Visitors' Centre of the Estonian Open Air Museum – Conservation Centre Kanut – Joint Storage Complex of the Museums of Tallinn

Conditions of the Architectural Competition

December 2006 – May 2007

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3. CONDUCTING THE ARCHITECTURAL COMPETITION

3.3. Required scope of the submitted work

3.3.1. Drawings (on plotting-boards):

- Building site plan M 1:2000, which must cover the entire competition site and the territory of the Estonian Open Air Museum that is functionally linked with the planned complex, including the exposition area together with the existing greenery. The building site plan must display planned height markers, active zones in the territory and greenery. Also traffic solutions in the territory and functional connections with the exposition area of the Estonian Open Air Museum (visitors' movements, servicing transport for the exposition etc) are required.
- Partial building site plan M 1:800 that displays the planned building complexes and their surroundings.
- The building complexes design solution, main plans M 1:400; the main plans must display height markers of different levels, groups of rooms and surface areas.
- Floor plans for the entire building complex, all views, at least 2 cross-sections M 1:400.
- Detailed drawings, if necessary.
- Axonometric views of the building complex, perspective or 3D drawings; at least one interior and one exterior axonometric characteristic, perspective or 3D view of each building complex must be presented.

Note: tenders must be placed on plotting boards so that the lower edge of the plotting board is parallel to the East-West direction.

3.3.2. Model M 1:800 of the competition site (size and immediate surroundings of the building complex).

3.3.3. Explanatory memorandum, containing:

- a short description of the architectural design solution,
- a short description of the functional and technical design solution, including description of the specific technological solution of the storages,
- a short description of the main materials used for construction, building and finishing,
- basic technical indicators (construction surface area, closed neto surface area, cubature); experts should be able to evaluate the approximate construction cost based on the presented technical data.

3.7. Architectural competition committees and judging of tenders

3.7.5. The general committee will judge the tenders according to the following criteria:

- conformity of the tender to the conditions of the architectural competition,
- quality of the presented idea and the architectural design,
- functional link of the Visitors' Centre of the Estonian Open Air Museum to the exposition area,
- sustainable energy consumption of the technical solutions of the storages and the entire building complex, safeguarding environment, rationality.

3.7.6. The following aspects will be considered in judging the tenders (total of 100 %):

- Technological solution ca 30 %,

- Functional link between the museum and the exposition area ca 30%,
- Architectural design ca 30%,
- Considering environmental and cultural heritage requirements ca 10%.

4. ACTIVITIES FOLLOWING THE COMPETITION

4.1. The use of awarded works and future design work˘

4.1.1. The contracting authority will use the tender that was awarded the first prize as basis for future planning and arrangement of architectural design. With the presentation of the tender (design) in this competition the participant gives his/her permission (license) for the use of the tender in case it is awarded with the 1st prize in accordance with the objectives and conditions of this competition.

4.1.2. The contracting authority will order the realization of the design of the building complex or parts of the complex from the tender that was awarded the 1st prize by a non-public procurement procedure in accordance with the procedure set forth in the Estonian Public Procurement Act § 57 section 10. The amounts of the design plans are set by the Estonian Standard EVS 811:2002, clauses 9, 10, 11 and 12.

4.1.3. In case the winner of the architectural competition gives up his/her right to participate in the supply as head designer, then:

4.1.3.1. the contracting authority will order architectural plans, building site plans and interior design plans from the winner of the competition by a non-public procurement procedure in accordance with the procedure set forth in the Estonian Public Procurement Act § 57 section 10. The amounts of the plans are set by the Estonian Standard EVS 811:2002:

- The preliminary project, to the extent set forth in clause 9,
- The preliminary project, to the extent set forth in clauses 10.1; 10.2; 10.3,
- The main project, to the extent set forth in clauses 11.1; 11.2; 11.3,
- The work project, to the extent set forth in clauses 12.1; 12.2,
- The author's supervision, to the extent set forth in clause 17.1.

4.1.3.2. the head designer for the building complex or parts of the complex will be chosen following the provisions in the Estonian Public Procurement Act governing open tendering procedure for public procurement. The ordered plans for the architectural design, building site design, and interior design will be supervised in accordance with the Estonian Public Procurement Act (to the extent set forth in clause 4.1.3.1), by the chosen head designer.

5. THE COMPETITION BRIEF

5.1. The site of the competition

The area of the competition is situated on the territory of the Estonian Open Air Museum in Rocca al Mare, at Vabaõhumuuseumi tee 12 in the Haabersti district of the city of Tallinn. The Estonian Open Air Museum (Eesti Vabaõhumuuseum - EVM) covers ca 86 ha of forest park, where an exposition of the total of 72 buildings representing Estonian traditional architecture is displayed. The museum territory lies entirely between the sea and the road Vabaõhumuuseumi tee, in the South-East it borders with the former Liberty summer manor and the Rocca al Mare schoolhouse. To the North-West the dwelling area Merirahu is situated.

The site of the competition is divided into two parts:

1) area in the North-West part of the EVM, intended for the future building complex, and which is presently being used as the household courtyard of the museum. Today two metal hangars (in a worn-out state, intended to be pulled down), an administrative building, a construction that has been adjusted for the needs of a storage (may be pulled down if necessary) and a temporary parking lot are situated on this site.

2) analyses area that covers the territory of the EVM.

5.2. Immediate surroundings, functional links

The territory of the Estonian Open Air Museum is situated ca 7 km from the town centre and ca 1 km from the Zoo, Rocca al Mare shopping centre and sports' complex by the Paldiski road. The museum territory is bordered by dwelling districts and forest areas. In between the museum territory, the roads Vabaõhumuuseumi tee and Paldiski maantee there is the territory of the Rocca al Mare School.

5.3. Geological and hydrological terms and conditions for building

The territory of the Estonian Open Air Museum is situated in Tallinn, in the district of Haabersti between the road Vabaõhumuuseumi tee and the Kopli Bay. The territory is situated on the North Estonian coastal plain on the verge of the Kakumäe base rock. The absolute height of the ground that is inclined towards East is 6 – 13 m. The relief is terraced, the largest and longest of the terraces stretches parallel to the coast and the smallest runs from North to South in the North-West part of the area. The surfacing consists mainly from the sediments of the ice lake and the sea, the thickness reaches from 1 to 8 m. In most parts the surfacing is 1 – 3 m thick, consisting mainly of dusty sand from the sea, which is covered either with soil or fill soil. Only in the South-East part of the area a 5, 5 m thick layer of ice lake sediments lies, which consist of fluid clay and clayey sand of soft to hard plasticity.
In the site foreseen for the building complex, i.e. in the North—West part of the Estonian Open Air Museum, the surfacing consists of 1, 5 m thick dusty sand.
The bedrock consists of Lower Cambrian period sandstone with aleurolite layers. Both the sandstone and the aleurolite are mellow or weakly cemented; the upper part is sporadically eroded into thick dusty sand.
The building site consists of sandstone that is capable of bearing heavy loads and therefore the construction conditions are favorable.
In the referred area groundwater (Quaternary layer) flows in marine sands. The level of groundwater stays at the depth of 1-2 m from the ground level, the water layer may also remain waterless during a dry season. Water follows the inclination of the ground, flowing in the North-East direction towards the sea.
The next water layer is connected with sandstone (Ordovician-Cambrian layer). Between those water layers clayey intermediate strata of aleurolite exist.

5.4. Existing green areas

The area bordering with the Paldiski road is covered with forest park (mainly pines), groves cover the central part of the territory and the area close to Kakumäe. The portion by the sea is in the form of shrubs (mainly alder); the area currently used as the household yard is mainly treeless with an odd pine tope here and there.
The following objects and areas under nature protection can be found in the territory of he Estonian Open Air Museum:

- Boulders: Open Air Museum stone scatter, Vesiveski stone (Watermill stone), Võrgukuuride stone (Net Shed stone),
- Denudations: Kakumäe denudation.

In the course of drawing up the general plan of Tallinn and in order to guarantee systematic development of greenery, a proposition was made to establish a green net that would consist of large radial green areas running from the town centre to the outskirts of the town and smaller green corridors that will connect these areas in a meridian manner.
The competition site is situated on the III Green Radial (III RR) that will run in the North-West part of the town, connecting the following areas: Falgi Park – Härjapea – Pelgulinn – Merimetsa – Rocca al Mare - Kakumäe. The III RR is fairly well developed on the western side of the Merimetsa area, including ecologically stable areas like the pine groves of Rocca al Mare and the Open Air Museum, the Õismäe bog, the mixed forests of coniferous and leafy trees of Kakumäe. The coastal meadows and wetlands of the Kopli Bay add ecological diversity to the area.

Air pollution is medium or small along the III RR.
The III RR enriches the environment of Tallinn by several unique biotopes like the bog, oak forest, meadow. Recreational opportunities are good due to the completed infrastructures of the Zoo and the Open Air Museum.

5.5. Roads and traffic

The museum territory can be accessed from the Paldiski road and from the Kakumäe dwelling area along the Vabaõhumuuseumi road, also from the Rannamõisa road along Lõuka Street. Entrance to the Estonian Open Air Museum is on the Vabaõhumuuseumi road that crosses the extension of the Lõuka Street. A parking lot for 79 cars is next to the Entrance hall. Parallel to the Vabaõhumuuseumi road a small road for pedestrians and bicycles runs from Paldiski road to Kakumäe. Another entrance to the museum which today serves as a household entrance is situated on the Vabaõhumuuseumi road ca 950 m from the main entrance in the direction of Kakumäe. There are two bus stops along the borders of the museum on the Vabaõhumuuseumi road (for buses No 21, 21a and 21b) – one of the stops is in front of the main entrance, the other near the household entrance.

5.6. Guidelines for museum storage climate

The starting point for designing museum storage is the natural Estonian climate. The temperature ranges from -10ºC to 20ºC. This is one of the better climates for preserving artifacts, though the human inhabitants may think it not optimal for their own comfort. The relative humidity varies from nearly 90% in winter to 55% on a summer mid day. This is not optimal for artifacts, being too high nearly all the time.
A low temperature is universally good for the chemical durability of materials but causes reversible stiffening and embrittlement of plastics, which makes them vulnerable to mishandling. Laminated materials will also suffer shear stress due to differential thermal shrinkage. A further disadvantage of low temperature storage is the risk of condensation on the object when it is moved to a warm room to interact with humans. A conservative lower temperature limit for storage would be about 10 degrees, but there is no magic to this particular number. Many national standards for museum collections give a lower limit of 16 to 19 degrees.
There are good reasons to keep the storage temperature above freezing for general collections. For most materials in equilibrium with a moderate relative humidity there is no particular significance to zero degrees: water in the materials is not in freezable form. It is difficult to screen a mixed modern collection for objects likely to be damaged by a few minus degrees. Most buildings contain freezable water in services, such as heating pipes and toilet cisterns, even sprinkler systems, so there is good reason to keep the temperature above 4ºC.
There is a difference when preserving the materials of modern communication, which are uniquely delicate: colour photographs, film and audio/video tape. These need cold storage at down to -20ºC, depending on their nature and frequency of retrieval. Mechanical air conditioning is unavoidable for these collections. However, such a store can be designed together with the larger general store, in such a way that services can be shared and energy exchanged between the two.
A relative humidity around 55% is uncontroversial and suits many materials. The consistently high natural relative humidity can be reduced either by heating or by dehumidification, but best by a combination of the two. Dehumidification can be achieved either directly, by mechanical devices, or cleverly, by pumping outside air into the building when, by chance, it has a low water content. This will happen often in winter but seldom in summer, which is why considerable humidity buffering must be designed into the structure. Winter dehumidification is easy because the building will be at a higher temperature than the outside in the winter. Even outside air at 100% RH at -5ºC will drop to 34% when this air is warmed to 10ºC. This pumping of air will also lower the temperature, so a cunning computer program is needed to control the ventilation to ensure a close approach to the intended indoor climate.
Conservation scientists stress the need to prevent rapid change of temperature and relative humidity. Transient changes in either cause shear stress because the temperature and moisture is transiently non-uniform in the object. Temperature equilibrates within a day even in massive objects; humidity uniformity may take years, in massive wooden structures for example.

In practice, it is easy to stabilise both temperature and relative humidity so that these transient disequilibria are prevented. Temperature stability is achieved through massive walls and floor and is helped by the stored objects themselves. Relative humidity stability is achieved through water absorbent materials lining the walls and ceiling but mainly through the water absorption in the stored objects. A low air exchange rate of about one per day is necessary for humidity stability.
In summer, in the absence of cooling, the store will warm to about 20ºC. The annual cycle of 10 to 20 degrees will not damage the objects, while the low average temperature, 15ºC, will ensure good chemical durability for most objects (exceptions are discussed above).
The winter heating, and a degree of summer cooling, can best be achieved by a combination of waste heat from lighting and adjacent office spaces and a heat pump, using the constant 6ºC of the ground at 1 meter below the surface to provide a moderate temperature which is boosted in winter to warm the building and which is used directly in summer to cool the building, though this will scarcely be necessary.
The stability of the underground temperature can be used directly by building the store room partly underground. The provision of thermal inertia, thermal insulation and ventilation must be carefully matched to give the optimum performance.
Humidity stability can be achieved even in an empty store by lining the walls and ceiling with water absorbent materials. A clay plaster will give good sorption, so will porous cement block. The bulk of the stability will, however, be provided by the collection itself and its packaging. The relative humidity controlled by absorbent materials is scarcely altered by temperature, so the annual temperature cycle will not spoil the relative humidity stability.
Solar heating is the summer threat. A raised roof with a freely ventilated attic space below is a good construction. Winter heating, and a measure of summer cooling, is paradoxically achieved with a poorly insulated floor, though one must be careful that the floor, always cooler than the room temperature, does not cause a local high relative humidity which will encourage organic growth. The heat should leak slowly through the floor from the constant 6ºC of the earth below.
Until now, very few stores exist that have been designed this way. Described principles have mainly been applied to archives; museums have been slow to appreciate the good performance of these buildings. Most museum stores are in ancient buildings designed for a different purpose, or they are in standard industrial warehouses. This is to save money immediately rather than to give efficient long term protection to artifacts. There has been a loss of knowledge in building massively, though the ancient military installations round the world, Suomenlinna in Helsinki for example, are evidence that they once knew how to do it. Earth, in the form of sand with about 15% clay and no organic matter, is the cheapest material for massive building in most places on earth. Its durability even in a cool wet climate is attested by many ancient structures in northern Europe, notably in Devon, England, where nearly all buildings were in earth until the mid twentieth century.

26th August 2006, Tim Padfield, www.padfield.org/tim

5.7. General requirements for the building complex and the territory

The main goal of the architectural competition is to find an architectural solution for a complex of buildings that would consider the following criteria:

- The maximum height of the buildings in all parts of the complex may not exceed 12 m from the ground level. Large monotonous surfaces should be avoided. Surfaces ought to be vertically disjunct.
- It should be possible to place part of the room program and parking spaces underground in order to avoid extremely large percentage of built-up space in the territory that would be inappropriate in the surrounding landscape.
- The design should follow a modern architectural concept; however, only appropriate materials for the surrounding environment should be applied in the outside finishing. The planned buildings should not dominate too much in the seaside nature or over the exposition of the Open Air Museum.
- The planned complex should be in harmony with the surrounding landscape, some of the rooms and the parking spaces should preferably be placed underground to avoid a high percentage of built-up space in the territory.
- The complex should have low energy consumption (see clause 5.6), the buildings should correspond to the relevant energy saving earmark.
- Sustainable technologies should be applied.
- The complex should offer ample space for the museum's visitors' centre – conservation centre – storage (see clauses 6.3, 6.5 and 6.6).

- It should be possible to construct the complex in different stages (1. Conservation Centre and I stage of the joint storage; 2. II stage of the storage; 3. III stage of the storage; 4. Visitors' Centre of the Open Air Museum; 5. Exhibition Hall of the Open Air Museum; see also Room Plan for the complex). The order of the building stages is not fixed (except for the building of the storages), i.e. construction of the buildings may start depending on the financial possibilities. It is essential that after each construction stage the buildings should form a visually uniform entity – the buildings should be finished to certain completeness.
- Estimated construction cost:
    - Conservation Centre Kanut – Joint Storage Complex max 10 000 kr/m2;
    - Visitors' Centre of the Estonian Open Air Museum max 20 000 kr/m2;
    - Exhibition Hall max 15 000 kr/m2.

  This estimation is done based on the prices including V.A.T as from the time the competition was opened in December 2006, they do not include the cost of furnishings.
- Functional links between the Visitors' Centre and the exposition area and the traffic scheme for the entire museum territory should be displayed. A solution should be found to the parking issue of the museum's visitors – in addition to the existing parking lot a space for 21 buses and 300 cars should be planned.
- The parking scheme for the Conservation Centre Kanut and the joint storage of the museums of Tallinn should consider the optimal trafficking of objects on the route intermediate depot of the joint storage to the preventive conservation department. 20 parking spaces should be created for the employees and customers of the Conservation Centre Kanut.
- Plans must include provisions for building-free areas (incl. coastal area and the near-by forest park), taking into consideration active involvement of the existing exposition area. The Estonian Open Air Museum intends to enlarge active use of the building-free area. This territory is already been used for the celebrations of various national holidays like the mid-summer festivities, Christmas etc. This function of the area should be strengthened.

5.8. Specific requirements for the buildings of the joint storage of the Tallinn museums

The architectural design and materials must consider the climatic conditions and create favorable conditions for the preservation of cultural heritage and museum objects.
The objective of the competition is to find a design for an environment-friendly complex with low energy consumption that would allow passive climate control, but which would consider museum parameters – i.e. a partially natural climate control must permit to maintain the interior climate within the following range (annual cycle): temperature from 14º C to 24 º C and relative humidity from 40 to 65 %, see also clause 5.6.
The storage must be designed in a way that it will secure a stable environment, which corresponds to the requirements and will depend in a least minimum way on mechanical systems (EVS-ISO 11799:2005). In order to passively secure the required interior climate it is advisable to apply the following sustainable solutions and materials:

- Ground heat will be used to safeguard appropriate interior climate, i.e. the storage has to be on one floor level.
- The outside body of the building is massive and airtight, materials used have great heat capacity (the use of industrially manufactured standard elements will be preferred).
- The building materials are fire-resistant, the use of materials emitting harmful substances is forbidden, and smoke removing system must not be planned on the roof.
- The roof construction allows natural ventilation – airing.
- The permitted lighting of 50 lx in the storage rooms excludes sunlight in the rooms.
- The storage area must be divided into sections, the area of a section is 300 – 500 m2 and the height is 6 m.
- Possibilities are created to use natural ventilation in order to avoid air conditioning.
- Materials used for interior finishing must be good absorbents.