

## MEMO

<b>PROJECT:</b>	New Town Hall, Sandnes <i>Nytt Rådhus Sandnes</i>	<b>DOCUMENT NAME:</b>	NRS151019_memo
<b>SUBJECT:</b>	Advantages and disadvantages of enclosing the central courtyard with a glazed roof	<b>DOCUMENT FORM:</b>	Memo
<b>CLIENT:</b>	Sandnes Eiendomsselskap KF	<b>ARCHITECT:</b>	Code of Practice GmbH
<b>CONTACT:</b>	Jarle Angelsen	<b>CONTACT:</b>	Tom Mival
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### 1. Introduction

The New Town Hall in Sandnes, is conceived as a 'courtyard building' as set out in the masterplan for the site. The competition winning scheme from CoP was one of the few competition entries that did not propose an enclosed central courtyard with a glazed roof. One of the comments of the competition jury was to consider whether a glazed roof should be added.

As part of the User Consultation Process undertaken in the summer of 2015, the Building User Group visited a number of projects with similar size and functionality as the New Town Hall. Some of these were organized with centrally glazed atria. Some of these enclosed courtyard spaces were considered very successful, some less so, and this naturally led to a discussion in the group regarding the advantages and disadvantages of glazing the courtyard in the NRS building.

CoP were requested to list the pros and cons of an enclosed courtyard in this memo to enable a more detailed and informed discussion in the building user group to take place.

## 2. Daylight

One of the main functions of the courtyard is to enable daylight to penetrate the building to give day-lit workspace (a basic requirement of workplace regulations both in Norway and abroad). While there are many built examples of workspaces surrounding a glazed atrium, the daylighting needs of these workspaces give restrictions on the nature of the glazed roof. While it is possible to achieve a regulatory minimum daylight level in the workspaces adjacent to a glazed courtyard, our experience of these workspaces is that they are generally considered by users to be inferior to spaces with a direct view to the 'outside'.

### **Enclosed courtyard**

The central courtyard space under a glass roof would be a very bright well-lit space, however it is likely that the daylight levels relative to an open courtyard are reduced by at least 40-50%, with a possible reduction of as much as 70% depending on the exact arrangement and detailing of the glazing panels and the solar performance of the glass. For much of the time this is not problematic as daylight normally needs to be controlled and reduced to avoid glare, however on overcast days, or winter days when the external daylight levels are much lower, this reduction can be detrimental to the quality of the **adjacent working spaces**.

Projects which have non-workspace (eg meeting rooms, support rooms & circulation) organized around an atrium can be more successful for this reason. An example of this arrangement is the Apply Building in Forus that was visited by the NRS User Group. The Apply Building is able to organize support rooms this way because it has a deep-plan landscape solution for the work-space. The negative consequence of this is that the daylight levels for workspaces away from the perimeter window in the deep plan areas are considerably inferior and rely on a landscape arrangement of desks.

### **Open courtyard**

An open courtyard, as proposed in the NRS competition scheme and Skisseprosjekt, enable the maximum amount of daylight to reach all workspaces. On very bright days, the light can be controlled through external sunshading as with the perimeter façade. On overcast days, workspaces will receive as much daylight as possible. This reduces the implicit hierarchy of 'well-lit workspaces' and 'badly lit workspaces' which is an important component of 'democratic workspace', particularly in a public building.

A benefit of an open courtyard (that was also mentioned by participants in the user consultation) is the perception of not just daylight but also 'weather' and 'seasons', in other words, the important psychological benefit of registering 'outside' whilst one is inside. In consideration of the seasonal daylight patterns in Norway, this point is of even more importance than in more southerly locations.

### 3. Program

There are a relatively small number of functions that can be successfully placed in a large glazed courtyard. Workspace is normally difficult to integrate, and specialized functions like conference area or debating chamber are challenging because daylight cannot be controlled sufficiently without detrimentally affecting adjacent spaces. Therefore the functions that are possible are generally limited to public areas such as 'general circulation or breakout space', reception, exhibition, circulation, and cafeteria.

#### **Enclosed courtyard**

There are many good examples of buildings where a central atrium becomes the focus and identity of the building. A large central space can enable informal and large scale congregations and a good location for a cafeteria. They can however sometimes feel quite 'empty' outside of lunch periods.

These spaces are almost always located on the ground floor close to the entrance. Typically, technical areas are located in a central basement beneath the courtyard. In the New Town Hall project this arrangement is not possible due to the difficult ground conditions that require a much reduced and shallow basement arrangement.

Unless the technical arrangement is reconceived (only realistically possible with a reduction in workspace) the NRS will have its courtyard floor at Level 02. Divorced from the entrance and ground floor functions such as conference and canteen a glazed courtyard at Level 02 is essentially functionless, or at best will serve as exhibition space or circulation space to the adjacent workspaces. In this case there is a danger it may feel 'oversized' for this relatively secondary function.

The use of an enclosed courtyard space for large gatherings of people (events etc) is likely to be very difficult on Level 02. Events with more than 150 people would require additional direct fire escapes (impacting the adjacent workspace) and potentially costly fireproof glazing in some areas.

#### **Open courtyard**

Open courtyards do not need 'heavy programming' to justify their existence. They are perceived more as 'background' and as a counterpoint to the surrounding functions. In the case of the NRS it is proposed to allow the public to enter the courtyard to look at either temporary or permanent art works and to enjoy fresh air and greenery in good weather. The 'emptiness' of this space is in this sense an important psychological quality.

#### 4. Cost

A detailed cost analysis has not been carried out for this initial appraisal, however, the addition of a glazed roof is highly unlikely to make the project cheaper. In consideration of the needs of the project to reduce overall cost, a decision to proceed with an enclosed courtyard would need to be planned and costed in more detail. Cleaning costs for both versions are likely to be similar (a glazed roof is smaller than the surrounding courtyard façade) although maintenance (and potentially heating) costs are likely to be higher for the enclosed version.

##### **Enclosed courtyard**

Enclosing the courtyard with a glazed or partially glazed roof enables the courtyard facades to have a reduced specification, with single glazing, and potentially to omit external sunshading (although internal screens are likely to remain). Normally there is a requirement for acoustic cladding to be added to the perimeter of the atrium.

The cost of the glazed roof itself is dependent on the nature of the structure and the glazing and can vary significantly dependent on the amount of 'architectural ambition'. In order to justify the costs of a glazed roof the architectural quality of the facades and roof has to be quite low, which has an impact on the perception of the building.

Costs for technical services (such as ventilation, heating, and lighting) need to be appraised by the relevant members of the project team. There are potentially knock-on impacts for the other areas such as the size of adjacent columns and the dimensions of the technical room. There would likely be increased costs for sprinklering and fireprotection depending on the chosen solution.

##### **Open courtyard**

An open courtyard naturally has the cost of a solid flat roof (above the technical room), although this is a basic construction with a well-known cost. There are costs for planting and substrate, and depending on the size of trees, some structural costs.

The cost of the courtyard façade is more than for an enclosed version (eg more insulation and tripled-glazed glass) and will be similar to the perimeter façade.

## 5. Identity and Building Orientation

The competition-winning design for the New Town Hall conceives of a confident outward looking building that addresses the harbour front, and has social and symbolic functions organized on the south façade that are highly visible from the surrounding harbour promenade.

### **Enclosed courtyard**

Many of the building examples that are organized around a central glazed courtyard tend to be inward-looking, often surrounded by a 'sea' of carparking, whereby a central daylit space is an entirely logical reaction from the architects, looking to generate a protected social space. In the case of the urban context and public function of the New Town Hall, CoP considers that this would be the wrong architectural response.

### **Open Courtyard**

The NRS design conceives the courtyard as a calm and green counterpoint to the highly focused (and well-proportioned) social spaces on the harbour front. These spaces are in direct contact with the main ceremonial rooms and the public stair. It is anticipated that some of the generosity and 'feeling' witnessed in the User Group visits to buildings like Apply and Kristiansand Town Hall, would be generated in this area. Please refer to the Skisseprosjekt report for more information regarding this.

## 6. Conclusion

The competition-winning proposal for the New Town Hall has a very carefully considered arrangement of enclosed social spaces and external green space.

While it would be technically feasible to enclose the central courtyard as central atrium, there are considerable negative impacts to address with regard to daylight, program, identity and potentially cost. CoP do not recommend this course of action without considering a reconfiguration of the entire scheme to ensure such a space is merited in architectural and functional terms. In short – it would be wrong to make this alteration as an afterthought as it would have an enormous impact on the architectural character of the project.