PROJECT MANAGEMENT MANUAL

PROJECT MANAGEMENT PROCESS
for
MAJOR CAPITAL PROJECTS

FOR

ESTATE MANAGEMENT

November 2012

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INTRODUCTION

Overview

This Project Management Manual provides best practice guidance and model documents, which will assist University staff and its Consultants and Contractors to perform their duties, with the express intention of standardising the project management process and encouraging the use of best practice.

The Manual is divided into two Volumes. Volume one contains the Project Management Process manual. Volume 2 contains all the ‘standard’ and amended forms that are used most regularly by the University in addition to standard model bonds and warranties and forms of contract that are not included.

The Executive Synopsis provides an overview of the project management process and is intended for use by Senior Managers and Development Managers who need an understanding of the project management process and its role within the University but do not need to be familiar with the detailed process.

The Project Management Process manual, which is this document, is intended to be the Project Manager’s main source of information and guidance. It contains a detailed description of, and a flow chart for, the project management process and incorporates model forms, checklists and templates.

Scope of the Project Management Process Manual

This document describes the route to be taken in the delivery of a project and is structured on the presumption that the project is for the delivery or improvement of a built asset or facility.

It is appreciated that many projects do not necessarily directly result in a changed physical asset. For example, actions taken by the University that either change the market’s perception of an area, or facilitate implementation of a project by another body, that could not have happened without a contribution in kind by the University, are all recognised as projects.

A project is therefore interpreted as any action requiring capital expenditure or other input by the University that results in an improvement in an asset or other measurable output.

A project can therefore include such diverse matters as:

- The execution of improvement works to the Estate within the University via capital funding
- The master-planning of a designated area, including land not in the University’s ownership
- Consideration of specific studies to review the social, environmental and economic impact of a range of options
- The acquisition, assembly, exchange or rationalisation and disposal of the University’s estate to facilitate regeneration by others

For the first time the University is asked to consider Benchmarking its own performance in the delivery of what it does, to assess the current position, ascertain if it is getting better and the rate at which it is improving. It is proposed that Project Managers select and use the most appropriate portion of this manual to assist in the effective delivery of their project.
INTRODUCTION

It is also worth noting that this is a ‘best practice’ document and is based upon the Treasury Procurement Guidelines. The intent was to provide transparent, auditable procedures that provide best value. There are alternative methods to those detailed in this document but the Project Team is strongly advised to follow the procedures outlined in this document. By doing so it will be able to demonstrate it is following best practice.

Project Management Process Manual Structure

The first 5 sections of this manual detail the project management process in a logical sequence from Project Concept to Project Review and Close Out.

It should be noted that although Sections 1-5 and their sub-sections are listed sequentially, as far as possible in the ‘chronological order’ of a typical project, the sequence does not have to be followed rigidly. It is expected that many tasks will be carried out simultaneously and the order of some tasks may be changed to suit the requirements of individual projects.

The document uses two flowcharts. The first, called the Project Management Process Stage Map, illustrates the relevant Procedure to be followed whilst the second is a the visual representation of the Capital Project, illustrating the route through each of these six stages.

The forms and checklists contained in the appendices are for guidance only and suitable alternatives may be used, but these should be used as a basic minimum.
Project Management Process Flowcharts

INITIATE PROJECT

- Single Action
  - Quotation Only (0-20k)
    - Quotation Procedure
      - Complete Request for Waiver of Standing Orders & Submit for Approval

- Minor Capital Project (20-250k)

- Major Capital Project (250K+)
  - Use Project Manual

POST PROJECT REVIEW: Provide feedback & Closure

FILING: Highlight & archive AUDIT Requested Info

PROJECT CLOSURE
STAGES OF CAPITAL PROJECTS

Stages of Capital Process

Stage 0 → Inception → Basic Business Case

Stage 1 → Riba A-C → Inception of Project

Gateways approval needed

Stage 2 → Riba D-G → Scheme Development

→ Design & Preparation of Tender Documentation

Gateways approval needed

Stage 3 → Riba H-J → Tender Stage

Gateways approval needed

Stage 4 → Riba K → Construction & Operation on Site

Gateways approval needed

Stage 5 → Riba L → Completion & Closure
STAGE ZERO

0.0 PROJECT CONCEPT AND DEFINITION

Introduction

Project Concept and Definition is the starting point for all projects. The objective of Project Concept and Definition is, within the context of the University Corporate Plan, to identify the potential need for a project, define those needs and decide whether or not it is worth investing resources in finding a solution to those needs. It should be noted that a project within the context of the University will be broadly defined and could include master-planning, urban design, town planning studies, land acquisition, land disposal or physical works such as site clearance, infrastructure works, civil engineering, building, decontamination, environmental improvement or landscaping.

The process of project concept and definition involves the assembly of all relevant information to enable the Investment Decision-Maker to make an informed judgement as to whether the project is feasible and should be considered further. A Project Sponsor will carry this out with the advice and support of a Project Manager.

The project at this stage exists only in the form of a preliminary business case that will be presented to the Investment Decision Maker.

To produce a successful project some stages of the project will be iterative so that some problems or risks become designed out, and what moves forward is a well defined project with all parties understanding their respective risks, liabilities and responsibilities.

Time spent in preparation of a project is very rarely wasted. The impact of change at this point will have least impact in cost on time of delivery.

0.1 Identify Stakeholder/User Needs

Potential projects are identified either within the University, usually by the Investment Decision-Maker or the Project Sponsor, or by external organisations such as Local Authorities, Urban Regeneration organisations, Government Departments or developers.

The first step in any project is to identify the need for a project:

- Identify the Stakeholders or users (both actual and potential)
- Clearly identify their needs
- Present clear reasons for meeting those needs

Every project must have a raison d’être. The clear identification of user needs is the first step in identifying the need for a project and the direction in which it should go. The project itself will not be the solution to the users’ needs it is merely the mechanism for delivering the solution.

The user needs and reasons for meeting those needs must be in line with the University’s corporate objectives, such as providing grants for businesses to create or secure jobs in a particular geographical area or remediating land to encourage development or other recognised output or deliverable.
The needs can only be identified through methodical but tactful interrogation of the Stakeholders or users. To improve the likelihood of obtaining all the relevant information this should be carried out, either in writing or verbally then confirmed in writing, by an experienced individual who knows what questions to ask.

0.2 Prepare a Statement of Need

If the potential project falls within the policy and/or funding capability of the University the Project Sponsor should prepare a Statement of Need. The scope and scale of a project will determine the breadth of such a statement of need.

The purpose of this stage is to identify whether it is likely that a project will be required. The statement of need is a distillation of the ideas generated by the identification of user needs and should provide clear answers to the following questions:

- What is the existing situation? (Where are we now?)
- What situation do we want to create? (Where do we want to be?)
- What product do we need?
- What are the characteristics of the product? (How do we get there?)
- What are the costs and benefits of this product?
- What is the most efficient way of delivering this product?

Always consider a ‘do nothing’ option as a comparison.

Value Management

If value management techniques are being employed on a project, apply them even at this early stage. The focus should be on both strategic issues and user and Stakeholder requirements. The techniques employed could include a Function Analysis.

Note that in all subsequent sections this manual assumes value management will be used.

For further information on Value Management refer to Section 15.

0.3 Preliminary Business Case

The development and production of a Business Case is an iterative process rather than a single task that only needs to be visited once. The development of the business case is a target for which a plan needs to be developed.

What needs to be included in a business case is scheduled in Section 1.6.

Having identified the stakeholder and the user needs it is essential to identify how the business case will be developed, what information needs to be assembled, how that information will be obtained and who will complete each task.

It is necessary at this point to consider the assembly of a project team, to bring that team together and assign tasks or duties.
0.4 **Prepare Outline Project Brief**

To be successful a project should fulfil the objectives defined at the outset. It is essential, therefore, that those objectives and their relative priority are clearly established at an early stage. Clear objectives form the platform for effective development of the project and provide a baseline reference if the project direction becomes unclear.

If the scope of the project is particularly complex then it may be beneficial to appoint a Project Manager at this stage to use his or her expertise to help define the objectives and later to help identify and assess the options for achieving those objectives.

The outline project brief will not only identify project objectives that reflect the University's objectives but it will also identify the benefits and also the constraints, such as time, cost, performance and location.

0.5 **Appoint Project Team**

At some point it will be necessary to begin drawing together a Project Team. Depending on factors such as the size and complexity of the project this may occur during the Project Concept and Definition stage or it may not occur until later in the project lifecycle. This section is included here since this is the earliest stage the appointment of the Project Team may occur. Refer back to this section if the Project Team will be appointed during a later stage.

Appoint an in-house Project Team to fulfil the roles listed below:

- Investment Decision Maker/Project Owner
- Project Sponsor
- Development Manager
- Project Manager (may be in-house or an external appointment)

As the project develops the Project Team will expand to include the designers, other specialists and the Contractor.

When appointing individuals, consider the following:

- Relevant experience
- Technical qualifications
- Level of available supporting resources

Define clear areas of responsibility and lines of authority for each Project Team member.

Terms of appointment should be written, setting out the team member’s responsibilities, authority and the resources available to them.

Assess the resource (time) requirements of each team member, based on the anticipated contract value and the complexity of the project, and ensure the individuals have the required resources.
An individual may fulfil more than one role but where this occurs ensure that:

- The allocation of the roles is clearly defined
- The individual has the required level of authority to fulfil all the functions

**Teamwork, Partnering and Incentives**

Only select people, be they University staff or external Consultants, with the right attributes i.e. those who have a teamwork mentality.

Once the team has been assembled it is essential that the team is properly established if it is going to operate effectively as a team.

**Communication**

Initiate the Project Review Meetings between the Project Sponsor and Project Manager.

### 0.6 Develop Preliminary Business Case

The Project Sponsor prepares this report in conjunction with the Project Manager and the support of any additional Consultants involved. This is the preliminary evaluation of project viability and is the springboard for the potential expenditure of large sums of money by the University.

The preliminary business case should identify:

- The need for the project
- The scope of the project
- The costs and benefits of the project
- The risks associated with the project
- The resources required for the project
- The viability of the project
- The options available

It should include:

- Order of Cost Estimates and identification of the University's commitment at each phase.
- Risk identification, including the analysis of likelihood and impact.
- A ranking of the project under consideration against the University's corporate investment policy and regional investment priorities.
- A checklist of key external approvals, consultations and clearances required for the project.

Acceptance of the business case will enable the appointment of Consultants to carry out the feasibility study.
Risk Management

Identify, assess and compose a response to the main risks associated with the potential project.

0.7 Gateway 1 – Approval to Proceed with Feasibility Stage

The purpose of Gateway 1 (G 1) is to confirm the robustness of the preliminary business case. When carrying out the review use the list below as a starting point.

Review of Current Phase

• Have all the assumptions been verified?

Potential for Success

• Is there a clear understanding of the user’s needs?
• Is the total scope of change to current services and business processes clearly defined?
• Are all the critical success factors clearly understood?

Business Case

• Is the proposed project affordable?
• Are the estimates in the business case robust and sensitivity to changes understood and does the business case indicate value for money can be achieved?

Risk Management

• Have the risks been evaluated?
Readiness for Next Phase

- Are the required funds to reach Gateway Review 2 in place?
- Are all external Stakeholder issues being addressed (statutory processes, communications, public relations, environmental, personnel, etc.?)
- Does the project have an assigned leader and defined project organisation?

Obtain permission to proceed through Gateway 1. (For details of the University’s internal financial approval procedures refer Standing Orders)
STAGE ONE

1.0 FEASIBILITY STAGE

Introduction

The aim of this stage is to develop the outline project brief then explore the full range of options available and select a preferred option that best meets that brief. This will involve developing and analysing all project aspects to give a detailed option appraisal that considers all variables from design through to completion for a construction project or other appropriate variables relating to land purchase or planning studies.

The feasibility stage process, depending on the nature of the project, can be summarised as:

- Identify site constraints and opportunities
- Select and appoint consultants to help complete the feasibility study
- Develop the project brief (Define objectives and constraints)
- Develop a preliminary project master programme
- Identify all options, appraise and select the preferred option
- Carry out funding investment and appraisal exercise
- Establish the project organisation and control mechanisms
- Identify the procurement strategy
- Complete a cost plan, cash flow plan and development budget
- Prepare a full business case
- Obtain approval to proceed

The options should include a ‘do nothing’ option and may include non-project options. Project options should give consideration to sustainability and life-cycle costs as recommended by the Treasury Procurement Guidelines and all constraints such as time, cost and quality.

In addition to selecting the preferred option it is also necessary to clearly set out the mechanism for delivering the preferred option and this involves defining the procurement strategy and project organisation and control systems.

The end product of the feasibility study will, depending on scale, be a report or series of reports with recommendations as to a further course of action.

The feasibility stage may start only upon receipt of formal approval to pass through Gateway 1.

1.1 Site Constraints and Opportunities

Acquisition, disposal or development of land or estate is a key University activity and it is essential that all possible information regarding sites, their physical characteristics, contamination, value etc. be acquired at the earliest opportunity to give the greatest possible validity to a feasibility study.

All of the constraints described above should be considered in a feasibility study.
The objectives are to identify, select and acquire or assemble a site that will meet the requirements of the detailed project brief.

Prepare detailed evaluation of all possible risks related to sites together with consideration of value, cost and time for any particular actions related to site investigation. Use risk management, value management and other techniques to identify the site that best fulfils the requirements of the project brief.

It is the University’s policy to carry out a detailed study for every proposed development site to provide factual information for the Project Sponsor to assess the likely cost of the development and any short or long term inhibiting factors such as contamination.

The importance of thorough site investigations cannot be over emphasised.

It is also the University's policy to test soil samples irrespective of whether it believes the site is contaminated or not because such information is vital to allay fears from prospective purchasers of the University's land and properties.

When considering development options for a site or the identification of a site for a development option, have in mind those things that need to be considered before the land is acquired. Whilst not all matters can be fully resolved during this feasibility stage, a plan should be set for how matters will be addressed and appropriate allowances made in the cost plan budget.

Items for consideration are:

- Review the outcome from site investigation, site abnormalities or special conditions discovered
- Town and Country planning – what permissions will be necessary?
- Consider if the proposed development fits within the district plan or if master-planning studies will need to be prepared to assist in amending the district plan.
- Consider seeking outline approval now
- Consider if change of use issues need to be reviewed
- Consider the need for an environmental impact or transportation study
- Assess if an economic appraisal is needed
- Consider if noise during development or operation will be an issue
- Consider if specialist advice from a hydrologist or transport consultant or valuation or development advisor is needed
- Review matters of discovery from due diligence checks or other residual liabilities or interests that may need to be considered

Once briefing details have been received from the Project Sponsor the Project Manager will decide whether to undertake the investigations directly or use Consultants. When the services of a Lead Consultant (or specialist) are employed the Project Manager, having defined the services required, will invite tenders in accordance with the procedures detailed in Section 3. For large scale site investigations it will be necessary to appoint a Planning Supervisor and comply with other aspects of the Construction (Design and Management) Regulations 1994.

A desk top study of the site and its adjacent land should be undertaken to establish former uses and identify likely problems of contamination and surface, overhead or underground obstructions. The extent of the study will depend upon the nature and results obtained.
It must be remembered that sites, and in particular brownfield sites, are likely to pose health and safety hazards to University staff, its consultants and contractors and furthermore the public at large. Immediately the site becomes the responsibility of the University it must complete a Site Health and Safety Audit and implement any protective measures necessary. A preliminary site investigation may reveal the need to provide an immediate barrier between the general public and the site. Consider how the site may be made secure before a development can take place. In addition the University should ensure a Health and Safety Site Risk Assessment is completed before each visit to site by its staff, consultants or contractors. This may, for example, identify the need for personnel visiting site to be accompanied rather than going alone.

Being always mindful of personal safety risks and acting accordingly, the University Project Manager and, where engaged, the Consultant, should carry out a physical inspection of the site identifying any buildings, structures, site boundaries, access to the land or other features that may affect development. In addition, early contact should be made with statutory bodies to ascertain the position of existing services and the cost of providing new ones for the development.

1.2 Select and Appoint Consultants

It may not be possible for the University to complete the feasibility study using in-house staff only so it should be prepared to appoint specialist Consultants to help complete the Feasibility stage. These may include:

- Surveyors
- Engineers
- Architects
- Planning Supervisor
- Project Manager
- Risk Manager (for potentially large or complicated projects)
- Masterplanners
- Transportation Consultants
- Ecologists
- Archaeologists
- Landscape Architects

The appointments may only be for the completion of the feasibility stage or they may be for any number of the project stages. During this stage of the project it is common to reimburse the Consultants on a time charge basis and without commitment to engage the specialist beyond completion of the feasibility stage however some may go on to become members of the Design Team.

To avoid cost escalation, give clear briefs to Consultants for the scope of the work that they are to undertake with particular consideration to the time-scale of the project, the anticipated form of procurement (yet to be determined) and the risks associated with the particular project. It is important to ensure the procurement guidelines are followed and that the Consultants have appropriate levels of Professional Indemnity Insurance cover.

During the feasibility stage the Project Manager should convene and minute meetings of the feasibility team and report progress.
When fee accounts and invoices are received these should be checked for accuracy and payment arranged within the terms of the appointment or contract.

Further Information:

Refer to Section 3 – Appoint Consultants for Detailed Design, which details the process for selecting and appointing specialists and Consultants. The process is identical to that for appointing Consultants for the feasibility stage.

1.3 Develop Project Brief

The outline project brief stated the University’s initial objectives and constraints but it must be developed into a detailed project brief, which is a comprehensive statement of the University’s requirements for the project. The development of the project brief is an iterative process that starts from the outline project brief. The process is usually lead by the Project Manager but will involve all members of the Project Team. During this process the University, and other Stakeholders, will be required to make many decisions. Since the cost of implementing changes increases and the scope for accommodating those changes decreases with the passing of time it is vital that the needs and objectives of all Stakeholders are explored fully at this stage. This should be done thoroughly but with tact. A common source of problems with projects is that the Stakeholders do not consider all aspects of the project in sufficient detail or provide sufficient information, which leads to changes in the scope of works later on.

During this stage it will be necessary to develop the project objectives and constraints, manage the process, resolve conflicts, obtain Stakeholder decisions and obtain Stakeholder approval. The brief should contain as many details as possible to provide clear direction for the Feasibility Study and limit the potential for wasting resources. Once the completed project brief has been written down and approved it should not be changed without formal approval. It should be viewed as a control document and the project should be compared with this detailed project brief at regular intervals to ensure all the requirements are being met.

The design brief, which is covered in a later section and is in effect the answer to the problem posed by the project brief, should comply with every aspect of the project brief.

Tender documents for professional services should include either a complete project brief or a draft version requiring the successful tenderer’s input to its completion. This should enable the construction professionals to understand the scope and extent of the project and the University’s quality requirements.

1.4 Preliminary Project Master Programme

In order to set the project in the time frame of the University’s objectives and to give a period for commitment of resources it is essential to prepare a preliminary programme to cover all known activities, with a reasonable allowance for contingencies.

As the project may take a long time to come to fruition a timeframe is also necessary to make a constructive assessment of the likely out-turn costs to completion.
A master programme is a programme that provides an overview of all stages in the project lifecycle. The master programme may include the following main headings although some, such as Fitting Out Works, will not apply if it is not a construction project:

- Feasibility Study
- Appointments
- Project Strategy
- Control and Reporting (cost and programme)
- Design Process
- Tender Process
- Construction Works (or Contract Delivery if not a construction project)
- Commissioning, completion and hand-over
- Fitting Out Works
- Occupation (and migration)
- Post-construction Activities (final account, project review etc)

Prepare a preliminary master programme (Refer to Appendix 2 A – Master Programme Checklist). At this stage there are many unknowns so some assumptions will have to be made. Record the assumptions then review and update the master programme at regular intervals as more information becomes available.

Obtain approval for the master programme and then following approval base line the master programme to facilitate monitoring of progress against the original targets throughout the life of the project. Where deviations occur implement the appropriate corrective action to redress the deviation. Once approved this programme may not be altered without the appropriate authority.

Further Information:
- A model master programme, and other programmes, can be found in ‘Code of Practice for Project Management for Construction and Development’ by the Chartered Institute of Building

### 1.5 Options, Appraisal and Selection

Following completion of all site investigations instruct the design Consultants to first identify design options. Initially the detail of each option will be limited, perhaps only taking the form of concept ideas. During this stage the designers and the Stakeholders need to work closely together to discuss and develop ideas. Once options have been identified their potential to fulfil the requirements of the detailed project brief must be evaluated. Rank the options by benefit and discard those that do not meet the project brief.

The generation, evaluation and selection of options is an iterative process and should be continued until a satisfactory option can be identified.

With each iteration the level of detail for each option should increase. During the latter stages of the iterative process for each option include:

- A risk assessment
• Preferred contractual procurement route
• A draft master programme
• A value management study (the preferred option should achieve the best value for money)
• Cost plan
• Health and Safety risk assessments (implementation of the CDM regulations is most effective at this stage)
• It may also be appropriate to compare lifecycle costs for each
• Record all assumptions

Having ranked the options select the preferred option and develop the design. For a building project this would be to Outline Proposals stage if it has not reached that stage already. Other projects should be developed to an equivalent stage. Confirm that it meets the requirements of the project brief and confirm that a project is required. The Construction (Design and Management) Regulations 1994 may apply to this phase of the project. Establish whether or not they are applicable and if so ensure the requirements of the regulations are fulfilled.

The options will be influenced by external factors such as the choice of site and the choice of procurement route so these other strands should be taken into consideration. Some external factors can have a significant impact on both the project process and the final design option. Such factors would include public consultation and design in the community. Involvement of the public, be it in the form of road shows, community consultations or public enquiries, can be expensive and even fatal for projects but it should not be viewed as a burden rather it should be viewed as an opportunity.

Good design is essential to achieving value for money and the following four aspects should be considered from the very beginning of the design:

• Function of the facility to meet the needs of the users. This should include a detailed assessment of how the users needs may change over time and how the facility will need to be altered to meet those changing needs. This should also address the detailed operation of the facility.

• Design of the entire project delivery process, addressing how each component will be manufactured, transported and assembled to complete the facility. The maintenance of the facility including details of how components can be replaced and or repaired should be addressed, as should its ultimate disposal.

• Detailed design of each component whether manufactured on site or in a factory.

• Design of the complete facility to address the environment for those that use, operate and maintain the facility, including aspects that impact on their health and safety. This should also address the impact on the external global environment, including the aesthetic appearance of the facility. Health and safety as well as environmental requirements are likely to become increasingly more important with time and hence it would be prudent to consider what the changes might become during the life of the facility.

Value Management
This is the stage at which value management can have the greatest impact and therefore benefit to the project, however the benefits of value management can be realised in all stages of the project lifecycle. Treasury Procurement guidelines recommend the emphasis be on providing the best value for money, not necessarily just for the delivery of the project but for the lifetime of the development.

Focus: Options appraisal and tactical issues

For projects over £1,000,000:

- Develop a strategy for the value management study and define its objectives
- Interview Stakeholders
- Carry out a Function Analysis
- Hold a Strategic Value workshop and follow-up meeting
- Hold a Tactical Value workshop and follow-up meeting
- Hold Targeted workshops and follow-up meetings as necessary
- Issue an interim report

For projects under £1,000,000:

- Gather information
- Hold a VM workshop
- Develop proposals
- Hold an evaluation workshop
- Issue a report

For further information on Value Management refer to Section 15.

Whole Life Costs

Depending upon the nature of the project the cost plan may include the running costs associated with the facility. Considering the running costs during the life of the facility will help identify the scheme that delivers the best value for money over the entire life of the development. This is more desirable than simply achieving best value for money or cheapest initial capital expenditure for the delivery of the development. It should be noted that Stakeholders with no responsibility for the running costs of the facility may be unwilling to pay higher development costs in order to achieve savings on running costs that more than offset the increased development costs.

The anticipated life of the University or its interest in a project may be exceeded by the anticipated life of a developed facility. This may introduce additional pressures to mitigate development costs at the expense of increased running costs. Best Practice does not provide an exact instruction in this situation. Current trends in general and current Government Executive thinking in particular are seeking to improve the quality of design of public facilities and this is thought to be provided by contemplating the increase in initial expenditure. This matter needs to be considered and a balance struck in each case.

Decide from the nature of the project if it is appropriate to consider whole life costs. If it is produce a preliminary whole life cost model.

For further information on Whole Life Costs refer to Section 19.
Cost Management

- Develop a feasibility cost plan for the preferred option
- Carry out cost estimates as necessary
- Check costs throughout the design process
- Develop a cash flow forecast
- Issue interim certificates and payments to Consultants and Contractor as necessary
- Agree final accounts for Consultants and Contractor as necessary
- Implement contra-charging mechanism as necessary
- Avoid or resolve contractual disputes as necessary

For further information on Cost Management refer to Section 14.

Risk Management

Identify, assess and compose a response to the main risks associated with each option then develop a preliminary risk register each.

For further information on Risk Management refer to Section 16.

Health and Safety Management

Establish whether the Construction CDM Regulations apply. Often they are not applicable at this stage of a project but if they are then the following tasks should be considered by the respective post holder(s):

Client

- Appoint a Planning Supervisor
- Provide information on health and safety to the Planning Supervisor
- Appoint a Principal Contractor
- Ensure those appointed are competent and adequately resourced to carry out their health and safety responsibilities
- Ensure the Principal Contractor has prepared a suitable construction Health and Safety Plan before work starts on site
- Ensure the Health and Safety File is given to the Client at the end of the project and is kept available for use

Planning Supervisor

- Ensure the Health and Safety Executive is notified of the project (by sending a F10 form)
- Ensure the designers co-operate with each other
- Ensure the designers comply with their duties
- Ensure a pre-tender Health and Safety plan is prepared
- Advise the Client when requested to do so
- Ensure the Health and Safety File is prepared

Designer

- Ensure the Client is aware of its duties
• Give due regard to health and safety during the design process
• Provide adequate information about the health and safety risks to those who need it
• Co-operate with the Planning Supervisor and, where appropriate other Designers involved in the project

Principal Contractor

• If the Principal Contractor is carrying out the design then the Designer’s duties will also apply to the Principal Contractor
• Manage health and safety on site

For further information on Health and Safety Management refer to Section 10.

Sustainability

Consider the factors affecting the sustainability of the facility and ensure design decisions are made that promote sustainability.

• Apply sustainability principles and good practice
• Use and appoint organisations to undertake project tasks that are committed to sustainability

Teamwork, Partnering and Incentives

During the Outline Design process it is important to:

Teamwork

• Break down barriers by holding team building events at appropriate intervals
• Align individual Project Team members’ objectives with that of the project
• Create an open, blame free culture
• Maintain records of how the Project Team worked to achieve best value
• Encourage people to share knowledge and ideas that may reduce waste and add value to the University at appropriate intervals
• Publicly reward significant effort and achievers of significant successes
• At appropriate intervals review the performance of the Project Team, in which the Contractor may be included depending on the procurement route, and implement any remedial measures as necessary.

Partnering (where applicable)

• Complete a partnering charter
• Encourage/request strategic partnering agreements throughout the supply chain
• Agree a problem resolution ladder
• Sustain high level management support for the partnering initiative
• If possible select a form of contract that reflects the partnering principles

Incentives

• Include incentives in the contract(s) that add value to the University based on measurable performance targets
Focus attention on incentives in the contract and measure performance against the performance targets.

For further information on Teamwork, Partnering and Incentives refer to Section 13.

Communication

Meetings

• Initiate the Design/Project Team meetings

Reports

• Initiate production of Progress reports
• Initiate production of Financial reports
• Initiate production of Consultants’ reports

1.6 Funding Investment and Appraisal

The University allocates an annual budget to the University Estates from which it can draw down funds for the projects. For projects over a certain value, as defined within the University’s financial regulations – (see source), approval is required from the responsible Council before any funds can be drawn down.

In order to be able to draw down funds a project must be both affordable and provide value for money. This is established by completing a business case.

1.7 Project Organisation and Control

This section and the following two sections on Procurement Strategy and Cost Planning and Cost Management look beyond the feasibility stage to how the project will be managed throughout its life. Although they are forward looking and are concerned with the strategy for delivering the project, these sections do influence the decisions that are made in this, the feasibility stage.

How a project is developed and managed will have a direct bearing on its viability and it is essential that the processes of cost control, time-management and overall project management are defined at the earliest possible time. It is for this reason that they have been included within this section. Nevertheless, the development of the team and the tools that they will use should not proceed faster than the immediate need of the feasibility study.

Success or failure of a project is dependent on many factors. Poor communication between the various Project Team members is often cited as the main cause of problems on a project. It is therefore essential that the Project Manager implements an effective communication framework capable of enabling all project parties to report on progress, highlight problems and discuss how to achieve the project objectives. It is the responsibility of the Project Manager to establish, monitor and control a system of work that promotes teamwork, encourages communication and is effective in delivering the project within the identified constraints.

In collaboration with the other Project Team members, the Project Manager should establish:
• A Project Team organisational structure
• Individual’s roles and responsibilities
• Communication routes
• Information control system
• Decisions required points
• Delegated levels of authority
• Monitoring and control procedures
• Change Control System
• Problem Resolution Procedure
• Risk Management Strategy
• Cost Management Strategy
• Value Management Strategy
• Quality Management Strategy
• Programme Management Strategy
• Health and Safety Management Strategy
• Commissioning, Completion and Handover Strategy

The above information should be designed to promote teamwork, be clear, detailed and without ambiguity. Much of it should be incorporated into the Project Execution Plan if one is to be used.

If possible the Project Team should agree to use compatible IT hardware, software and systems of work such as layering conventions for CAD drawings. This is particularly relevant to drawings that will pass between the design Consultants.

Consider the costs and benefits of locating the entire Project Team in one location or of setting up a project specific Intranet or Internet site then organise and maintain, if required

Consider the costs and benefits of operating common filing systems and/or databases

Encourage partnering all the way down the supply chain.

From now, and for the full duration of the project, maintain clear records of how the parties worked together to add value

Identify a suitable deputy for each Project Team member, who will be sufficiently familiar with the project to be able to act as their replacement should the need arise

Review the performance of the Project Team and implement any remedial measures as necessary.

1.8 Procurement Strategy

Selection of the procurement option is an important strategic decision and must be given careful consideration. The Project Team should discuss in detail the relative merits of each option to determine the most effective and appropriate method of procurement. The Project Team should consider innovative solutions, provided they offer the best value for money.
Treasury Procurement Guidelines state the primary consideration in the choice of a procurement strategy is the need to obtain **overall value for money in the whole life of the service or facility**. This should indeed be the main factor but there are several other areas to consider:

**The allocation of risk and responsibility.** The various procurement options available (detailed in Section 12) reflect the fundamental differences in the allocation of risk and responsibility. Risk and responsibility should be allocated to those who are in the best position to manage them given the requirements of each individual project.

**Type of project**

- **Timescale** – e.g. early completion
- **Cost certainty** – throughout the project life cycle
- **Out-turn quality** – the degree of control the University wishes to retain over the design and build quality
- ** Complexity** – the nature and content of the project
- **Variation** – the need for change and the impact on cost and timescale
- **Buildability** – would early Contractor input be beneficial?
- **Responsibility** – degree of control the University wishes to retain over the Design Team and contracts

The selected form of procurement should be the one most likely to fulfil the project brief within the project constraints. There are strengths and weaknesses in each of the forms of procurement and selection of the preferred route should be completed methodically.

It should be noted that the Treasury Procurement Guidelines favour forms of procurement:

- That involve all parties such as those in design, construction, supply, use, operation and maintenance of the facility as early as possible in the project lifecycle
- Where the main Contractor, Sub-contractors and specialist suppliers become involved in the design, thus limiting the opportunities for wasteful activities and improving value for money in terms of whole life costs and overall performance
- Use of output specifications, left open enough not to inhibit innovation, in favour of traditionally detailed specifications. Where circumstances require innovative designs and/or closer control of workmanship on sites with special contamination or geotechnical issues, then a traditional approach with Consultants providing a full service, or another alternative, may be considered acceptable.

Whichever form of procurement is chosen, it is important to include the main incentives that will limit waste and add value to the University within the contract or partnering charter and to formulate an appropriate incentive mechanism.

Project Managers should use one of the University’s standard amendments to the approved Forms of Contract for the appointment of Consultants and Contractors unless the circumstances are exceptional and it is more appropriate to use an alternative form of contract or have one written specifically for the project. To do this specific approval must be obtained.
Once selected, obtain approval for the selected procurement strategy. Following its approval no amendments should be made without further approval.

1.9 Cost Planning and Cost Management

Costs must be carefully planned and controlled if the project is to have a successful outcome. There are three main cost planning tools:

- A cost plan
- A cash flow plan
- A development budget

A cost plan sets out a realistic and best estimate for the total expenditure for the project and includes construction costs, consultant’s costs, fees to Local Authorities, land purchase costs and risk allowance etc. It serves as the reference point for the monitoring and control of costs throughout the project.

It should be prepared thoroughly and professionally and be realistic. The budget should not be set from a political agenda or on some other artificial basis.

At the start of the project, project details will be limited so the cost plan will be based on a number of clearly identified assumptions. As the design progresses and more information becomes available so the number of assumptions will diminish and the accuracy of the cost plan will increase.

Cost Planning is an essential part of the feasibility study. Evaluating design options and procurement variables to give a best value opportunity is the overall output of a cost plan. Appropriate risk allowances (previously described as contingency) provision must be made such that a cost plan is developed that has credibility with sufficient allowance for best practice and the procurement and time-scale options under consideration.

The cost plan should include a cash flow forecast. A cash flow forecast allocates expenditure and income to each period of the fiscal year based on the master programme.

A development budget sets out the total costs and total returns expected from the project. All the costs in the cost plan should be included in the development budget.

At the preliminary and early Feasibility Study stage it is probable that costs for each option under consideration will have to be estimated to ascertain the most probable price.

There are occasions when a fixed capital value may be one of the prime design goals. The essence of good cost management is that the price should be ascertained for the desired scheme and not that the scheme be made to fit an artificially created or unrealistic cost budget. In recognition that this latter situation may occur however, the procedure has been prepared on the assumption that cost management against a fixed budget is commenced from this stage.

Monitoring costs alone will not be sufficient, costs must also be controlled. The objective of cost management is to keep the project costs within the approved budget. Cost management involves monitoring and more importantly realistically forecasting or trending the out turn cost and then, where adverse deviations occur,
implementing the appropriate actions to bring the costs back in line with the cost plan. Techniques for effective cost control are detailed below:

- Only make decisions when the full cost implications are known
- Do not take decisions that cause the total budget to be exceeded
- Cost increases that cause the total budget to be exceeded should be offset by similar cost savings in other areas
- Encourage the Project Team to design within the cost plan
- Where cost changes are necessary, desirable or unavoidable use the Project Control procedure
- Regularly update and re-issue the cost plan and cash flow plan
- Review the risk allowances at regular intervals and reduce them as the risks to the project reduce. Note that risk allowances are for unforeseen or unforeseeable events and not for changes to the project objectives or for errors or omissions unless specifically allowed for
- Implement the Change Control Procedure during the contract procurement phase
- Ensure Consultants and Contractors are given the correct information at the right time to minimise claims
- Ensure the project costs are always reported back against the original approved budget and that subsequent variations to the budget are clearly indicated in the cost reports
- Plot actual expenditure against predicted expenditure to give a good graphical indication of the project’s progress

In addition to the above:

- Establish limits of financial authority
- Establish the project change control procedure
- Establish the contract change control procedure

1.10 Prepare Full Business Case

The business case report is the product at the end of the feasibility stage.

Throughout the feasibility stage options have been considered but the full business case concentrates on the preferred option. Acceptance of the full business case is the main pre-requisite for Gateway 2.

The Project Sponsor will prepare an appraisal of the proposed scheme to establish its financial viability. The appraisal submission acts as a focal point for all activities carried out previously, and once the project has been approved it acts as the control point for all further stages, specifications, costs, cashflow and programme. If any of the elements are varied to a major degree, subsequent executive approval is required.

The Project Manager will provide the Project Sponsor with the information outlined below to enable the development appraisal and the business case to be prepared:

- A brief description of the project identifying any problem areas and assumptions made and a copy of the site evaluation report - the original of which should be kept in a secure place, and if the land is purchased, filed with the deeds.
• A schedule of the gross and nett lettable areas (only required if the project is to provide a building), a brief specification and estimated costs - identifying any abnormal elements separately (together with a copy of the Consultants' report).
• Completed Analysis of Construction Costs signed by the Project Manager
• Where appropriate, a set of scheme drawings
• Always consider a 'do nothing' option as a comparison
• The University's financial commitment to date and an estimate for all subsequent phases
• The economic and other risks to the University; the benefits and drawbacks of investment
• Environmental impact considerations
• Demonstration of approvals gained or consultations with other interested parties

1.11 Gateway 2 - Approval to Proceed with Detailed Design

Projects cannot proceed beyond this stage without the necessary approval. Most projects will proceed but some may stop here, either because approval to proceed is denied or, as is the case with land acquisition, it may actually be the end of the project process itself. This document assumes that the process will continue.

The Project Manager before proceeding to the detail design stage should present a clear statement on the Appraisals of Options considered at the feasibility stage and obtain an Approval in Principle from the Project Sponsor to proceed to the detail design stage. At this stage the Project Sponsor should obtain approval to invest in a project and financial approval (Gateway 2) should be sought.

The Project Sponsor should not allow time to be devoted to detailed scheme planning and facility design until he or she has seen and approved an Approval in Principle submission from the Project Manager based on the appraisals of option. Only when the Project Sponsor has accepted appraisal of options then the design can begin.

This main approval stage identifies the options proposed to meet the project objectives and is driven by the University's requirements to promote the development, which demonstrates clearly the economic and/or social benefits of the project under consideration, derived from the above full feasibility stage of the project. The executive directly or via delegation considers the project for approval.

The purpose of Gateway 2 is to review the potential for success and validating the viability of the project. When carrying out the review use the list below as a starting point.

**Review of Current Phase**

• Have all Gateway 1 assumptions been verified?
• Is the project under control (e.g. on plan and running to budget)?

Potential for Success
• Is there a clear understanding of the user’s needs?
• Is the project expected to meet ALL objectives upon completion?
• Are the project benefits understood and supported?
• Has the procurement strategy been defined?
• Have all options to satisfy user needs been evaluated?
• Is the total scope of change to current services and business processes clearly defined?
• Are all the critical success factors clearly understood?

Business Case
• Does the business case indicate value for money can be achieved?
• Are the costs within the current budget and are the whole life funding requirements affordable and clearly supported by key sponsors?
• Will the project be attractive to the private sector?

Risk Management
• For the preferred option have the major risks of all types been understood, financially evaluated and are there appropriate risk management plans in place?

Readiness for Next Phase
• Confirm the required funds to reach Gateway 3 are in place
• Are the required delivery timescales reasonable?
• Is the project following the required procurement procedures (OJEC or non OJEC)?
• Have the potential partners been identified?
• Is the process for demonstrating value for money clearly defined?
• Are all external Stakeholder issues being addressed (statutory processes, communications, public relations, environmental, personnel, etc.)?
• Can the required in-house resources be assigned to complete the project?

Obtain permission to proceed through Gateway 2. (For details of the University’s internal financial approval procedures).

Issue Certificate of Readiness to Proceed to Scheme Design/Detailed Design Stage

Although not part of the Gateway review it would be beneficial at the end of the feasibility stage to undertake a performance appraisal of all in-house and external Project Team members.
APPENDIX 1 A

MASTER PROGRAMME CHECKLIST (Stage One)

- Appointment of Project Managers
- Appointment of Consultants (Architect, Engineers, Quantity Surveyor, Other Specialists)
- Feasibility/Option Studies
- Prepare Project Executive Plan
- Develop and confirm Project Brief with Client
- Devise Project Strategy and confirm client approval
- Key Approval Gates
- At the appropriate stages include all value engineering and risk management workshops
- Prepare cost plan and cash flow
- External Interfaces
- Design
  - Outline Design
  - Detailed Design
  - Final Design
  - Production Design
    - Allow for University approval at each design stage
- Design
- Cost Reports and Board/Departmental Approvals
- Statutory Consultations
  - Planning
  - Environmental
  - Building Control
- Long lead-in Items
- Tender
  - Client Approval to Short List
  - Confirm readiness to tender
  - Tender Issue
  - Tender Period
  - Tender Return
  - Tender Evaluation
  - University Approval
- Appointed Contractor
- Construction
  - Mobilisation
  - Construction Phases
  - Testing and Commissioning
- Facility Hand-over
- Client/Operational Commissioning Period
- Defects Period
APPENDIX 1 C

CERTIFICATE OF READINESS TO PROCEED TO DETAILED DESIGN/ FINAL DESIGN* STAGE

Client: The University

Scheme:

Certification by Project Sponsor:

1. The University is satisfied that the detail/final design* brief dated …………………….. represents a comprehensive statement of the University’s requirement at detail/final design stage and covers all essential matters.

2. The University envisages making no changes to the detail/final design* brief (excepting future changes in legal and statutory requirements).

Signed: …………………………………………………

Project Sponsor on behalf of the ……………………………

Note: University needs to adopt this form to obtain assurances on the adequacy and integrity of briefing from members of the Design Team.

* Delete as appropriate
STAGE TWO

2.0 DETAILED DESIGN

This section details the procedure for appointing all types of Consultants. Consultants frequently have strengths in particular fields and weaknesses in others so it is important to select and appoint the right Consultants whose strengths are in the right areas for the particular project. The process detailed in this section is likely to lead to the best match but this can never be guaranteed.

In order that Consultants can design and execute a project the brief must be clear and appropriate to the project. Consideration must be given to correct forms of appointment, particularly in relation to Treasury Guidelines and the European Commission regulations. When the contract value is such that the European Commission regulations apply, a minimum of 5 tenders will be required.

Appointment of Consultants should be appropriate to the scale and locality of the project with the final selection being based on the appropriate balance between quality and price. The appointment must relate to the chosen project procurement route as Consultants responsibilities and long-term warranty commitment will need to be appropriate to this.

The process involves preparation of tender documents, evaluation of tenders and production of a tender report with a recommendation. The process should leave a complete audit trail. This process culminates in the permission to appoint Consultants for the roles to be undertaken.

If the University anticipates using a Consultant right through the project from concept to review and close out then it should ask the Consultant to tender for all stages, giving fixed prices for each stage or a defined group of stages. The contract would then be awarded for one or more stages at a time, such as up to and including the feasibility stage. Following successful completion of the feasibility stage the Consultant’s contract may then be extended to include one or more of the subsequent stages for the pre-agreed fixed price.

2.1 Prepare Detailed Consultant Brief

The Consultant’s brief should precisely detail the services that the Consultant is required to carry out. The brief may be a design brief but it does not have to be, it will depend on the nature of the appointment. The detailed Consultant brief should reflect the requirements of the detailed project brief and it may be developed in parallel with the scheme design.

Scope of Service

The scope of service must be clearly defined and cover all the required items of work. Poorly described requirements will be open to interpretation, providing opportunities for misunderstanding, abortive work and claims for additional work.

If there are several appointments, for individual members of the Design Team for example, the appointments must be compatible without any overlaps or gaps. Grey areas between different appointments are a frequent source of problems and conflicts so it is very important that due attention is given to these areas.
To prevent confusion and the potential for misunderstandings, the roles and responsibilities of each individual should be clearly set down at the outset and made known to the other members of the team.

The brief should include:

- Adequate provision for the allocation and management of contingencies
- Clear and detailed quality standards so the Consultants know what is expected of them
- Clear instructions, particularly for the Lead Consultant, regarding management responsibilities such as cost control
- Details on the relationships between the Consultant and other organisations, such as a development partner, as appropriate
- Clear evaluation criteria

Refer to Appendix 2 A for a suggested Design Brief content list.

Limits to Authority

The brief should clearly detail the scope of authority delegated to the Consultant, particularly the Project Manager. It should also identify decisions that are reserved solely for, say, the Project Sponsor. Consider the appropriate level of authority for the following areas:

- Order variations and make changes
- Certify interim payments
- Grant extensions of time
- Settle claims
- Agree final accounts

It is recommended that, as a minimum, the authority delegated be limited by:

- The value and type of variations and changes that may be made without prior approval (can be specified as a maximum total value for any one change and/or the aggregate value of changes over a specified time)
- Prior approval of payment certificates
- Prior approval of settlement of claims for extra payment or extensions of time

Professional Indemnity Insurance

Professional indemnity (PI) insurance provides cover for professionals against the financial aspects of legal liability to the client for professional negligence. PI insurance is required for all professional appointments and may need to be maintained by the Consultant for up to 12 years after completion of the contract. The specified levels of cover should be appropriate to the particular project. The full cost of requiring an unusually high level of cover should be evaluated before such a requirement is made. To have a PI cover substantially extended beyond the norm may be commercially un-placeable and thereby the appointment unviable.

The level of cover required should reflect the potential damage or loss than could be incurred as a result of a negligent act by the consultant. This is not necessarily directly linked to the value of any construction works to be undertaken.
It should be noted that it is University policy not to limit the Consultant’s liability to the extent of the PI cover. If the Consultant has a PI policy for £10 Million and the University has a claim against the Consultant for £15 Million then the Consultant will be expected to pay the balance of £5 Million.

Approval

Obtain approval for the brief.

It is extremely important to ensure that any subsequent changes to the brief, and in particular a Design Brief, are properly controlled, recorded and confirmed. This should be done via the Design Development Control Sheet. A typical proforma is included in Appendix 5 A.

2.2 Select Tender List

The fundamental rules regarding tender lists are that the list should only contain those organisations that have been thoroughly vetted, have the experience and track record to undertake the work to be tendered and would be acceptable if selected.

It is also essential that due public notice be taken of the relevant tendering procedures, depending on the scope and scale of the work. If the value of the work is such that the EC procurement regulations apply, then the selection and tender process must be carried out in accordance with these regulations (Refer to Appendix 12 J for further information).

If the CDM Regulations apply, the Client as defined by the Regulations has a duty to ensure those appointed are competent and adequately resourced to carry out their health and safety responsibilities.

2.3 Tender

The tender process must be fair and should be completed leaving a clear audit trail. If the EC procurement regulations apply, they must be complied with throughout the tender, evaluation and award process. (Refer to Appendix 12 J)

2.4 Evaluate Tenders

The project criteria, the tender criteria, evaluation criteria and the report format, should be formalised and agreed with the Project Sponsor.

Tender documents and tender evaluation should consider the options for negotiation and best value within the tender process. Care should be taken to advise successful and unsuccessful tenderers of the results of the process set within Audit Commission criteria.

Refer to the following Sections:
12.20 – Open Tenders
12.21– Evaluate Tenders
12.22 – Clarify and Negotiate
12.23 – Issue a Tender Report
2.5 Approval to Proceed

The Investment Decision Maker or Project Sponsor must give provision for internal endorsement of the tender report at the earliest practical time.

2.6 Appoint Consultants

Appointment of Consultants will result in a large number of documents and conditions to be satisfied, including a timetable for satisfying all conditions. Signatures or sealing of documents and provision of warranties, with whatever further financial checks are necessary, should be made so that these do not delay the start of a project, or interfere with the prime business of moving the project forward.

2.7 DETAILED DESIGN

Design development and detailed design is a phased process that starts with the outline design that was produced during the feasibility stage. It progresses through detailed design and final design to the production of information stage. Design is an iterative process so with the transition from outline to detailed to final design, the detail of the design increases with each stage, the number of assumptions falls and the certainty increases. The final stage, production of information, involves the production of detailed tender and construction information such as steel reinforcement details and bar-bending schedules. This staged approach allows greater control of the design programme and allows key reviews to be introduced at the end of each stage.

The level and detail of the design is dependent on the nature of the project and the form of procurement. The form of procurement may however, only transfer the production of design information, it will not remove the ultimate need for this information to allow construction to proceed. The design process should be both innovative and iterative with milestones of Client acceptance to be achieved along the way.

It is essential that this process is controlled and programmed:

- It is critical that the Designers are aware of the cost limits within which to design at the outset of the project
- The Project Manager must retain overall control of time and cost
- It is important to be aware that design is a means to an end and not an end in itself
- It is also essential that all relevant information is prepared in a timely manner both for the needs of cost forecasting and appropriate to the construction process

Since the design information is the only means of making a tenderer aware of the scope of a project any shortcomings in this information are likely to give rise to increased costs if the scope or detail of a project is subsequently changed.

The Project Manager’s role will involve continuous and extensive liaison with all members of the Project Team and will include the following tasks:
• Review brief for each Consultant
• Advise on the interpretation of the project brief, and design brief
• Agree a design programme
• Monitor progress against the cost plan
• Monitor production of drawings and specifications
• Ensure the design meets the design brief
• Ensure long-lead items are identified and commissioned
• Ensure client decisions are obtained as necessary
• Obtain approval for the design at the end of each design stage
• Management of risk, value, quality, cost, design and health and safety
• Organisation of mock ups and samples as required
• Organisation of specialist input (surveys, legal etc.)
• Discharge of all statutory obligations
• Team building

2.8 Design Team Briefing

Throughout the design development process there should be monthly or fortnightly Design/Project Team Meetings but there should be an initial meeting to brief the Design Team and to begin the team building process. The scope of the meeting should include:

• A review of the project brief and design brief
• A review of the PEP to ensure all Design Team members are intimately familiar with its contents and their obligations under it (If a PEP is not used then use the headings of a PEP as a basis for the discussion)
• Agree common format with the Design Team for the production of all design deliverables (e.g. CAD systems, drawing title blocks, drawing legends, specifications etc.)
• An agreement to produce a schedule of design information and a design programme (see below)
• An emphasis on teamwork, enthusiasm, a ‘can do’ attitude and good communications

Depending upon the scale of the project and consequently the duration of the design process it may be beneficial to hold a similar meeting at the start of the other phases – Final Proposals and Production of Information.

Consider appointing a Design Manager if the scheme is sufficiently complex to warrant one. If a Design Manager is appointed the Project Manager will not have to attend all the Design Team meetings, but may do if required, but the Project Manager should always receive copies of the minutes.

Appoint a Planning Supervisor, if one has not been appointed already.

2.9 Detailed Proposals

The Project Manager should satisfy himself that the design process is being managed by all the Design and Cost Team and that the technical content, project objectives and project timetable are being maintained. In parallel with this, all external project interfaces and cost development should be monitored and reported by the Design Team Leader.
Programme Management

At the start of the detailed design phase all members of the Project Team should be asked to contribute to the production of a design programme that is aligned with the master programme. The objective of the design programme is to identify responsibility and timescales for the delivery of all elements of the design so that the input required from each Design Team member is known, understood and properly co-ordinated. The Design Team members should be clear as to what is required and by when. This should be monitored regularly and discussed at each Design/Project Team Meeting.

In addition to the design programme produce a schedule of documents and drawings to be issued. Not only can this be used to monitor the design progress but it will also indicate the completeness of the design package. The drawing issue schedule should include:

- Drawing number
- Drawing title
- Design stage issued
- Predicted issue date

Throughout this phase of the project monitor progress against the design and master programmes, update them as necessary and implement any corrective measures if required.

For further information on Programme Management refer to Section 11.

Design Change Management

It is likely that the project brief will be modified and developed. Care must be taken that the Design Team is kept up to date with the Project Sponsor’s and Project Manager’s requirements.

Any change to the design by reason of a change to the scope, detail, material or specification which occurs after the agreement of the Outline Design, and approval of the associated Budget Cost, should be implemented using the Change Control System. This is detailed in the PEP and Section 14 – Cost Management of this manual. A model form has been included in Appendix 14 B. If however the design is still undergoing development then the form in Appendix 5 A should be used.

The initiator of the design change should complete the Design Change Proposal Form and highlight the category (e.g. Client Change) and authority for the change.

No design change should be authorised until the effect on programme and cost has been assessed and agreed under the change control procedure.

Design changes should be clearly identified on drawings by “clouding” the change and describing it within the revisions column. Similarly changes to specifications or other textual documents must be clearly identified, by way of version numbers or revisions, and explained.

For further information on Design Change Management refer to Section 14.4.
Design Monitoring

The Design Team must keep the Project Manager and Project Sponsor aware of the progress of the design through regular meetings and reports. A Design Review Meeting Agenda is included in Appendix 5 B. The level of actual involvement by the Project Manager or Project Sponsor will depend on the procurement route for the project. The Project Manager and Project Sponsor must also respond to any requests for information and clarification that the Design Team require, as quickly as is practicable.

As the Design Team produces information it must be checked to ensure they meet the University’s requirements in terms of achieving the design brief, programme, quality and technical accuracy. Consider appointing an in-house or external Technical Manager, for complex technical projects. This role does not take any responsibility for the design.

Statutory Approvals

Although the Planning Permission and Building Regulations approval are carried out by the Design Team and other Consultants, it is the responsibility of the Project Manager to ensure that these consents are in place otherwise development cannot proceed without the necessary planning permission being obtained.

Ensure Planning Permission and Building Control Approval applications have been made.

Ensure Planning Permission and Building Control Approval conditions are being discharged. It may be beneficial to record all the conditions on a schedule and track the progress of the Design Team in discharging all the conditions. Nominate a single point of contact, usually the Architect, for each authority.

It may also be necessary to comply with Section 106 Notices.

Ensure early contact is made with the Utility companies and that regular contact is maintained to ensure delivery of the appropriate design information on time. Remember to use a single point of contact.

Communication

Initiate all new Project Team members in the project communication framework to ensure all parties can communicate and report effectively to ensure the project objectives are met.

Meetings

• Include new Project Team members in the Design/Project Team meetings
• Hold the Stage Design Review meeting at the end of this design stage

Reports

• Ensure new members of the Project Team produce Consultants’ reports
• Initiate production of the Contractor’s report (if included in this phase)

For further information on Communication refer to Section 17.
Cost Management

- Re-confirm limits of financial authority
- Re-confirm the project change control procedure
- Implement the project change control procedure as necessary
- Take account of whole life costs if relevant
- Carry out cost estimates as necessary
- Check costs throughout the design process
- Carry out estimate cost comparisons as necessary
- Update cost plan
- Update cash flow forecast
- Issue interim certificates to Consultants and Contractor as necessary
- Implement contra-charging mechanism as necessary
- Avoid or resolve contractual disputes as necessary

For further information on Cost Management refer to Section 14.

Risk Management

Having obtained approval for the preferred option and appointed a Design Team the preliminary risk register should be developed into a fully detailed risk register. For large or complex projects the whole of the Project Team should be involved in identifying, assessing and composing responses to the risks but for smaller projects it may be more cost effective to limit the number of people involved. At this stage this will usually be a one-off exercise following which the risk register should be updated.

Following that initial development of the risk register, hold risk reviews at intervals appropriate to the duration of the design development process and complexity of the design.

Throughout the design development process ensure risk owners are managing the risks appropriately.

For further information on Risk Management refer to Section 16.

Value Management

Focus: Elements optimisation and technical/operational issues

For projects over £1,000,000:

- Hold a Technical Value workshop and follow-up meeting
- Hold Targeted workshops and follow-up meetings as necessary
- Hold a Control Value workshop as necessary
- Issue an interim report

For further information on Value Management refer to Section 15.

Health and Safety Management
If the CDM Regulations did not apply during the feasibility stage establish whether they apply now. If they do then the following tasks should be considered by the respective post holder(s):

**Client**

- Appoint a Planning Supervisor (if not already done)
- Provide information on health and safety to the Planning Supervisor
- Appoint a Principal Contractor (if relevant to the procurement route and not already done)
- Ensure those appointed are competent and adequately resourced to carry out their health and safety responsibilities

**Planning Supervisor**

- Ensure the Health and Safety Executive is notified of the project by sending a F10 form (if not already done) or update as necessary
- Ensure the designers co-operate with each other
- Ensure the designers comply with their duties
- Ensure a pre-tender Health and Safety plan is prepared
- Advise the Client when requested to do so

**Designer**

- Ensure the Client is aware of its duties
- Give due regard to health and safety during the design process
- Provide adequate information about the health and safety risks to those who need it
- Co-operate with the Planning Supervisor and, where appropriate other Designers involved in the project

**Principal Contractor (if applicable)**

- If the Principal Contractor is carrying out the design then the Designer’s duties will also apply to the Principal Contractor

For further information on Health and Safety Management refer to Section 10.

**Sustainability**

Consider the factors affecting the sustainability of the facility and ensure design decisions are made that promote sustainability.

- Apply sustainability principles and good practice
- Use and appoint organisations to undertake project tasks that are committed to sustainability

For further information on Sustainability refer to Section 18.

**Teamwork, Partnering and Incentives**

**Teamwork**
• Break down barriers by holding team building events at appropriate intervals
• Align individual Project Team members’ objectives with that of the project
• Create an open, blame free culture
• Maintain records of how the Project Team worked to achieve best value
• Encourage people to share knowledge and ideas that may reduce waste and add value to the University at appropriate intervals
• Publicly reward significant effort and achievers of significant successes
• At appropriate intervals review the performance of the Project Team, in which the Contractor may be included depending on the procurement route, and implement any remedial measures as necessary.

Partnering (where applicable)

• Sustain high level management support for the partnering initiative

Incentives (where applicable)

• Focus attention on incentives in the contract and measure performance against the performance targets

For further information on Teamwork, Partnering and Incentives refer to Section 13.

Reporting

Implement the reporting procedure detailed in this manual (Section 17.3) or the PEP.

At this stage the following reports should be generated:
\* Project Manager’s Progress report
\* Financial reports
\* Consultants' reports

For further information on Communication refer to Section 17.

Design Review

At the end of each design stage the design must be reviewed to:

• Ensure it fully represents the University’s requirements as outlined in the project and design briefs
• Ensure it represents an adequate level of development (on programme)
• Ensure it is well co-ordinated
• Ensure it reflects value for money
• Ensure risks are being identified and, where possible, avoided (in accordance with the CDM Regulations)

The design review is a formal review over and above the ongoing monitoring and review of the design that is part of the iterative process. It should be a thorough and detailed review of the total design to date and should include a design review meeting with the Project Team and a formal sign-off by the University.

Appendix 5 C contains a Detailed Design Checklist.

2.10 Final Proposals
The completion of Final design proposals is a watershed, in that the acceptance of the design by the Project Manager and Project Sponsor, together with appropriate costs, will start the production information process that will lead to the preparation of tender documents.

Modifications to the design beyond this stage are likely to incur additional design costs and potentially additional construction costs.

As a guide, it takes 10 times as much money to alter work on site than it does to change a drawing. A well disciplined project will have a formal acceptance of a complete set of pre defined tender deliverables prior to the tender process.

Final Proposals is an extension of Detailed Proposals.

2.11 Production Information

The quality of production information both drawn and written will be a key indicator to tenderers of the scope for possible additional costs during the construction process. It is essential that the quality of information produced clearly identifies, as far as practicable the full scope of works. The added benefit of producing high quality tender information is that it sets the standard for Contractors to follow.

Following production of all the design documents a Technical Audit should be carried out before the documents are issued for tender.

Depending on the process of procurement, the production information for a project may be delivered by others but the guidelines for controlling the process remain the same.

The procedures are similar to the previous two design stages with the exception of the Technical Audit, which is detailed below and the completion of the some contracts if applicable:

Cost Management

For any organisations leaving the project at this stage:

- Agree final accounts
- Implement contra-charging mechanism as necessary
- Avoid or resolve contractual disputes as necessary

For further information on Cost Management refer to Section 14.

Technical Audit

When the design development has reached tender stage and a tender package has been compiled for issue, the Project Manager should procure an audit of the full tender package to ensure that both the design and terms of appointment:

- fulfil the Design Brief
- are complete
- are fully co-ordinated
- are suitable to issue for tender
All members of the Design Team should attend the audit.

A sample agenda for such an audit is included at Appendix 5 E and follows a similar format to that used for Design Reviews.

2.12 Variations from the Traditional Form of Procurement

The different stages of design from Outline to Production of Information will have to be completed for all construction projects but the difference with other forms of procurement such as design and construct is that the Contractor will complete the design process.

The two main differences in process with Contractor design are:

- The University will have to produce a detailed output specification rather than a completed design. The process for this is similar to the process for completing a full design.
- The University will have a monitoring role for the completion of the detailed design rather than an active management role. It is usual for the Consultants who completed the output specification to be retained by the University to monitor design development by the Contractor and ensure the Contractor’s design fulfils the requirements of the output specification.
APPENDIX 2 A

CERTIFICATE OF CONFIRMATION OF APPROVAL TO PROCEED TO TENDER STAGE

Client: The University

Scheme:

Certification by Project Sponsor:

1. The University is satisfied that the documents dated …………………… represents a comprehensive statement of the University’s requirements at design stage and covers all essential matters.

2. The University envisages making no changes to the design documents (excepting future changes in legal and statutory requirements).

Signed: …………………………………………………

Project Sponsor on behalf of the ……………………………

Note: University needs to adapt this form to obtain assurances on the adequacy and integrity of briefing from members of the Design Team.
APPENDIX 2 B

DESIGN BRIEF CHECKLIST

This Design Brief checklist is intended for use with the appointment of Architects but it could also be used for the appointment of other Consultants and Contractors, although some items would not be applicable.

The brief may include the following:

Brief Details of the Project

- Project Objectives
- End Use
- Purpose
- Site Location
- Current Status of Project

Operational and Technical Requirements

Detail the end use requirements. Include:

- Operational Policies
- Site Density
- Functional Content
- Future flexibility/expansion

Design Requirements

Define the work to be done to complete the project.

- Performance standards for engineering services and facility elements
- Major plant and equipment requirements
- Net development Area Requirements
- Floor areas (if known)
- Equipment Schedules (if appropriate) - particularly substations, gas governor equipment
- Specification requirements
- Security requirements
- Life expectancies
- Technical Specification
- Appearance/Preferred Layouts
- Fire Principles
- Technical Standards
- Services to be Incorporated
Services to be Provided

- Define/schedule roles and responsibilities
- Detail any particular skills or expertise requirements
- Define communication strategy
- Reserve the right to inspect the design deliverables at any time
- Charge the Lead Consultant with the responsibility for design co-ordination
- Site Investigation and Surveys
  - Include a request for details of personnel who will work on the project, their roles, timescales, commitment, output
- State whether the Consultant is expected to provide advice on project strategy and contracting strategies
- Requirements for sketch plans of the options investigated

Constraints

General

- Cost (Define Notional Cost Plan and Cost Limits)
- Time

Quality

- A requirement for all designers to be registered to BS EN ISO 9001:1994

Organisations should be requested to submit with their tender:

- Identification of the Regulations which impact on specific aspects of their scope of works
- Identification of which Quality Standard they will comply with
- A quality management plan clearly identifying the personnel responsible for its administration and compliance
- The methodology adopted to ensure compliance with the Quality Management System
- The University, or its authorised representative, shall request unrestricted access at all reasonable time to the facilities, equipment, materials, personnel and records of all organisations providing services to audit their respective QMS’s.

Consents

- Define Client approvals required
- Building Control
- Planning
- Other Statutory Consents
Site Specific Details

- Environmental Health/Contamination
- Physical Constraints
- Site Location and Boundaries
- Access
- Nature of the Site/Easements/Rights of Way
- Existing Buildings (if any)
- Interface with Existing Buildings (if appropriate)
- Related Projects/Neighbouring Developments
- Planning Applications
- Development Control Plan
- Construction Constraints

Legal Requirements

- Warranties required, for whose benefit and in what format
- Insurance requirements (such as P.I. cover)
- Whether the contract will be executed under hand or as a deed under seal
- Collateral Warranty requirements
- Power of Attorney requirements
- Performance Guarantee Bond requirements (in respect of workmanship and contractual obligations)
- Parent Company guarantee requirements

Information Available

If appropriate make available any existing information held by the University. This may include:

- Site Surveys
  - Topographical
  - Ground Geology / Hydrogeology
  - Contamination (Ground/Water)
  - Structural condition of any buildings on site including identification of any contamination to be removed.
- Services Surveys
- Utilities
- Accesses
- Ground Investigation Reports
- Information on Feasibility Studies, Option Appraisals
- Outline sketch plans of the option investigated
APPENDIX 2 C

DETAILED DESIGN CHECKLIST

Architect

- Existing site surveys (Topographic)
- Site layout indicating plot relationships/building positions
- Main services layouts
- Floor plans showing the details of all spaces and their use
- Details of main cores and risers
- Sections through the building showing the key relationships between spaces
- Elevations of all facades showing the characteristics and relationships of all components
- Perspectives and details of key Architectural features
- Outline finishes schedule for all spaces

Engineering

- Desk studies and site investigation
- Proposals for dealing with site contamination
- Geotechnical survey
- Site plans showing and structural components, e.g. bridges, culverts etc.
- Road and drainage layouts
- Floor plans showing layout and sizes of all structural components
- Key sections through the structure of the building
- Details of all non-standard structural components
- The principles of foundation and frame design
- Acoustic treatment

Mechanical Services

- Site Plans showing existing and proposed routes for water, gas and other utilities
- The principles of the heating, ventilation, cooling and plumbing systems, together with critical dimensions within ceiling and floor voids
- Floor plans showing main routes of all services systems
- The principles of the fire protection and fire alarm systems
- Plant room locations, sizes and weights of principle items of plant
- Location and size of principal service ducts and risers

Electrical Services

- Site Plans showing existing and proposed routes for electricity and telephone/communications utilities
- Electrical intake and transformers with size and position of switchrooms
- The principles of lighting and power distribution; tenant and client supplies, power and lighting to common areas
- Standby electrical generation
- Building management systems
- Lightning protection
- Security systems
Vertical Transportation

- Passenger use studies
- Principles and location of alternative systems and location and size of lift motor rooms

Method Statement

- Statement of the way the works will be constructed

Approvals

- A copy of planning and statutory permissions and approvals granted to date or a statement on the position regarding approvals needed
- Detailed completion, commissioning and handover procedures, requirements and approvals
APPENDIX 2 D

FINAL DESIGN CHECKLIST

The checklists are based on the primary zones of the development.

Site Plan & Infrastructure

- Site layout - measured, line, level and elevation survey, site boundaries, rights of way, orientation, road names, adjoining buildings and owners, adjoining basements
- Existing building and sight lines, rights of light (in London, St Paul's cones and grid)
- List of buildings to be demolished
- Structures to be preserved – listed buildings, conservation areas
- Site reclamation and remediation of contaminated land
- Extent of archaeological interest and proposed examination of site
- Outline of new buildings with main dimensions and information required to position building on site
- New access and exit points from roads for car parking, servicing including loading/unloading and rubbish disposal, visitor's entrance, new roads and footpaths with widths, levels, falls, details of crossovers, crash barriers, controlled crossings etc
- Details of temporary and permanent fences and walls on boundaries and within the site
- Hard and soft landscaping – steps or changes of level, indication of proposed banking, cutting or other excavation and areas including levels for depositing, storing and spreading surplus soil, tree planing, irrigation, mowing margins, street furniture, flagpoles
- Survey of existing above and below ground services
- Proposed soil and surface water drain runs, gullies, grease-traps, manholes, rodding eyes, petrol interceptors, connections to existing sewers (manhole sizes, cover and invert levels may be shown on a separate schedule)
- Position and inverts of gas, water, electricity, British Telecom, Mercury and other services with positions of connections to existing mains or meters – termination points within buildings co-ordinated with design of internal services
- External lighting, illuminated signs, earthing plates, CCTV masts etc.

Substructure

- Soil reports and foundation design assumptions of ground bearing capacity, ground heave, water table, tidal water, artesian pressure, flow rates
- Demolition of existing structures, provide a method statement for safe demolition, consider ground heave
- Re-use or removal of existing foundations
- Existing and reduced ground levels, establish new building datum level
- Basements; retaining walls, methods for temporary and permanent anchorages, tanking, water-proofing, provide a preliminary construction method statement, finishes to in situ structure, internal drainage, pumping system
- Services undercroft, crawl spaces, access/ventilation, service duct entries
- Foundation types, e.g. piling, mass concrete fill, strip foundations
- Alternative types of piling design
- Excavation, reinforcement and concrete quantities, method statement for materials handling and construction logistics, preliminary temporary works designs, upholding existing pavements, services, basements and structures, assess risk of settlement, construction access and egress from site, safety proposals
• Use of basement, location of plant rooms, wind bracing, car parking spaces and layout, preferred column grid, compatibility with main building grid, assess need for transfer structure or special members
• Proximity to deep underground structures, tube lines, post office tunnels or trunk water mains
• Electricity Board’s switchrooms, transformers
• Lightning conductor and lift pits, thickening to ground slab for drainage and service ducts
• Plant support steelwork, plinths, holding down bolts, cast-in fixings
• Temporary and permanent access for plant installation, removal and maintenance, smoke ventilation, duct system and effect at street level
• Parking lifts and turntables; compactors, rubbish removal
• Stand-by generators, oil storage and fill points
• Sprinkler systems, water storage

Structure – Sections and Details Of

• Underground structures
• Roadways and drainage
• Frames, suspended floors including framing and trimmers around openings
• Framing plans for steel or pre-cast/in situ concrete frame, dimensioned building grid, offsets and member sizes
• Galleries and mezzanines
• Decking systems – in situ, pre-cast concrete, metal decking, composite construction etc.
• Edges and special details
• Expansion joints, movement joints, bearing pads, isolating structures and construction
• Cast in fixings, components, column protection, service penetrations through structural members
• Service risers, shafts and flues
• Staircases and ramps
• Escalators – fixing and motor rooms
• Typical and detailed core layouts
• Rainwater collection and disposal system

External Envelope

• External walls
• Roofs
• Plant and lift motor rooms
• Atria roofs
• Cleaning equipment

Risers, Plant Rooms and Primary Services

• Risers
• Soil drainage
• Plant rooms
• Air circulation plant rooms
• Low pressure hot water plant rooms
• Cold water
• Electrical services
• Finishes to cores and landlord areas
• Kitchens
• Sanitary ware
Horizontal Distribution and Fitting Out

- Services
- Low pressure hot water heating
- Access panels

**STAGE THREE**

**TENDER STAGE**

### 3.0 PRODUCE CONTRACT WORKS

This section details the procedure for appointing all types of Contractors and is similar to Section 2, which deals with the appointment of Consultants. As with Consultants, Contractors frequently have strengths in particular fields and weaknesses in others so it is important to select and appoint the right Contractor whose strengths are in the right areas for the particular project. The process detailed in this section is likely to lead to the best match but this can never be guaranteed.

In order to procure a Contractor to execute a project, it is important that the highest quality of information is issued and that there is not a philosophy of risk transfer by stealth.

The selection of tenderers should be conducted in a manner appropriate to the scale of the project with clear selection criteria established for any evaluation process.

The tenderers should be provided with as much information as possible, related not only to the works to be executed but also the form of contract and all available information contained in the Project Execution Plan.

Tenders should be structured in such a way that negotiation is conducted on a like for like basis to give the best possible value for money and with clear indication as to the value and cost criteria that are to be applied.

The tender process should be as transparent as possible, capable of audit and capable of response to unsuccessful tenderers.

When the Project value is such that the European Procurement Directives apply, at present, a minimum of 5 tenders will be required.

#### 3.1 Select Tender List

The fundamental rules regarding tender lists for Contractors are the same as those for Consultants, in that the list should only contain those organisations that have been thoroughly vetted, have the experience and capability to undertake the work and would be acceptable if selected.

It is also essential that due public notice be taken of the relevant tendering procedures, depending on the scope and scale of the work. If the value of the work is such that the EC procurement regulations apply, then the selection and tender process must be carried out in accordance with these regulations.
If the CDM Regulations apply, the Client as defined by the Regulations has a duty to ensure those appointed are competent and adequately resourced to carry out their health and safety responsibilities.

3.2 Prepare Tender Documents

There should be early agreement between the Project Manager, the Project Sponsor, the Design Team and the Cost Consultants as to the content of the tender document package and the tender return package. The tender documents should clearly detail what is required of the tenderers.

3.3 Gateway 3 - Approval to Proceed to Tender

The purpose of Gateway 3 is to review the tender documents and confirm they are appropriate and, if correctly executed, will fulfil the project objectives. This process is distinct from, but accompanies, the Technical Design Audit. The difference is that the Technical Design Audit focuses on the completed design while the scope of the review at Gateway 3 is much wider. The review at Gateway 3 considers the entire tender package, the current state of the project and challenges previous decisions such as the validity of the chosen procurement route.

When carrying out the review use the list below as a starting point.

Review of Current Phase

- Have all Gateway 1 and Gateway 2 assumptions been validated?
- Is the project under control (e.g. on plan and running to budget)?
- Have all the required departmental checks been carried out?

Potential for Success

- Does the project still meet the user needs and governmental objectives?
- Has a firm business process change management plan been developed yet?
- Has a firm benefits capture plan been developed? (This sets out what the benefits will be, all of the steps to achieve them and addresses the critical issues.)

Business Case

- Does the business case indicate value for money can be achieved?
- Are the costs within the current budget and are the whole life funding requirements affordable and clearly supported by key sponsors?
- Will the project be attractive to the private sector?

Risk Management

- Does the contract reflect standard terms and the required level of risk transfer?
- Have major risks of all types been understood, financially evaluated and are there appropriate risk management plans in place?

For further information on Risk Management refer to Section 16.
Readiness for Next Phase

- Have all necessary Stakeholders given approval to the project?
- Are all resources and internal funds (Client-side budget) in place?
- Is the project management plan adequate and realistic?
- Is the Project Acceptance strategy acceptable?

As detailed previously, the purpose of gateways is to create a pause in the process where the entire project can be reviewed before proceeding to the next stage. The time is best spent thinking, challenging, assessing and evaluating rather than writing a report so the report may be brief but it should adequately answer the above questions.

Follow the University procedures for signing off tender documentation and obtain approval to proceed through Gateway 3. (For details of the University’s internal financial approval procedures refer to Appendix 1 A.)

**Issue Certificate Confirming Approval to Proceed to Tender. (See Appendix 3A for a copy of the certificate)**

### 3.4 Tender

The Contractors should be given the option to price for providing an all inclusive Guaranteed Maximum Price tender where the Contractor takes all the risks including those for the weather, unforeseen ground conditions and pollution.

The final selection of Contractor should be based on the correct balance between quality and price.

### 3.5 Evaluate Tenders

The project criteria, the tender criteria, evaluation criteria and the report format, should be formalised and agreed with the Project Sponsor.

Tender documents and tender evaluation should consider the options for negotiation and best value within the tender process. Care should be taken to advise successful and unsuccessful tenderers of the results of the process set within Audit Commission criteria.
Value Management

Focus: Bid analysis and contractor/supplier credentials

For projects over £1,000,000:

- Include a section on value in the Tender Report
- Hold Targeted workshops and follow-up meetings as necessary

For further information refer to Section 15 on Value Management

3.6 Gateway 4 - Approval to Contractual Commitment

The purpose of Gateway 4 is to review the readiness to award the construction contract and to ensure there is an appropriate ongoing monitoring regime in place.

The documentation to be presented at this stage is the input identified on the Gateway 2 pro-forma supplemented with:

- The Tender Evaluation Report
- The University commitment to date and estimate for the next phase
- The residual risk to the University in investing in the project under consideration and proposals for their management
- Demonstration that all approvals have been gained

When carrying out the review use the list below as a starting point.

Review of Current Phase

- Does the total service meet the Acceptance criteria?
- Is the project under control (e.g. on plan and running to budget)?

Potential for Success

- Does the project still meet the user needs and governmental objectives?
- Can the chosen partner deliver the contract?

Affordability

- Does the business case still demonstrate value for money?
Readiness for Next Phase

- Have all Stakeholder issues been addressed?
- Is the long term contract administration process in place?
- Has the benefits measurement process been established?
- Has the change control procedure been established?

Following completion of the review issue a brief report that adequately answers the above questions.

If the tender sum of the winning bid exceeds the Gateway 2 approval then a revised Gateway 2 with a justification statement is to be prepared and appropriate approval is to be obtained. This may require a further fundamental project review.

On receipt of the tender report, which should be supported by updated risk and value assessments, the Project Sponsor should request approval from the Investment Decision-Maker to proceed to construction prior to the appointment of contractors. If necessary, any provision should be made for the modification of the tender scope and or costs and time-scale in order to fulfil the parameters of the project or the budget available.

Obtain Approval to proceed through Gateway 4. (For details of the University’s internal financial approval procedures refer to Appendix 1 A.)

3.7 Appoint Contractor

Prior to the appointment of a Contractor, all negotiations should be completed with the requirement to provide, at the earliest opportunity, all contractual details requested at tender.

As an indication of the competence and efficiency of the Project Team, all documents should be in place prior to work commencement, or as soon as possible thereafter. Consideration must be given to integrating the Contractor activities within the Project Execution Plan with detailed agreement of particular methods of working that have been proposed during the tender process.
APPENDIX 3 A

CERTIFICATE OF CONFIRMATION OF APPROVAL TO PROCEED TO TENDER

Client: The University

Scheme:

Certification by Project Sponsor:

3. The University is satisfied that the tender documents dated …………………… represents a comprehensive statement of the University’s requirements at tender stage and covers all essential matters.

4. The University envisages making no changes to the tender documents (excepting future changes in legal and statutory requirements).

Signed: …………………………………………………

Project Sponsor on behalf of the ……………………………

Note: University needs to adapt this form to obtain assurances on the adequacy and integrity of briefing from members of the Design Team.
STAGE FOUR

4.0 IMPLEMENTATION

Introduction

Before starting this phase it is essential that all relevant documents, contracts and warranties are in place. Particular care should be taken prior to commencement of the contract to ensure that all matters relating to ownership, boundaries, statutory authorities and statutory undertakers are in place and such information is available to the Contractor.

The Contractor should be encouraged to participate and develop the Project Execution Plan, in line with the methodology employed within its own company. The Project Manager should establish both his or her authority and control to ensure the PEP is used as the primary control and management document for the execution of the project.

As with previous sections, the scale of the project, the operational procedures and professional skill of the Project Manager will have a major bearing on how much of this section applies. It is intended to be a checklist for the benefit of experienced professionals and guidance for those less experienced in project organisation and management. For more detailed information on items such as Cost Management or Health and Safety Management, refer to other sections within this document.

4.1 Pre-Contract Meeting

This meeting should be the first of a series to be held at regular intervals and precedes all of the procedures prior to commencement of construction. Its purpose is to ensure all the relevant information and systems are in place and to ensure the Contractor is fully briefed before the start of the works.

Hold a Contract Pre-commencement Meeting prior to commencement of works on site to:

- Determine and agree a way forward
- Confirm the present position and documentation
- Agree outline meeting dates
- Agree proposals for future works
- Agree the mechanism for installing on site design and inspection procedures

Issue an agenda in advance of the meeting and circulate the minutes as quickly as possible.

Further Information:
- Refer to Appendix 7 A and 7 B for model agendas
- Section 17 – Communication
4.2 Contractual Arrangements

Before commencing a contract it is essential that all relevant contractual arrangements are in place or are identified with a control register indicating the status of outstanding matters.

Ensure the land has been acquired prior to start on site and obtain a copy of the deeds of ownership (if available).

Obtain details of any covenants, easements, rights of way or other legal restrictions that apply to the Title of Ownership. It is critical that clear title and recognition of all covenants and easements on land, concerned with a project, are known and adhered to.

Ensure the existing conditions surrounding the site have been adequately recorded, that all condition surveys have been completed and that all Party Wall Awards are in place, or at least those relating to the early phases of the work.

View all insurance certificates to verify all the required insurances are in place. During long contracts review the provision of insurances on an annual basis to ensure they have been renewed.

Execute warranties and bonds at the earliest opportunity. If bonds are required they must be provided before possession of the site is granted.

Complete all partnership arrangements before any site start is made.

Appointments for ongoing Design Team involvement and site supervision should be placed and the terms and conditions made aware, where appropriate, to the Contractor.

Prepare a register of contracts and approvals and their status as an ongoing document for the project held by the Project Manager.

All statutory approvals should be identified and listed with due notice given to the Contractor who will be responsible for the project site.

All negotiation on contract price should have been completed in order that a contract sum is established and contracts can be placed.

All arrangements for site accommodation for the client, Project Manager and Design and Supervisory staff must be defined and in place.

It is essential for the Project Manager to have a good understanding of all contracts the University has with third parties.

4.3 Health and Safety Management

In addition to contractual arrangements it is clearly necessary to confirm all the necessary health and safety arrangements are in place prior to commencement of the works.

Security of the site should be inspected and arrangements made for ongoing site security with appropriate signage and transport control arrangements.
Checks should be made that all relevant accommodation and welfare provision, together with all safety equipment, are available, as specified, for the Consultants Client and Contractors staff.

Notify and advise boundaries and adjoining owners. Make provision for any public announcements related to construction, public relations and education considerations, if appropriate, e.g. if a site is near to a school or housing estate.

Make suitable arrangements for notices and signage including Health and Safety Form 10.

Put in place a Health and Safety Plan with appropriate method statements at least for the initial phases of construction. No work may start on site until the relevant section of the Health and Safety Plan has been completed and implemented. Although the Planning Supervisor has no on-site duties the individual should ensure the Health and Safety Plan is in place for each item of work before it starts on site.

Set up a continuous Site Induction programme. The Project Team should complete site inductions as soon as possible and all site workers should complete them before being allowed on site.

Procedures for the treatment and/or removal of contaminated material, including asbestos and COSSH elements should be recorded.

Consideration should be given to a permit to work and hot work permit system particularly in locations under control of the University.

The Contractor should supply full details of staff, staffing levels and sub-Contractors.

Particular attention should be paid to the processes of demolition and disposal of any buildings or materials on site.

Monitor the above processes at regular intervals to ensure they are being implemented correctly.

The ongoing CDM duties will apply and these are summarised below:

**Client**

- Ensure the Principal Contractor has prepared a suitable construction Health and Safety Plan before work starts on site
- Ensure the Health and Safety File is given to the Client at the end of the project and is kept available for use

**CDM Co-Ordinator**

- Ensure the Health and Safety Executive is notified of the Principal Contractor’s appointment by sending a revised F10 form
- Ensure the designers co-operate with each other
- Ensure the designers comply with their duties
- Advise the Client when requested to do so
- Ensure the Health and Safety File is prepared
Designer

There may be a need to carry out design work during the Project Delivery phase in which case the duties below are still relevant:

- Ensure the Client is aware of its duties
- Give due regard to health and safety during the design process
- Provide adequate information about the health and safety risks to those who need it
- Co-operate with the Planning Supervisor and, where appropriate other Designers involved in the project

Principal Contractor

- If the Principal Contractor is carrying out the design then the Designer’s duties will also apply to the Principal Contractor
- Manage health and safety on site

Further Information:
- Section 10 – Health and Safety Management

4.4 Control Systems

Prior to commencement of construction it is most important that all of the methods and procedures that will be needed to execute the project are recognised and all systems established at inception. A properly assembled Project Execution Plan will have control systems for drawing issue, cost recording, reporting, meeting times, agendas and minutes and all other management elements of a project.

The Project Execution Plan prepared during the design stage should be updated to include all relevant information concerning the Contractor, together with any contributions the Contractor is encouraged to make.

Establish and implement the monitoring and control systems as set out in the PEP, or this document if a PEP is not being used.

Implement an efficient office document control system covering referencing, issue, receipt, storage and retrieval of all project documentation.

Arrangements must be made for start up meetings including team building exercises and site induction procedures.

The status and register of drawings for construction must be identified and the method of registration and drawing status established.

Initiate the Contractor in the project communication framework to ensure all parties can communicate and report effectively to ensure the project objectives are met.

Continue with the current relevant meetings and initiate the Site Progress/Contract Review meetings and the Contractor’s Co-ordination meetings.
Establish the cyclical issue of reports and meetings as detailed in this manual, or the PEP, whichever is appropriate. This will include the initiation of the Contractor’s report and the Site Visit reports.

All site instructions must be in writing. If they are given verbally on site they must be confirmed by fax immediately upon return to the office.

4.5 Teamwork, Partnering and Incentives

This item features both in the pre start section and in the project delivery phase as it is critical that good working relationships are established from the outset of a project and that these working relationships towards a common goal are sustained.

Teamwork takes many forms and can be based around the attitude that the key players need each other.

In order to sustain a teamwork atmosphere various social events and team building exercises can be used stress a common purpose and a general attitude of working in harmony.

Teamwork

- Break down barriers by holding team building events at appropriate intervals
- Align individual Project Team members’ objectives with that of the project
- Create an open, blame free culture
- Maintain records of how the Project Team worked to achieve best value
- Encourage people to share knowledge and ideas that may reduce waste and add value to the University at appropriate intervals
- Publicly reward significant effort and achievers of significant successes
- At appropriate intervals review the performance of the Project Team, in which the Contractor may be included depending on the procurement route, and implement any remedial measures as necessary.

Partnering (where applicable)

- Encourage/request strategic partnering agreements throughout the supply chain
- Sustain high level management support for the partnering initiative

Incentives (where applicable)

- Focus attention on incentives in the contract and measure performance against the performance targets

4.6 Monitoring Design and Construction

Timely delivery of information in front of construction need is the most critical element of information flow on a project.

Systems must be put in place to record information need and information delivery.
Ensure that all design and any other information is available to the Contractor when required and that the Contractor’s reasonable requests are being met. It may be appropriate to implement a ‘Request for Information’ system and/or a production information programme.

Resolve design issues as quickly as possible. Assign an owner to each problem to ensure individuals are made responsible for tackling the issues.

Arrange site inspections and site visit reports as necessary. Monitor works on site to ensure it is:

- In accordance with the design
- Of the right quality
- On programme

Regularly review the project objectives and constraints to ensure they are being met.

The following is a possible check-list for the Project Manager as a means of assessing the performance of the Contractor’s management of the project.

- Contractor compliance with specification and production of works to appropriate quality
- Sub-contractor Management
- Procurement Management and Control
- Production of Method Statements and Health and Safety Plan
- Practice of Site Health and Safety
- Organisation of Site and facilities
- That sufficient resources continue to be made available
- Performance of Key Personnel
- Efficiency of Site Management
- Risk Assessments and Risk Register
- Programming and Compliance
- Team Building and Social Activities
- Continuous liaison with statutory authorities, including the utility companies

4.7 Cost Management

Review and update the Cost Plan at regular intervals

Carry out Option Appraisal Cost Estimates as necessary

Carry out Estimate Cost Comparisons as necessary

Update the Cash Flow Forecast. Regular checks should be made between the original estimated cash-flow and the cash-flow as the works progress, as a means of assessing progress.

A programme for valuations and certification must be set in place, together with a cash-flow based on the Contractor’s contract sum and project programme.

It should be made clear to the Contractor that the speedy production of all cost information is essential to a successfully controlled contract.
Value Engineering and option appraisals should be considered when the contract size and condition justifies.

Initiate implementation of the formal contract change control procedure detailed in the PEP or in Section 14.5 – Cost Management of this document.

Maintain a schedule of variations and their status.

Ensure interim valuations of the works and payments occur in accordance with the contract terms.

Ensure daywork sheets are reviewed on a weekly or monthly basis as appropriate.

If there have been any warning signs of the impending insolvency, great care is needed in preparing valuations to avoid any possible overpayment which would result in the University having less money in hand to deal with the setting off of losses. Appropriate contract amendments are provided in the Reference Document.

Manage the contingency fund as necessary.

Agree final accounts for Consultants as necessary.

Implement contra-charging mechanism as necessary.

Avoid or resolve contractual disputes as necessary.

**Value Management**

Focus: Change management and control issues

For projects over £1,000,000:

- Hold a Control Value workshop
- Hold Targeted workshops and follow-up meetings as necessary
- Issue interim reports as necessary

**4.8 Quality Management**

Both in the tender documents and the PEP a regime should be established and maintained for all quality checking, both on and off site with clear baselines for acceptable quality and recognised procedures for the checking acceptance and covering up of completed works.

It is essential that both the Consultants and the appointed Contractor attain the quality standards detailed in the Project Brief.

In addition to compliance with the principles of BS EN ISO 9001-4:1994, other measures should be introduced to monitor and verify the standards to be achieved. These measures will include:

- Submission by the Contractor of samples of materials for approval by the Design Team – sample required should be listed in the Contract Documents.
• Completion of workmanship samples and ‘mock-up’ of completed works to establish a quality standard for the project – again these requirements should be reflected in the Tender/Contract Documents.
• Detailed Testing Procedures will also help to achieve and confirm the quality standards have been achieved, particularly for services and structural provisions.

Clear arrangements must be in place for the inspection and acceptance of works under construction. This may involve the appointment of Site Inspectors, Clerks of works and Engineers, acting on behalf of the University. The scope and terms of reference of such inspecting staff must be made clear, both to the Design Team and the Contractor.

Inspection procedures must be clearly identified, together with the degree and frequency of testing.

Regularly review implementation of site monitoring to ensure the appropriate level is being attained.

Clearly identify and record inspection procedures for materials, both leaving and entering the site, together with the sources and disposal arrangements.

Give clear instructions for production of samples and prototypes and compliance of subsequent work with these.

Define a set of work completion procedures, together with all necessary arrangements for subsequent protection and cover up.

Make arrangements for closure notices where works are to be covered. Clear arrangements for sectional completion notices should be in place where works are to be handed over to the Client or others prior to contract completion.

Review the Contractor’s quality plan that should include the management of its sub-Contractors.

4.9 Programme Management

Programming, sequencing of works and implementation of corrective actions to maintain programmes are essential management tools for successful execution of a project. Particular care should be taken that all programmes are maintained and updated regularly with adequate reporting in order that pro-active rather than reactive actions may be taken where appropriate.

The tender documents should require all bidders to submit a construction programme with their tender for appraisal, together with a network on which the programme is based. The programme should highlight any key pre-construction activities such as Contractor design, long lead in items and the like. Review and develop the Construction Programme to ensure it is aligned with the Master Programme.

The Contractor should also provide its programme for procuring each sub-contract works package and, where relevant the major materials items. Monitor the Contractor’s procurement programme for sub-contracts and key materials against the master programme. Pay particular attention to items with long lead times.

If applicable monitor the Contractor’s design programme against the master programme.
The tenderers should also be required to implement the appropriate programme management techniques as part of his management of the construction process.

An agreed Commissioning Programme should be identified as a key deliverable for the Contractor, to ensure that this process is properly planned, controlled and implemented. This programme should be issued well before commissioning begins to enable all parties involved, possibly including the University, to make adequate preparations.

It is important to ensure that a detailed network (on which the initial construction programme is based) is received prior to the commencement of the works. This can then be used to consider the impact of any delays, additional works and the like and assess whether an extension of time is due.

Throughout this phase of the project monitor progress against all programmes, update them as necessary and implement any corrective measures if required.

4.10 Risk Management

Under the new Office of Government Commerce and Treasury Guidelines, risk allocation should be made to those best able to control and eliminate risks in construction. Risk assessments should be made across all aspects of a project with a risk register established and updated at frequent intervals of no more than three months, with all parties participating.

The control and elimination of risk must be sustained throughout the project and its effective distribution is a good team-working tool.

Throughout the Project Delivery phase ensure risk owners are managing the risks appropriately and hold risk reviews at appropriate intervals.

4.11 Contractual Claims and Dispute Management

There is always a risk that there will be disputes on a project, particularly where there are unknown elements at inception. It is therefore essential that contract documentation recognises the existence of unknown elements and defines the procedures for resolution of all types of claim. If the rules of engagement are unambiguous and the documents are similarly clear the risk of counter productive claims will be much reduced.

If the teamwork/partnering initiatives are effective, the probability of disputes arising is greatly diminished but not removed completely. All parties should make every effort to resolve problems before they escalate to a contractual dispute. Should a contractual dispute arise it should be dealt with in accordance with the relevant contract.

All members of the Project Team should keep accurate and up-to-date records throughout the project that can be easily referred to in the event of a claim or dispute.

The appointed Design Team will assess applications for extensions of time by the Contractor and any appropriate awards will be made by the Contract Administrator in accordance with the relevant form of contract. The Project Manager should ensure
that the Contractor reflects any extensions of time granted within his Construction Programme.

The Project Manager should reflect the approved extensions of time within the Master Programme for monitoring and reporting purposes.

**STAGE FIVE**

**5.0 COMMISSION, COMPLETION AND HANDOVER**

**Introduction**

The commissioning, completion and handover phase of a project encompasses the completion, testing, inspection and acceptance of the works. Some of the activities under this heading occur not only in the post-contract phase but also in the pre-contract phase.

The primary purpose of commissioning and testing systems is to prove that the installations meet the design requirements and can operate in a safe manner. It also allows faults to be identified and corrected prior to the planned handover date, if undertaken in good time. It is critical that full and complete documentation from the project is initially requested and subsequently received so that all obligations under the Health and Safety Regulations can be fulfilled. Clearly then, this section is most relevant to construction projects but it will also apply to land remediation projects and some parts of this section will be relevant to all projects.

**5.1 Preparation for Commission, Completion and Handover**

Whilst implementation of the commissioning, completion and handover activities occur towards the end of the contract delivery phase, a great deal of preparation must be carried out much earlier in the project lifecycle. These preparation activities are detailed in the sections below but are also cross referenced with the earlier appropriate sections.

When developing the project strategy the University should consider its commissioning, completion and handover requirements. During the detailed design phase it should discuss the requirements with the Design Team and develop a general commissioning and handover strategy. At the end of the detailed design phase the Project Team should clearly and unambiguously specify the scope of commissioning, performances to be achieved, approvals to be obtained and handover requirements in the contract documents.

Initially the commissioning and handover strategy should address the following:

- A technical commissioning programme and a separate handover programme. Ensure these are aligned with the master programme. The commissioning programme will be developed by the successful Contractor to demonstrate how it proposes to commission the works to meet the University’s requirements.
- Identification and appointment of a commissioning and handover team (usually the Design Team)
- Roles and responsibilities
- Pre-handover activities and preparation
- Technical commissioning and handover activities
• Handover requirements (time, sequence, documentation to be provided, approvals required etc.)
• Attendees at Handover Meeting
• University’s operational commissioning
• Post-handover activities

Commissioning must be integrated in the master programme with sufficient allowance for the materials and equipment to be commissioned to be ready for this action well in advance of contract completion. The master programme should make an allowance for implementing any corrective action should it be required.

The Project Manager should ensure that:

• The Design Team fully specify the testing and commissioning requirements
• The Contractor undertakes all tests required and records the results
• The Design Team inspect and witness the testing and commissioning to the required level

Decide whether commissioning will be a separate appointment or function or is to be undertaken by the Consultants and/or Contractors concerned.

Generally, large construction projects could be subject to phased (sectional) handover or Practical Completion.

Care must be taken that the handover specification complies with the requirements of any insurance company or funder, together with the University, taking an interest or providing cover of a building or project.

Make suitable arrangements for staff training, post contract operation and maintenance together with any additional materials or spares to be provided to support the new facility.

To ensure that a Contractor makes due allowance for all the testing and recording requirements of the University, these should be clearly identified in the contract documents at tender stage. Keep a running log of all activities and records that will ultimately be required on completion. Consider including financial inducements in the contract, either positive in the form of incentives or negative in the form of liquidated and ascertained damages or retention, to encourage the Contractor to complete all works and handover documentation on time.

Include a provision in the contract documentation for the correction of works when there is non-compliance by the Contractor or Sub-Contractor e.g. a contra charging provision.

5.2 Implement Commissioning

Appoint an individual with the responsibility for managing the commissioning process.

The Consultants should identify all the required statutory and insurance approvals required and ensure they are adequately programmed and completed satisfactorily.
Carry out the commissioning of the services in accordance with the commissioning strategy and programme. It is important to ensure the commissioning programme does not become compressed due to the late completion of the works.

The Consultants should inspect the work for which they have design responsibility and report to the University the progress and compliance with the contract provisions, highlighting any corrective measures necessary. The Consultants are unlikely to witness all commissioning tests but they must witness the tests for the major items of work and should review the commissioning results for all items of work. The duties of the Consultants should be clearly identified to ensure there is no ambiguity. For large, complex projects a Commissioning Engineer may be appointed to fulfil this role.

The Contractor and Consultants should work closely together to arrange joint inspections/witnessing of the tests and for the Consultants to review and comment upon the documented commissioning results. Commissioning/pre-handover meetings may be required to facilitate this process. An effective inspection and sign off regime and tight control of this process during construction by the Project Manager will assist in the final commissioning process.

Often commitment from Consultants and Contractors tails off at this stage of a project as they become more involved in new projects they are just starting. The Project Manager should be aware of this and use all necessary skills to overcome it.

Before individual systems are commissioned, ensure the responsibilities for insurance are clearly defined.

Ensure all commissioning records, including certificates, results and calibration requirements, are included either in the Operations and Maintenance manuals or in separate Commissioning Manuals. These manuals should form part of the handover documentation.

Programme Management

Throughout this phase of the project monitor progress against all programmes, update them as necessary and implement any corrective measures if required.

For further information on Programme Management refer to Section 11.

Risk Management

The Commission, Completion and Handover phase involves risks, particularly on large or complex projects, so risk management should be continued through this phase. Ensure risk owners are managing the risks appropriately and hold risk reviews at appropriate intervals. This also applies during Works Completion and Hand-over.

In addition to continuing risk management it may be appropriate to carry out a risk management review at the end of the project.

For further information on Risk Management refer to Section 16.

Health and Safety Management

The following duties will still be applicable:
Client

- Ensure the Health and Safety File is given to the Client at the end of the project and is kept available for use

Planning Supervisor

- Ensure the Health and Safety File is prepared

Principal Contractor

- Manage health and safety on site

For further information on Health and Safety Management refer to Section 10.

Teamwork, Partnering and Incentives

The information contained under this heading will be less relevant to small projects where the Commissioning, Completion and Handover phase is relatively short.

Teamwork

- Break down barriers by holding team building events at appropriate intervals
- Align individual Project Team members’ objectives with that of the project
- Create an open, blame free culture
- Maintain records of how the Project Team worked to achieve best value
- Encourage people to share knowledge and ideas that may reduce waste and add value to the University at appropriate intervals
- Publicly reward significant effort and achievers of significant successes
- At appropriate intervals review the performance of the Project Team, in which the Contractor may be included depending on the procurement route, and implement any remedial measures as necessary.

Partnering (where applicable)

- Sustain high level management support for the partnering initiative

Incentives

- Focus attention on incentives in the contract and measure performance against the performance targets

For further information on Teamwork, Partnering and Incentives refer to Section 13.

Communication

Initiate the Operational Commissioning meetings.

For further information on Communication refer to Section 17.

5.3 Implement Works Completion
Full provision must be made in both the master programme and the construction programme for snagging and remedial action.

As with commissioning, the Consultants should inspect the work for which they have design responsibility and report to the University the progress and compliance with the contract provisions, highlighting any corrective measures necessary.

Consultants should inspect the works regularly throughout the contract delivery phase. Towards the end of the contract delivery phase the Consultants should begin to compile a list of outstanding work and minor faults, or snags. These snagging inspections may be completed in one visit but this will not be possible for large projects. Where the projects are large, areas can be snagged when the Contractor has finished in those areas; this may be on a floor by floor basis for example. This phased snagging can occur even though the actual handover is not phased.

It is important to note that the Contractor should complete its snagging inspections and remedial works before the Consultants carry out their snagging inspections. The Contractor should only be allowed to make the works available for inspection only when it believes all the work is complete.

Generally the snagging list will be collated by the Lead Consultant and issued following each pre-handover inspection meeting. The list will be passed to the Contractor who will then complete the works on the list. Practical Completion should not be issued until all incomplete or defective works have been made good.

5.4 Implement Handover

The actual handover of the facility from the Contractor to the user is a significant milestone and it requires careful management. It is essential that all Stakeholders including the University are satisfied that the works being accepted fully represent the contracted works and discharge the obligations that the University may have to others such as Statutory Undertakers, Project Partners, and Local Authorities for completion of a project.

It is particularly important that the works or site are left in a safe and secure condition on completion, and that insurance is in place and that all obligations are signed off and completed.

The sequence of pre-handover inspections should culminate in a final handover inspection, which should be immediately followed by a formal handover meeting. A typical agenda for a Handover Meeting is included at Appendix 8 A.

Certification may also be required to achieve handover to other parties such as Service Providers and Local Authorities, for example Section 38, 102, 104, 106 and 278 Agreement requirements.

The following, where relevant, should be completed as a pre-requisite of a successful handover. It should be noted this list is not comprehensive:

- Contract works (including all snagging)
- Testing and commissioning
- Ensure the maintenance regime and procedures are in place
- Implementation of maintenance contracts
• Building Regulations consent signed off
• Discharge of all planning conditions
• Training to the University’s (or other Stakeholder) operational staff and other relevant staff
• Adoption of highways, estate roads, walkways and below ground services such as drainage by local authorities
• Consents (e.g. to erect signage)
• Transfer of insurance from the Contractor to the user
• Issue of ‘as-built’ drawings
• Completion of the Health and Safety File

It is important to make the Contractor aware that Practical Completion will not be achieved until all the items on the above list have been completed.

Appendix 8 B lists handover documentation etc. that may be required in order to complete the handover process.

Handover should only take place and acceptance be agreed at Practical Completion i.e. when all work, inspections and approvals are complete. It should be noted that traditionally Practical Completion has been issued when the works are, say 98% complete. Clients today tend to be unsatisfied when they receive facilities that are actually incomplete, so the target should always be to achieve 100% completion at Practical Completion/handover.

Practical Completion means complete in every detail, ready for immediate occupation with all necessary tests and inspections made and clearance given by statutory authorities such as Building Control, fire, water and public health authorities, etc. The exception is the Contract Administrator may, with absolute discretion, accept a small number of minor deficiencies at the time of issuing the Statement of Practical Completion. Any such deficiencies should not have any adverse effect on the fitness of the facility for occupation, the appearance of the works internally or externally, or interfere with the functioning of the facility whilst defects are being remedied.

Ultimate responsibility for declaring the works practically complete rests with the Contract Administrator named in the Contract, however, as part of the Handover Meeting, each party should be asked to formally declare whether they believe that there is any matter outstanding which would prevent Practical Completion being certified. If the Meeting members and the Contract Administrator are satisfied that Practical Completion has been achieved, the Contract Administrator should issue the Practical Completion Certificate required under the form of contract utilised for the project.

This procedure applies equally to Sectional Completion, provided the form of contract has been amended to cater for it. If the handover is phased, ensure that:

• The phased handover does not prevent any party from fulfilling its contractual obligations
• The phased handover does not adversely affect the operation of any plant or services installations
• The occupier of the area has taken back the insurance responsibility for that area from the Contractor

Samples of typical sectional and practical completion certificates, for use with the JCT suite of contracts, are included at Appendix 8 C and Appendix 8 D respectively.
When using other forms of contract use the certificates appropriate to that form of contract.

If the Contractor fails to achieve Practical Completion within the Contract Period, then issue a Certificate of Non-completion to the Contractor. If the contract includes liquidated and ascertained damages then these may be deducted from the contract sum but there is no obligation to do so. Blank certificates of Non-completion, and other milestones, are available from RICS if the University does not have its own forms.

There may be work that will occur post-handover, such as tenant fit-out, which does not form part of the main contract. The University should ensure that where it is responsible for such works it has set up procedures to monitor and supervise these works. If appropriate, opportunity should be given for the integration of any post hand-over or non-contract works commissioned by the University.

5.5 Post-Handover Activities

Whilst every effort should be made to close off a Project at handover, there will be elements that are carried forward beyond this event. Such activities will include rectification of defects, completion of post contract works and certification of outstanding works. In parallel with this, it is likely that the final account for the works will be being resolved.

There is a tendency in the Construction Industry to consider Practical Completion as the end of a project, with all personnel disappearing along with the Contractor, leaving the subsequent difficulty of getting a Contractor, Consultant or Sub-Contractors to return to complete outstanding works.

The Project Manager should make particular efforts to close off Project Documentation before closing off the relevant fee and construction accounts.

After practical completion it is important to consider a post completion review meeting which addresses not only those things that have gone right, those which have been unsuccessful and, in parallel with this, obtain resolution of all outstanding matters.

Before handover occurs, procedures and timescales must be agreed for all post-handover activities. These activities include, but are not necessarily limited to, the following:

- Rectification of defects
- Defects meetings
- Agreement of the Final Account
- Completion of post-contract works
- Certification of making good defects

A detailed procedure must be agreed for the rectification of defects, to ensure defects are valid, properly communicated, prioritised and rectified. All reported defects should be logged and their rectification monitored on a regular basis. A defect flowchart is included in Appendix 8 E and a defect notification sheet in Appendix 8 F for this process.
Regular Defects Meetings should be held so that formal reports on defects issues can be received and actions planned. The agenda for a Defects Meeting should cover:

- Verification of defects addresses
- Additional defects notified
- Actions awaited and timescales

Following hand-over and occupation, arrangements should be made for the completion of any outstanding works with the occupier, or via an agent, if the site is left vacant.

Suitable arrangements must be made by the University for storage and access to the key post completion documents. These should be held in a secure place under a controlled system. Provision should be made for any relevant spares to be provided and stored and for any further project access, post completion, to the works for remediation.

**Defects Liability Period**

Following the expiry of the contract defects liability period, (normally 6, 12 or 18 months), a final inspection of the works should be undertaken. Compile a defects schedule and pass it to the Contractor. When the Contractor confirms the defects have been made good, re-inspect the works and provided that all defects have been remedied, the Project Manager should arrange for the Certificate of Making Good Defects to be issued by the Contract Administrator. A sample of a Making Good Defects Certificate is included at Appendix 8 G for reference; again this is for use with JCT forms of contract and a different form should be used with the other forms of contract.

If the Contractor fails to make good the defects then, providing the contract has made provision for this, the University may employ another Contractor to carry out the work and pay the Contractor with the retention withheld from the Principal Contractor.

Once all work on the project has been completed, the records should be properly filed, archived and stored in accordance with the University's standard guidelines and any QA procedures in place.

Following issue of the certificate for Making Good Defects release the outstanding retention.

**Final Accounts**

The final account for a project must be agreed as early after project completion as possible, in order to reduce the risk of unplanned expenditure to the University.

The progress of the agreement of the Final Account should be monitored as part of the defects meetings.

**Further Information:**
- Section 14 – Cost Management
• ‘Code of Practice for Project Management for Construction and Development’ by the Chartered Institute of Building for information on fitting out and re-location management
The objective is to consider how the project was undertaken from Concept to Handover and to consider the lessons learnt. It involves a thorough assessment of all elements of the project to draw out or feed back, for the benefit of the University and the project management practice concerned, any lessons and conclusions for applications to future projects. Production of a post completion review is a good practice but it is not essential.

The typical post project review is likely to consist of the following elements:

- Project Audit
- Cost and Time Study
- Human Resources Aspects and Communication Frameworks
- Performance Study (Performance Measurement) – output assessment report

5.6 Project Audit

The Project Audit is used to measure how effective the project management system was in delivering the project objectives. It should identify lessons to be learnt, both good and bad.

The project audit report will include the following:

- Brief description of the project objectives
- Summary of any amendments to the original project and reasons
- Brief comment on project form of contract and other contractual agreements and comments whether they are appropriate
- Comment on the organisational structure effectiveness and adequacy of expertise and skill
- Brief summary of lessons and briefly comment how effectively the project was executed with respect to:
  - cost
  - quality
  - time
  - health and safety
- Conclude whether the project brief was fulfilled and does the facility meet the client/user needs
- Indicate whether improvements can be made

5.7 Cost and Time Study

This exercise specifically examines the procedures related to management of cost and time and report on the following:

- Effectiveness of budgetary controls and claims monitoring procedures
- Comment on the impact of claims
- Maintenance of necessary records
- Identification of extension of time due to variation and reason

5.8 Human Resources Aspects

- Examine the communication channels and reporting relationships in the project
• Comment on the staff welfare, morale and motivation

5.9 Performance Study – Output Assessment Report

This study assesses the performance of the University, Consultants and Contractors. Where appropriate the report should identify and highlight both the good performance and the short-comings in order that the database of performance can be created and maintained for future use.

Performance measurement is essential to maintain and improve the University’s performance. There are two ways to generate information on performance:

• Active systems which monitor the achievement of plans and the extent of compliance with standards
• Reactive systems which monitor incidents and reported failures to any aspect of the Project Management System

Both approaches may be employed by the University.

The purpose of this section is to describe the system to be followed when assessing the performance of all participants to the project and of the project itself. It can be prepared in accordance with the University’s Assessment Report.

One difficulty with evaluation is that the appointed project participants may find it difficult to be objective about decisions for which they have been personally responsible. The assistance of a person not previously involved with the project may therefore be appropriate.

Methodology

The method used can include interviewing, workshop(s), observing what has happened in practice and regular monitoring and communication of performance to demonstrate the achievement of goals, plans and targets.

Responsibility for performance monitoring is vested with all levels, starting with top management through to each Project Manager’s individual responsibility for monitoring allocated tasks and targets.

The effectiveness of performance of each area/office is to be subject to regular review by an appropriate level of management. The reviews must be chaired by a Senior Manager and will be carried out at a pre-determined frequency and timing.

The review content will generally comprise evaluations and assessments of historical performance and future requirements and address the following common activities:

• Direction and planning, including the setting of objectives and associated constraints
• Endorsement of project strategies or changes to the University’s Project Management Policy Statement/associated policies
• Approval of plans or project proposals
• Measurement of project performance against set plans e.g. Project Execution Plan, targets and benchmarks using established performance indicators
• Breaches of control (e.g. significant incidents, audit findings, etc)
• Improvement plans, initiatives or projects

Recommendations and/or decisions reached as a result of reviews should be documented and submitted for approval.

Extent and frequency of the performance review on a specific project will be determined at project initiation and defined within the relevant Project Execution Plan.

The extent and frequency of review will depend upon the criticality of the Project and the risks involved, but will be undertaken at least at the end of each Project.

**Measuring Performance**

Performance should be measured against agreed standards to reveal when, and where, appropriate improvement is needed.

Active monitoring reveals how effectively the Project Management System is functioning. This looks at both assets (land, property, premises, construction works, etc) and systems (people and procedures).

If controls fail, reactive monitoring discovers why by investigating the failure.

The objectives of active and reactive monitoring are to:

- determine the immediate causes of sub-standard performance
- identify the underlying causes and the implications for the effective implementation of the PM System

The following performance indicators should be used in measuring performance:

- Consultant’s Performance Refer Appendix 9 A - Checklist
- Contractor Performance Refer Appendix 9 B - Checklist

Using the above checklists determine:

- Whether or not each Consultant or Contractor should be asked to tender again
- What type of projects the Consultant or Contractor is suitable for

Then update the University’s Consultant/Contractor database (if applicable).

**Project Performance:**

- Achievement of time, cost and performance objectives
- Added value
- Success of procurement strategy
- End user satisfaction
- Safety standards
- Cost in Use
- Environmental impact
- Communicating effectiveness
- Project Management System
- Investment Review
The results of the performance review should be incorporated in a Post Project Report, filed with the project records and a copy issued as necessary for analysis/regional distribution.

An interim report may be required if the final report cannot be issued within one month of the project’s completion or issue of the final certificate, whichever is appropriate.

Within the scope of the above it may be appropriate to conclude the value management study for projects over £1,000,000 by:

- Holding Targeted workshops and follow-up meetings as necessary
- Collating all previous reports into a final report

For further information refer to Section 15 on Value Management.
### APPENDIX 5 A

#### CONSULTANT PERFORMANCE MONITORING CHECKLIST

<table>
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<tr>
<th>PERFORMANCE INDICATOR</th>
<th>WEIGHTING</th>
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<td>Teamworking</td>
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<td>Presentations</td>
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<td>Compliance with PEP</td>
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<td><strong>3 CONSULTANT REPORTS</strong></td>
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<td>Punctuality</td>
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<td>Strategic advice</td>
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<td>Content/format</td>
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<td><strong>4 DESIGN</strong></td>
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<td>Briefing</td>
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<td>Complies with PEP/key guidance</td>
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<td>Quality of product/advice</td>
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<td>Completeness</td>
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<td>Change control</td>
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<td>Quality and standard of the key personnel</td>
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<td><strong>5 PROGRAMME &amp; PROGRESS CONTROL</strong></td>
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<td>Properly monitored</td>
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<td>Achieve timescales</td>
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<td>Regular updates issued</td>
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<td>Allocation of resources</td>
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<td><strong>6 COST</strong></td>
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<td>Achievement of budget</td>
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<tr>
<td>Added value</td>
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**MAXIMUM SCORE**

100

**SCORING SYSTEM**

1. Poor
2. Below average
3. Average
4. Above average
5. Good
## CONTRACTOR PERFORMANCE MONITORING CHECKLIST

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<td>MANAGEMENT OF SUBCONTRACTORS</td>
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<tr>
<td><strong>MAXIMUM SCORE</strong></td>
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</table>

**SCORING SYSTEM**

1. POOR
2. BELOW AVERAGE
3. AVERAGE
4. ABOVE AVERAGE
5. GOOD
<table>
<thead>
<tr>
<th>Term</th>
<th>Definitions</th>
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<tbody>
<tr>
<td><strong>CDM Regulations 1994</strong></td>
<td>Construction (Design and Management) Regulations 1994</td>
</tr>
<tr>
<td><strong>Client</strong></td>
<td>Person or organisation that requires a project to be completed (e.g. land reclaimed and a building to be erected) and is responsible for initiating and approving the brief. Under the CDM Regulations the Client has a duty to appoint competent Designers, Planning Supervisor and Principal Contractor.</td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td>When making value judgements and choosing between alternative approaches, optimum value is sought by maximising desired functionality while minimising cost. In this context, cost is wherever possible taken as Life Cycle Cost. Decisions giving short-term capital savings but long-term penalty are discouraged.</td>
</tr>
<tr>
<td><strong>Design Team</strong></td>
<td>Architects, engineers and specialist designers responsible for the conceptual and/or detailed design.</td>
</tr>
<tr>
<td><strong>Development</strong></td>
<td>The Project to be carried out at the site (i.e. reclamation, site preparation, infrastructure works etc.).</td>
</tr>
<tr>
<td><strong>Development Manager</strong></td>
<td>Individual responsible for the effective advice on surveying matters of location, ownership, development appraisals and investment and disposal of property.</td>
</tr>
<tr>
<td><strong>Functionality</strong></td>
<td>Delivery of performance requirements for any of the Stakeholders.</td>
</tr>
<tr>
<td><strong>Gateway</strong></td>
<td>These are points along the project planning route, beyond which the project should not proceed without specific financial approval being obtained from Senior Management (Director, Project Executive, Board as appropriate).</td>
</tr>
<tr>
<td><strong>Investment Decision Maker/Project Owner</strong></td>
<td>A senior manager, director or board member who decides whether or not to invest in a project and who is ultimately responsible for the project.</td>
</tr>
<tr>
<td><strong>Lead Consultant</strong></td>
<td>A Consultant appointed by the client to co-ordinate the activities of various other sub-consultants, who may be involved in the project. The Lead Consultant may be asked by the Client to take on one or more of the following roles: Project Manager, Designer, Planning Supervisor, Architect, Quantity Surveyor, Contractor Administrator etc.</td>
</tr>
<tr>
<td><strong>Planning Supervisor, REPLACED now with CDM(C)</strong></td>
<td>A competent person/individual or a multi-disciplinary team appointed by the client as required under the CDM Regulations 1994 to co-ordinate Health and Safety matters during design development, ensure a health and safety plan is developed during construction and the safety file is prepared on completion of a project.</td>
</tr>
<tr>
<td><strong>Principal Contractor</strong></td>
<td>A competent Contractor appointed by the Client to act as the Principal Contractor under CDM Regulations to co-ordinate Health and Safety during construction.</td>
</tr>
<tr>
<td><strong>Project Manager</strong></td>
<td>An individual, generally within the University, who is responsible for the day to day management of the project and who provides an interface between the Project Sponsor and the Project Team he or she manages.</td>
</tr>
<tr>
<td><strong>Project Sponsor</strong></td>
<td>A named individual responsible for ensuring that the interests in the project are achieved in a proper manner to the right quality and on time.</td>
</tr>
<tr>
<td><strong>Project Team</strong></td>
<td>Membership will vary according to the project phase and type of project but it will include those who own the project (user/sponsor), those who are responsible for its delivery (Project Manager, Design Team, consultants and Contractor) and those for whom the completed facility is intended (buyer/user).</td>
</tr>
<tr>
<td><strong>Scope</strong></td>
<td>Extent of the study – this must be agreed early in any VM study to ensure that effort is focused on the right area, the whole of the right area and nothing but the required area.</td>
</tr>
<tr>
<td><strong>Stakeholder</strong></td>
<td>Any group or individual that is positively or negatively affected by the outcome of the project, such as developers, the public at large, local authorities, regional economic offices and tenants.</td>
</tr>
<tr>
<td><strong>Study/VM Study</strong></td>
<td>A Value Management intervention into the project, as a series of meetings (including a workshop) in a defined timescale, to achieve defined objectives.</td>
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<tr>
<td><strong>Unnecessary Cost</strong></td>
<td>Any cost contributing little or no required functionality, or where that functionality can be reliably achieved by other, less expensive means.</td>
</tr>
<tr>
<td><strong>Value</strong></td>
<td>Reliable performance of what is required (by all ‘customers’) at lowest possible life-cycle cost.</td>
</tr>
<tr>
<td><strong>Value Analysis (VA)</strong></td>
<td>Application of VM after project commissioning, during ongoing operation – either as a programme of continuous improvement aimed particularly at areas of high operating cost, or in response to apparent concerns in use and uncompetitive performance.</td>
</tr>
<tr>
<td><strong>Value Engineering (VE)</strong></td>
<td>Application of VM during the design and implementation phases of the project to determine HOW will it be done – ensuring delivery of objectives and functionality at optimum life cycle cost.</td>
</tr>
<tr>
<td><strong>Value Management (VM)</strong></td>
<td>The generic term for the process by which the value of the project is optimised in terms of high functionality and benefit to customers and operators for minimum life cycle cost, within required timing.</td>
</tr>
<tr>
<td><strong>Value Management Facilitator</strong></td>
<td>Appointed to manage the complete study in consultation with the Project Sponsor and to run the Workshop.</td>
</tr>
<tr>
<td><strong>Value Plan</strong></td>
<td>For any element of the project, an agreed definition of functionality to be achieved for a declared life cycle cost and timing.</td>
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<tr>
<td><strong>Value Planning (VP)</strong></td>
<td>Application of VM during the early development phases of the project and its major elements to determine WHAT will be done – aimed at defining objectives and agreeing on concept and strategy. VP is also applicable post-project to learn lessons for the future</td>
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B SUSTAINABILITY

Introduction

Sustainability is a global issue and, by that very nature, is easily misinterpreted as one beyond the control of relatively small groups of individuals, however, this is not the case. This section aims to provide practical guidance in addressing sustainability issues on a project level. The types of projects considered in this section have a natural bias towards construction development since construction projects have a potentially huge impact upon the environment. This section briefly explains the definition and world wide significance of sustainability and includes details of initiatives promoted by national government. This provides a background to two key aspects of managing sustainability issues at project level. Firstly, guidance notes are outlined which relate to stage by stage principles and good practice for the main stages within a project development process. Secondly a framework for procurement of services to undertake project tasks is provided. A summary of further information sources is also given.

B.1 Sustainability Defined

A common summary definition is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs,” or, in other words, it can be described as “ensuring a better quality of life for everyone, now and for generations to come.” Sustainability is a world-wide issue that demands a proper balance between social, economic and environmental factors; often referred to as “the triple bottom line.”

B.2 The Importance of Sustainability

The Earth Summit in Rio de Janeiro in 1992 provided an agenda called “Agenda 21”. This recognised that past human development had largely been “unsustainable”, which arose from a failure to consider the economic, social and environmental factors in the development processes. The agenda identified ways that sustainable development could be achieved. Unsustainable development has resulted in serious problems such as climate change, desertification, pollution and wildlife extinction, as well as wide disparities in the standards of living within and between countries.

At a national level, in 1998, the UK government published a white paper “A Better Quality of Life – A Strategy for Sustainable Development in the UK” which highlights four key principles:

1. Social progress which meets the needs of everyone
2. Effective protection of the environment
3. Prudent use of natural resources
4. Maintenance of high and stable levels of economic growth and employment

These principles require a co-ordinated, strategic planning approach. The construction industry has a key role to play because the built environment has a significant impact on many sustainability issue, for example Egan reported: “every year some 70 million tonnes of construction and demolition materials and soil end up as waste. Some 13 million tonnes of that comprise material delivered to sites and
thrown away unused. Poor design and planning also result in wasted time and money and reduced profits."

B.3 Achieving Sustainability

Notwithstanding the importance of the “triple bottom line,” it is important to recognise that sustainability issues are relevant to all stages of a project and that they require timely and adequate consideration. There are two main approaches to achieving sustainability:

- Applying sustainability principles and good practice throughout each stage of the development and construction process
- Using and appointing organisations to undertake project tasks. (Procurement of Services)

B.4 Ten Stage by Stage Principles and Good Practice for Sustainable Development

Whilst there are endless issues that could theoretically be considered, there are recurring themes which should be used as a checklist beginning at the Concept Stage of a project. These “themes” have been grouped into 10 distinctive groups to aid establishment of issues and assignment of responsibility for them.

As noted in the introduction, there is a construction bias; the reason for this is the wide ranging issues a construction project has in relation to sustainable issues – in other words it covers the potentially most complex and numerous topics. Reference to national issues such as sustainable economies and health service provision can be found in the Government White Paper “A Better Quality of Life - a Strategy for Sustainable Development for the United Kingdom” (available at www.sustainable-development.gov.uk).

The ten principles and good practices are detailed below. Under each heading is a list of issues and actions, which is not exhaustive but should form the basis for applying practical Sustainability concepts throughout a project cycle. These items will require prioritising and detailing relative to the specific project. Sources of assistance and information are also listed under each heading and these include project members, statutory bodies and other relevant organisations.

Re-use of Buildings and Land

Clients’ functional requirements may be fulfilled through the re-use of existing facilities rather than the provision of new.

Key issues / actions:

Reusing buildings
- Think ahead - at the design stage, consider and plan for eventually refurbishing and reusing a building
- Design for flexibility - a renovated building should be able to accommodate different uses in future. List the likely future uses for the facility.
- Choose construction materials carefully - are they easy to maintain? Check designed maintenance allowances.
• Can the materials / structures be dismantled? i.e. can its component parts be disassembled for re-use at a later date? List main materials / structures and deconstruction methods.
• Design with aesthetic quality - “Beautiful” buildings are more difficult to discard and encourage re-use and adaptation. Seek opinion on aesthetic credentials.
• Listed buildings and property within designated conservation areas will require special consideration. Seek advice from local planning authorities at an early stage as more detailed design work may be required early on in the project.

Key issues / actions:

Reusing land

• Land reclamation can often be a complex technical area with specialist advice often being required at concept stage. Seek the right advice and contact the Local Authority’s Planning and Environmental Health Departments as well as the Environment University.
• Procure site investigation and then a feasibility study to facilitate thorough and accurate planning of the reclamation work.
• Select and implement reclamation techniques:
  There are 4 principle techniques any combination of which may be applicable to particular sites:
  i. Crushing and Screening – materials present as demolition rubble or made ground within the ground can be screened, sorted and crushed to allow them to be reused.
  ii. Salvage – e.g. shred and sell wood waste as mulch or soil improvement rather than burning it.
  iii. Disposal – efforts should be made to identify local recycling facilities for material that cannot be re-used or recycled on site. In the event that these facilities are not available, or not local, then disposal to landfill as “engineering materials” rather than as “waste” may be beneficial to the project to secure a Landfill Tax exemption prior to reclamation.
  iv. Contamination Remediation – see Section 20.

Assistance / Information Sources: The Project Design team, the Environment University, Local Authority, Society for the Protection of Ancient Buildings (SPAB), Civic Trust, Local Historical Societies.

Design for Minimum Waste

Design out waste both during construction and from the useful life and afterlife of the building or facility. Involve the supply chain and specify materials with care including consideration of recycled materials.

Key issues / actions:

• The first question to ask is – “can the amount of waste being produced be minimised or eliminated?” Sustainable waste management can be achieved if all bodies involved in the generation, collection, treatment and disposal of waste commit themselves to a strategy based on the following hierarchy:

  Reduce e.g. only order the amount of building materials needed
**Re-use** e.g. select building materials that can be broken down into component parts at the end of their life and re-used

**Recovery** – including recycling, composting and waste-to-energy e.g. using recycled materials in the new building such as reclaimed concrete instead of natural stone for surfacing.

The hierarchy dictates that reduced consumption and waste minimisation are the most sustainable actions, followed by re-use and recovery, with disposal to landfill the least sustainable action.

*Communicate this strategic hierarchy to the Project Team and obtain its commitment. Define and monitor targets.*

- Design for recycling – check *that space has been included for the occupier to store materials for recycling; including access and services to enable vehicles to collect sorted waste.*
- Minimise waste in the construction phase – *Request method statements regarding waste management and disposal from the Contractor. Consult the local Waste Authority and Waste Operators to vet this method statement and to formalise the most efficient ways of achieving this given the project specific constraints.*
- Recycle waste on site as much as possible – *estimate how much waste will be produced and cost it; identify and rank recyclable materials so that real cost saving targets can be set and monitored.*

*Assistance / Information Sources:* The Project Design team, Contractor’s supply chain, Environment University, BRE, Specialist Waste Management Companies.

**Aim for Lean Construction**

Strive for continuous improvement, waste elimination, strong customer focus, value for money, strong management of supply chains and improved communications.

*Key issues / actions:*

- The main construction Stakeholders are construction workers, local residents, shareholders and clients. Demonstration of commitment to these Stakeholders can be achieved through the Considerate Contractors scheme – a voluntary code of practice, which enhance reputations and sustainability. *Request details of previous sign up and implementation of the Considerate Contractors scheme at pre-qualification and tender stages of contractor procurement.*
- Use local materials and labour – local materials and labour should be selected wherever possible to stimulate the local economy and reduce transport resources. *Request research and commitment of using local resources from the Design Team and from the Contractor.*
- Use materials that minimise the use of natural resources and energy. *Ensure the design team has prioritised materials with low embodied energy, those produced using renewable resources and environmentally benign processes.*

*Assistance / Information Sources:* Main Contractors and their definitive supply chains, Local Authority departments, Construction Industry Board (running the Considerate Constructors Initiative), Construction Best Practice Programme.

**Minimise Energy in Construction and Use**
Consider more energy efficient solutions in design including passive systems using natural light, air movement and thermal mass, as well as solutions involving energy produced from renewable sources.

**Key Issues / actions:**

Build to reduce the amount of energy used: *use as a design audit checklist:*

- Improve building fabric insulation
- Install controls for heating, lighting and ventilation
- Incorporate heat recovery ventilation
- Decentralise or zone the space heating system to allow part use of the building or flexibility in operation
- Design for use of solar heat gains in winter
- Use low emissivity glass
- Source energy with minimum environmental impacts
- Use renewable sources of energy for electricity and/or heat generation
- Choose fuel type carefully
- Use efficient lighting
- Use condensing (modular) heating boilers
- Use energy efficient office equipment
- Use high efficiency fans and pumps
- Use “A” rated domestic appliances

**Assistance / Information Sources:** Project Design Team, DETR Energy Efficiency Best Practice Programme, European Solar Industry Foundation, Chartered Institute of Building Services Engineers (CIBSE), Building Research Establishment (BRE), Combined Heat and Power Association, British Wind Energy Association, British Photovoltaic Association.

**Do Not Pollute**

Understand local environmental impacts and have policies and systems to manage them positively. Use environmental management systems under ISO 14001 or Eco Management and Audit Scheme (EMAS).

**Key Issues / actions:**

- Understand the pollution risks – *plan pollution management into the job from the outset.*
  
  *Check suppliers and contractors environmental credentials and management systems, which account for pollution management.*

- Communicate the risks to everyone on site – *insist that it is an integral part of health and safety induction training.*

- Deploy common sense site management measures to plan and control pollution, considering:
  
  - Site drainage – *ensure both foul and surface water disposal are managed; consult the local Environment University office.*
  
  - Silty water – *Discharge to foul sewers where available, otherwise discharges to streams, watercourses or soakaways will require Environment University approval.*
  
  - Excavations – *try to prevent water entering open excavations using cut off ditches.*
• Exposed ground and Stockpiles – *minimise* them, consider seeded or covered stockpiles and silt fences constructed from suitable geotextiles.
• Plant and wheel washing – *facilities should be securely constructed with no overflow and the effluent should be contained for proper treatment and disposal.*
• Site roads – *should be regularly brushed or scraped and kept free from dust and mud deposits.*
• Refuelling – *deploy drip trays and have spill kits on hand; create a designated area away from drains and watercourses.*
• Concrete – *ensure suitable provision for washing out mixing plant or lorries away from drains and watercourses.*
• Emergencies – *spillage should be contained using absorbent materials such as sand or soil - notify the Environment University immediately.*
• Fuels, Oils and chemicals – *must be stored on an impervious base within a bund and secured; disposal only via licensed waste disposal contractor.*
• Security – *e.g. valves and trigger guns etc. must be protected from vandalism and unauthorised interference – secure compounds and containers should be used and locked when not in use.*
• Marking – *e.g. contents of any tank should be clearly marked together with hazard warning notices as applicable.*

**Assistance / Information Sources:** CIRIA, Environment University, Department of the Environment Transport and Regions.

**Conserve and Enhance Biodiversity**

Biodiversity means the biological diversity or variety of life. The key to biodiversity lies in the step from being aware of wildlife and habitats to actively doing something to conserve it.

**Key Issues / actions:**

- *Obtain Local Biodiversity Action Plans (BAPs) which help to translate local biodiversity issues into strategies allowing development to take place.*
- *Avoid developing on areas of important biodiversity value; contact the Local EA to identify these.*
- *Aim for net gain in biodiversity – maximise habitat creation and use indigenous species.*
- *Relocation of existing habitat / species should be last resort. Design to incorporate existing biodiversity; some features may include:*  
  - Incorporate wildlife friendly features such as nesting boxes, platforms and niches in the roof space.
  - Design the buildings around pockets of wildlife and ensure migratory routes are maintained.
  - Use materials with similar pH values so as not to adversely affect adjoining habitats by leaching.
- *Involve local people, schools and voluntary groups – provide for public access and help.*

**Assistance / Information Sources:** UK Government’s publication “Biodiversity: The UK Action Plan,” Local Biodiversity Action Plans (BAPs), Local Environment University, RSPB, Project Design Team.
Conserve Water Resources

Sustainability means using water thoughtfully, to avoid both wasting it and polluting it.

Key Issues / Actions:

Conserve water in and around the building:

- Ensure all sanitary fittings are water-efficient and working properly – fit low volume flush w.c.s, urinal controls and flow restrictors to taps
- Provide porous hard surfaces in order for water to drain away
- Recycle “grey” water e.g. water from the roof to flush systems

Conserve water on the site:

- Carry out a water assessment of existing water quantity and quality
- Set a target for natural water storage
- Design in sustainable urban drainage
- Consider using reed bed technology to filter waterborne waste

Assistance / Information Sources: Project design team, Chartered Institute of Building Services Engineers (CIBSE), Local Water Suppliers, Local Environment University, National Water Demand Management Centre of the Environment University, Building Services Manager/facilities manager.

Respect People and their Local Environment

The participation and support of local people is crucial to achieving sustainable development and promoting equal opportunities.

Key Issues / Actions:

- Local people need to be informed; talk informally to local people about their ideas and gain their support; attend local community meetings; consider holding a public meeting in a local building to share your ideas and gain community support.
- Consultation techniques need to be suited to the project and the audience in question; consider newsletters, open days, display boards, local surveys and questionnaires.
- Local communities may assist in initiating development; investigate the existence or potential for local trusts or self build schemes to be involved.
- Widen the debate and inform more people about sustainability issues; research Local Agenda 21 initiatives; utilise their publicity with press releases; consider involvement in Sustainable Development Partnerships that reflect the priorities of local people.

Assistance / Information Sources: Neighbour Initiative Foundation, Development Trust Association, Local Council Neighbourhood and Community Officers, Local Housing Associations.

Think About the Whole Place

To be wholly sustainable it is critical that projects are in locations of choice rather than in locations of rejection. Whilst this issue relates to larger strategic
development, many of the key issues below are relevant to projects of small scale such as a group of houses or a small office building.

Key Issues / Actions:

Design with respect

- Respect site and setting: design from a basis of understanding and avoid importing pattern book designs.
- Respect context and character understand local styles conditions and skills.

Design to create real places

- Create a real Public Realm – a hierarchy of spaces and buildings that relate to them
- Plan at a people scale – make walking easy and link up areas more readily; improve the balance between pedestrian and car.
- Fit the development into its landscape setting.
- Use land efficiently – look for intensity i.e. close succession of facilities one after another.
- Design out crime - avoid blank frontages, include windows and mix uses to encourage activity during day and night. Street networks should encourage human activity; locate parking on streets where it can be overlooked; choose planting carefully, for example by using prickly boundary hedges and provide entrances and exits to buildings that are visible from adjacent buildings.

Assistance / Information Sources: Specialist Urban Design Consultants, Property Specialists, Local Estate Agents and the Project Design Team.

Give People Transport Choices

Accessibility to and from a development can have a major bearing on its sustainability, therefore, sustainable travel options need to be considered and, ultimately, be made available.

Key issues / actions:

Plan ahead

- At concept stage of a project, start consultation with the Highway and Planning Authorities, public transport operators and service providers.
- Use planning guidance and local provision standards with sustainability issues considered.
- Integrate into existing local transport initiatives.

Design for Safety, Convenience and Amenity

- Design new routes to be direct, safe and fully connecting the places that people wish to go.
- Provide shelter and cycle storage at key destinations and visible cycle parking close to building entrances.
- All routes, interchanges and connections should be attractive and well overlooked.
- Integrate the needs of the mobility impaired.

Reduce Traffic Impacts
• Avoid standard highway solutions and “bolt-on” traffic calming measures.
• Minimise parking provision, maximise shared provision and design to allow future
development for non-parking uses.
• Give priority to low-emission travel i.e. walking, cycling and public transport
movements.

Assistance / Information Sources: Traffic Section and Road Safety teams of the
Authority Highway Engineers; Consultant Transportation Practices such as SIAS and
Ove Arup, Public Transport Operators.

B.5 Procurement of Services

People and organisations of all sizes can influence and make a difference – it is
therefore important to utilise companies and individuals that are committed to
sustainability. This can be achieved by an assessment matrix detailed below (which
is based upon the Good Practice Guide 200, published by DETR’s Energy Efficiency
Best Practice Programme 1996). It has 5 distinctive levels reflecting understanding
and implementation of sustainability on a scale of 1-5 (where 5 is the most
advanced). It shall be the responsibility of the Project Manager to assess which level
an organisation should attain in order to be considered for formal appointment. For
example the Project Manager may decide that a Main Contractor will need to achieve
a 3 or higher rating due to the scope and nature of work required. Conversely, a
company required to provide staff training services may only be required to attain
level 2 rating to be considered for appointment. It is shown below in a matrix format,
although it can be adapted to a “points scoring” format for more detailed comparison
/ analysis.
## ASSESSMENT MATRIX for SUSTAINABILITY

### MANAGEMENT FUNCTIONS

<table>
<thead>
<tr>
<th>Best Practice</th>
<th>Nearly there</th>
<th>On the way</th>
<th>Starting up</th>
<th>Pre-sustainable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Published, with targets, reviews and promotion</td>
<td>Comprehensive internal statement, with indicators for some issues</td>
<td>Formal Statement setting out position on sustainable development</td>
<td>Informal guidelines setting out position on some environmental issues and social aspects</td>
<td>No written policy</td>
</tr>
<tr>
<td>Policy</td>
<td>Allocation of Responsibilities</td>
<td>Communication</td>
<td>Operations Procedures</td>
<td>Forward Planning</td>
</tr>
<tr>
<td>Overall responsibility with a senior manager and regular progress reviews</td>
<td>Regular dialogues with key stakeholders and supply chain performance major focus for reports</td>
<td>Procedures integrated into a manual, widely promoted and regularly updated</td>
<td>Action plan for ‘future proofing’ regularly updated and supported by research</td>
<td>Company wide audit scheme conforms to ISO 14001, with regular review and independent auditing linked to review of action plan</td>
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### Best Practice
- Policy: Published, with targets, reviews and promotion
- Allocation of Responsibilities: Overall responsibility with a senior manager and regular progress reviews
- Communication: Regular dialogues with key stakeholders and supply chain performance major focus for reports
- Operations Procedures: Procedures integrated into a manual, widely promoted and regularly updated
- Forward Planning: Action plan for ‘future proofing’ regularly updated and supported by research
- Auditing: Company wide audit scheme conforms to ISO 14001, with regular review and independent auditing linked to review of action plan

### Nearly there
- Policy: Comprehensive internal statement, with indicators for some issues
- Allocation of Responsibilities: Management responsibilities within each project team
- Communication: Information on sustainability issues reported to senior managers, shared with key stakeholders
- Operations Procedures: Public commitment to award schemes. Routine use of Key Performance Indicators for all projects.
- Forward Planning: Prediction of longer term market and regulatory trends, analysis of business development needs
- Auditing: All projects audited and reported feedback to Clients and supply chain

### On the way
- Policy: Formal Statement setting out position on sustainable development
- Allocation of Responsibilities: Responsibility for sustainability assigned to one manager
- Communication: Agreement with Clients on sustainability objectives and targets. Data collected on most sustainability issues
- Operations Procedures: Routine use of sustainability design and planning tools and Codes of Practice
- Forward Planning: Medium term skills and competency needs identified and recruitment and training initiated
- Auditing: Major projects audited to assess performance against targets set with Clients, results reported to senior management

### Starting up
- Policy: Informal guidelines setting out position on some environmental issues and social aspects
- Allocation of Responsibilities: One or more individuals with adopt informal advocacy role
- Communication: Some data requested routinely on issues such as health and safety and pollution
- Operations Procedures: Procedures for site-related compliance with regulated issues
- Forward Planning: Ad-hoc reviews of business impact of recent or imminent environmental and social regulation
- Auditing: Occasional project audits environmental and regulatory issues, with no quantification of costs and impacts, and on follow-up

### Pre-sustainable
- Policy: No written policy
- Allocation of Responsibilities: No staff resources active in management of sustainability issues
- Communication: No awareness of sustainability, and no dialogue with Stakeholders
- Operations Procedures: No reference to sustainability
- Forward Planning: No consideration of future sustainability of the business
- Auditing: No management audits of performance