

Appendix

Schedule Report

pt. 2

INTRODUCTION

This part contains an example to support the guide to the 'Schedule Analysis – Part I'. The schedule analysis supplements the tendering schedule by describing the timing assumptions behind it. Part I has been published in printed form while both Part I and Part II can be found at www.vaerdibyg.dk.

Part II contains an example of a completed schedule analysis for a small refurbishment project in a laboratory at Roskilde University (RUC).

The example is intended to serve as inspiration to illustrate the use of the schedule analysis. The plan is for this example to be supplemented in the longer term with an example schedule analysis for a larger construction project.

At Værdibyg, we are working to enhance quality in the building industry by focusing on improving the processes. We believe that there is a need in the consulting and project design process to focus more strongly on the assumptions behind and impact of the time frames for the construction phase.

This guide recommends, when providing consulting and project design services ahead of a procurement procedure, producing a schedule analysis describing the basis and requirements behind the tendering schedule. The schedule analysis gives the client an overview of relationships between project activities and time. It also highlights the implications of the requirements and wishes that define the time frame for implementing the contract. The analysis provides greater transparency for the bidders, which results in better tender documentation with more accurate pricing and fewer conflicts.

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ABOUT THE EXAMPLE

As mentioned earlier, the example is for a small refurbishment project in a laboratory at RUC. The Danish Building and Property Agency is the client, and COWI is the consultant for the project. The project involves refurbishing a room which is laid out with smaller rooms within it. This room is to be removed, but there is to be a new 'airlock' into the laboratory.

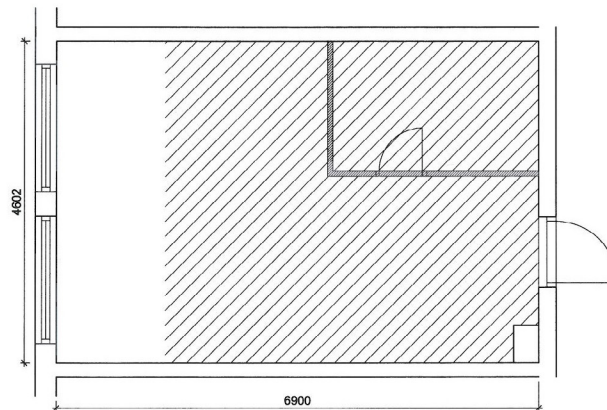
New installations are also to be introduced, and there are specific requirements for GMO laboratories that must be met. This also means that there has to be close coordination between the contractor and the operations organisation, to ensure that approvals are obtained in accordance with the GMO requirements. The project also has to allow for the fact that the building which houses the laboratory will be in use throughout the refurbishment. Finally, the actual laboratory

equipment is a client deliverable, which will partly determine the deadlines for the refurbishment and the installations.

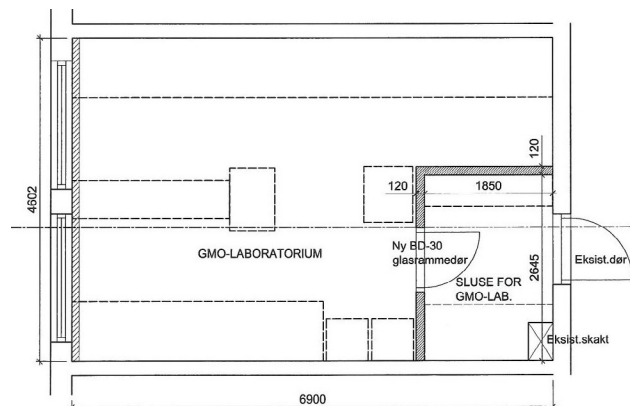
Project deadlines:

Tenderdocumentation will be sent out:	7 December 2009
Deadline for tenders:	18 January 2010
Contract:	25 January 2010
Contractor's start date:	26 Jan – 1 Feb 2010
Construction period:	2 Feb – 29 Mar 2010
Handover:	31 March 2010.

This schedule analysis was drawn up by Henrik Schmidt from COWI as an example after the project was completed.



Drawing of the laboratory as it looked before the refurbishment.



Drawing of the rebuilt laboratory.

Overall schedule

This section sets out the overall schedule conditions. For example, it could cover a date for commissioning, deadlines for planned activities, or any knowledge of specific matters that could be crucial or challenging to adherence to the schedule. The schedule analysis should therefore include the key milestones and any external dependencies.

Information on the overall timings.	
Special conditions which are crucial to the schedule	The building is in use. The two rooms are not in use, but access roads (also used for demolition and deliveries) are in use by RUC.
Deadlines	Handover 31 March 2010
Issues affecting adherence to the schedule.	Client changes during the project. Preceding works must be complete (windows and clearing) Coordination between the contractor and client deliverables
Other	

Choice of materials

This describes the scheduling implications of the choice of design approach, materials and technical solutions. As these choices are made in the course of the project, this is updated with details of delivery times and drying times, for example.

Implications the design approach	
Choice of materials	Materials are specified in the tender documentation. All surface materials must be acceptable under GMO rules.
Technical solutions	Ventilation solutions in particular need to be coordinated with client deliveries of laboratory equipment.
Special delivery times	No particular obstacles identified.
Other	

Deliveries

Any critical deliveries that could affect the schedule should be documented. This could include the use of client deliverables or specific system installations such as electricity, plumbing and heating, ventilation and lifts, which are already known at the time of tendering. This will highlight particular deadlines for all contractors and can also help to involve the suppliers' expertise in planning solutions and logistics early in the project.

Critical deliveries and deadlines	
Client deliverables	Client deliverables (laboratory equipment) must be clear to install from 1 April 2010.
Special functions/system deliveries	

Choice of method and process

This describes the thinking behind the time schedule in terms of the choice of method for the construction process. It may be crucial to the bidders if a particular building method has been stipulated. Use of mock-ups can be a good idea, but needs to be included in the plan. It should also be made clear when the technical installations are required to go into operation, and how the client expects the project to be handed over. If the building is in use for all or part of the building process, the report should outline how it is intended to handle this. The client's ideas about the process can be supplemented after the contract is awarded with new proposals based on experience from the contractors.

Overall choice of methodology for the building process.	GMO requirements for fitting out (of clean rooms) must be adhered to during construction
Use of mock-ups	
How technical installations are to be commissioned	Technical installations must be in operation in good time, so the adjustment report can be approved at handover time.
Handover of the building	Handover date 31 March 2010. This handover will be co-ordinated by the client's operations staff.
Use of the building during the project	The rest of the building is in use. Special attention must therefore be given to the access road. Connection of installations to existing supplies must be coordinated with the operations organisation.
Other	

Regulatory processing

Regulatory processing is shown with a deadline in the tendering schedule, assuming it has not been completed prior to the tendering procedure. The report also discusses relationships with others around the project – including other authorities (e.g. environmental approval, local plan, the Danish Heritage Agency, politicians, building permits etc.). If any dispensations are requested, there is a risk of not adhering to the schedule.

Regulatory processing	The building permit is expected to be in place by the start-up date; if not, the contractor must accept a delay to the project of up to 14 days.
Deadlines	
Other authorities	The client must obtain approval from the Danish Working Environment Authority before commissioning the building. This requires the contractor to comply with GMO requirements.
<ul style="list-style-type: none"> • Building permits • Environmental approval • Local plan • Danish Heritage Agency 	
Other	A planning application has been submitted, but additional material has been requested.

Decision-making processes

The client's internal decision-making processes are presented to give the contractors an impression of how the client's organisation works and to allow the necessary time in the building process for decisions from the client. This section also describes how and when users and stakeholders are to be involved in the process.

This will take account of the phasing of the project and the effect of leave and public holidays on the building process. Summer holidays can impact both the contractor's production and the client's decision-making. Double-manning may be a necessity with a tight schedule, but it needs to be considered early on in the process.

The client's internal decision-making processes	
Involvement of users and stakeholders	The users will remain in the building, but decisions on changes will be made by the construction management team (CMT) alone.
Phasing of the project	
Handling annual leave and public holidays	
Manning	
Other	

Winter measures

The report should state whether the tendering schedule assumes total enclosure and/or a quick 'sealing' and warming of the building. This can reduce the time spent by promoting drying-out and helping to prevent mould in the building and improving the working conditions on the site. Winter measures can thus help to increase productivity and reduce the number of wasted days.

Use of winter measures	No. The work will take place in the existing heated building.
Closure and warming of the building (deadline etc.)	
Other	The contractor must take winter measures for his own outdoor work site.

Working environment/Health and safety

It must be determined how health and safety requirements are to be met, to ensure that the necessary time is allowed in the schedule for carrying out the various works and project phases. There should also be a description of how the overall works and project phases are to be organised in relation to each other so the work can follow correct health and safety procedures. Allowance must also be made for input from the working environment coordinator into the project, and the schedule analysis can form part of the documentation to show that these considerations have been addressed. Where the schedule analysis describes the general health and safety aspects, specific actions can be included in the work schedule later on.

It is helpful to consider whether alternative solutions or adjustments to the tendering schedule could help to improve the working environment and productivity.

Have any particular health and safety issues been identified that could affect the schedule?	Please refer to the Health and Safety Plan.
Working conditions, access etc.	Access roads pass through buildings in use. The contractor must check the conditions on site.
Other	

Risk

A general risk assessment should be produced in relation to the tendering schedule, identifying possible critical events. The impact of the individual risks should be identified, and a strategy defined for handling events that jeopardise the schedule. The overall risk assessment will make the client aware of possible timing problems even at the tendering stage, and so provide a basis for deciding how to handle them.

Risk assessment	
Risk management	Unforeseen events will be addressed in co-operation with the CMT.
Other	

Preparation

Mobilisation time

The client should consider whether the length of time from contract signature to start-up is sufficient for both contractors and the client to mobilise the right resources. It is often worth delaying the project start-up until the parties and the project are ready to go, and the contractors can organise the building project and arrange the work better if they have sufficient time.

Involvement of operations organisation

The schedule analysis should set out how the client wants the contractors and the future operations organisation to work together. It should cover the exchange of experience and planning for delivery, handover and commissioning.

Project review and optimisation

It is advisable to think of the project review as an optimisation process rather than a single meeting. It is important to make use of the contractors' implementation experience and to identify possible problems before the whole production machinery is under way.

At the preparation stage, the contractor works with the client and contractors to review the assumptions and time-related risks that have been identified and formulated in the schedule analysis.

Time for mobilisation from contract signature to start-up	Note that only one week has been allowed for mobilisation.
Involvement of operations organisation (handover and commissioning)	The operations organisation must approve the final solutions (particularly for the ventilation). The operations organisation must be trained in the use of the technical installations. The contractor must provide an adjustment report to be approved by the operations organisation.
Project review and optimisation process <ul style="list-style-type: none"> • Start-up workshop • Project optimisation as a process • Planning • Discussion of buildability • Discussion of risk assessment 	Start-up meeting between the contractor, users, operations organisation and CMT, 27 January 2010.
Other	