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UNIVERSITY OF OXFORD

Capital Projects Soft Landing Strategy

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1. INTRODUCTION

The term “Soft Landing” is used to describe several initiatives all with the objectives of: ensuring that the end facility delivers the functionality required by the end user; ensuring an efficient and issue free transition from the design and construction phase of a project to the occupied and operational phase and; improving the performance of the facility.

BUILDING SERVICES RESEARCH INFORMATION ASSOCIATION SOFT LANDINGS

The Building Services Research Information Association (BSRIA) published an open-source Soft Landings framework that is intended to ‘...smooth the transition into use and to address problems that post-occupancy evaluations show to be widespread’. It aims to enable designers and contractors to improve the performance of buildings and generate feedback for project teams.

The BSRIA framework also sought to ensure designers and constructors stay involved with buildings beyond practical completion, assisting the client during the first months of operation and beyond, to help refine systems and address problems, and ensure the occupiers understand how to control and best use their buildings. Meanwhile, sustainability drivers will ensure that Soft Landings focus on many of these issues while also ensuring that continual commissioning is on-going for a number of years post practical completion. This is in order to ensure that maximum energy efficiency is achieved and waste eliminated while still achieving the required functionality for end users.

GOVERNMENT SOFT LANDINGS

The Government Soft Landings (GSL) developed from the Government Construction Strategy had the intention of reducing the cost of public sector construction and describes soft landings as ‘...the process of aligning the interests of those who design and construct an asset with the interests of those who use and manage it. It aims to improve client and user experiences, with reduced re-visits, and to give a product that meets and performs to client expectations.’

More recently GSL has encompassed Building Information Modelling (BIM), and the potential for BIM to link into Computer Aided Facility Management (CAFM) systems, to support the maintenance, management and future adaptation of buildings. This initiative helps to reinforce a direct link between construction and operation with Soft Landings in this context referring to a strategy adopted to ensure the efficient transition from construction to occupation.

UNIVERSITY OF OXFORD CAPITAL PROJECTS SOFT LANDING STRATEGY (SLS)

Estates Services Capital Projects considered that project delivery and user experience could be improved by the introduction of a Soft Landing Strategy for all capital projects. Targeting improvement the University of Oxford Soft Landing Strategy (SLS) builds on the two Soft Landing initiatives detailed above to improve delivery of capital projects. Commencing early in the project, if not before, the strategy seeks to: improve project delivery; improve client experience; manage expectations; ensure stakeholder involvement and engagement during design and post-handover; prepare the end User for the occupancy, use and management of their new facility; ensure an efficient handover; minimise impact on day to day operations, both during the project and after handover and; improve building performance.

The SLS is intended to be scalable the basic principle being that all issues, work streams and functions have been considered, addressed, adopted or rejected, and planned for accordingly thereby ensuring a “soft landing”.

The SLS complements the established Estates Services capital project delivery process which seeks best practice through a number of other parallel initiatives but adds additional focus on pre-handover activities in order to ensure operational readiness and adds a structured aftercare service to improve Client experience.

Soft landing team philosophy

Underpinning the SLS are a set of core principles which include, but are not limited to, transparency, clarity, listening, honesty, open communication, collaboration, continuous improvement, continuous learning, inclusion, fair and equal treatment, consultation and delivery of the best experience for the Client. By accepting any invitation to join the Soft landing team members are agreeing to honour and abide by these principles.

2. THE SOFT LANDING PROCESS

The delivery of the soft landing for a project commences as early in the project as practically possible, in some cases during pre-feasibility stage if only to set the aspiration of achieving a “soft landing”. Delivered by a Soft Landing team the SLS is a process delivered via work streams contained within five stages aligned to the 2013 RIBA Plan of Work and other Estates Services quality processes and as defined in the Soft Landing Strategy Matrix.

THE SOFT LANDING TEAM

Membership

The soft landing team should ordinarily include, but not be limited to:

- The Project Manager (Team leader and Chair)
- The Capital Projects Programme Manager
- The Client Representative (Client champion)
- A representative of Building Services Electrical Section
- A representative of Building Services Mechanical Section
- The new facility’s Building & Facilities Manager
- A representative of the main contractor (contractor’s champion)
- A representative of the mechanical and electrical contractor
- A Departmental and/or IT Services IT representative
- A representative of the Estates Services Sustainability team

Others will be co-opted to the team as required including stakeholders, Departmental representatives, design team members and the architect as well as maintenance & facilities management contractors and service providers, commissioning manager(s) and finishing managers,

Resource

The soft landing process will require adequate resourcing in order to ensure success. Members of the design and project teams will have identified resource schedules during the tender process and have agreed these through contracts with the University.

Critical to the soft landing process, especially with larger technically complex buildings, is the involvement of the Client or occupying Department. Estates Services Capital Projects therefore advocates the appointment of a person with a specific role to assist with the soft landing or occupation of the new building. This role which could be a “Soft Landing Manager” would most likely be the Building & Facilities Manager or Client Representative but if such a person is not available then the possibility of resource from within the Estates Services Strategic FM team may be explored. For Departments which have a FM managed service, the Estates Services FM team may support this process on behalf of occupying Departments. The person might not necessarily be the “Responsible Person” defined within the handover section although efficiencies might be gained if they were one and the same. The project may wish to consider ensuring sufficient funding is in place to support such a role.

It is noted that some Departments, typically within the Sciences, retain directly appointed Facilities Managers and teams, other Departments utilize a managed service provided by the Estates Services Strategic FM team. It is important that the Soft Landing team confirm the facilities management structure relevant to the occupying Department.

Roles & responsibilities

Each member of the soft landing team is responsible for their respective organisation's decisions and actions and processes owned by their organisation such as the Project Quality Review Process. The roles and responsibilities of members of the Soft Landing team should be defined at the first meeting of the team. The BSRIA Guide "A design framework for building services, 4th edition" [BSRIA BG 6/2014] may assist in defining a more detailed responsibility matrix.

Worthy of particular mention, since this is not typically defined elsewhere, are the responsibilities of the Client Soft Landing Manager which include:

- providing a pro-active voice for end users and facilities management team;
- developing operational strategies;
- managing the decant into the building;
- providing support in the delivery of the areas of facilities management;
- any removal process and decommissioning of existing premises;
- being the first point of contact for building occupants;
- representing the occupying department with regards to snag and defect resolution;
- representing the occupying department at contractor and design team reviews;
- support of the pre- and post-handover commissioning process;
- support of the aftercare process communication of snagging and defect works

It is important that such a person is prepared to take ownership. Duties will vary widely from "rolling up sleeves" and unpacking furniture if necessary, to using a high level of technical knowledge to enable the undertaking of such tasks as Building Management System interrogation. The Client Soft Landing Manager may well also be the Client Representative and/or Buildings and Facilities Manager.

Estates Services Capital Projects will champion the soft landing process, the Programme Manager, will act as the soft landing champion, providing continuity of involvement from the strategic definition stage to the in use stage and seeking to ensure that:

- the project utilizes a soft landing strategy;
- the project meets the Client needs and is maintainable in use;
- operational running costs are identified during the design process and changes to design are reviewed for impact on operational running costs;
- the aftercare process is supported;
- the project evaluation process is supported and lessons learnt feedback collected and;
- evaluation and monitoring are undertaken to compare actual performance against design performance.

Training

All members of the Estates Services Capital Projects team as well as selected members of Estates Services within Building & Conservation, Building Services, Asset & Space Management, Sustainability and Strategic Facilities Management, as well as invited Departmental Buildings & Facilities Managers have attended training and attained the Building Services Research & Information (BSRIA) Soft landings Level 1 Certificate. In order to embed Soft Landing principles with teams, and enable constructive contribution to the development of the Soft Landing Strategy the project may wish to invest in training of key project team personnel.

STRUCTURE OF THE SOFT LANDING PROCESS

Stages

The Estates Services soft landing process consists of five stages:

1. Inception and briefing (RIBA Stages 1 and 2)
2. Design and pre-construction (RIBA Stages 3 and 4)
3. Construction, commissioning and pre-handover (RIBA Stage 5)
4. Post-practical completion (0-12 months) and initial aftercare (RIBA Stages 6 and 7)
5. Aftercare (12-36 months) and post occupancy evaluation (RIBA Stage 7)

These are more clearly defined in the Soft Landing Strategy Matrix.

Work streams

The Estates Services soft landing process consists of multiple work stream some of which flow across multiple stages and some of which are specific to a particular stage. These are detailed in the Soft Landing Strategy Matrix.

Soft Landing Workshops

Soft landing workshops will be scheduled throughout the life of a project consistent with the process as defined in the soft landing strategy matrix. The purpose of the workshops (workshop Terms of reference) are to:

- Develop a soft landing strategy for the project
- Review the generic soft landing matrix and develop actions and identify action owners
- Monitor progress of actions
- Escalate risks, issues and matters of concern

During the preparation for handover stage workshops should be held at least monthly starting at least twelve months before completion and handover. All workshops should have an agenda which must be issued to all invitees no later than four working days before the workshop. The Project Manager should minute all workshops and issue minutes from the workshop, recording actions and items escalated, and an updated soft landing strategy matrix no later than five working days after the workshop. Formal output from meeting:

- Minutes of meeting recording actions and items escalated
- Updated soft landing strategy matrix

The agenda for the workshops will evolve throughout the project suggested agenda items are detailed in Annex A

Programme

A soft landing programme should be presented at the first soft landing workshop and reviewed at each subsequent workshop. The programme should detail, but not be limited to, the following milestones and activities:

- Soft landing workshops

- Construction period
- Topping out
- Building weathertight
- Building energized
- Black building test
- Chlorination
- Practical completion
- Handover or occupation
- Project Quality Review Process workshops
- Client fit-out or installation readiness and periods
- Client live testing period
- Commissioning (detailed programme required including:)
 - Mechanical systems
 - Electrical systems
 - Fire detection, safety and suppression systems
 - Building Management System
 - Data networks
 - Security systems
 - Lifts
 - Specialist installations
- Training (detailed programme required)
- Aftercare attendance periods
- Seasonal commissioning dates

SOFT LANDING STRATEGY MATRIX

The Estates Services Soft Landing process is defined fully through the use of a Soft Landing Strategy Matrix. The default matrix may be found in Annex B which details the stages, the actions associated with each stage, the deliverables, the action owners, participants and details of other Estates Services initiatives which interface with the Soft Landing process. Further columns allow for the recording of key actions, target dates and owners as well as for the provision of an update.

A number of actions within the Soft Landing Strategy Matrix are worthy of specific note and highlight, these are further detailed below.

Go / No-Go dates

Project programmes are often set very early in the project process, possibly even before feasibility. However, actual programmes may not be accurately identifiable until completion of the second stage tender. At this stage, it might become apparent that the initial timescale was inadequate. There is often a reluctance by both Estates Services and main contractors to reset programmes when extensions to those programmes are first evident. It follows that there is a reliance on recovery programmes to bring projects back on programme. On occasion it may be that the best course of action is to postpone occupancy of a building, but that this decision is often taken too late to implement contingency plans or abort occupation.

Accordingly Estates Services require as part of the soft landing process an open exchange of information takes place which allows an honest review of programme at all stages, the development of contingency plans and critically, the agreement of go/no go dates.

Protection of commissioning periods

As construction programmes become challenged there is sometimes reluctance by both Estates Services and main contractors to accept a later completion and/or handover date. There are clearly contractual implications ensuring that practical completion and handover remain the focal point of the project however the focus of the soft landing strategy is delivery of the best experience for the client. As construction programmes lengthen the completion date may be maintained by shortening the period set aside for commissioning. This approach has often been shown to be ineffective and resulted in a poor experience for the Client and end-user. Meanwhile with complex buildings a continued period of commissioning beyond handover when the building or facility has been given time to settle down is hugely beneficial to the client.

Accordingly Estates Services require as part of the soft landing process that pre-handover commissioning periods are defined early in the project delivery process and the period set aside for commissioning maintained regardless of other pressures. Further that post-handover commissioning periods are defined and maintained (see post-handover commissioning).

Aftercare

Client experience of capital project delivery is often limited to the period after handover in the case of building or facility end-users. Responsiveness, the timely resolution of issues and/or appropriate communication regarding on-going works or project management interventions is therefore of increasing importance to Estates Services.

Accordingly Estates Services require as part of the soft landing process that an aftercare strategy is defined early in the project process and that sufficient resource is made available to deliver the aftercare service.

SUPPORTING DOCUMENTATION AND MATRICIES

Handover checklist

Estates Services operates a procedure which is applied at Practical Completion on major capital projects. The procedure includes a check list against which those taking management responsibility of the building acknowledge acceptance of the various systems and documentation, and confirm that they have received adequate training. The current procedure focuses on the acceptance by Estates Services staff, more specifically building services, as well as the responsible person in the form of the Departmental Building & Facilities Manager or representative from within the Estates Services Strategic FM team. The check list is shown in Annex C.

Facilities Managers Responsibility Matrix

In order to clarify building management responsibilities, a facilities management responsibility matrix has been developed by Capital Projects to inform Building & Facilities Managers of their responsibilities and ensure timely initiation of relevant contracts and programmes of work. The matrix has several intended uses as part of the Soft Landing process including serving to ensure that the Building & Facilities Manager is adequately prepared for occupation by helping to ensure that all requirements for operation are in place from installation of vending machines, to receipt of trade effluent licences to application for a building postcode. The matrix also helps the Building & Facilities Manager (especially if new to the University) to understand what he/she is responsible for and what other sections, such as Building Services in Estates Services or the Safety Office, are responsible

for. The matrix will also serve to ensure that the requirement for maintenance contracts has been reviewed, including those that are required during the Defects and Liabilities Period (DLP) to ensure compliance with health & safety or maintenance obligations and those that the Building & Facilities Manager (or others) will need to have in place ready at the end of the 12 months DLP. Lastly the matrix will help the occupying Department to prepare an informed management budget for the occupation of their building. The matrix is shown in Annex D.

Furniture, Fixtures & Equipment Schedule

When specifying the Furniture, Fixtures & Equipment (FF&E) Schedule Estates Services has found that User groups will focus very much on those items which will impact appearance, and possibly experience, such as furniture or those items necessary for their core activities such as scientific equipment. This can lead, on occasion, to overlooking those items which are taken for granted such as telephone handsets, post trolleys, clocks, fire extinguishers etc. To ensure that all FF&E items are detailed, procured and installed prior to, or at, occupation Capital Projects has developed a generic FF&E schedule for review by the project team and Soft Landing team. The generic FF&E schedule may be found in Annex E.

IT network application matrix

Post-project evaluation of projects has determined that often IT requirements are not factored into the project at a sufficiently early stage, that brief was unclear being described as “needing to be state of the art” and that specification changed throughout the project as a result of advances in technology. Estates Services has also found that IT requirements extend much further than provision of voice and data networks, extending to include: building services such as meters, energy production systems and diagnostics; safety and security systems such as fire and lift alarms; access control systems and; equipment with billing functionality such as washing machines, photocopiers and coffee machines. To ensure that all IT items are detailed, procured and installed prior to, or at, occupation Capital Projects has developed an IT network applications checklist for review by the project team and Soft Landing team. The IT network applications matrix may be found in Annex F.

Operation & Maintenance philosophy document

Comprehensive and accurate building information provided in a timely manner, and easily accessible to all those who require it, is an important aspect of the soft landing process. Estates Services has set out its requirements for project documentation in the O&M philosophy document including asset data, electrical test data and CAD drawings as well as electronic O&M manuals. It is expected that electronic O&Ms will be referenced during client training and therefore these need to complete at this stage.

MANAGEMENT OF THE FACILITY POST-HANDOVER

Building or facility responsible person post practical completion

It is critical that a single point of contact, or a ‘responsible person’, is appointed for the site, including all areas within the project, whether within the control of the contractor or the Client. The single point of contact should have a knowledge of the status of, and activities within, the defined area (the clarity of the area should be supported by marked up floor plans) and be comfortable that they have received sufficient training in order to discharge their duties. It is appropriate that this is the Building & Facilities Manager or Departmental Administrator. This is because such a person will be best informed with regards to specific site constraints or hazards introduced by the occupant, with which a contractor

may not be familiar. These include, but are not limited to, security arrangements, the presence of vulnerable persons and specific hazards. This person must be responsible for, and participate in, the provision of a 24hr callout or key holder service (and able to provide a response within 20 minutes) until such time that the building has settled down and responsibilities may be assumed by University Security Services (when a key holder may still be required). Where departments do not have resource to appoint a Building & Facilities Manager, or the Departmental Administrator is unable to provide such cover, Estates Services Strategic FM should be appointed for a period of time to provide such cover, the cost for this service may have to be borne by the project.

Partial occupation

Estates Services, the Safety Office and Contractors prefer that projects are delivered such that a partial occupation is not necessary. However where a partial handover is necessary because there is benefit to the occupying department, or a partial handover is unavoidable, it is critical as part of the handover to ensure that contractor and department ownership of areas post-handover is clearly defined. Accordingly, any partial handover of buildings will be accompanied by marked up plans issued as part of the handover procedure.

Undertaking works post-handover - permit to work

It is important that works activities post-handover, including any outstanding works to be undertaken by the contractor, are fully controlled.

Accordingly Estates Services, in order to improve management control of occupied areas in which post-occupation building works are still required, has developed a Permit to Work system, the permit to work is included in Annex G. The permit to work system:

- enables the attendance of contractors within an occupied building post practical completion to be managed effectively;
- ensures formal handover (or handback) of space from the Client to the contractor; defines responsibility and ownership of areas or systems;
- ensures that the contractor is aware of their responsibility to put in place appropriate health and safety procedures, and;
- that the occupants are aware of the need to comply with the contractor's health and safety procedures and ensures adequate protection from hazards that may be introduced into the building by the occupiers and with which a contractor may not be familiar. These could include high magnetic fields, radioactivity, lasers, cryogenics, biological hazards, workshop machinery and/or chemical hazards.

The permit to work form will be issued by the Project Manager to all Departments, whether a partial or full handover is implemented, and used to manage contractor attendance on site.

It is considered that the responsible person within the Department is best positioned to manage this process via a 'permit to work' system.

Two files will be maintained on site, one containing live permits and one containing closed permits.

The permit to work system is a formal safe system of work and therefore it is necessary to ensure that those issuing the permits are suitably competent and confident. Training may therefore be required for those issuing the Permit to Work document, this requirement should be identified within the soft landing process.

3. COMPLIMENTARY ESTATES SERVICES PROCESSES

Project Quality Review Process (PQRP)

Estates Services has introduced a Project Quality Review Process (PQRP) following approval by the Building and Estates Sub-committee on 24 May 2012. Lessons learnt and recorded during the evaluations are actively fed back into the earlier stages of future projects. The process facilitates transfer of experience from one project to another and continuous improvement.

The University, and particularly Estates Services, is encouraging continuous learning from capital projects whereby issues identified during the project process are addressed in a timely manner before project completion, and the benefits of lessons learned, both positive and negative, are passed on to other projects. The aim is to foster a culture of continued review and problem resolution, and constructive feedback within the project teams and amongst the client representatives, consultants and contractors, with the intention of improving the efficiency and effectiveness of the delivery process.

The PQRP is a whole life project process of evaluating the design and construction of new buildings, and the refurbishment of existing buildings whilst actively involving a wide group of people who have responsibility for delivering the project, who will occupy the resulting construction, or have some form of responsibility for the building.

The process involves four key stages (6 on major projects):

- Pre-project Initiation (PPI)
- Pre-construction Review (PCR)
- Mid-construction review (MCR) – major projects only
- Post Project Evaluation (PPE)
- Post Occupancy Evaluation (POE)
- 5 year Post Occupancy Review (POE5) – major projects only

Each stage is equally valuable and to be afforded equal focus and effort.

4. POST-HANDOVER COMMISSIONING

Post-handover commissioning plays an important part of the soft landing process assisting in the handover of full control of the building from the services and commissioning engineers to the management team, the training of those that will operate the building and the improvement of building performance.

Commissioning following the handover of a new building or facility takes several different forms, often difficult to distinguish. While these are outlined below it should be recognised that post-handover commissioning is very distinct from the snagging or defect resolution process and not a substitute for addressing issues which should be addressed as part of good project delivery.

Purpose

The purpose of post-handover commissioning is:

- to enable comparison of the ongoing building performance, with the predictions of the design model and investigation of discrepancies;
- to ensure that building services perform optimally for the actual use of the building (this may not necessarily be as designed) and;
- to minimise and reduce the energy consumption, and/or carbon emission of the facility by suggesting and implementing performance improvements.

Requirement for post-handover commissioning

An assessment as to whether a project will undergo seasonal and continuous commissioning must be made at the conclusion of RIBA Stage 2.

Ordinarily all projects with a construction value in excess of £1m will be expected to undergo seasonal commissioning while large complex buildings, especially those employing low carbon technologies that interface with conventional systems, will be expected to undergo continuous commissioning for a period of 12 months commencing no sooner than 6 months post-Practical Completion.

FINE TUNING

Fine-tuning is likely to be needed even if the building's systems are meeting the requirements of the specification. Personal preferences, location of furniture in relation to vents, windows and doors, and the location of equipment can have significant effects on comfort levels and whether the building services are perceived to be working, or not. Occupant feedback will need to be considered to highlight issues that are very difficult to detect otherwise and inform possible changes to set points in the specification to improve building performance. Activities might involve changing lighting controls, heating cooling and ventilation systems.

SEASONAL COMMISSIONING

Seasonal commissioning involves re-commissioning systems, particularly heating, cooling and energy production systems as well as any building system affected by seasonal changes such as powered vents and windows and active solar-shading devices, during the different seasons of the year. In particular seasonal commissioning will check that systems are performing to expectation and facilitate adjustment as necessary. Seasonal commissioning will follow the format as defined for continuous commissioning save for it is expected that Seasonal commissions will:

- commence 6 months after practical completion and continue for a minimum period of 12 months;
- consist of quarterly reporting and workshops for the period of the seasonal commissioning programme and;
- require collection of data over a short time period of 10 days.

CONTINUOUS COMMISSIONING

Continuous commissioning involves the building and its systems being continuously monitored, either via the BMS or through the use of dedicated logging devices such that systems can be re-commissioned or adjusted to optimize performance. However, the flexibility and adaptability of many University buildings enables end-users to adapt the building to meet the ever evolving requirements of research and teaching and change patterns of use. Adjustments or re-commissioning in response to change may be delivered by the project team for a period, to be defined, post-handover with support from Estates Services Building Services, during which it can be useful to involve the original commissioning engineers. After the defined period re-commissioning will be delivered by Estates Services Building Services.

Requirements for commencement of post-handover commissioning

It is essential that accurate and comprehensive data collection is available and systems functioning correctly. Accordingly post-handover commissioning may not commence until:

- all relevant systems are snag and defect free;
- all systems have been commissioned at minimum and maximum loads;
- the Building Management System is fully functional with all necessary sensors, drivers and other devices operational and recording data as appropriate;
- the Building Management System graphics are an accurate representation of the system schematics and reading correctly and;
- all meters and metering systems are functional, accurate, recording and monitored remotely at Estates Services as required.

Post-handover commissioning team and roles

The post-handover commissioning team will consist of the following members:

- the Project Manager with responsibility for delivering the project (project management of process including organisation of review meetings, meeting agenda, monitoring progress, communication with Project Sponsor Group and budgetary control);
- a representative of the Mechanical & Electrical contractor (technical knowledge);
- a representative of the Mechanical & Electrical design consultant (design knowledge and intent, collection of data, data analysis, performance improvement proposals and preparation of reports and meeting minutes);
- a representative of the Main Contractor (assessment of suitability of systems for start of commissioning, reporting on defect resolution and retained construction knowledge);
- a representative of the Building Management System controls contractor (technical and retained knowledge);
- a representative of Estates Services Building Services (support of the provision and collection of data by the design consultant, technical review and performance improvement suggestions);

- the department Buildings & Facilities Manager (anecdotal performance evidence, user knowledge, communication with occupiers and performance improvement suggestions) and;
- representatives of Low or Zero Carbon technology and energy system providers including Ground Source, Combined Heat & Power and Photovoltaics (technical knowledge, data analysis, performance improvement proposals and preparation of reports) and;

The following person or persons will be a member of the team but not necessarily attend all review meetings:

- Building Management System engineer or maintenance engineer able to undertake fine tuning and implementation of required adjustments and;
- The Estates Services Capital Projects Programme Manager with responsibility for delivery of the project.

Design stage activity

In order to inform and support the commissioning process evaluation of the operational energy performance of facilities must be undertaken at the design stage utilizing CIBSE Technical Memorandum 54 (TM54) methodology.

TM54 goes beyond compliance modelling to assess and report on all energy end uses and uses dynamic simulation models to give more realistic profiling for heating, cooling, fans and pumps. The methodology attempts to replicate actual operational hours, occupancy density and energy management and includes all energy uses rather than just fixed building services

In use activity

A log book will be maintained in which all changes to the Building Management System (BMS) will be recorded detailing change, date and person making the change. The log book may also be used by the Building & Facilities Manager to record issues, faults and notes.

The Mechanical & Electrical design consultant on a quarterly basis should attend site and:

- review adjustments or fine tuning undertaken by maintenance, contractor or University personnel (which may be in response to direction from the commissioning team);
- confirm that all meters are reading correctly;
- review all BMS graphics to confirm that they are reading correctly;
- review all BMS graphics to confirm they remain a reasonable representation of the system schematics;
- review set points and dead bands;
- review sensor and driver plots and compare with actual occupancy;
- collect and discuss feedback regarding perceived performance and occupant comfort levels and required environmental performance and;
- collect data as detailed within the next section.

In use data collection

Once the post-handover commissioning period is initiated the Mechanical & Electrical design consultant is responsible for collecting and assembling data. To inform the commissioning team the following data should be collected on a daily and monthly basis from all individual meters, and monitoring points, or from building managers as appropriate:

- heating consumption;
- electrical consumption (by area, system and time period);
- water consumption;
- provision of heating (heating flow and return temperatures, flow rates);
- provision of cooling (cooling low and return temperatures, flow rates);
- provision of hot water (temperature and usage profile);
- provision of generated electricity;
- occupancy (hours and headcount);
- performance of Low or Zero Carbon technology energy systems;
- performance of performance of heat reclaim and energy storage systems;
- performance of night set back and energy conservation strategies;
- performance of night purging strategies;
- performance of rain water harvesting systems;
- performance of weather compensation schemes (including outside temperature);
- BMS set points and dead bands and;
- BMS damper and valve positions, if appropriate.

Reporting

The above data should be assembled by the Mechanical & Electrical design consultant on a quarterly basis into a report to be submitted to the commissioning team no later than 5 working days before the scheduled meeting of the team. In addition the report should:

- assess the performance of the facility in comparison with the TM54 model;
- assess the consumption of utilities against design;
- assess the performance against design of all major systems and strategies and;
- review actual occupational data and user feedback.

Post-handover commissioning team duty and responsibility

The commissioning team will meet quarterly to review the report and data comparing actual building performance with the predictions of the design model. The commissioning team will endeavour to ensure that building services perform optimally and minimises energy consumption, and/or carbon emissions having considered the actual use of the building suggesting or implementing performance improvements. Minutes of the meeting, including details of actions agreed, will be issued within five working days of the meeting.

Should opinion be divided as to whether a change in control strategy should be implemented, or adjustment made, the Head of Building Services will retain executive authority to approve or refuse having consulted as required.

Post-handover commissioning budget

As with all soft landing initiatives sufficient budget should be allowed within the project budget to deliver the services detailed above. In particular there should be allowance for data collection, changes to the control strategy and implementation of performance improvements outside of the original scope including additional plant, sensors and software. A capped allowance should be set which may be drawn down as recommended by the commissioning team and with the approval of the Programme Manager and Project Sponsor Group as required.

5. LATENT DEFECTS

The year after Practical Completion is the Defects Liability Period and during this time the contractor is expected to rectify all the defects notified to him. At the end of the 12 months, provided no defects remain un-rectified a Making Good of Defects certificate is issued and the final payment is made to the main contractor. Any defect identified after this point, or could not have been discovered by reasonable inspection, is a latent defect. The main contractor may be responsible for rectifying latent defects that come to light after the completion of the defects liability period. If necessary, the University has recourse to legal action under the contract, provided the problem is identified within 12 years of Practical Completion.

Additionally it is proposed that for projects with a gross out turn cost in excess of £5m a group should be convened to approve release of retention. This group to consist of the Head of Conservation and Buildings, the Head of Capital Projects, the relevant Programme Manager, the Head of Building Services, the Head of Sustainability and the Head of Strategic Facilities Management. Retention may be withheld where there are identified defects which have not been remedied.

MANAGEMENT OF LATENT DEFECTS

A matrix recording potential and confirmed latent defects is maintained and reviewed by the Contracts Appointment Group. This group consists of the Construction Solicitor, the Capital Projects Administrator, Programme Managers, the Deputy Head of Capital Projects and the Head of Capital Projects. Others may be invited to attend as required. Potential latent defects may be brought to this group by any member of the University or Stakeholder Group. It would assist the group if defects notified by the Department or Stake holder Group could identify maintenance requirements and the extent to which these have been complied with.

It may be necessary to convene a latent defect review and resolution group which would typically be convened from representatives of Conservation and Buildings, Capital Projects, Building Services, Sustainability and Strategic Facilities Management.

On agreement of a latent defect by Contracts Appointment group the contractor should be put on notice of a potential latent defect by the Contract Administrator, and requesting a response from the contractor within 10 working days advising how the contractor will deal with the latent defect.

If no response is received within 20 working days then the University will write to the contractor informing the contractor that the University will now investigate the latent defect and requesting the contractor to advise their insurers accordingly. Following investigation the University will write to the contractor advising that the investigation has been completed, the nature of the defect and the estimated costs of rectification. A response is required from the contractor within 10 working days.

If no response is received from the contractor, the works to rectify the defect will be undertaken by the University and the University will write to the contractor advising that the works have been completed on their behalf, detailing the cost, including investigation and rectification. The Contractor will be asked to meet those costs, and if he fails to do so, the University will pursue the contractor for the costs incurred

6. ANNEXES

Annex A – Suggested soft landing workshop agendas

| Agenda item | Stage 1 | Stage 2 | Stage 3 | Stage 4 | Stage 5 |
|-----------------------------------|---------|---------|---------|---------|---------|
| Introductions | ● | ● | ● | ● | ● |
| Energy use (TM54) | ● | ● | ● | ● | ● |
| Introduction to soft landing | ● | | | | |
| User groups | ● | | | | |
| Roles & responsibilities | ● | ● | | | |
| Review of past experience/lessons | ● | ● | | | |
| Design update | ● | ● | | | |
| Review attendance at workshop | ● | ● | ● | ● | |
| Programme | ● | ● | ● | ● | |
| Soft landing strategy matrix | ● | ● | ● | ● | |
| Commissioning programme | | ● | ● | ● | |
| Handover attendance | | | ● | | |
| Critical spares list | | | ● | | |
| BREEAM/Passivhaus update | | | ● | | |
| Client direct packages | | | ● | | |
| Training matrix | | | ● | | |
| Commissioning progress update | | | ● | | |
| Decant programme | | | ● | | |
| Building user guide | | | ● | | |
| Agree and review go/no go date | | | ● | | |
| O&M manuals/H&S file | | | ● | ● | |
| Snag and defect reporting system | | | ● | ● | |
| Contractors progress update | | | ● | ● | |
| M&E contractor progress update | | | ● | ● | |
| FM responsibility matrix | | | ● | ● | |
| Handover checklist | | | ● | ● | |
| Communication strategy | | | ● | ● | ● |
| Post-handover commissioning | | | ● | ● | ● |
| Post project evaluations | | | | ● | ● |

Annex B – Soft landing strategy matrix

| RIBA Stage | Soft Landing Strategy Stage | Action | Owner | Participants | Estates process | Suggested actions | Notes | Agreed Action | Owner | Target Date | Status |
|----------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------|-------------|--------|
| 1 and 2 Preparation and Brief Concept Design | 1 Inception & Briefing | 1.1 – Define roles and responsibilities Project team need to ensure that team members have the right mix of qualification, ability, experience, ownership and knowledge (training may be required) | Project Manager | Project Team | PQRP (PPI) | Issue "Client Guide to Capital Projects" handbook to Client/Client Representative Define list of participants in PQRP Identify Client Representative or need for professional Client Representative Identify soft landing budget headings e.g. Client Representative and Seasonal Commissioning | Need to ensure that design reflects operational needs, involve the client's facilities management team early on, ideally with the individuals who will manage the facility and installed systems. If personnel are not yet appointed (for example because occupants have not been recruited, the facility will be sold on, or operations outsourced), then independent advice is desirable. | | | | |
| | | 1.2 – Review past experience The University encourages continuous learning and transfer of knowledge (successes and failures) from one project to another, past experiences of team members and others benefit the briefing, design, and construction process, and allow better and more realistic targets to be set. The PQRP enables this as does the HS&SRF | Project Manager | Design Team Client Representative Facilities Manager Project Team | PQRP (PPI) | Hold Pre-Project Initiation workshop (PPI) Review and provide list of philosophy documents, distribute documents to team. Consider tours of other exemplar buildings or operational facilities | Consider visits to exemplar examples of facilities which might not be HE sector but use carry out a relevant function perhaps to world class standards for example the Formula 1 industry for workshops, the pharmaceutical industry for laboratories, Amazon for distribution systems Philosophy document review may result in formation of dedicated working groups, foreexample for project information management | | | | |
| | | 1.3 – Plan for intermediate evaluations and reality checks The programme should incorporate opportunities for intermediate evaluation workshops. These will help to ensure that stakeholders are fully engaged as the design develops and that input from key users and stakeholders is . The workshops will help to clarify understanding. In particular the workshops are designed to ensure that requirements are not missed and issues are addressed | Project Manager | Design Team Client Representative Design Team Meetings Project Team | PQRP Design Team Meetings | Schedule PQRP workshops Schedule Soft Landing workshops | | | | | |
| | | 1.4 – Set environmental and energy performance metrics The project should set environmental performance metrics as part of the setting of project metrics reproduced on the front of PSG reports. These should be benchmarked against other facilities and institutions and targets agreed by the PSG. The metrics will be compared against actual use after handover. | PSG | Client Representative Sustainability Team Facilities Manager | Project Metrics PQRP (PPI) BREEAM Passivhaus | Document Client modelling assumptions, predicted headcount, hours of operation etc. Set environmental performance criteria BREEAM or Passivhaus Ensure Client is aware of anticipated energy consumption and expenditure Issue design philosophy documents Consider procurement of energy modelling: CIBSE TM54 Ensure project metrics and targets recorded on PSG report | Consider engagement of a champion Energy performance may be part of business case for funding The "Statement of Need" document may be a source of metrics | | | | |
| | | 1.5 – Approval and other gateways The University follows a gateway process for project governance and there will be other key milestones within the project programme including delivery of stages, design freeze, start on site, handover etc. These should be mapped out at the outset | PSG | Design Team Client Representative Occupying Department | RIBA Plan of Work Capital Projects Plan of Work | Prepare and publish high level programme with milestones defined | | | | | |
| | | 1.6 – Plan to improve and measure delivery outcomes The project should establish how performance in use will be assessed, how comparison will be made with design and how improvements will be made if required | PSG | Design Team | Project Metrics Seasonal Commissioning | PSG to establish project metrics at outset Seasonal commissioning strategy to be adopted by team Consider procurement of energy modelling: CIBSE TM54 | Department operational management will significantly impact performance in use. | | | | |
| | | 1.7 – Define User Groups and Stakeholders Some user groups may be apparent such as "Laboratories", "Library", "Office" or "Teaching Spaces" Requirement for an "Organizational Strategy" user group should be included. This will define and clarify and effects on the occupiers organization or operations and ensure these are addressed | PSG | Client Representative PSG | | Define User groups Define Stakeholders | Often over looked it should be considered as to whether there is a requirement for an "Organizational Strategy" user group. This group will define and clarify and effects on the occupiers organization or operations and ensure these are addressed. Consider fire alarm cause and effect group | | | | |
| | | 1.8 – Manage Expectations Start to manage expectations of the Client especially items such as running costs | PSG | | Project Metrics | Design Team and Facilities Management should list headline costs of building operation including utilities, staff, catering, cleaning, consumables Introduce Soft Landing Strategy to Client | | | | | |
| | | 1.9 – Communications The project should consider how it will manage communications | Programme Manager | Client Representative | Capital Projects Communications Plan | Prepare communications plan | Communications with neighbours who may be affected by the construction process should be considered in addition to other stakeholders | | | | |

| RIBA Stage | Soft Landing Strategy Stage | Action | Owner | Participants | Estates process | Suggested actions | Notes | Agreed Action | Owner | Target Date | Status |
|-------------------------------------------------|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------|--------|
| 3 and 4 Developed Design Technical Design | 2 Design Pre-construction | <p>2.1 – Review past experience</p> <p>Continuing the concept of continuous learning and transfer of knowledge from one project to another, review of past experiences and lessons learnt should continue to ensure buildability, usability and manageability while considering budget and ensuring the needs of the end user will be met. In particular the process should lessen the chance of a mistake being repeated, a success not repeated or an opportunity missed</p> | Project Manager | <ul style="list-style-type: none"> Design Team Client Representative Contractor Department Project Team Facilities Manager | PQRP (PCR) | <ul style="list-style-type: none"> Undertake review of philosophy documents, especially updates Hold Pre-construction review | | | | | |
| | | <p>2.22 – Design reviews</p> <p>Design review will be undertaken as part of normal design team meeting however options exist to improve the design process including independent peer reviews which may assist in the transfer of knowledge. Design reviews should include a cross-section of stakeholders at all levels of seniority to capture valuable perspectives on aspects of building usage and operation</p> | Project Manager | <ul style="list-style-type: none"> Design Team Client Representative Contractor Department Project Team Facilities Manager | <ul style="list-style-type: none"> Estates Services Plan of Work DQI PQRP (PCR) | <ul style="list-style-type: none"> Schedule maintenance and operability reviews including appropriate stakeholders Define Stage Review signatures for approval of design stages Define strategy for communicating "value engineering" changes to stakeholders Contractor Proposals should be captured and conveyed to R&M team. Define design elements that require specific dedicated design teams or working groups Schedule Stage Reviews Consider construction of mock up facilities for review by End-Users and Stakeholders Schedule visits of other exemplar buildings or operational facilities Ensure philosophy document derogation schedule published at stage reviews Review IT network application matrix Undertake CIBSE: TM54 energy modelling | <ul style="list-style-type: none"> Ensure that design input is captured in a timely manner to avoid issues later. For example, natural cooling strategies have too often been undermined when security staff insist on closing night ventilation openings or insurance policies require it. The openings could have been designed differently had these concerns been identified earlier. Design elements that require a dedicated working group might include meeting bespoke scientific facilities, environmental or other conditions, specialist safety and security requirements, public art, specialist IT or specialist equipment installations | | | | |
| | | <p>2.3 – Procurement</p> <p>Ensure that requirements related to Soft Landings procedures need to be incorporated as part of conventional contract documentation</p> | Project Manager | <ul style="list-style-type: none"> Project Manager Contractor Legal Services | Estates Services Plan of Work | Issue Soft Landing Strategy to successful contractor | The tender documentation must include a question as to how the lead contractor, key sub-contractors and suppliers will deliver a soft landing to allow demonstration of an understanding and acceptance of the Soft Landings process | | | | |
| | | <p>2.4 – Agree roles and responsibilities of contractor team</p> <p>Roles and responsibilities of contractor team should be identified including Soft Landing Champions and attendees at Soft Landing Workshops</p> | Project Manager | Contractor | | Agree roles and responsibilities of all team members | | | | | |
| | | <p>2.5 – Create commissioning management plan</p> <p>The University recognises the importance of commissioning and the project team should establish the commissioning plan at the design stage and agree to protect the time set aside within the programme to undertake commissioning</p> | Contractor | <ul style="list-style-type: none"> Design Team Contractor Client Representative Maintenance team or contractor | | <ul style="list-style-type: none"> Include commissioning plan within contract. Discuss status of commissioning plan at PCR Define and agree Seasonal Commissioning strategy Publish agreed commissioning management plan/strategy document Publish witnessing schedule and attendee list Review commissioning plan at PCR | | | | | |
| | | <p>2.6 – Create building occupancy plan</p> <p>A building occupancy plan should be outlined including details of current space, space being yielded, periods within programme for live testing of facility, periods within programme for validation (e.g. Home Office)</p> | Facilities Manager | <ul style="list-style-type: none"> Client Representative Project Manager Contractor Facilities Manager | | <ul style="list-style-type: none"> Publish building or facility occupancy plan Define what items of work, e.g. landscaping, may be on-going after occupancy. Identify non and critical decant Prepare decant budget Define validation programmes (i.e. Home Office) | <ul style="list-style-type: none"> It is recommended that the programme allow a period for Buildings & Facilities Manager to running building live before occupation to identify issues and undertake dry run of building operations. Strategic FM have a "live testing" checklist or protocol It is recommended that critical and non critical moves are identified such as key academics arriving, expiry of leases or planning permissions, loss of premises | | | | |
| | | <p>2.7 – Define and appoint additional roles</p> <p>The University has demonstrated a link between successful projects and the recruitment to certain roles such as Client Representative and the Building & Facilities Manager</p> | PSG | Client Representative | PSG | PCR | <ul style="list-style-type: none"> If not appointed identify Client Representative Appoint Buildings & Facilities Manager Appoint other specialists as required such as Laboratory Managers | The Client Representative and Buildings & Facilities Manager may not be full time at this stage however it is important that they have sufficient capacity to dedicate sufficient time to the project. The Client Representative should be suitable empowered to act on behalf of the Project Principal or Department | | | |

| | | | | | | | | | | |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| | <p>3.11 – Review O&M manuals</p> <p>Significant progress should be made towards the assembly of the O&M manuals during the construction phase. The team should review the content of the O&M manual with the facilities manager and against the Estates Services O&M philosophy documents</p> | Project Manager | <p>Client Representative</p> <p>Facilities Manager</p> <p>Project Team</p> <p>Contractor</p> <p>Building Services Team</p> | Estates Services O&M Philosophy document | <p>Consider forming a separate working group to review the O&M production</p> <p>Establish contractor mechanism for collating O&M technical submissions</p> | <p>A technical guide which provides a succinct introduction for the facilities management team to help to smooth the transition to local operation may be of use where the Facilities Manager is "non-technical"</p> <p>Documents will include: O&Ms, User Guide, H&S file, log book</p> <p>e-documents are the University's appointed O&M complier</p> | | | | |
| | <p>3.12 – Communications</p> <p>Communications with proposed occupants becomes increasingly important as the construction phase nears completion and the communications strategy should now be reviewed</p> | Capital Projects Communications Manager | <p>Client Representative</p> <p>Facilities Manager</p> <p>Project Team</p> <p>Contractor</p> | Estates Services Capital Projects Communication Plan | <p>Schedule "town hall" Departmental briefings updating on progress and conveying information, make available presentations on internet</p> <p>Communications, ask what, where, when, form</p> | | | | | |

| RIBA Stage | Soft Landing Strategy Stage | Action | Owner | Participants | Estates process | Suggested actions | Notes | Agreed Action | Owner | Target Date | Status | |
|------------------------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|---------------|-------|-------------|--------|--|
| 6/7 Hand Over and Close Out In Use | 4 Post-Practical Completion (12 Months) Initial Aftercare | 4.1 – Handover It is necessary to define and complete Practical Completion and handover if may be different points in time | Project Manager | Design Team Client Representative Facilities Manager Stakeholders Contractor | | Complete handover checklist | | | | | | |
| | | 4.2 – Resident on-site attendance It is necessary to confirm who will be on site after Practical Completion, where and when. | Project Manager | Design Team Facilities Manager Contractor | | Define form of aftercare attendance, location and times and mechanism for contact | Project manager to have scheduled attendances on site and be included within aftercare team. | | | | | |
| | | 4.3 – Provide workplace and data links The occupier must provide an appropriate and well-located workstation for the aftercare team. | Facilities Manager | Client Representative Department Project Manager | | Allocate aftercare team office space, within Portacabins if necessary. Check mobile cellular phone signal availability. Licence 5w VHF radio system to enable communication between teams | | | | | | |
| | | 4.4 – Introductory guidance for building users The occupier's representative should organise informal user meetings as soon as possible after the building has been occupied. The size of the meetings and who exactly should go will depend on the size of the project and the nature of the occupying organisation | Client Representative | Project Manager Department Contractor | | Issue A4 size simple instructions including fire, safety and sustainability Introduce induction presentations compulsory for all building occupants before access activated | Induction presentations should be on-going for life of the building, held monthly or termly | | | | | |
| | | 4.5 – Maintenance arrangements The purpose is to ensure that the Building manager is fully aware of maintenance responsibilities as primarily detailed in Estates Regulations a detailed responsibility matrix will detail those maintenance contracts in place, those that will need renewing in 12 months and by whom, also expectations regarding the type and level of maintenance required including mandatory requirements. | Facilities Manager | Building/facilities manager | Facilities Management Responsibility Matrix | Review Facilities Management Responsibility Matrix maintenance responsibility matrix. Ensure maintenance responsibilities are defined from Practical Completion | | | | | | |
| | | 4.6 – Logging environmental and/or energy performance The Facilities Manager must take the lead in monitoring energy consumption and usage. Logging provides the basis for comparison with the energy plan and will assist fine-tuning of the systems. | Sustainability Team | Design Team | Estates Seasonal Commissioning Strategy | Report at Post Occupancy Evaluation (POE). Schedule seasonal commissioning review workshops Prepare Energy Performance Certificate (EPC) and/or Display Energy Certificate (DEC). | | | | | | |
| | | 4.7 – Communications It is important that users are kept informed of progress on operational issues, for example via a newsletter. | Project Manager | Facilities Manager Client Representative Contractor | Estates Services Capital Projects Communication Plan | Place daily look-ahead board in reception area. e-mail daily bulletin for first month of occupation Website update of progress, issues, communications | | | | | | |
| | | 4.8 – Project inspections Inspect facility informally on a regular basis, to examine the building in use, observe occupation and spot emerging issues. Walkabouts can be combined with other visits as appropriate. Make spot-checks with instruments if necessary; these also provide opportunities to discuss with individuals their experience of the building, its systems and the indoor environment. | Facilities Manager | Users Client Representative Contractor | | Schedule inspections Maintain system for users to be able to report snags, defects, problems or ask questions | Project manager to triage reported issues to identify whether snags, maintenance responsibilities, defects or latent defects. | | | | | |
| | | 4.9 – BMS interface completion and demonstration The building management system (BMS) should be reviewed and demonstrated | Project Manager | Facilities Manager Building Services Team Design Team Client Representative Contractor Commissioning Engineers | Estates Services Seasonal Commissioning strategy | Schedule BMS review meetings | | | | | | |
| | | 4.10 – Project review Estates Services encourages continuous learning and the transfer of knowledge from one project to another including both successes and failures | Programme Manager | Project Team Client Representative Facilities Manager Stakeholders | PQRP (PPE) | Schedule and undertake Post Project Evaluation | Consider formal review with Project Sponsor or Project Principal | | | | | |

| RIBA Stage | Soft Landing Strategy Stage | Action | Owner | Participants | Estates process | Suggested actions | Notes | Agreed Action | Owner | Target Date | Status |
|-------------|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|---------------|-------|-------------|--------|
| 7 In Use | 5 Aftercare (36 Months) Post Occupancy Evaluation | <p>5.1 – Aftercare review meetings</p> <p>Once the initial period of intensive aftercare is over, regular meetings should continue, in order to review progress with the user representatives and facilities management. Frequency will depend on the project. Intervals of 3-4 months may be appropriate in Year 1, decreasing to six months in Years 2 and 3.</p> | Programme Manager | Design Team Client Representative Contractor Facilities Manager | | Schedule review meetings | Include maintenance contractors in reviews | | | | |
| | | <p>5.2 – Logging environmental and/or energy performance</p> <p>The Facilities Manager must take the lead in monitoring energy consumption and usage. Logging provides the basis for comparison with the energy plan and will assist fine-tuning of the systems.</p> | Sustainability Team | Design Team | Estates Services Seasonal Commissioning Strategy | Report at Post Occupancy Evaluation (POE). | | | | | |
| | | <p>5.3 – Systems and energy review</p> <p>A written review of overall energy and systems performance is desirable. Six month intervals will normally be adequate, though some can be done remotely and much of the rest combined with activities Y1 and Y4.</p> | Building Services Team | Design Team FM Team Client Representative Department Maintenance Team | PQRP (POE) | Report energy consumption data formally at POE. | | | | | |
| | | <p>5.4 – Fine tuning of systems and seasonal commissioning</p> <p>Seasonal changes and any particular issues emerging (for example from environmental and energy monitoring and occupant comments) will dictate when this needs doing and whether it needs repeating. The FM team and commissioning engineers may need to be involved as well as the building services contractor.</p> | Project Manager | Design Team Client Representative Facilities Manager Contractor FM Team | Estates Services Seasonal Commissioning strategy PQRP (POE) | Continue to implement seasonal commissioning strategy | | | | | |
| | | <p>5.5 – Record fine tuning and changes of use</p> <p>Dependable comparison of actual and forecast performance will be impossible unless the facilities manager records changes routinely. The O&M manuals and building logbook will also need updating to reflect alterations to systems and equipment and any changes to standard control settings and operating schedules.</p> | Facilities Manager | Design Team FM Team Facilities Manager Contractor BMS Maintenance Engineer | | Maintain A4 log book alongside BMS recording all changes made and all issues noted or maintenance requests | | | | | |
| | | <p>5.6 – Communications</p> <p>Updates to newsletters and websites will likely be less frequent and be related to any on-going project related issues otherwise the facility will now be entering a phase of normal facilities management and maintenance for which the FM team will have defined processes</p> | Facilities Manager | FM Team Project Manager Client Representative | Estates Services Capital Projects Communication Plan | Place daily look-ahead board in reception area (if required) Consider website update of progress, issues, communications (if required) Ensure understanding of how users can report maintenance or other issues Ensure that Users are able to retrieve an update as to the status of their reported problems | | | | | |
| | | <p>5.7 – Project inspections</p> <p>The Facilities Manager should continue to pro-actively inspect the facility, make observations and where possible discuss performance with occupiers, management and maintenance staff. This provides opportunities for spotting actual or emergent changes which may go unrecorded, and may otherwise compromise performance or not make the most of the latent potential in the design.</p> | Facilities Manager | FM Team Client Representative | | | | | | | |
| | | <p>5.8 – Measure energy use and occupant satisfaction</p> <p>A key part of the annual end of year review is to compare recorded performance with the design targets, this also supports Estates Services Capital Projects Customer Service Excellence</p> | Head of Capital Projects | Design Team FM Team Client Representative Department | PQRP (POE) Sustainability Team | | | | | | |
| | | <p>5.9 – Conduct end of year review at end of years 1 and 5</p> <p>To facilitate continuous learning and maximise performance 1 and 5 year Post Occupancy Evaluations and reviews of energy performance (in addition to seasonal commissioning) is required to review the general and environmental performance of the facility. This also allows all parties (client, design and facility team, users and facilities managers) to maintain a positive relationship. The Year 1 and 5 year reviews provide a well-structured wrap-up of lessons learned, and an opportunity to celebrate success and prospects for future collaboration. A five year review provides an independent evaluation of the facility following a "lifecycle" of occupants</p> | Head of Capital Projects | Design Team Client Representative Contractor Stakeholders Facilities Manager | PQRP (POE) PQRP (5+POE) | Schedule 5 POE for project Ensure first year POE is written up and published | | | | | |

Annex C – Handover checklist

Handover procedure for completed capital projects

Below is an indication of typical items which are required before a project can be handed over and accepted by an occupying Department.

The items are intended as a guide only and should be amended to suit the particular project. The final version should be agreed with Estates Services and be included in the project tender specification for Contractors to understand what will be required for the occupying Department to accept responsibility for the project.

It is expected that invitees to the building handover will include, but not be limited to, representatives of the Project Sponsor Group, University Safety Office, Principal Contractor, Contract Administrator, Design Team, Principal Designer and Insurance Office.

This Handover Certificate is not a Certificate of Practical Completion or an indication that the premises are ready for occupation. It is intended to ensure that the building is ready for handover to the Department and responsibilities have been allocated and correctly understood.

Section 1. To be completed by Project Manager

| | | |
|-------------------------------------------------------------------------------------|-----------------------------------|-------------|
| Project Title | Estates Services Reference | |
| Building | Area or room number(s) | |
| Contractor | | |
| Name of Contractor's Responsible Person | | Date |
| Contractor's Responsible person contact details (including telephone number) | | |

| Section 2. To be completed by Project Manager | | | |
|-----------------------------------------------------------------------------------------------------|----------------------------|--------------------------------------|--------------------|
| Handover Requirements | Insert cross if applicable | Insert cross if required at handover | Status at handover |
| Fire alarm systems | <input type="checkbox"/> | <input type="checkbox"/> | |
| Fire extinguisher and other fire suppression installations, smoke extract systems and fire curtains | <input type="checkbox"/> | <input type="checkbox"/> | |
| Fire stopping works | <input type="checkbox"/> | <input type="checkbox"/> | |
| Fire strategy document complete | <input type="checkbox"/> | <input type="checkbox"/> | |
| Fire alarm cause & effect document | <input type="checkbox"/> | <input type="checkbox"/> | |
| Emergency lighting | <input type="checkbox"/> | <input type="checkbox"/> | |
| Emergency signage | <input type="checkbox"/> | <input type="checkbox"/> | |
| Escape routes internal and external | <input type="checkbox"/> | <input type="checkbox"/> | |
| Black building test | <input type="checkbox"/> | <input type="checkbox"/> | |
| Building security systems | <input type="checkbox"/> | <input type="checkbox"/> | |
| Building Control certificate | <input type="checkbox"/> | <input type="checkbox"/> | |
| DDA compliance and measures | <input type="checkbox"/> | <input type="checkbox"/> | |
| Mechanical systems major plant access | <input type="checkbox"/> | <input type="checkbox"/> | |
| Mechanical systems piped services | <input type="checkbox"/> | <input type="checkbox"/> | |
| Mechanical systems air balancing | <input type="checkbox"/> | <input type="checkbox"/> | |
| Mechanical systems cleaning | <input type="checkbox"/> | <input type="checkbox"/> | |
| Electrical systems including labelling | <input type="checkbox"/> | <input type="checkbox"/> | |
| Lift installation | <input type="checkbox"/> | <input type="checkbox"/> | |
| Drainage system – dye test all drainage connections | <input type="checkbox"/> | <input type="checkbox"/> | |
| Data and voice services | <input type="checkbox"/> | <input type="checkbox"/> | |
| BMS networks (inc. access control, GSHP, CCTV, ION metering, intruder alarm) | <input type="checkbox"/> | <input type="checkbox"/> | |
| Specialist installations and testing (laboratory gases) | <input type="checkbox"/> | <input type="checkbox"/> | |
| Specialist installations and testing (LEV & fume cupboards) | <input type="checkbox"/> | <input type="checkbox"/> | |
| Specialist installations and testing (maintenance access provision) | <input type="checkbox"/> | <input type="checkbox"/> | |
| Specialist installations and testing (gas monitoring) | <input type="checkbox"/> | <input type="checkbox"/> | |

| Handover Requirements | Insert cross if applicable | Insert cross if required at handover | Status at handover |
|--------------------------------------------------------------------------------|-------------------------------------|--------------------------------------|--------------------|
| Specialist installations and testing (magnetic field precautions) | <input type="checkbox"/> | <input type="checkbox"/> | |
| Specialist installations and testing (lifting gear) | <input type="checkbox"/> | <input type="checkbox"/> | |
| Statutory compliance | <input type="checkbox"/> | <input type="checkbox"/> | |
| Health & Safety file update | <input type="checkbox"/> | <input type="checkbox"/> | |
| Operation & Maintenance manuals - life safety test certification | <input type="checkbox"/> | <input type="checkbox"/> | |
| Operation & Maintenance manuals completion | <input type="checkbox"/> | <input type="checkbox"/> | |
| Chlorination certificate | <input type="checkbox"/> | <input type="checkbox"/> | |
| Pressure systems and vessels – Written Scheme of Examination | <input type="checkbox"/> | <input type="checkbox"/> | |
| Lifting gear – Written Scheme of Examination | <input type="checkbox"/> | <input type="checkbox"/> | |
| Earth bonding certificate | <input type="checkbox"/> | <input type="checkbox"/> | |
| Lightning protection certificate | <input type="checkbox"/> | <input type="checkbox"/> | |
| Other certification (medical gases) | <input type="checkbox"/> | <input type="checkbox"/> | |
| Record drawings – Architectural | <input type="checkbox"/> | <input type="checkbox"/> | |
| Record drawings – Electrical | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| Record drawings – Mechanical | <input type="checkbox"/> | <input type="checkbox"/> | |
| Building log book | <input type="checkbox"/> | <input type="checkbox"/> | |
| Energy performance certificate | <input type="checkbox"/> | <input type="checkbox"/> | |
| Building management protocols | <input type="checkbox"/> | <input type="checkbox"/> | |
| Estates Services personnel received training and/or further training scheduled | <input type="checkbox"/> | <input type="checkbox"/> | |
| Department personnel received training and/or further training scheduled | <input type="checkbox"/> | <input type="checkbox"/> | |
| Occupancy advised to University Security Services | <input type="checkbox"/> | <input type="checkbox"/> | |
| Occupancy advised to Insurance Office | <input type="checkbox"/> | <input type="checkbox"/> | |
| Premises Responsible person (Section 4) appointed | <input type="checkbox"/> | <input type="checkbox"/> | |
| List of outstanding snags and defects | <input type="checkbox"/> | <input type="checkbox"/> | |
| Name (<i>Print</i>) | Signature | | Date |

| Section 3. Building acceptance and record of handover | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------------------------------|
| Agreed by the undersigned 1. The building is ready for occupation 2. To the best of my knowledge the building is safe to occupy in normal use 3. To the best of my knowledge the building is secure to occupy for normal use 4. The above checklist has been completed to my satisfaction and the handover of the project to the Department is therefore approved | | |
| Project Title | | Estates Services Reference |
| Building | | Area or room number(s) |
| Project Manager Name (Print) | | |
| Company | Signature | Date |
| Contract Administrator Name (Print) | | |
| Company | Signature | Date |
| Architect Name (Print) | | |
| Company | Signature | Date |
| Principal Designer Name (Print) | | |
| Company | Signature | Date |
| Estates Services Electrical Engineer Name (Print) | | |
| Company | Signature | Date |
| Estates Services Mechanical Engineer Name (Print) | | |
| Company | Signature | Date |
| PSG Divisional Representative Name (Print) | | |
| Company | Signature | Date |
| PSG Departmental Representative Name (Print) | | |
| Company | Signature | Date |

| | | |
|---------------------------------------------------------|------------------|-------------|
| PSG Estates Services Representative Name (Print) | | |
| Company | Signature | Date |
| Main Contractor Name (Print) | | |
| Company | Signature | Date |

| | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------------------------------------|
| Section 4. To be completed by the Responsible Person | | |
| <p>Agreed by the Facilities Manager</p> <ol style="list-style-type: none"> 1. I accept responsibility for the building/premises/defined areas formerly undergoing capital project works 2. I understand the status of the site and, if partial occupation has been granted, the status of areas and on-going works within those areas still controlled by the Contractor 3. I understand the reporting procedure for defects discovered during the Defects Liability Period. 4. I am confident that I received sufficient training with regards to building design and operation 5. I am confident that I have received training on, and understand the operation of, the building fire protection systems 6. I am confident that I have received training on, and understand the operation of, the building security and access control systems 7. I am able to provide a 24-hour call out and key holding service with a 20 minute response time 8. I have provided contact details of the call out system to Security Services | | |
| Start Date of Responsibility | | Start Time of Responsibility |
| Contact Telephone Number (Mobile) | | Contact Telephone Number (Landline/mobile) |
| Name (Print) | Signature | Date |

| | | |
|------------------------------------------------------------------------------------|------------------|--------------|
| Section 5. To be completed by Contractor's Responsible Post-Handover Person | | |
| Contractor's Responsible person contact details | | |
| Company | Email | Phone |
| Name (Print) | Signature | Date |

Annex D – Facilities management responsibility matrix

| Category | Item | Component | Task | Frequency | Responsibility | Budget | Notes |
|----------------------------------------|------------------------------------|-----------------------------------------------------------|-------------------------------------------|-----------|----------------|--------|-------------------------------------------|
| 1 Maintenance | 1.1 - Laboratory - Specialist | Laboratory equipment | Maintenance, testing, validation | | | | |
| | | Chemical Waste System Glass Bottomed Traps | Inspection, cleaning | | | | |
| | | Drench Shower Operation | Testing, Maintenance, replacement | | | | |
| | | Drench Shower Legislation Compliance | Testing, inspection | | | | Legionella testing and system flushing |
| | | Fume cupboard Controls | Calibration | | | | |
| | | Fume cupboards Glazing | Replacement | | | | |
| | | Fume cupboards Legislation | Containment testing | | | | |
| | | Fume cupboards Legislation | Face velocity testing | | | | |
| | | Fume cupboards sash operation | Inspection | | | | |
| | | Fume cupboards Visible surfaces | Inspection, cleaning | | | | |
| | | Laboratory Special Gas Systems Legislation | Pressure systems safety regulations - WSE | | | | |
| | | Laboratory Special Gas Systems Legislation | Inspection, testing | | | | |
| | | Liquid gas dewars | Inspection, testing | | | | Liquid nitrogen carbon dioxide, oxygen |
| | | Liquid gas bulk storage vessel | Inspection, testing | | | | Liquid nitrogen carbon dioxide, oxygen |
| | | Liquid gas vacuum insulated distribution pipework | Inspection, replenishment of vacuum | | | | Liquid nitrogen carbon dioxide, oxygen |
| | | Liquid gas trace heating (external plant) | Testing, maintenance, replacement | | | | |
| | | Liquid gas vaporizer | Cleaning, maintenance | | | | |
| | | Gas cylinder manifolds and regulators | Inspection, testing, 5 year replacement | | | | |
| | | Specialist gas systems distribution pipework and fittings | Inspection, testing | | | | |
| | | Oxygen depletion system sensors and alarms | Testing | | | | |
| | | Oxygen depletion system sensors and alarms | Servicing and sensor replacement | | | | |
| | | Other gas detection systems | Servicing and sensor replacement | | | | To include carbon monoxide, hydrogen etc. |
| | | Process chiller systems controls | Inspection, testing, calibration | | | | |
| | | Process chiller systems, pumps, pipework and fittings | Inspection, repair | | | | |
| | | Process chiller systems controls | Cleaning | | | | |
| | | Microbial safety cabinets legislation | Containment testing, validation | | | | |
| | | Microbial safety cabinets sash operation | Inspection | | | | |
| | | Microbial safety cabinets visible surfaces | Inspection & cleaning | | | | |
| | | Autoclaves | Validation, Maintenance | | | | |
| | | Laboratory gases gas cylinders | Changing, re-charge of costs | | | | |
| | | Laboratory gas taps and POU regulators | Maintenance | | | | |
| | | Safety cabinet controls | Testing, calibration | | | | |
| | | Safety cabinet filters | Integrity testing, changing | | | | |
| | Laboratory Furniture | Maintenance, replacement | | | | | |
| | 1.2 - General internal | Emergency Lighting | Function Testing, Load Testing | | | | |
| | | Light fitting lamps | Replacement | | | | |
| | | Cupboard Glazing | Maintenance, replacement | | | | |
| | | Door & Partition Glazing | Maintenance | | | | |
| | | Doors | Inspection, maintenance | | | | |
| | | Flooring - Fixed | Inspection, maintenance | | | | |
| | | Flooring - Loose | Maintenance, replacement | | | | |
| | | Ironmongery | Maintenance, replacement | | | | |
| | | Joinery | Maintenance | | | | |
| | | Signage | Maintenance, replacement, update | | | | |
| | | Window Blinds | Maintenance, replacement | | | | |
| | | Furniture - Desks, Tables, Task Chairs etc. | Maintenance, replacement | | | | |
| | | Sanitary Fittings - removing blockages | Cleaning | | | | |
| Access Control System hardware | | Inspection, testing, upgrade, replacement | | | | | |
| Access Control Management | Programming of new cards/dongles | | | | | | |
| Lockers | Maintenance, key management | | | | | | |
| Clocks | Maintenance, replacement | | | | | | |
| Shelves | Maintenance, replacement | | | | | | |
| Mobile storage racking | Inspection, repair | | | | | | |
| Notice boards | Maintenance, replacement | | | | | | |
| Urinal Cistern Control System | Inspection, testing | | | | | | |
| Portable Appliance Testing | Annual portable appliance testing | | | | | | |
| Servery and food preparation equipment | Cleaning, maintenance, replacement | | | | | | |
| Waste compactor | Maintenance, maintenance | | | | | | |

| Category | Item | Component | Task | Frequency | Responsibility | Budget | Notes |
|------------------------------------------|-------------------------------|-------------------------------------------------------------------------------------------|--------------------------------------------------|-----------|----------------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 Services and Contracts | 2.1 - Laboratory - Specialist | Chemical and hazardous waste removal | Removal and disposal | | | | Organic solvents for incineration (chlorinated, halogenated), oils, liquid fuels, gases, absorbents, radioactivity, sharps Liquid nitrogen carbon dioxide, oxygen Various to be defined Nitrogen, argon University supplier |
| | | Chemical and solvent packaging recycling | Removal and recycling | | | | |
| | | Liquid gas provision | Replenishment | | | | |
| | | Laboratory gases cylinder provision | Replenishment | | | | |
| | | Laboratory gases bulk supply | Replenishment | | | | |
| | | Dry ice supply | Replenishment | | | | |
| | 2.2 - General | Catering provision | Catering contract | | | | |
| | | Internal planting | Maintenance, replacement | | | | |
| | | Vending Machines | Provision, cleaning and replenishment | | | | |
| | | Photocopiers and printers | Provision, replenishment | | | | |
| | | Postage collection, mail delivery and franking machines | Provision | | | | |
| | | Drinking water coolers | Provision, maintenance, replenishment | | | | Replenishment of water bottles, filters and cups |
| | | General waste removal | Removal and disposal | | | | |
| | | Recycling waste removal | Removal and disposal | | | | |
| 3 Health and Safety | 3.1 - Laboratory - Specialist | Breathing apparatus | Certification, inspection and cleaning | | | | |
| | | Portable oxygen depletion monitors | Calibration, maintenance | | | | |
| | | Personal radiation monitoring | Dosimeters, badges, processing, record keeping | | | | |
| | 3.2 - General | First Aid Stations | Inspection, replenishment | | | | |
| | | First aid room equipment | Maintenance, replenishment | | | | |
| | | Portable lifting equipment | Insurance inspection | | | | Including pallet trucks, hydraulic platform tables, forklifts |
| | | Disabled toilet alarm | Testing | | | | |
| | | Portable lifting equipment | Maintenance, Maintenance | | | | Including pallet trucks, hydraulic platform tables, forklifts |
| | | Roof access safety system | Inspection, testing, maintenance | | | | Anchor points, cable, harness |
| | | Evacuation chairs | Inspection, maintenance, replacement | | | | |
| 4 Voice and Data | 4.1 - General | Telephone handsets | Maintenance, replacement | | | | |
| | | DRAX panel | Maintenance, maintenance | | | | |
| | | Shared printers, photocopiers | Maintenance, replacement | | | | |
| | | Public address system | Testing, maintenance | | | | |
| | | Active equipment, Servers, Hubs, Switches Photocopier charging and re-charging systems | Inspection, repair, replacement | | | | |
| 5 Decoration | 5.1 - Decoration | General internal redecoration | Maintenance, redecoration | | | | |
| | | Redecoration at lease determination | Restoration | | | | |
| | | Flag pole | Painting | | | | |
| | | External decoration and repairs Decoration (as required at lease requirement) | Inspection, repairs, maintenance Redecoration | | | | |
| 6 Cleaning | 6.1 - Laboratory specialist | Laboratory floors sweeping and vacuuming | Cleaning | | | | |
| | | Laboratory consumables | Replenishment | | | | 10" paper rolls, hand soap, hand towels |
| | | Laboratory floors damp mopping | Cleaning | | | | |
| | 6.2 - General internal | Office floors vacuum | Cleaning | | | | |
| | | Offices/Write-up Areas/Meeting Rooms | Cleaning | | | | |
| | | Store Rooms | Cleaning | | | | |
| | | Toilets | Cleaning | | | | |
| | | Windows - internal cleaning | Cleaning | | | | |
| | | Atrium and reception communal areas | Cleaning | | | | |
| | | Corridor floors | Cleaning | | | | |
| | | Food and drink areas | Cleaning | | | | |
| | | Sanitary bins | Exchange or Replenishment | | | | |
| | | Washroom and cleaning consumables | Replenishment | | | | Bin liners, hand towels, hand soap, toilet rolls |
| | Dust control mats | Replenishment | | | | | |
| | 6.3 - General external | External access roads | Cleaning | | | | |
| | | External air intakes | Cleaning | | | | |
| | | Car parks and bicycles stores | Cleaning | | | | |
| | | Façade (pressure washing) | Cleaning | | | | |
| | | Glazing (window cleaning) | Cleaning | | | | |
| Paving, steps and pathways | | Cleaning | | | | | |
| Rain water gutters | | Cleaning | | | | | |
| Signage | | Cleaning | | | | | |
| Smoke vents | | Cleaning | | | | | |
| Underground drains, chambers and gullies | | Cleaning | | | | | |
| Plant rooms | | Cleaning | | | | | |
| Petrol and fuel interceptors | | Inspection, maintenance, cleaning | | | | | |
| Roads, paving and pathways | Snow Clearance | | | | | | |

| Category | Item | Component | Task | Frequency | Responsibility | Budget | Notes |
|----------------------------------------------------------|-------------------------------------------|----------------------------------------------------------|-----------------------------------------|-----------|----------------|--------|-------|
| 7 Building Services | 7.1 - Laboratory specialist | Chemical waste system | Inspection, maintenance | | | | |
| | | Chemical waste system | Blockage removal | | | | |
| | | Vacuum distribution systems | Inspection, maintenance | | | | |
| | | Vacuum system pumps | Maintenance, replacement | | | | |
| | | Fume cupboard ductwork (Non Plant Rooms) | Inspection | | | | |
| | | Fume cupboard ductwork (Non Plant Rooms) | Cleaning | | | | |
| | | Fume cupboard ductwork (Plant Rooms) | Inspection | | | | |
| | | Fume cupboard ductwork (Plant Rooms) | Cleaning | | | | |
| | | Extract Fans | Maintenance | | | | |
| | | Purified water systems | Maintenance, replacement of consumables | | | | |
| | | Helium recovery system | Inspection, maintenance | | | | |
| | | Helium recovery system legislation | Pressure Systems Safety Regulations | | | | |
| | | Liquid gas distribution pipework | Inspection, vacuum replenishment | | | | |
| | | Safety cabinet ductwork (Non Plant Rooms) | Inspection | | | | |
| | Safety cabinet ductwork (Non Plant Rooms) | Cleaning | | | | | |
| | Safety cabinet ductwork (Plant Rooms) | Inspection | | | | | |
| | Safety cabinet ductwork (Plant Rooms) | Cleaning | | | | | |
| | 7.2 - General | Emergency power UPS | Inspection, testing | | | | |
| | | Emergency power UPS | Maintenance | | | | |
| | | Building Management System | Adjustments, maintenance | | | | |
| | | Fire detection and alarm system | Weekly testing | | | | |
| | | Fire detection and alarm system | Evacuation drill | | | | |
| | | Fire detection and alarm system | Cause and effect testing | | | | |
| | | Fireman's switch | Cause and effect testing | | | | |
| | | Fire fighting dry risers | Inspection, testing | | | | |
| | | Fire extinguishers | Inspection | | | | |
| | | Fire suppression systems (foam, CO2, sprinkler, misting) | Inspection, testing | | | | |
| | | Foul waste system | Inspection, maintenance | | | | |
| | | Foul waste system | Blockage removal | | | | |
| | | Photovoltaic and solar thermal systems | Cleaning, maintenance, Maintenance | | | | |
| | | Electrical Sockets | Maintenance | | | | |
| | | Local Distribution Boards | Electrical Maintenance | | | | |
| | | RCDs | Testing | | | | |
| | | Sub Station | Electricity Board (EB) Maintenance | | | | |
| | | External building lighting | Maintenance, lamp replacement | | | | |
| | | Lightning protection | Inspection, testing | | | | |
| | | LV system distribution boards | Electrical Maintenance | | | | |
| | | LV system distribution boards | Isolation | | | | |
| | | LV system earthing and bonding | Testing | | | | |
| | | Electrical circuits | Testing | | | | |
| | | Power factor correction equipment | Testing | | | | |
| | | Generators | Testing | | | | |
| Generators | | Maintenance, maintenance | | | | | |
| Generators fuel | | Replenishment | | | | | |
| Natural gas distribution | | Inspection, maintenance | | | | | |
| Natural gas emergency isolation systems | | Inspection, testing, maintenance | | | | | |
| Storm water pipework and gutters | | Inspection & cleaning | | | | | |
| Storm water pumps | M&E maintenance | | | | | | |
| Building Management System | Maintenance, replacement | | | | | | |
| Central refrigeration plant and distribution | Inspection, testing, maintenance | | | | | | |
| Central refrigeration plant and distribution | Pressure Systems Safety Regulations | | | | | | |
| Trace Heating (External Pipework) | Testing, maintenance | | | | | | |
| Central refrigeration pressurisation Units | Inspection, testing | | | | | | |
| Cold water systems | Maintenance | | | | | | |
| Cold water systems legislation | Legionella Sampling | | | | | | |
| Cold water system meters | Calibration, reading | | | | | | |
| Cold water system storage tanks | Inspection & Cleaning | | | | | | |
| Grey water systems filters | Maintenance | | | | | | |
| Compressed air compressor, dryer, filters, receiver | Maintenance | | | | | | |
| Compressed air legislation | Pressure Systems Safety Regulations | | | | | | |
| Compressed air distribution | Inspection, maintenance | | | | | | |
| Gas boilers chemical Dosing System | Filling | | | | | | |
| Gas boilers, plant, gas boosters, distribution, controls | Inspection, maintenance, testing | | | | | | |
| Gas boilers legislation | Pressure Systems Safety Regulations | | | | | | |
| Hot water systems, plant, distribution, controls | Inspection, testing | | | | | | |
| Hot water systems gas fired water heaters and storage | Inspection, maintenance, testing | | | | | | |
| Hot water systems, point of use systems | Inspection, maintenance, testing | | | | | | |
| Hot water systems legislation | Legionella Sampling | | | | | | |
| Hot water systems legislation | Pressure Systems Safety Regulations | | | | | | |
| Space heating - radiators and TRVs | Inspection, maintenance | | | | | | |

A log book of all changes must be maintained - see "Commissioning"

| | | | | | | |
|--|-----------------------------------------------------------|-----------------------------------------------|--|--|--|------------------------------------------------------------------------------|
| | Ventilation, extract AHU filters | Inspection, replacement | | | | |
| | Ventilation, supply and extract plant, controls, ductwork | Inspection, maintenance | | | | |
| | Ventilation, air balancing | Testing, adjustment | | | | |
| | Ventilation, air quality analysis | Testing | | | | |
| | Ventilation, dampers and actuators | Inspection, testing | | | | |
| | Ventilation heating and cooling coils | Inspection, maintenance | | | | |
| | Ventilation heating and cooling coils | Cleaning | | | | |
| | Chillers | | | | | |
| | Supply and extract fire dampers | Inspection, testing, maintenance, replacement | | | | |
| | Ventilation terminal re-heat and cooling coils | Inspection, testing | | | | |
| | Ventilation, run around coils | | | | | |
| | Extract smoke vents | Inspection, testing, maintenance | | | | |
| | Magnetic water conditioning equipment | Inspection, maintenance | | | | |
| | Fixed electrical equipment | Electrical Maintenance | | | | Hand driers, calorifiers, radiators, heaters |
| | Flag pole hoisting system | Maintenance | | | | |
| | Goods lifts | Insurance Inspection, maintenance | | | | |
| | Ladders | Inspection and tagging | | | | |
| | Passenger lifts | Insurance Inspection, maintenance | | | | |
| | Pavement hoists | M&E maintenance | | | | |
| | Scissor lifts | M&E maintenance | | | | |
| | Security system CCTV cameras | Maintenance, recording, archive (monitoring) | | | | |
| | Security system Intruder and panic alarms | Maintenance, monitoring | | | | |
| | Steam generators | Inspection, maintenance | | | | |
| | Steam generator and distribution | Pressure Systems Safety Regulations | | | | |
| | Steam generator distribution | Inspection, maintenance | | | | |
| | Fixed furniture | Maintenance, replacement | | | | Fixed seating and tables in lecture theatres, reception, catering facilities |

| Category | Item | Component | Task | Frequency | Responsibility | Budget | Notes |
|------------------------------------------|--------------------------|---------------------------------------------------------|---------------------------------------|-----------|----------------|--------|----------------------------------------------------------------------------------------------|
| 8 Building Fabric Maintenance | 8.1 Building fabric | Access hatches | Inspection, maintenance | | | | |
| | | Cladding | Inspection, maintenance | | | | |
| | | Doors & ironmongery | Inspection, maintenance | | | | |
| | | Glazing | Inspection, maintenance | | | | |
| | | Roofs | Inspection, maintenance | | | | |
| | | Track and cradle window cleaning system | Inspection, maintenance | | | | |
| | | Storm water down pipes and gulleys | Inspection, maintenance | | | | |
| | | Ceilings - fixed or suspended systems | Maintenance | | | | |
| | | Sanitary Fittings | Maintenance | | | | |
| | | Walls - plastered, tiled, papered | Maintenance | | | | |
| | | External fences, gates and boundary walls | Inspection, maintenance | | | | |
| | | External gates locks and fastenings | Maintenance | | | | |
| | | Cycle storage and stands | Maintenance | | | | |
| | | Road and car park surfaces | Inspection, maintenance | | | | |
| | | Road and car park markings | Re-application, maintenance | | | | |
| | | Signage | Maintenance | | | | |
| | | Steps, paving and pathways | Inspection, maintenance | | | | |
| Steps, paving and pathways | Weed control | | | | | | |
| Underground drains, chambers and gullies | Maintenance | | | | | | |
| Underground service ducts | Maintenance | | | | | | |
| External landscaping (planting) | Maintenance, replacement | | | | | | |
| 9 Overheads | 9.1 Overheads | Insurance | | | | | |
| | | Business rates | | | | | |
| 10 Personnel | 10.1 Personnel | Receptionist and security personnel | | | | | Clothing may be required |
| | | Security, key holding and response personnel | | | | | |
| | | Fire wardens and first aiders | | | | | |
| | | Facilities Management | | | | | |
| 11 Utilities | 11.1 Utilities | Electricity standing charge and consumption | Charging | | | | |
| | | Gas standing charge and consumption | Charging | | | | |
| | | Oil standing charge and consumption | Charging | | | | |
| | | Water standing charge and consumption | Charging | | | | |
| | | Trade effluent licence | Licence application and charges | | | | |
| 12 Other | 12.1 Other | Building security plans to University Security Services | Issue, update | | | | The documents within this section could be consolidated into a co-ordinated "emergency plan" |
| | | Disaster recovery plan | Issue, update | | | | Include response to photovoltaics |
| | | Tactical firefighting plans | Agree, update, store in safe location | | | | Liase with University Fire Officer |
| | | Fire plan | | | | | Include location of hazards |
| | | Fire zone plans | Issue, update | | | | |
| Building user guide | Issue, update | | | | | | |

Annex E – Generic Furniture, Fixtures and Equipment (FF&E) schedule

| Category | Item | Responsibility | Budget | Notes |
|------------------------------|-------------------------------------------------------------------|----------------|--------|---------------------------------------------------------------------------------------|
| 1 Laboratory Equipment | Vacuum pumps (high vacuum, low vacuum, roughing) | | | |
| | Vacuum controllers (remote, fixed, portable) | | | |
| | Water purification units (reverse osmosis and/or high purity) | | | |
| | Solvent drying units | | | |
| | Solvent mantles | | | |
| | Steam generator | | | |
| | Crystal growth cabinets | | | |
| | Autoclaves | | | |
| | Microbial safety cabinets class II | | | |
| | Glass washing machines | | | |
| | Reverse Osmosis units for glasswashers | | | |
| | Ceiling services gantries | | | |
| | Vibration isolation blocks/keel slabs | | | |
| | Vibration isolation bearings/air jacks | | | |
| | Gas cylinder support racks for storage/cylinder cupboards | | | |
| | Gas cylinder clamps for laboratories | | | |
| | Gas cylinder regulators (supply - special gases building systems) | | | |
| | Gas cylinder continuous supply change over units (auto/manual) | | | |
| | Fume cupboard or other gas outlet speciality regulators | | | |
| | Dark room equipment (developers/processors/enlargers) | | | |
| | Scaffolding to interior of fume cupboards (bars and clamps) | | | |
| | Fridges | | | |
| | Freezers -20°C | | | |
| | Freezers -80°C | | | |
| | Ice machines | | | |
| | Solid CO ₂ cardice chests | | | |
| | Drug and poisons storage cabinets | | | |
| | Process cooling units | | | |
| | Liquid nitrogen dewars | | | |
| | Shared equipment (centrifuges/balances/incubators/furnaces) | | | |
| Clocks | | | | |
| | Loose furniture | | | Desks, task chairs, pedestals, tables, informal chairs, bookcases, cupboards, filing, |

| | | | | |
|-------------------------|----------------------------------------------------------------|--|--|------------------|
| 2 Loose Furniture | Laboratory stools | | | soft furnishings |
| | Servery furniture (tables and chairs) | | | |
| | Laboratory storage system (tray insert system such as Mailbox) | | | |
| | Shelving - general stores | | | |
| | Shelving - dry goods stores | | | |
| | White boards/blackboards | | | |
| | Notice boards (closed/open) | | | |
| 3 Health and Safety | Eyewash Kits | | | |
| | Spill kits | | | |
| | Fire Extinguishers | | | |
| | First aid kits - general | | | |
| | First aid kit - specialist for first aid room | | | |
| | First aid kits - response kit for first aiders | | | |
| | Health and Safety notice boards | | | |
| | Portable oxygen depletion sensor | | | |
| | Oxygen depletion and other gas detection systems | | | |
| | Fire marshal high-visibility vests | | | |
| | Safety visors for liquid nitrogen decant stations | | | |
| | Gloves for liquid nitrogen decant stations | | | |
| | Solvent storage cabinets | | | |
| | Incident kit (megaphone/spill kit/barrier tape/torches) | | | |
| Evacuation chairs | | | | |
| Emergency stretcher | | | | |
| | First aid room bed | | | |
| 7 Audiovisual and IT | LCD projectors | | | |
| | Web-Cast Equipment for Seminar Room | | | |
| | Lecture theatre and seminar room lecterns | | | |
| | Video signage/display screens and software | | | |
| | Meeting room display screen | | | |
| | Patch cables | | | |
| | Network switches | | | |
| | Server room cabinets | | | |
| | CCTV system | | | |

| | | | | |
|------------------------------------------------------|---------------------------------------------------------------------|--|--|--|
| 6 General Equipment | Telephone handsets | | | |
| | Task lights | | | |
| | Photocopiers/printers | | | |
| | Photocopier EMOS or other charging system | | | |
| | Workshop Equipment (benches/tools/power tools) | | | |
| | Departmental electric vehicle | | | |
| | Reception computers | | | |
| | BMS laptop and additional software | | | |
| | UPS system for BMS | | | |
| | Facilities management software | | | |
| | PAT testing equipment and software | | | |
| | Mail room trolleys | | | |
| | Franking machine and contract | | | |
| | Key safes | | | |
| | Toilet brushes | | | |
| | Soap dispensers | | | |
| | Hand towel dispensers (laboratory and washroom) | | | |
| | Toilet roll holders | | | |
| | Electrack system or other power distribution umbilicals for offices | | | |
| | Coat hooks to offices | | | |
| | Labelling machine | | | |
| | Stepladders/kick steps | | | |
| | Clocks, reception, meeting rooms, write up areas | | | |
| | External cigarette ashtrays and bins | | | |
| | Cycle racks | | | |
| | Reception fax machine | | | |
| | Additional key sets | | | |
| | Radio handsets for FM team including booster station and licence | | | |
| | Pallet truck | | | |
| | 3-way truck | | | |
| Mobile scissor lift hydraulic lifting platform/table | | | | |
| Dock leveller | | | | |
| Water softeners | | | | |
| Internal planting | | | | |

| | | | | |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>8</p> <p>Kitchen, Servery and Beverage Stations</p> | <p>Kettles or water boilers</p> <p>Dishwashers</p> <p>Microwave ovens</p> <p>Fridges/freezers</p> <p>Coffee machines</p> <p>Vending machines</p> <p>Commercial dishwasher for servery</p> <p>Dry goods storage racks</p> <p>Ovens</p> <p>Panni grill</p> <p>Hotplates</p> <p>Chinaware and cutlery</p> <p>General kitchen equipment</p> <p>General hospitality equipment</p> <p>Insect killer</p> <p>Catering fridge</p> <p>Catering freezer</p> | | | |
| <p>5</p> <p>Decanting Costs</p> | <p>Removals and logistics</p> <p>Chemical shipping</p> <p>Specialist equipment relocation (inclusive engineer attendance</p> <p>Connection of new/existing equipment</p> <p>Opening ceremony expenses (catering/stage/security/cleaning/furniture</p> <p>Opening ceremony plaque or other</p> <p>Clearance costs of building being vacated to enable clean and clear</p> <p>Skip hire (packaging removal)</p> <p>Servery coffee machine</p> | | | <p>Relocation of people/equipment/desk contents/laboratory contents inclusive resource, vehicles, insurance, crate hire, crane hire, road closures, temporary structures and enabling works such as removal and replacement of windows, doors and structures</p> |
| <p>4</p> <p>Waste Disposal</p> | <p>Waste compactor</p> <p>Waste paper bins to offices and write up areas</p> <p>Recycling bins to offices and write up areas</p> <p>Waste paladins</p> <p>Recycling collection cages</p> <p>Waste solvent storage facility</p> <p>Laboratory bins</p> | | | |
| <p>9</p> <p>Signage</p> | <p>Internal signage</p> <p>External signage</p> | | | <p>Room numbering, office occupants, mandatory, route finding</p> |

Annex F – IT network application matrix

| System | Being Installed | Connection Required beyond actual service | Wired or Wireless | Requires access out of building | Uses standard structured wiring | Use Converged Network | Network to be connected | Service Owned By | Design / Sign off | Install / Setup | Ongoing Support / Maintenance by: | Notes |
|---------------------------------------------------------------|-----------------|-------------------------------------------|-------------------|---------------------------------|---------------------------------|-----------------------|-------------------------|------------------|-------------------|-----------------|-----------------------------------|-------|
| Building Services Systems | | | | | | | | | | | | |
| Ground Source Heat Pump | | | | | | | | | | | | |
| BMS | | | | | | | | | | | | |
| Electric Meters | | | | | | | | | | | | |
| Emergency Lighting | | | | | | | | | | | | |
| Generators | | | | | | | | | | | | |
| Lights | | | | | | | | | | | | |
| Blinds | | | | | | | | | | | | |
| DAS / Mobile Phone Service | | | | | | | | | | | | |
| CHP | | | | | | | | | | | | |
| Water Flow Meters | | | | | | | | | | | | |
| Gas Meter | | | | | | | | | | | | |
| Chillers | | | | | | | | | | | | |
| PV | | | | | | | | | | | | |
| Security / Safety Systems | | | | | | | | | | | | |
| Fire Alarm | | | | | | | | | | | | |
| DRAX | | | | | | | | | | | | |
| Strategic CCTV | | | | | | | | | | | | |
| Alarm Systems | | | | | | | | | | | | |
| Panic Alarms | | | | | | | | | | | | |
| Security Radios | | | | | | | | | | | | |
| Lone Worker systems | | | | | | | | | | | | |
| Lift Phone | | | | | | | | | | | | |
| FM Supported Systems (departmental FM or strategic FM) | | | | | | | | | | | | |
| Door Access Controls | | | | | | | | | | | | |
| Departmental CCTV | | | | | | | | | | | | |
| Phones / Fax | | | | | | | | | | | | |
| Emergency RED phones | | | | | | | | | | | | |
| Photocopiers / MFD | | | | | | | | | | | | |
| Door Entry Phones | | | | | | | | | | | | |
| Electronic Signs | | | | | | | | | | | | |
| Vending Machines | | | | | | | | | | | | |
| Clocks | | | | | | | | | | | | |
| Public Address Systems | | | | | | | | | | | | |
| Departmental Systems | | | | | | | | | | | | |
| Local department LAN | | | | | | | | | | | | |
| Departmental Computing | | | | | | | | | | | | |
| AV | | | | | | | | | | | | |
| Tills | | | | | | | | | | | | |
| Chip N Pin Devices | | | | | | | | | | | | |
| WIFI: EduROAM | | | | | | | | | | | | |
| WIFI: OWL | | | | | | | | | | | | |
| WIFI: The Cloud | | | | | | | | | | | | |
| WIFI: Other: | | | | | | | | | | | | |
| Signs / Display Boards | | | | | | | | | | | | |
| Electronic Key Tracking system | | | | | | | | | | | | |
| Lecture Recording / Distribution | | | | | | | | | | | | |
| Library Specific Services | | | | | | | | | | | | |
| Library Reader | | | | | | | | | | | | |
| Occupancy Systems | | | | | | | | | | | | |
| Library Gates | | | | | | | | | | | | |
| Hanwell Env. Monitoring | | | | | | | | | | | | |
| Book Detection | | | | | | | | | | | | |
| PCAS | | | | | | | | | | | | |
| Stock Management | | | | | | | | | | | | |
| Specialist Application (Studio) | | | | | | | | | | | | |
| BEAM | | | | | | | | | | | | |
| Graduate Accommodation Services | | | | | | | | | | | | |
| Residential Internet Access | | | | | | | | | | | | |
| Washing Machines | | | | | | | | | | | | |

Annex G – Permit to work

To be completed when Contractors return to site between handover and the end of the Defects Liability Period.

The Building or Facilities or Department Manager (or if none available, Estates Services Strategic FM) is to complete this form to ensure all constraints and hazards have been attended to. This person is responsible for the provision of a 24 hour call-out or key holder service and be able to provide a response within 20 minutes. Hazards include, but are not limited to, security arrangements, the presence of vulnerable people and specific hazards.

The purpose of the form is to ensure, a) the Department effectively manages the Contractor on site, b) the Department formally hands over the space to the Contractor, c) responsibility and ownership of work areas / systems are understood by all parties, d) the Contractor is aware of their responsibility to put into place appropriate Health & Safety procedures, and e) the Department is aware of the need to comply with these H&S procedures.

Section 1. To be completed by the person organising the work

Permit No

Start Date of Work

Finish Date of Work

Start time

Finish time

Project Title

Building

Area or room number

Contractor

Name of Contractor's Responsible Person

Date

Responsible person contact details (including telephone number)

Work Title

Section 2. To be completed by the person organising the work

Description of work permitted (include reference to hot works, working at height, specialist systems)

Section 3. To be completed by the person organising the work

Hazards Identified

Section 4. To be completed by the person organising the work

Safety Precautions to be Observed and Personal Protective Equipment Required

Section 5. To be completed by the Contractor's Responsible Person only when sections 2, 3 and 4 are completed

Agreed by the Contractor's Responsible person

1. The general hazards on site have been explained to me
2. I understand the work to be done, the hazards involved and safety precautions required
3. No person will enter any specialized or controlled area without wearing required PPE
4. Work will only be undertaken in the specified area, which will be defined and protected
5. All work will be in accordance with University philosophy documents and authorised procedures
6. I accept responsibility for ensuring that persons who report to me understand and agree to the above

Name (Print)

Signature

Date

Section 6. To be completed by the Facilities Manager when sections 2, 3, 4 are completed

Authorisation – Agreed by the Facilities Manager

- | | |
|--------------------------------------------------------|--------------------------------------------|
| 1. The required safety precautions have been confirmed | 5. Estates Services R&M have been informed |
| 2. The Method Statement has been received | 6. Safety Officer has been informed |
| 3. Building Induction has been completed | 7. Security Services have been informed |
| 4. Occupants of affected areas have been informed | |

Approval – I certify that that the work specified has been approved and may proceed.

Name (Print)

Signature

Date

Section 7. To be completed by the Contractor's Responsible Person

Handback – I certify that *(delete as appropriate)*

- the work specified HAS BEEN completed and all services and fabric reinstated, the area is in a safe condition and all personnel, tools and safety equipment within my control have been removed from the work area
- OR
- the work HAS NOT BEEN fully completed and a further extension is required, normal controls which have not been re-instated at this time are detailed below (to include smoke detectors, panel alarms, enclosures)

Normal controls not re-instated at this time

Fire watch required until

Date

Time

Name (Print)

Signature

Date

Section 8. To be completed by the Facilities Manager

Cancellation – I certify that *(delete as appropriate)*

- the services ARE SATISFACTORILY re-commissioned and the area is re-instated and returned to normal service
- OR
- the work HAS NOT BEEN fully completed and a further permit to work is required

Fire watch required until

Date

Time

Name (Print)

Signature

Date