wastewater treatment plants, fitment of covers to tanks at such works, and spray facilities at solid-waste treatment facilities.

v Evidence for this would be found in design drawings and specifications.

11.4.2 **NSO**	Is there evidence that appropriate measures have been taken to minimise dust emissions during construction? If No, score 0; if Yes, score 5			5

Example measures include damping down haul roads and siting of dust-producing operations away from neighbours.

v Evidence could include identification of potential dust creating activities within construction planning and evidence of implementation of dust reduction measures. In the absence of a specific plan, other evidence is required to identify the range of measures taken and verify their implementation, for example, photographic evidence, site records, records of external monitoring or, in exceptional circumstances, a site visit by the Verifier during construction.

11.4.3	Is there evidence that appropriate measures have been taken to minimise gaseous emissions, including odour, during construction? If No, score 0; if Yes, score 3			3

Scope out question if no gaseous emissions during construction.

v These measures could be laid out in a dust and odour management plan or equivalent section in a SEMP or integrated project management plan. In the absence of such a plan, other evidence is required to identify the range of measures taken and verify their implementation, for example, photographic evidence, site records, records of external monitoring or, in exceptional circumstances, a site visit by the Verifier during construction.

11.5 Nuisance from Light Pollution

Light can prove a nuisance to neighbours when it spills into surrounding buildings and/or is excessively bright. It can also be a waste of energy. Light sources that minimise spillage and illuminate only those areas that need it are likely to cause least or no nuisance to neighbours.

All lighting for the final project, as well as all compound and site lighting, should be designed to prevent spillage of light into neighbouring buildings and/or areas. Construction lighting in particular is often extremely powerful, to allow work to continue safely outside daylight hours. Apart from causing considerable nuisance and disrupting the sleep of site neighbours, it can also cause disruption to wildlife.

Note: The following two questions can be scoped out if there are* no *neighbours, sensitive wildlife habitats (not just protected species) or public recreation areas that might be affected by the works.

		Client	Design	Con-struction
11.5.1	Is there evidence that appropriate measures have been taken in the design of the project to prevent light spillage to neighbouring areas during operation? If No, score 0; if Yes, score 5		5	

Scope out on projects that contain no lighting for their operational phase.

v Evidence for this would be found in design drawings and specifications.

11.5.2	Is there evidence that appropriate measures have been taken at each stage of the project to prevent light spillage to neighbouring areas during construction? If No, score 0; if Yes, score as indicated		1	1

These measures could be laid out as part of a site environmental management plan or equivalent. A score at design stage is possible here if designers can influence where the site compound is placed.

v In the absence of a specific plan, other evidence is required to identify the measures taken and verify their implementation, for example, photographic evidence or, in exceptional circumstances, site visits by the Verifier during construction.

11.6 Visual Impact / Tidiness of Site

A common complaint about construction sites is that they look a mess. Materials are scattered all over the place along with various items of litter. Proper storage of materials can result not only in a tidier site that is visually less unpleasant but can also reduce wastage. Regular clearance of litter makes the site look tidier and enhances a culture of environmental care amongst staff.

		Client	Design	Con-struction
11.6.1 **NSO**	Is there evidence of measures to minimise the adverse visual impact of the construction site? If No, score 0; if Yes, score 3			**3**

Example measures include appropriate site screening, allocation of stacking areas, tidy storage of materials, a regular litter pick and site tidy-up, and inspection and cleaning of site hoardings.

- **These measures could be laid out as part of a site environmental management plan or equivalent. In the absence of such a plan, other evidence is required to identify the measures taken and verify their implementation, for example, site records, photographic evidence or, in exceptional circumstances, a site visit by the Verifier during construction.**

12. COMMUNITY RELATIONS AND JOY IN USE

12.1 Basic Principles

Establishing and maintaining a community relations programme throughout the whole project process is more likely to result in a well-informed public, and will help to build a spirit of co-operation with the relevant authorities, agencies and local community. Ideally every project should include a consultation stage when initial design ideas are being developed. This will reduce delays during planning application, reduce the risk of environmental protest during site works, enhance site community relations and provide greater acceptance of the completed scheme.

As opposed to 'Nuisance to Neighbours' this section deals with the wider community issues. The scope of this section is community 'relations', implying a two-way dialogue, and a relationship that goes far beyond the immediate impact of the construction project on its direct neighbours.

Who needs to be consulted?

'The community' is taken to mean the following groups:

- project site neighbours;
- regulatory authorities and agencies;
- local interest groups;
- the wider community.

Liaison with Statutory Authorities and Agencies

Relevant authorities include:

- the local authority planning department;
- the local authority environmental health department;
- the local authority transport department;
- the Environment Agency, SEPA or EHS-NI or its equivalent;
- Natural England, Scottish National Heritage etc.;
- English Heritage or its equivalents;
- water companies.

Liaison with the Wider Community

Examples of the wider community could be:

- national or regional non-governmental organisations (NGOs);
- the local Wildlife Trust;
- other local environmental groups.

		Client	Design	Con-struction
12.1.1	Has a community consultation exercise been carried out and the results been passed to appropriate members of the project team and, as and where appropriate, the results fed back to consultees? If No, score 0; if Yes score as indicated	4	8	2

This question should not be scoped out for the Client role, as even for a remote location with no immediate neighbourhood there may be other stakeholder groups that ought to be consulted, such as parks and wildlife authorities, the Ramblers Association, Environment Agency etc.

If the initial consultation has established that there are no interested parties the question may be scoped out for design and construction.

Ideally, consultation should be carried out early for *each stage* of the overall process (for example, at planning proposal stage, during design and before construction starts). Consultation exercises can take the form of a simple public meeting or a full action-planning event, depending on the scale and profile of the project. Other methods can be door-to-door surveys, leaflet drops and newsletters, though the latter should mainly be a way of following up consultation that has already taken place.

It is important to bear in mind that simply providing *information* does not constitute *consultation*. True consultation will offer other stakeholders the opportunity to become involved – at least to a certain extent – in decision-making. Any kind of consultation exercise must therefore include a "feedback loop" allowing the community to respond and their comments to be taken into account as and where appropriate.

- **Evidence could be reports or minutes of meetings with appropriate groups that are carried out at appropriate stages of the project. Evidence should also be provided to show how information from these exercises is then communicated to the project team.**

12.1.2 **NSO**	Has a member of the project team been made responsible for ongoing community consultation? If No, score 0; if Yes, score 1 for each stage	1	1	1

For each project there should be someone nominated to be responsible for ongoing community consultation, even if it is to merely handle enquiries from interested parties.

- **Evidence could be in the form of a letter appointing someone to be responsible or it could be included in a project management plan. In either case responsibilities need to be defined.**

		Client	Design	Con-struction
12.1.3	Has there been a community relations programme covering all relevant project stages? If No, score 0; if Yes, score 7	7		

This question can be scoped out in remote locations or on very small projects if the initial consultation has established that there are no interested parties. Assessors and Verifiers may also exceptionally consider scoping out this question if an initial community consultation exercise has concluded that the community were very pleased that the project was happening, so the project cannot be deemed to be sensitive and therefore does not require a continuing CR programme, just someone appointed to deal with queries and complaints as and when they arise.

Whereas a community consultation exercise (Question 12.1.1) is a one-off event – even if carried out at each stage of a project – a community relations programme is an ongoing effort to maintain a dialogue with all community stakeholders throughout the planning, design and construction processes.

A thorough and effective community relations programme should consider the following elements:

- the significant environmental impacts of the final constructed product, perhaps (but not necessarily) evaluated by an environmental impact assessment;
- the significant environmental impacts of the construction stage, perhaps (but not necessarily) evaluated by an environmental impact assessment;
- transportation impacts, perhaps (but not necessarily) resulting from a transport impact assessment;
- livelihood impacts of the construction process;
- timing and programme of the works for design and construction stages;
- employment and skill development opportunities during the works and resulting from the final product.

An effective community relations programme should also manage the expectations of the consultees – consultation should not lead to unrealistic expectations of the project.

v Evidence needs to show a programme of community relations activities carried out. These could include leaflet drops, press releases, open evenings, websites, regular liaison group meetings, etc. However the programme is constructed, it needs to include two-way consultation (as described in 12.1.1.)

12.2 Engagement with Relevant Local Groups

Examples of local groups with an interest in the environmental performance of a project could include:

- Not-for-profit Non-Governmental Organisations (charities);
- Residents Associations;
- Chambers of Commerce;
- Local Agenda 21 groups;
- Voluntary environmental groups (for example, the British Trust of Conservation Volunteers);
- Local wildlife trusts;
- Local recycling or waste exchange schemes.

		Client	Design	Con-struction
12.2.1	Did the community relations programme include a mechanism for local interest groups to communicate with the project and/or construction team? If No, score 0; if Yes, score 1 for each stage	1	1	1

v Evidence needs to show these activities actually taking place and the relevant groups having been invited and/or taking part. This could be in the form of meeting minutes, correspondence, attendance lists etc.

12.2.2 NSO	Have any partnership links been established with local groups (for example, donation of skills or surplus materials)? If No, score 0; if Yes, score as indicated	1	1	3

For every project, even in remote locations or on small projects, there is the potential to establish links with community groups, schools or other groups who could benefit from an exchange of skills or donation of materials.

v Appropriate evidence needs to be provided to show the relationships formed.

12.3 Effectiveness of the Community Relations Programme

Aside from the nature of the Community Relations Programme itself, it is also necessary to make some assessment of actions taken by the designer and/or contractors as a result of listening to the responses obtained from the community.

Clearly, any community consultation is valid only if comments are taken into account and, where necessary or appropriate, changes are made to plans, designs or construction processes to try to accommodate concerns raised at the consultation. At the least, a system should be in place, as part of the community consultation programme or on its own, whereby any comments or complaints are registered and any action taken as a result is recorded.

		Client	Design	Con-struction
12.3.1	Has there been a mechanism to ensure that comments from the local community were recorded and followed up? If No, score 0; if Yes, score 2 for each stage	2	2	2

v Evidence could be in the form of meeting minutes with liaison groups and the actions taken. A complaints procedure would also provide evidence but the definition of a complaint may restrict what gets recorded.

12.3.2	Has the client incorporated responses from the community relations programme into project decision making? If No, score 0; if Yes, score 8	8		

Note that this question can be scoped out if there was genuinely no feedback that generated issues to be considered in the project decision-making.

Note also that there is no intent with this question for the client to always accede to actions requested in the responses, only to have a process for incorporating them into project decision making.

v Appropriate evidence could show that comments from the community have been incorporated into the client's brief or specification.

12.3.3	Is there evidence of changes having been made to the design or construction process as a result of feedback from the community consultation? If No, score 0; if Yes, score as indicated		8	2

Note that this question can be scoped out if there was genuinely no feedback that prompted possible changes to the design.

Note also that there is no intent with this question for changes that the project team judge are needless or pointless to be made just to score the CEEQUAL points.

v Evidence would be any amendments to proposals or designs as a result of comments from consultation with the community. For the construction stage there should be a record of any consultation that has taken place and changes or arrangements as a result of this (for example, timing of noisy works), as well as the record of complaints or comments and what action was taken as a result.

12.4 Joy in Use

This is often not considered to be applicable to civil engineering projects, but more the province of architects and planners. However, design engineers can have a significant input to this factor and should be encouraged to participate fully in shaping the project to provide joy in use (sometimes called the 'wow' factor) generated by structures of high aesthetic value.

'Joy in use' in this context does not necessarily have to apply to users only. Almost any built structure can provide 'joy in use' to neighbours, visitors, passers-by – anyone who sees or experiences it – if it is designed to be aesthetically pleasing and add value beyond its actual function. Conversely, any built structure that is not aesthetically pleasing can represent an eyesore and be aesthetically offensive, however useful and necessary its function may be.

The assessment of these factors is necessarily subjective. The evidence of success for these factors must be at least by demonstration that best practice has been used in accordance with the 'softer' social standards as well as those for engineering.

The design factor is more appropriate to a building, but should still be considered for other projects, for example the aesthetics of a bridge or, on a more practical level, the ventilation of tunnels. Another good example is the design of major road junctions, where the needs of all its different users (for example, drivers, cyclists and pedestrians) need to be considered equally. Examples of how designers and traffic engineers have got this wrong are plentiful!

		Client	Design	Con-struction
12.4.1	Is there evidence that consideration has been given to a high degree of occupier comfort and/or user enjoyment? If No, score 0; if Yes, score as indicated	4	5	1

Can be scoped out on projects where there are no identifiable occupiers, neighbours or users.

Example measures could include providing viewing points, picnic areas and lay-bys with toilets on road projects and bridges, viewing points and picnic/leisure areas on dams and reservoirs, footpath access to river frontages after new flood defence schemes are built, or providing additional moorings on a waterway embankment protection project.

v Evidence in the form of briefs, specifications and other documents that demonstrate inclusion of features which give benefit to occupiers and/or users. At design stage photographs or other site records could show incorporation of these features.

12.4.2	Is there evidence that the needs of all different user groups have been considered and respected to an equal degree in the design solution (for example, car drivers, cyclists, pedestrians etc)? If No, score 0; if Yes, score 7		7	

Can be scoped out on projects where there are no identifiable occupiers or users.

For example, on a road scheme, are all users given equal consideration within the design, or are pedestrians expected to climb over bridges or descend into subterranean tunnels, and are cyclists expected to take a longer diversion to avoid a new road junction?

v Evidence would be in the design brief, design team meeting minutes, civic awards etc

		Client	Design	Con-struction
12.4.3 **NSO**	Is there evidence that the project has been designed to be sympathetic to its human users and in scale with its surrounding environment? If No, score 0; if Yes, score 4		**4**	

For example, on a wastewater treatment plant are mess and office facilities placed as an afterthought in corners of buildings with no natural light or ventilation, or are buildings designed with these elements in mind to give external views and light, to help relaxation at break times?

In flood defence works it is now commonplace to design the scheme such that its purpose is effectively disguised, and all local people see are banks, brick-faced walls, footpaths and ramps, all in scale with, and woven into, the local landscape and buildings.

v Evidence would include the design brief, meeting minutes, drawings etc.

Appendix 1 How CEEQUAL was developed

The development of CEEQUAL was originally undertaken in 1999 to 2004 by a team led by the Institution of Civil Engineers, with financial support from the 'Partners in Innovation' scheme first operated by DETR and then by DTI. What was called 'the CEEQUAL development project' was managed by Crane Environmental Ltd, and received active support and participation of relevant Government Departments and Agencies, professional and industry associations, and leading civil engineering consultants and contractors. The organisations contributing resources to the project in cash or in kind were Project Partners, many of whom now own shares in CEEQUAL Ltd, the company set up to run the Scheme into the future. The development of the scheme began in September 2000 with a Feasibility Study, for delivery of a scheme framework and business plan by April 2002. The key activities of the Feasibility Study comprised:

- identifying the core environmental issues to be covered, and how performance beyond legal and industry minimum standards can be assessed and credited;
- developing sets of credits and methodology for assessment;
- trialling of the draft scheme on real projects by the Project Partners;
- producing a business plan for the subsequent operation of CEEQUAL;
- documenting and presenting the proposed scheme to the construction industry and its clients.

The Development & Implementation phase of the project started in May 2002, and saw the scheme through further trials and the first set of Assessments undertaken in the Spring and Summer of 2003 using Version 1 of the Scheme. These first eight awards were presented in June and September 2003.

In the development of CEEQUAL, account was taken of the substantial body of research and experience relating to environmental issues on construction projects, environmental management of design and construction, and the Building Research Establishment Environmental Assessment Method (BREEAM), an award scheme that has achieved a voluntary improvement in the environmental specification, construction and performance of buildings. However, unlike the BREEAM scheme for buildings, where there are specific schemes for different types of building, CEEQUAL is an assessment framework appropriate to ***any*** civil engineering project, such as roads and railways, airports, coast and river works, water supply and wastewater treatment, power stations, retail and business parks. It includes environmental aspects such as the use of water, energy and land; ecology; landscape; noise and dust; archaeology; waste minimisation and management; and community amenity. Awards are made to projects in which the clients, designers and constructors have gone beyond the legal and environmental minima, to achieve distinctive environmental standards of performance.

In parallel with this, the future management of CEEQUAL as a self-sustaining business operation was arranged and this third version of the scheme produced. The participating Project Partners have steered the project through a Project Advisory Group to develop and test the scheme details. Wider industry consultation was also invited, so that the evolving system of scores, assessment, trial applications and the operational business plan were open for industry comment and contribution.

For the time being at least, CEEQUAL is a scheme operated by and for the UK construction industry. However, discussions are in progress for country-specific versions of CEEQUAL to be developed in the future.

Who was involved in the Development Project?

The participating organisations were (Project Partners are indicated by an asterisk):

- Association of Consulting Engineers*
- AMEC
- Anglian Water
- Arup*
- Atkins Environmental*
- BAA
- Babtie*
- BRE*
- British Waterways*
- Buro Happold*
- Carillion Construction
- Chartered Institute of Water & Environmental Management*
- Casella Stanger*
- CIRIA*
- Civil Engineering Contractors' Association*
- Confederation of Construction Clients,
- Cornwall County Council*
- Costain*
- Crane Environmental*
- Channel Tunnel Rail Link
- Dean & Dyball Construction Ltd
- Department of the Environment (NI)
- Department of Environment, Transport and the Regions (project sponsors prior to May 2001)
- Department of Trade & Industry (current project sponsors)
- English Nature
- Edmund Nuttall Limited
- Environment Agency
- Faber Maunsell*
- Government Construction Clients' Panel
- Highways Agency
- Institution of Civil Engineers*
- KBR*
- King Environmental*
- Laing (now Laing O'Rourke)
- M4i Sustainability Group (now part of Constructing Excellence)
- Ministry of Defence
- Morrison Construction
- NI Assembly
- Network Rail (previously Railtrack)
- Northern Ireland Construction Service*
- Scottish Environment Protection Agency
- Taylor Woodrow*
- Temple Environmental*
- TRL*
- WSP Environmental*.

Details about the Scheme and those now involved in its operation are available on the website, www.ceequal.com.