SCOTTISH CAPITAL

INVESTMENT MANUAL

Risk Management

# Introduction

Risk management is a structured approach to identifying, assessing and controlling risks that emerge during the course of the policy, programme or project lifecycle. It is a critical and continuous process throughout the planning, procurement and implementation journey of a project.

Project risks should be recorded and managed through the use of a project risk register which will be developed by the project team and overseen by the Senior Responsible Officer and/or Project Board for the project.

The project risk register will mature from an overview of a project’s main strategic, organisational and service risks at Initial Agreement stage towards a more specific and detailed understanding of a project’s design and construction related risks between OBC and FBC. The project risk contingency will also develop from an optimism bias allowance at Initial Agreement stage towards a fully costed risk contingency by the time of submission of the FBC.

## Risks & Issues

A ‘Risk’ can be defined as a factor that can affect the achievement of an outcome (either positive or negative) at a future date.

An ‘Issue’ is a factor affecting the development or the implementation of a project at the present time. Actions are therefore immediately put in place to resolve the issue due to its urgency.

All projects will contain risks that may impact on their progress therefore it is important to identify and assess risks in the present so that they can be managed to prevent them from becoming an issue.

## Why is risk management important?

Effective management of risk helps to promote innovation and improve performance by contributing to:

* Increased certainty and fewer surprises
* Better service delivery
* More effective management of change
* More efficient use of resources
* Better management at all levels through improved decision making
* Reduced waste
* Innovation
* Management of contingent and maintenance activities

# Risk Management Process

Risk management is a planned and systematic process consisting of 4 defined stages:

Each of the above stages is described in more detail below:

## Risk Identification

The initial identification of risks and issues with the potential to impact on the achievement of the project’s objectives and benefits realisation is essential in terms of understanding the actions needing to be undertaken to ensure the success of a project.

Risks fall into three main categories:

* Business related risks which remain with the public sector and should never be transferred.
* Service / Project risks which mainly occur during the design, build and operational phases of a project and may be shared between the public and private sectors.
* External risks which relate to society and the impact of the economy as a whole.

Facilitated, multi-stakeholder workshops are useful tools to identify the risks associated with a project. As they are identified they should be documented in a project risk register similar in style to the one outlined below.

The ownership of each risk must also be clearly defined within the risk register and agreed with the individual owners. This will ensure understanding of roles, responsibilities and ultimate accountability. Individual owners should have the capability, authority and experience to deal with risk/s allocated to them.

It should also include an indication of whether the risk will have a financial and/or non-financial impact on the project, or is unquantifiable at that stage of the project:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1. Identification** | | | **2. Assessment** | | | **3. Control** | | **4. Monitoring** | |
| **Risk No** | **Risk Description** | **Financial/**  **Non-Financial /Unquantifiable** | **Consequence** | **Likelihood** | **Risk Rating** | **Proposed Treatment / Mitigation** | **Action Taken** | **Risk Owner** | |
| **(1 - 5)** | **(1 - 5)** | **Type** | **Individual** |
|  |  |  |  |  |  |  |  |  |  |

Note that the project risk register should be a single register that is developed as it progresses through the business case process and not a suite of different registers.

## Risk Assessment

The purpose of risk assessment is to assess the likelihood of risks occurring and their potential consequence or impact.

| **Likelihood** | **Consequence** |
| --- | --- |
| The evaluated chance of a particular outcome actually happening (including a consideration of the frequency with which the outcome may arise). | The evaluated effect or result of a particular outcome actually happening. |

Establishing the likelihood and consequence of each risk occurring is key to determining the risk rating and subsequent actions to be taken.

### Likelihood

The likelihood of a risk occurring can be assessed either quantitatively (% occurrence) or qualitatively (chance of occurrence). The most appropriate method should be selected in each case. The assessment of the current likelihood of a risk occurring should take into account the controls in place to prevent it.

Having assessed the likelihood of the event happening, the following table should be used to determine the likelihood score (1-5) for the event. For example, if the chance of an event happening was 50% then the score would be 3:

|  |  |  |  |
| --- | --- | --- | --- |
| **LIKELIHOOD** | | | |
| **Score** | **Description** | **% Occurrence** | **Chance of Occurrence** |
| 1 | Rare | < 5% | Hard to imagine this event happening – will only happen in exceptional circumstances. |
| 2 | Unlikely | 5 - 24% | Not expected to occur but might – unlikely to happen. |
| 3 | Possible | 25 - 59% | May occur – reasonable chance of occurring. |
| 4 | Likely | 60 – 84% | More likely to occur than not. |
| 5 | Almost Certain | 85 – 100% | Hard to imagine this event not happening. |

### Consequence

The consequence of a risk occurring can impact on an organisation’s responsibilities in different ways and its assessment will therefore need to consider which of the consequence descriptors described in Appendix A is most relevant for the assessment of each risk.

The consequence score (1-5) can be determined using the following criteria:

|  |  |
| --- | --- |
| **CONSEQUENCE** | |
| **Score** | **Description** |
| 1 | Negligible |
| 2 | Minor |
| 3 | Moderate |
| 4 | Major |
| 5 | Extreme |

The assessment of the current consequence of a risk occurring should take into account the controls currently in place to minimise the impact.

### Risk Rating (likelihood x consequence)

The risk rating is assessed by multiplying together the likelihood and consequence scores. Risks are then classified as Red, Amber, Yellow or Green based on the table below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Likelihood** | **Potential Consequences** | | | | |
| **Negligible (1)** | **Minor (2)** | **Moderate (3)** | **Major (4)** | **Extreme (5)** |
| **Almost Certain (5)** | **Medium** | **High** | **High** | **Very High** | **Very High** |
| **Likely (4)** | **Medium** | **Medium** | **High** | **High** | **Very High** |
| **Possible (3)** | **Low** | **Medium** | **Medium** | **High** | **High** |
| **Unlikely (2)** | **Low** | **Medium** | **Medium** | **Medium** | **High** |
| **Rare (1)** | **Low** | **Low** | **Low** | **Medium** | **Medium** |

## Control

Once risks have been identified and assessed they must then be addressed and controlled. The response will need to be proportionate to the level of risk that will have been determined as part of the risk assessment. The following suggests four response types that can be used to address risks at different levels.

### Tolerate

Risks should only be tolerated if the result of their assessment is that they are Low risk and that the cost of taking an action would be disproportionate to the potential benefit gained. This does not mean no action should be taken at all. They should continue to be monitored and any changes in the situation noted that may result in an increased level of risk.

### Mitigate

The purpose of 'mitigating' a risk is to reduce the risk to an acceptable level for the organisation. It is likely that a large number of risks will belong to this category. There are many courses of action an organisation could take to mitigate against risks, for example:

* + Consulting early;
  + Avoiding irreversible decisions;
  + Carrying out pilot studies;
  + Building in flexibility from the start;
  + Taking precautionary action;
  + Transferring risk through contractual arrangements (insurance being an example);
  + Reinstating, or developing different options; or,
  + Abandoning the project because it is too risky.

Appendix B provides more information on mitigating actions that might typically be taken both before and during project implementation.

### Transfer

Before deciding to transfer a risk to a third party, consideration should be given as to who is best placed to manage the risk. It may be that the risk is best managed internally within the organisation. It is also possible that transferring risk to a supplier will result in a significant cost to the organisation and this should be considered before taking this course of action. Also remember that whilst transferring responsibility for a risk is possible, accountability for that risk is not.

### Review & Rethink Strategy

If the assessed level of a risk is Very High, consideration will need to be given to the overall approach to the project. In some circumstances it may be necessary to stop the current course of action and start over. It should be noted that the option to terminate activities should be exercised as a last resort, where other courses of action have not mitigated the risk to an acceptable level. It should, however, be realised that the reason a number of activities are conducted in the public sector is because the associated risks are so great that there is no other way in which the output or outcome, which is required for the public benefit, can be achieved.

When controlling risks at the contract management stage, cooperation and dialogue between a contract manager and supplier should be actively encouraged. If suppliers feel able to share information about potential problems at the earliest opportunity then small issues can be dealt with and not escalate.

## Risk Monitoring

One of the most common approaches to monitoring risks is the use of a risk register. This will be developed first at Initial Agreement stage and then be reviewed at each further stage of the business case, procurement and contract management processes.

Risk monitoring by the project team should thus be a **continuous** process throughout the project planning, procurement and implementation stages.

The risk management and reporting processes shall be developed by the project team and overseen by the Senior Responsible Officer (SRO) and/or Project Board who will be able to scrutinise and challenge some of the following:

* That an appropriate risk management process has been suitably adopted.
* That assumptions behind High and Very High risks are appropriate.
* That Major and Extreme consequence risks are suitably assessed for their likelihood of occurrence.
* That appropriate control measures have been put in place to mitigate against these risks.
* That the presumed affect of the mitigation measures isn’t overly optimistic.
* That those mitigation measures have been effective.
* That the project isn’t inherently too risky to proceed,
* That the subsequent risk quantification process is robustly developed.

In order to maintain a historical record of risks identified and mitigating actions taken, a new version of the risk register should be completed at each review stage.

# Risk Quantification

## Introduction

Early project cost estimates are inherently uncertain which can result in them being misrepresented or misunderstood at the various reporting stages, therefore, a framework of appropriate risk quantification is required that better supports the appraisal of these project costs.

As the risk register is formed at Initial Agreement stage there is an expectation that each risk is determined to either have a financial and/or non-financial impact on the project, or is unquantifiable at that particular stage of the project.

Financially quantifiable risks shall be incorporated into a risk contingency for a project, whereas unquantifiable risks shall be covered by an allowance of ‘optimism bias’ – a financial adjustment to project costs to redress the tendency of estimators to overstate benefits and understate project timings and costs.

As a project develops from Initial Agreement through to Full Business Case and procurement, it is expected that the level of unquantifiable optimism bias is minimised through a combination of increased quantification of known risks, elimination of risks through mitigation measures, and the transfer of contingencies into the project base cost.

## Use of Optimism Bias

Optimism bias shall be used at Initial Agreement stage where only minimal risk quantification for a project can be undertaken; however, if historical precedents of similar types of projects are available then they can be used as an alternative source for setting an early cost benchmark for a project.

The following five steps should be followed to derive the appropriate Optimism Bias adjustment factor to use for a project:

* Step 1: Determine the type of project that the business case relates to.
* Step 2: Identify the starting upper bound percentage for Optimism Bias.
* Step 3: Assess the level of mitigation already carried out.
* Step 4: Apply the Optimum Bias adjustment to project costs.
* Step 5: Continually review the Optimism Bias adjustment.

Each of these steps is described in more detail below:

### Step 1: Determine the type of project

The definitions of generic project types are as follows:

* **Standard building projects** – those which do not require special design considerations such as general hospitals, health centres, office accommodation, etc.
* **Non-standard building projects** – those which require special design considerations due to space constraints, complicated site characteristics, specialist innovative buildings or unusual output specifications (i.e. specialist hospitals, high technology facilities, and other unique buildings or refurbishment projects)
* **Standard civil engineering projects** – these involve the construction of facilities, in addition to buildings, not requiring special design considerations – for example, most new roads and some utility projects
* **Non-standard civil engineering projects** – these involve the construction of facilities, in addition to buildings, requiring special design considerations due to space constraints or unusual output specifications – for example, innovative rail, road, utility projects, or upgrade and extension projects
* **Equipment and development projects** – these are concerned with the provision of equipment and/or development of software and systems (i.e. manufactured equipment, information and communication technology development projects or leading edge projects)
* **Outsourcing projects** – these are concerned with the provision of hard and soft facilities management services – for example, information and communication technology services, facilities management and maintenance projects.

A project which includes several project types (for example, an element of standard building, non-standard building, standard civil engineering, outsourcing and equipment/development) should be considered as a ‘programme’ with five ‘projects’ for Optimism Bias assessment purposes.

### Step 2: Identify the starting upper bound percentage

The table below provides adjustment percentages for these generic project categories that should be used as the starting point for calculating the level of optimism bias in the absence of more robust evidence.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Project Type** | **Optimism Bias (%)** | | | |
| **Works Duration** | | **Capital Expenditure** | |
| **Upper** | **Lower** | **Upper** | **Lower** |
| Standard buildings | 4 | 1 | 24 | 2 |
| Non-standard buildings | 39 | 2 | 51 | 4 |
| Standard civil engineering | 20 | 1 | 44 | 3 |
| Non-standard civil engineering | 25 | 3 | 66 | 6 |
| Equipment/development | 54 | 10 | 200 | 10 |
| Outsourcing | n/a | n/a | 41\* | 0\* |

\* the optimism bias for outsourcing projects is measured for operating expenditure.

If, however, historical precedents of similar types of projects are available then this can be used as a source of cost information for setting an alternative upper bound percentage. An explanation will be required of the assumptions made and robustness of this alternative adjustment factor.

### Step 3: Assess the level of mitigation already carried out

The identified upper bound level for optimism bias should be reduced to take account of the extent to which each Optimism Bias contributory factor has been mitigated. The following table provides a list of typical Optimism Bias Contributory Factors and their proportion related to a building related project:

|  |  |  |  |
| --- | --- | --- | --- |
| **Contributory Factor to Upper Bound** | **% Factor Contributes** | **% Factor Contributes after mitigation** | **Explanation for rate of mitigation** |
| Progress with Planning Approval | 4 |  |  |
| Progress with other Regulatory approvals | 4 |  |  |
| Depth of surveying of site/ground information | 3 |  |  |
| Detail of design | 4 |  |  |
| Innovative project/design (i.e. has this type of project/design been undertaken before) | 3 |  |  |
| Design complexity | 4 |  |  |
| Likely variations from Standard Contract | 2 |  |  |
| Design Team capabilities | 3 |  |  |
| Contractors’ capabilities (excluding design team covered above) | 2 |  |  |
| Contractor Involvement | 2 |  |  |
| Client capability and capacity (NB do not double count with design team capabilities) | 6 |  |  |
| Robustness of Output Specification / project brief | 25 |  |  |
| Involvement of Stakeholders, including Public and Patient Involvement | 5 |  |  |
| Agreement to output specification / project brief by stakeholders | 5 |  |  |
| New service or traditional | 3 |  |  |
| Local community consent | 3 |  |  |
| Stable policy environment | 20 |  |  |
| Likely competition in the market for the project | 2 |  |  |
| **TOTAL** | **100** |  | **- Adjusted Factor** |

The degree by which these Contributory Factors is reduced may be dependent upon a combination of increased quantification of known risks, elimination of these factors through mitigation measures, and/or the transfer of these factors into the project base cost where a 90-95% cost certainty has been developed.

Note that there should be no double counting between these Contributory Factors and quantifiable project risks.

### Step 4: Apply the Optimum Bias adjustment to project costs

The present value of the capital costs should be multiplied by the adjusted optimism bias factor. The result should then be added to the total net present cost (or NPC) to provide the base cost. The base cost, as defined in the Green Book, is the best estimate of how much a proposal will cost in economic terms, allowing for risk and optimism bias.

### Continually review the Optimism Bias adjustment

Clear and tangible evidence of the mitigation of contributory factors must be presented, whilst also being verified independently, before reductions in optimism bias are made. Procedures for this include the Gateway Review and Key Stage Review processes.

### Presenting the Results

Following these steps will provide an optimism bias adjustment that can be used to provide a better estimate of the base case. Sensitivity testing can be used to consider uncertainties around the adjustment for optimism bias to show the range of potential outcomes, not just the single optimism bias adjustment. This can then be used to inform the range of costs applicable for reporting at Initial Agreement stage.

### Operating Costs and Benefits

Optimism bias should also be considered for operating costs and benefits. If, however, there is no evidence to support adjustments to operating costs or benefits, appraisers should use sensitivity analysis to check switching values to answer key questions such as:

* By how much can we allow benefits to fall short of expectations, if the proposal is to remain worthwhile? How likely is this?
* By how much can operating costs increase, if the proposal is to remain worthwhile? How likely is this to happen?
* What will be the impact on benefits if operating costs are constrained?

## A Bottom up Approach to Risk Quantification

The need to use generic ‘Optimism Bias’, or any other provision for unknown uncertainty, in a project cost estimate implies that there is significant elements of the project that are not defined or understood. As these project details become better understood the intention should be to develop an integrated project base cost and risk contingency that all but replaces optimism bias. This, however, should be done in stages as the project develops between Initial Agreement, Outline and Full Business Cases.

This risk contingency must therefore be generated from a ‘bottom-up’ risk quantification based on a comprehensive risk register and associated mitigation plans.

The following describes three approaches for calculating this risk contingency, with the Monte Carlo simulation technique regarded as the most beneficial approach to take.

### Single point probability analysis

At its most basic, a risk analysis consists of an estimate of the cost of each risk occurring, multiplied by a single likelihood of that risk occurring – see the example below.

|  |  |
| --- | --- |
| **Case Study**  **Single Point Analysis** | |
| Element of Cost being considered | £2 million |
| Estimated consequence of risk of cost over-run | £200,000 |
| Estimated likelihood of risk occurring | 10% |
| Estimated value of risk = £200,000 x 10% | £20,000 |

### Multi-point probability analysis

For any risk, a range of possible outcomes is more likely. An output probability distribution provides a more complete picture of the possible outcomes and recognises that some of these outcomes are more likely to occur than others. An ‘expected outcome’ is the average of all possible outcomes, taking into account their different probabilities. An example is given below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Case Study**  Multi point analysis.  It is estimated that a particular facility will cost £50m to build. The expected costs associated with construction cost uncertainties have been calculated as follows: | | | |
| Possible Cost (£m) | Difference from estimated cost (£m) | Estimated likelihood of the event occurring | Risk Value (£m) |
| 45 | -5 | 0.1 | -0.5 |
| 50 | 0 | 0.6 | 0 |
| 55 | +5 | 0.1 | +0.5 |
| 60 | +10 | 0.1 | +1.0 |
| 65 | +15 | 0.1 | +1.5 |
| The most likely outcome is that of no extra cost, as this outcome has the highest likelihood (60%). However, the expected outcome – the sum of each possible outcome multiplied by its likelihood – is an additional cost of £2.5 million. This needs to be calculated in NPV terms, taking into account the time period over which the risk occurs. | | | |

### Monte Carlo or Latin Hypercube simulation

It is unlikely that all risk items will occur and there are a variety of packages available that take the analysis of risk a step further, using probability distribution.

Information included in the Risk Register detailing risks, likelihood and consequence (lowest cost impact, most likely cost impact and highest cost impact) are fed into the Monte Carlo or Latin Hypercube IT programmes which then calculate an overall cost of the risk. Generally the programme is run several times to avoid any “rogue” results being included thereafter in the process.

**Monte Carlo** analysis is a risk modelling technique that presents both the range as well as the expected value of the collective impact of various risks. It is useful when there are many variables with significant uncertainties. However, expert advice is required to ensure it is applied properly, especially when risks are not independent of each other.

**Latin Hypercube** is designed to reproduce accurately the input distribution through sampling using fewer iterations compared with the Monte Carlo approach.

### Testing of risk quantified allowances

A problem that can arise when using a bottom-up approach to the quantification of risk is that the more comprehensive the project’s risk register is, the greater the potential to develop a similarly comprehensive list of risk costs and thus an abnormally high risk contingency.

The most reliable way to crosscheck the scale of the overall risk allowance is to integrate it with the project base cost and then compare it with out-turn data from comparable projects at similar stages of development. If these benchmark costs are significantly higher or lower than the project estimate, this suggests that it would be prudent to include an adjustment to the bottom-up calculation used to inform the project risk contingency.

# Expectations at Business Case Stages

As the project progresses from Initial Agreement towards OBC and FBC Stages, the project risk register will mature from an overview of a project’s main strategic, organisational and service risks towards a more detailed understanding of a project’s design and construction related risks. The project risk contingency will develop from an optimism bias allowance towards a fully costed risk contingency. The following provides more information on the different expectations at each business case stage:

## Initial Agreement stage

The following steps will provide a guide to the development of a risk management and quantification process appropriate at Initial Agreement stage:

* Develop a project risk register by initially identifying the strategic risks associated with the project. Appendix C provides an indication of typical risks expected to be considered at this stage.
* Indicate whether these risks have a financial and/or non-financial consequence, or are unquantifiable at this stage.
* Assess each risk to determine its risk rating.
* Outline the action taken, or to be taken, in controlling each risk.
* Identify the likely owner type for each risk.
* Where appropriate, calculate the risk contingency to be added to the project base cost by identifying a suitable adjustment for optimism bias.
* Alternatively, use historic cost data from projects of similar type and stage of development to calculate the combined project base cost and risk contingency.
* Review the outturn project cost (inclusive of risk contingency) against suitable benchmark costs to confirm that they are reasonably reported.
* Follow confirmed governance arrangements for independent review (and reporting) of the project risk register and risk quantification by a senior management governance committee.

## OBC Stage

The following steps will provide a guide to the development of a risk management and quantification process appropriate at Outline Business Case stage:

* Review the existing risk register developed at Initial Agreement stage, update it for any change in assumptions, and record the impact of any control measures.
* Add any further project specific risks to the risk register. Appendix D provides an indication of typical risks expected to be considered at this stage.
* Update the assessment of each risk as a financial and/or non-financial risk, or confirm that it remains unquantifiable at this stage. These risks should then be treated as follows:
  + All financial risks shall be used as the basis of the bottom-up quantification of risks for the project risk contingency.
  + The main non-financial risks should be considered as part of the non-financial risk appraisal of project options in the Economic Case.
  + Reliance on unquantifiable risks shall be as low as reasonably possible, and replaced with financially quantifiable risks where appropriate to do so.
* Provide more detailed information of control measures introduced, their effectiveness, and further measures to take.
* Indentify and record the individual owner to be responsible for the control of each risk.
* Review the outturn project cost (inclusive of risk contingency) against suitable benchmark costs to confirm that they are reasonably reported.
* Follow confirmed governance arrangements for independent review (and reporting) of the project risk register and risk quantification by the project’s Senior Responsible Owner (SRO) or Project / Programme Board.

## FBC Stage

The following steps will provide a guide to the continued development of a risk management and quantification process appropriate at Full Business Case stage:

* Review the existing risk register developed at OBC stage, update it for any change in assumptions, and record the impact of any control measures.
* Add any further project specific risks to the risk register. Appendix E provides an indication of typical risks expected to be considered at this stage.
* Update the assessment of each risk as a financial and/or non-financial risk, or confirm that it remains unquantifiable at this stage. These risks should then be treated as follows:
  + Financial risks with a high cost certainty shall be transferred from the project contingency into the man project base cost. All other financial risks shall be identified within the business case with an explanation as to why they remain within the project contingency, when they are most likely to occur, and how they are to be managed.
  + Non-financial risks should have been reduced to Low or Medium risk through appropriate control measures; otherwise, an explanation is needed in the business case as to why they remain High or Very High, how they are to be monitored and controlled, and whether they are a burden to the potential success of the project.
  + Unquantifiable risks should at this stage be minimal, if not eliminated altogether. Any remaining unquantifiable risks shall be identified within the business case whilst being excluded from the project costs. Risk ownership will transfer to Scottish Government at this stage.
* Confirm that all outstanding project risks have an appropriate control measure and individual risk owner associated with it.
* Review the outturn project cost (inclusive of risk contingency) against suitable benchmark costs to confirm that they are reasonably reported.
* Follow confirmed governance arrangements for independent review (and reporting) of the project risk register and risk quantification by the SRO.

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Appendix A – Risk Consequence Descriptor Table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Descriptor** | **Negligible (White)** | **Minor (Green)** | **Moderate (Yellow)** | **Major (Amber)** | **Extreme (Red)** |
| **Patient Experience** | **Reduced quality of patient experience / clinical outcome not directly related to delivery of clinical care.** | **Unsatisfactory patient experience / clinical outcome directly related to care provision – readily resolvable.** | **Unsatisfactory patient experience / clinical outcomes; short term effects – expect recovery within 1 week.** | **Unsatisfactory patient experience / clinical outcomes; long term effects – expect recovery longer than 1 week.** | **Unsatisfactory patient experience / clinical outcomes; continued ongoing long term effect.** |
| **Objectives / Project** | **Barely noticeable reduction in scope, quality or schedule.** | **Minor reduction in scope, quality or schedule.** | **Reduction in scope or quality of projects, project objectives or schedule.** | **Significant project overrun.** | **Inability to meet the project objectives; reputation of the organisation seriously damaged.** |
| **Injury (physical and psychological) to patient / visitor / staff** | **Adverse event leading to minor injury not requiring first aid.** | **Minor injury or illness. First aid treatment required.** | **Agency reportable (e.g police (violent and aggressive acts).**  **Significant injury requiring medical treatment and / or counselling.** | **Major injuries / long term incapacity or disability (loss of limb) requiring medical treatment and / or counselling.** | **Incident leading to death or major permanent incapacity.** |
| **Complaints / Claims** | **Locally resolved verbal complaint.** | **Justified written complaint peripheral to clinical care.** | **Below excess claim. Justified complaint involving lack of appropriate care.** | **Claim above expected level. Multiple justifiable complaints.** | **Multiple claims or single major claim.**  **Complex justified complaint.** |
| **Service / Business Interruption** | **Interruption in a service which does not impact on the delivery of patient care or the ability to continue to provide service.** | **Short term disruption to service with minor impact on patient care.** | **Some disruption in service with unacceptable impact on patient care.**  **Temporary loss of ability to provide service.** | **Sustained loss of service which has serious impact on delivery of patient care resulting in major contingency plans being invoked.** | **Permanent loss of core service or facility. Disruption to facility leading to significant “knock on” effect.** |
| **Staffing and Consequences** | **Short term low staffing level, temporary reduce service quality (less than 1 day). Short term low staffing level (greater than 1 day), where there is no disruption to patient care.** | **Ongoing low staffing level reduces service quality. Minor error due to ineffective training / implementation of training.** | **Late delivery of key objectives / service due to lack of staff. Moderate error due to ineffective training / implementation of training. Ongoing problems with staffing levels.** | **Uncertain delivery ok key objective / service due to lack of staff. Major error due to ineffective training / implementation of training.** | **Non delivery of key objective / service due to lack of staff. Loss of key staff.**  **Critical error due to ineffective training / implementation of training.** |
| **Financial**  **(including damage / loss / fraud)** | **Negligible organisational / personal financial loss (less than £1K)**  **(N.B. Adjust for context).** | **Minor organisational / personal financial loss (£1K - £10K).** | **Significant organisational / personal financial loss (£10K - £100K).** | **Major organisational / personal financial loss (£100K - £1m).** | **Severe organisational / personal financial loss (greater than £1m).** |
| **Inspection / Audit** | **Small number of recommendations which focus on minor quality improvement issues.** | **Recommendations made which can be addressed by low level of management action.** | **Challenging recommendation that can be addressed with appropriate action plan.** | **Enforcement action. Low rating.**  **Critical Report.** | **Prosecution. Zero rating.**  **Severely critical Report.** |
| **Adverse Publicity / Reputation** | **Rumours, no media coverage.**  **Little effect on staff morale.** | **Local media coverage – short term.**  **Some public embarrassment.**  **Minor effect on staff morale / public attitudes.** | **Local media – long term adverse publicity.**  **Significant effect on staff morale and public perception of the organisation.** | **National media / adverse publicity, less than 3 days.**  **Public confidence in the organisation undermined.**  **Use of service affected.** | **National / international media / adverse publicity, more than 3 days.**  **MSP/MP concerns (Questions in Parliament). Court enforcement. Public Inquiry / FAI.** |

Appendix B – Risk Mitigation

There are a number of approaches that can be taken to mitigate against the impact of the identified risks, such as:

* **Active risk management** – Effective management of risks involves:
  + identifying possible risks in advance and putting mechanisms in place to minimise the likelihood of their materialising with adverse effects;
  + having processes in place to monitor risks, and access to reliable, up-to-date information about risks;
  + the right balance of control in place to mitigate the adverse consequences of the risks, if they should materialise; and,
  + decision-making processes supported by a framework of risk analysis and evaluation.
* **Early consultation** – Experience suggests that costs tend to increase as more requirements are identified, or the later that these requirements are identified. Early consultation will help to identify what those needs are and how they may be addressed.
* **Avoidance of irreversible decisions** – Where lead options involve irreversibility, a full assessment of costs should include the possibility of delay, allowing more time for investigation of alternative ways to achieve the objectives.
* **Pilot Studies** – Acquiring more information about risks affecting a project through pilots allows steps to be taken to mitigate either the adverse consequences of bad outcomes, or increase the benefits of good outcomes.
* **Design Flexibility** – Where future demand and relative prices are uncertain, it may be worth choosing a flexible design adaptable to future changes, rather than a design suited to only one particular outcome. For example, different types of fuel can be used to fire a dual fired boiler, depending on future relative prices of alternative fuels. Breaking a project into stages, with successive review points at which the project could be stopped or changed, can also increase flexibility.
* **Precautionary Principle** – Precautionary action can be taken to mitigate a perceived risk. The precautionary principle states that because some outcomes are so bad, even though they may be very unlikely, precautionary action is justified. In cases where such risks have been identified, they should be drawn to the attention of senior management and expert advice sought.
* **Procurement / contractual** – risk can be contractually transferred to other parties and maintained through good contractual relationships, both formal and informal. Insurance is the most obvious example of risk transfer. The main text of this Appendix provides further information about the types of risk that can, and often are, transferred.
* **Reinstate, or develop different options** – Following the risk analysis, the appraiser may want to reinstate or options, or develop alternative ones that are either less inherently risky or deal with the risks more efficiently.
* **Abandon proposal** – Finally, the proposal may be so risky that, whatever option is considered, it has to be abandoned.

Appendix C: Strategic Risks at Initial Agreement stage

| **1. Identification** | | | **2. Assessment** | | | **3. Control** | | **4. Monitoring** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Risk No** | **Risk Description** | **Financial / Non-Financial / Unquantifiable** | **Consequence** | **Likelihood** | **Risk** | **Proposed Treatment / Mitigation** | **Action Taken** | **Risk Owner** | |
| **(1 - 5)** | **(1 - 5)** | **Type** | **Individual** |
| **CLIENT / BUSINESS RISKS** | | |  |  |  |  |  |  |  |
| **1.0** | **Business risk** |  |  |  |  |  |  |  |  |
| 1.1 | The project disrupts day to day business operations |  |  |  |  | Set up regular review points throughout the life of the project to monitor and respond to the impact of the project on normal activities |  |  |  |
| 1.2 | Client doesn't have the capacity or capability to deliver the project |  |  |  |  | Develop appropriate governance arrangements for the project including resource planning and individual skills review |  |  |  |
| 1.3 | The clinical need for change and expected outcomes isn’t clearly defined |  |  |  |  | Set out a plan to engage with service providers to fully understand the service based need for change and the expected outcome from investment |  |  |  |
| 1.4 | Poor stakeholder involvement results in a lack of support for the project |  |  |  |  | Prepare and implement an appropriate project communication plan which engages with all appropriate stakeholders at appropriate stages of the project |  |  |  |
| **2.0** | **Reputational risk** |  |  |  |  |  |  |  |  |
| 2.1 | Adverse publicity occurs due to an issue with the project |  |  |  |  | Review the reputational impact of all risks in this register and take action |  |  |  |
| 2.2 | Poor communication ignores stakeholder interests |  |  |  |  | Ensure that the project communication plan covers issues of public perception / consultation feedback / media interest / parliamentary interest / organisational reputation, etc |  |  |  |
| **3.0** | **Demand risk** |  |  |  |  |  |  |  |  |
| 3.1 | Demand for the service does not match the levels planned, projected or presumed |  |  |  |  | Carry out sensitivity testing of assumptions behind service demand projections to understand and manage any underlying risks |  |  |  |
| **4.0** | **Occupancy risk** |  |  |  |  |  |  |  |  |
| 4.1 | Review any project specific risks |  |  |  |  |  |  |  |  |
| **5.0** | **Operational risk** |  |  |  |  |  |  |  |  |
| 5.1 | The available accommodation is unable to support the proposed service model |  |  |  |  | Review service model & activity levels at early design planning stages and test assumptions throughout design development and implementation. |  |  |  |
| **6.0** | **Decant risk** |  |  |  |  |  |  |  |  |
| 6.1 | Unable to decant staff / clients from one site to another in a timely manner |  |  |  |  | Regularly review decant plan against project plan to ensure that they remain aligned |  |  |  |
| **7.0** | **Technology risk** |  |  |  |  |  |  |  |  |
| 7.1 | Review any project specific risks? |  |  |  |  |  |  |  |  |
| **PLANNING & DESIGN RISKS** | | |  |  |  |  |  |  |  |
| **8.0** | **Planning risk** |  |  |  |  |  |  |  |  |
| 8.1 | Local community objects to the project |  |  |  |  | Engage with local communities to gain their support for proposals re new site developments |  |  |  |
| **9.0** | **Project information risk** |  |  |  |  |  |  |  |  |
| 9.1 | Information used as part of the strategic & project brief is unreliable |  |  |  |  | Assumptions which have a material impact on the project should be clearly defined in the Initial Agreement, with a process for confirming those assumptions set out as the project develops between OBC & FBC |  |  |  |
| **10.0** | **Design risk** |  |  |  |  |  |  |  |  |
| 10.1 | The design does not meet the Design Assessment expectations |  |  |  |  | The design team need to engage with the Design Assessment team from early design planning stages onwards to avoid confusion over expectations |  |  |  |

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| **CONSTRUCTION / PROPERTY RELATED RISKS** | | |  |  |  |  |  |  |  |
| **11.0** | **Procurement risk** |  |  |  |  |  |  |  |  |
| 11.1 | Review any project specific risks at this stage |  |  |  |  |  |  |  |  |
| **12.0** | **Construction risk** |  |  |  |  |  |  |  |  |
| 12.1 | Critical programme dates are unrealistic |  |  |  |  | A realistic project programme should be developed from IA stage onwards which is regularly monitored and reviewed |  |  |  |
| **13.0** | **Maintenance risk** |  |  |  |  |  |  |  |  |
| 13.1 | Review any project specific risks at this stage |  |  |  |  |  |  |  |  |
| **FINANCE RISKS** | | |  |  |  |  |  |  |  |
| **14.0** | **Funding risk** |  |  |  |  |  |  |  |  |
| 14.1 | The project estimate is poorly prepared and inaccurate |  |  |  |  | The level of detail required for project cost estimates should align with guidance on each planning stage |  |  |  |
| 14.2 | The project becomes unaffordable |  |  |  |  | The affordability of the project should be tested at IA stage and further explored as part of the OBC and FBC stages of the project |  |  |  |
| **15.0** | **Residual value risk** |  |  |  |  |  |  |  |  |
| 15.1 | Review any project specific risks |  |  |  |  |  |  |  |  |

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| **EXTERNAL RISKS** | | |  |  |  |  |  |  |  |
| **16.0** | **Economic risk** |  |  |  |  |  |  |  |  |
| 16.1 | Inflation costs rise above those projected |  |  |  |  | The likelihood of this occurring needs to be considered as part of the Financial Case |  |  |  |
| **17.0** | **Legislative risk** |  |  |  |  |  |  |  |  |
|  | Changes in legislation or tax rules increase project costs |  |  |  |  | The likelihood of this occurring should be considered as part of this risk register |  |  |  |
| **18.0** | **Policy risk** |  |  |  |  |  |  |  |  |
|  | Changes to non-legislation policy affects project cost or progress |  |  |  |  | The likelihood of this occurring should be considered as part of this risk register |  |  |  |
|  | There are uncertainties over future policy changes |  |  |  |  | The likelihood of this occurring should be considered as part of this risk register |  |  |  |

Appendix D: Additional Project Risks at OBC stage

| **1. Identification** | | | **2. Assessment** | | | **3. Control** | | **4. Monitoring** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Risk No** | **Risk Description** | **Financial / Non-Financial / Unquantifiable** | **Consequence** | **Likelihood** | **Risk** | **Proposed Treatment / Mitigation** | **Action Taken** | **Risk Owner** | |
| **(1 - 5)** | **(1 - 5)** | **Type** | **Individual** |
| **CLIENT / BUSINESS RISKS** | | |  |  |  |  |  |  |  |
| **1.0** | **Business risk** |  |  |  |  |  |  |  |  |
| 1.5 | A safe environment for staff, patients and visitors is not maintained during the course of the project |  |  |  |  | Ensure that an appropriate health & safety plan is developed in line with CDM regulations etc |  |  |  |
| 1.6 | A safe clinical environment is not maintained during the course of the project |  |  |  |  | Ensure that the health & safety plan incorporates issues related to infection control and clinical governance |  |  |  |
| **2.0** | **Reputational risk** |  |  |  |  |  |  |  |  |
| **3.0** | **Demand risk** |  |  |  |  |  |  |  |  |
| 3.2 | Demand for accommodation does not match the levels planned, projected or presumed |  |  |  |  | Ensure that service demand assumptions are closely link with accommodation needs, and that there is sufficient flexibility in the arrangements to meet reasonable variations in demand |  |  |  |
| **4.0** | **Occupancy risk** |  |  |  |  |  |  |  |  |
| 4.1 | The accommodation remains empty following completion of works |  |  |  |  | Ensure that the operational commissioning plan is aligned with any construction programme and that service move arrangements are in place and ready to move at the appropriate time |  |  |  |
| **5.0** | **Operational risk** |  |  |  |  |  |  |  |  |
| **5.2** | Service provision or performance is below that contracted or normally expected |  |  |  |  | Where service performance is linked to contractual arrangements then appropriate monitoring arrangements need to be set out along with service change proposals |  |  |  |
| 5.3 | Operating service costs are higher than budgeted |  |  |  |  | Set out proposals for monitoring service costs, with contingency plans if costs begin to rise above budget projections |  |  |  |
| 5.4 | New service model cannot be implemented |  |  |  |  | A service change plan should be developed which is closely aligned to the design development process and implementation of the project |  |  |  |
| 5.5 | Plans for service integration between different providers or organisations is not achieved |  |  |  |  | The project's service change plan should incorporate, where required, consultation between the various service providers on proposed new working arrangements |  |  |  |
| **6.0** | **Decant risk** |  |  |  |  |  |  |  |  |
| 6.2 | Lack of available decant space impacts on service provision |  |  |  |  | The availability of decant space should be identified at OBC stage and confirmed at FBC stage |  |  |  |
| **7.0** | **Technology risk** |  |  |  |  |  |  |  |  |
| 7.1 | Changes in technology result in services being provided using non-optimal technology |  |  |  |  | Opportunities to take advantage of potential future technology advances should be explored as part of the OBC |  |  |  |
| **PLANNING & DESIGN RISKS** | | |  |  |  |  |  |  |  |
| **8.0** | **Planning risk** |  |  |  |  |  |  |  |  |
| 8.2 | Progress with Planning Approval takes longer than planned |  |  |  |  | The project programme should consider the complexity of design and any planning risks when projecting a reasonable time period for this stage |  |  |  |
| 8.3 | Progress with other regulatory body approvals takes longer than planned |  |  |  |  | The project programme should consider the complexity of design when projecting a reasonable time period for this stage |  |  |  |
| 8.4 | Requirements of Planning or Statutory consents result in an increase to project scope/requirements |  |  |  |  | The planning authority should be engaged at an early stage once design proposals are formed to understand any planning constraints or further planning expectations |  |  |  |
| 8.5 | Planning constraints delay project progress and thus increase costs |  |  |  |  | The project programme should consider the complexity of design and any planning risks when projecting a reasonable time period for this stage |  |  |  |
| 8.6 | There are objections to the use of the proposed site |  |  |  |  | A full site feasibility report should be prepared when potential new sites are being considered, which includes consultation on local community support for the proposed use of each site |  |  |  |
| **9.0** | **Project information risk** |  |  |  |  |  |  |  |  |
| 9.2 | The client's project brief is lacking in the required information or is insufficient |  |  |  |  | A project brief should be fully developed as the project reaches OBC stage and before FBC stage. This should be further tested as part of the business case approval process |  |  |  |
| 9.3 | Inadequate depth of surveying of site constraint / ground information |  |  |  |  | The need for site constraint / ground investigation information should be considered at OBC stage where there is a risk to the project budget, and a detailed investigation carried out during the FBC stage |  |  |  |
| **10.0** | **Design risk** |  |  |  |  |  |  |  |  |
| 10.2 | The design team does not have sufficient capacity or capability for the project |  |  |  |  | The capacity and capability of the design team should be fully explored by the client and contractor during the procurement stage, and evidenced in the project's OBC |  |  |  |
| 10.3 | Client requirements regularly change throughout the duration of the project |  |  |  |  | The client's project brief should be fully explored and confirmed during the OBC stage and prior to any in-depth design development work |  |  |  |
| 10.4 | The design isn't capable of delivering the services to the required performance or quality standards |  |  |  |  | The quality and appropriateness of design should be fully explored with all stakeholders as part of the design development process |  |  |  |
| 10.5 | Service providers or users cannot agree the project brief |  |  |  |  | A design consultation / stakeholder engagement plan should be developed to minimise confusion or disagreements between service providers and users |  |  |  |
| 10.6 | The design does not meet the Design Assessment expectations |  |  |  |  | The design team need to engage with the Design Assessment team from early design planning stages onwards to avoid confusion over expectations |  |  |  |
| 10.7 | The complexity or innovative nature of design is difficult to implement |  |  |  |  | Ambitions for complexity of design should be balanced with the design team and contractor's capabilities to implement such designs |  |  |  |
| 10.8 | There is insufficient car parking for the number of occupants and their service users |  |  |  |  | A traffic management plan should be developed as part of the project brief at OBC stage which also considers the appropriate number of car parking spaces required |  |  |  |
| **CONSTRUCTION / PROPERTY RELATED RISKS** | | |  |  |  |  |  |  |  |
| **11.0** | **Procurement risk** |  |  |  |  |  |  |  |  |
| 11.1 | The contractor does not have sufficient capacity or capability to deliver the project |  |  |  |  | The capacity and capability of the contractor should be fully explored by the client during the procurement stage, and evidenced in the project's OBC |  |  |  |
| 11.2 | The Contractor's involvement in the project is too late to impact on the design solution |  |  |  |  | The contractor should be involved at an early stage in the design development in line with the appropriate procurement route recommendations |  |  |  |
| 11.3 | The project varies from standard contracts |  |  |  |  | A statement explaining the reasons behind deviation from standard contract arrangements should be declared at OBC and confirmed at FBC |  |  |  |
| 11.4 | Disputes arise between client and contractor affecting project cost and time |  |  |  |  | A partnering type arrangement should be developed whereby both client and contractor are aware of each other’s expectations from the project and a good working relationship is formed |  |  |  |
| **12.0** | **Construction risk** |  |  |  |  |  |  |  |  |
| 12.2 | The construction project is poorly managed causing delays and cost overruns |  |  |  |  | The capacity and capability of the project director and project manager should be fully evidenced in the project's OBC & FBC |  |  |  |
| 12.3 | Construction of the physical solution is not completed to time, budget or specification |  |  |  |  | A construction based risk register should be developed and confirmed at FBC stage to minimise changes to programme, budget or specification |  |  |  |
| **13.0** | **Maintenance risk** |  |  |  |  |  |  |  |  |
| 13.2 | Ongoing maintenance costs are higher than projected |  |  |  |  | Expected maintenance costs should be discussed throughout the design development stage and subsequently monitored post completion |  |  |  |
| **FINANCE RISKS** | | |  |  |  |  |  |  |  |
| **14.0** | **Funding risk** |  |  |  |  |  |  |  |  |
| 14.3 | Additional funds are required to support increased capital costs |  |  |  |  | The availability of contingency funds needs to be considered at OBC and addressed as part of the FBC |  |  |  |
| 14.4 | Income receipts supporting the project are not as high as expected |  |  |  |  | Realistic market estimates need to be obtained if this is critical to project funding |  |  |  |
| **15.0** | **Residual value risk** |  |  |  |  |  |  |  |  |
| 15.1 | There is uncertainty over the value of the physical asset at the end of the contract term |  |  |  |  | A plan needs to be set out to regularly review the value of the physical asset during the contract term |  |  |  |
| **EXTERNAL RISKS** | | |  |  |  |  |  |  |  |
| **16.0** | **Economic risk** |  |  |  |  |  |  |  |  |
| **17.0** | **Legislative risk** |  |  |  |  |  |  |  |  |
| 17.2 | Changes are made to clinical regulations or other related legislation |  |  |  |  | Status of clinical regulations and other related legislation should be regularly reviewed and current status confirmed prior to each business case submission |  |  |  |
| **18.0** | **Policy risk** |  |  |  |  |  |  |  |  |

Appendix E: Additional Project Risks at FBC stage

| **1. Identification** | | | **2. Assessment** | | | **3. Control** | | **4. Monitoring** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Risk No** | **Risk Description** | **Financial / Non-Financial / Unquantifiable** | **Consequence** | **Likelihood** | **Risk** | **Proposed Treatment / Mitigation** | **Action Taken** | **Risk Owner** | |
| **(1 - 5)** | **(1 - 5)** | **Type** | **Individual** |
| **PLANNING & DESIGN RISKS** | | |  |  |  |  |  |  |  |
| **10.0** | **Design risk** |  |  |  |  |  |  |  |  |
| 10.9 | The design fails to incorporate infection control standards |  |  |  |  | A stage within the design development process should incorporate engagement with Infection Control representatives |  |  |  |
| 10.10 | The proposed design isn’t buildable |  |  |  |  | Innovative design solutions should engage with contractors to ascertain ease of construction |  |  |  |
| **CONSTRUCTION / PROPERTY RELATED RISKS** | | |  |  |  |  |  |  |  |
| **11.0** | **Procurement risk** |  |  |  |  |  |  |  |  |
| 11.5 | The planning and procurement of equipment is inadequate |  |  |  |  | Ensure that the procurement of equipment is part of the project implementation plan |  |  |  |
| **12.0** | **Construction risk** |  |  |  |  |  |  |  |  |
| 12.4 | The works do not pass required project inspections / audits |  |  |  |  | Arrangements for monitoring quality expectations from the works should be explained in the FBC and implemented appropriately |  |  |  |
| 12.5 | Person safety and security is compromised during the construction stage |  |  |  |  | All construction health & safety standards should be controlled as part of CDM procedures & regulations |  |  |  |
| 12.6 | Unforeseen events occur during construction |  |  |  |  | These eventualities should form part of the contract clauses |  |  |  |
| 12.7 | There are delays in gaining access to the site |  |  |  |  | Set out within the project execution plan how and when access will be available, any permissions required, any dependencies, and who needs to be consulted |  |  |  |
| 12.8 | Contractors don’t have the capacity, capability or appropriate resources to deliver the project |  |  |  |  | This should form part of a detailed scrutiny process prior to contractor selection |  |  |  |