

Figure 8.7 Risk analysis table.

Risk Description	Risk Assessment			Cost Implications			Risk Class	Proposed Management of High Risk
	High	Average	Low	High	Average	Low		
Planning permission refused		Yes		Yes			5	Contract experienced planner
Construction delays	Yes			Yes			6	Seek compensation clause within contract
Construction accidents			Yes		Yes		2	Ensure insurance policies exist
Unforeseen ground conditions			Yes	Yes			3	Undertake adequate survey of ground conditions

Some examples of risk management strategies that can be developed are shown in Figure 8.8.

It is good practice to closely monitor activities which have a high risk classification. Special attention should be given to exceptional issues, milestones and target achievements. Some monitoring techniques are described later in this chapter. Risk analysis is an iterative process. Therefore, risks are reassessed at least once during the project's life cycle when changes to the likelihood or the seriousness of risks might require amendments to the risk analysis and contingency plans.

The project definition stage provides the framework that enables the effective execution of the

project. Issues such as the project brief, organization, control systems, analysis of risk and project interfaces are established. Time and money spent, at this stage, will be repaid in the overall success of the project.

PROJECT PLANNING STAGE

The objective of the project planning stage is to translate the overall project aims into a series of identifiable activities which can be set out in a logical way that will achieve the desired end. Project requirements such as schedules, deadlines, resources, as well as budget and cost constraints, have to be clearly defined. The ultimate objective of the planning stage is to produce a total project plan. To do this it is necessary to develop in a methodical way the key elements that form the project plan; these are the 'work breakdown structure', the 'project network', the 'project schedule', and the 'cost plan'.

The work breakdown structure is a list of all major activities and sub-activities that form the project. It has built-in levels to allow a clear identification of the actual work that must be performed to meet the project requirements. Each major activity is divided into sub-activities and sub-sub-activities helping in this way to completely define the project scope. The work breakdown structure assists in relating all the elements of work to each other and

Figure 8.8 Risk management strategies.

- Addition of contingencies; by adding extra budget allocations to cover risks if they arise
- Avoidance of risk; by passing on risks to sub-contractors or the client
- Reduction of risk; by including testing and other project activities that will discover technical risks before the project is completed
- Insurance against risk; by taking out insurance if the risks have a known statistical nature

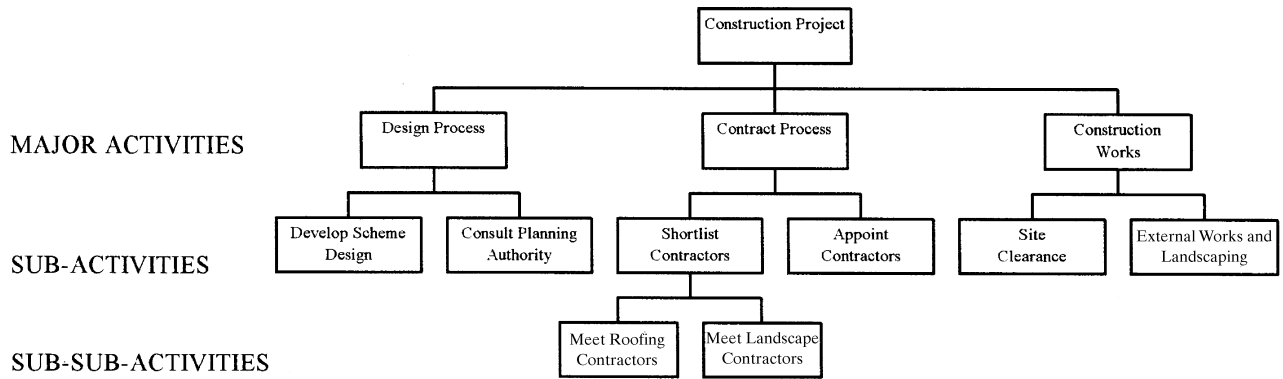


Figure 8.9 Work breakdown structure.

to the project. It also helps in defining work packages, establishing cost breakdown structures, organizational breakdown structures and project estimates, permitting the development of the project network and programme. The work breakdown structure should specify clear deliverables for each activity. In practice, when all the activities identified in the work breakdown structure are finished, the project is completed. The work breakdown structure assists in establishing in detail 'what' has to be achieved in terms of meeting the project requirements. It also helps in identifying 'who' is accountable for achieving it, 'how' it is going to be achieved in terms of detailed action and 'when' it is going to be achieved in terms of milestones and target dates (see Figure 8.9).

The critical path is one of the techniques most commonly used in building a project network. Once all the detailed activities have been identified, it is possible to create a network which shows the dependencies of activities and work packages. A critical path shows the sequence of the project activities and how they depend on each other. It also reveals those activities which are critical for completing the project on time. This sequence of activities, known as the critical path, determines how long the project will take to complete. Any delays to the activities on the critical path will delay the overall completion of the project.

With simple projects it is possible to find the critical path by ascertaining the duration of the activities that form the project and the sequential path that these activities follow. With more complex projects, project management software is used to undertake these arithmetic calculations. By networking the activities of the project it is possible to have a clearer understanding of the critical activities which can constrain the project's success. It also enables the project duration to be optimized by focusing on the activities that form the critical path, as it is these that can affect the progress of the project (see Figure 8.10).

Once the work breakdown structure has been defined and the network has been established, it is possible to create the project schedule. The project schedule contains key information regarding the viability of completing the work in the given timescales with the given resources. It identifies key events which, if late, could delay the programme and the project milestones or those points against which progress can be monitored.

Gantt charts or bar charts are particularly useful for displaying a schedule of project activities in a cascading form, whilst showing in a graphical way their durations and their start and finish dates (Figure 8.11). Gantt charts are also useful for illustrating who is responsible for given activities and for displaying key events and project milestones. They