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# Petra Museum Project 2013 in the Hashemite Kingdom of Jordan
## ヨルダン・ハシェミット王国の世界遺産ペトラ遺跡のための博物館計画 2013

Our project for the design of the Petra Museum aims to preserve, restore and exhibit the Petra World Heritage Site. Since the planned site for the museum is located close to the boundary of Petra, UNESCO asked us to assess the effect of the museum and its construction on the surrounding landscape. As a member of a research team that included archaeologists, Lecturer Hideaki Tembata, of Mukogawa Women's University's Department of Architecture, visited the site in September to survey the topography and vegetation, and to take pictures of the surrounding area. With this information, we created four designs that consider specific views of the areas that surround the site. We selected nine pictures taken at the important points in the landscape, such as mountain slopes that surround the museum and the road leading to the museum, and then, using computer graphics, created composite images that depict the proposed appearance of the museum for each of the four designs against the selected background pictures. We expressed our views on the issues raised by UNESCO's landscape assessment criteria and proposed including elements of Japanese landscape composition, preserving existing trees, matching the design with the stone ruins, and referencing a form that symbolizes Petra's culture.

昨年から取り組んでいるペトラ博物館の設計は、ヨルダン・ハシェミット王国(Hashemite Kingdom of Jordan)の世界遺産ペトラ遺跡の遺跡保存と修復、展示のためのものでした。博物館の敷地が世界遺産ペトラ遺跡の境界領域に立地することから、博物館の建設がもたらす景観への影響調査をユネスコから要求されました。本学建築学科教員の天畠講師が、考古学者などからなる調査チームの一員として、9 月に現地を訪問し、敷地周辺の地形や樹木などの測量、さらに現地の写真撮影などを行ってきました。これに基づいて特に博物館の敷地周辺の景観に配慮しながら、景観への影響を検討するため、4 つの博物館案を設計しました。撮影した膨大な現地写真の中から、敷地を取り巻く山腹や博物館へのアプローチ道路などの、景観上重要な 9 か所の地点から、敷地を撮影した写真を選定しました。それぞれの写真の中に、4 案のコンピューター・グラフィックスによる博物館の外観図を合成し、できあがった景観を提示しました。そして同時に特に以下の設計上の諸点についてコメントし、設計案の中に提示しました。すなわちユネスコが求める景観評価基準の基本的な考え方に関する問題点の提示、文化交流として日本的景観構成を適用すること、そして植栽の保全、石の遺跡に適応する展示方法、ペトラの文化を象徴する形態の引用などの新たな提案を行いました。

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Design 4: Ayane Ise, Noritoshi Sugiura

**デザイン** 統括: 岡﨑 甚幸
案 1: 天畠 秀秋、森本 順子
案 2: 本郷 佑奈、天畠 秀秋、鈴木 利友、猪股 圭佑
案 3: 山口 彩、猪股 圭佑
案 4: 伊勢 文音、杉浦 徳利

### 1) Conservation and creation of landscape

UNESCO's landscape assessment criterion is based on the premise that new building construction can damage the existing landscape. In other words, any constructions of artificial objects have a negative impact. The assessment tries to assign negative points according to how much landscape value is lost. However, no thought has been given to the possibility that creatively designed new construction can actually increase the value of the existing landscape. In fact, introducing a structure with an excellent exterior appearance can create a more distinguished landscape than the conventional landscape. We introduced the Togetsu-kyo Bridge in Arashiyama, Kyoto as an example. Without the accent of the Togetsu-kyo Bridge, the view where the river runs out of the mountains that surround the basin would be commonplace in Japan. However, because of the Togetsu-kyo Bridge, Arashiyama is one of the best scenic places in Kyoto.



Togetsu-kyo Bridge

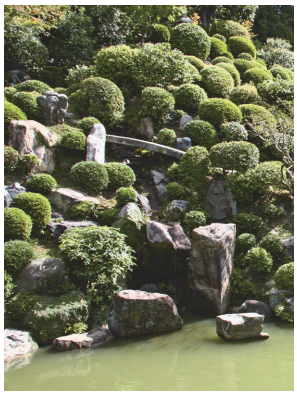
### 2) Introduction of Japanese landscape composition

#### 2-1) Shiseki-senri

Common image is that incorporating materials from the natural environment in the museum would be pointless since the exhibits could never compete with the abundant actual landscape. China and Japan, however, have found a way of enjoying these natural qualities by introducing them as symbolically prepared miniatures in the daily living space, i.e., the idea of "Shiseki-senri." Bonsai (a miniature potted tree), Bonseki (a small-scale and and stone landscape on a tray), stone gardens where mountains or waterfalls are figuratively expressed by blocks of stone, and ink paintings that depict the scenic beauty of the vast world are examples of Shiseki-senri. We propose to introduce the essence of Japanese culture into the Petra Museum, which is to be built with financial assistance from Japan. In our designs for the museum, we provide examples of how the Japanese would enjoy Petra's surrounding natural beauty.



Daisen-in garden, Daitoku-ji (photo by Kazuhiko Yanagisawa)



Chishaku-in garden expressing Mt. Lu



Lofty Mt. Lu by Shen Zhou, 1467 (National Palace Museum)

**2-2) Shakkei (borrowed scenery)**

Various buildings have already been randomly built in the area planned for the museum's construction, such as a visitor center built by the United States Agency for International Development (USAID), private hotels, and stores. A hotel is situated on a rocky stretch that occupies some of ancient caves. Considering the extent of existing construction in this area, so close to the planned museum, the assessment of the effect on the landscape seems a little too late. However, the surrounding mountain range is beautiful, with overlapping rows of hills of huge rocks. In this regard, in our designs, we plan to build low walls on the museum's roof with a rooftop garden situated along the exterior walls. As a result, the hotels and other buildings around the premises will be hidden, and a view of the mountains as borrowed scenery can be enjoyed from the rooftop. Traditional Japanese landscape composition utilizes the backdrops, such as the view of Mt. Fuji or Higashi-yama. This is called "shakkei" (borrowed scenery). Introducing this traditional landscape composition in Petra will represent a meaningful cultural exchange between Jordan and Japan.



The beautiful surrounding mountain range with overlapping rows of hills of huge rocks



Shakkei (borrowed scenery) of Entsu-ji: Mt. Hiei view from Entsu-ji

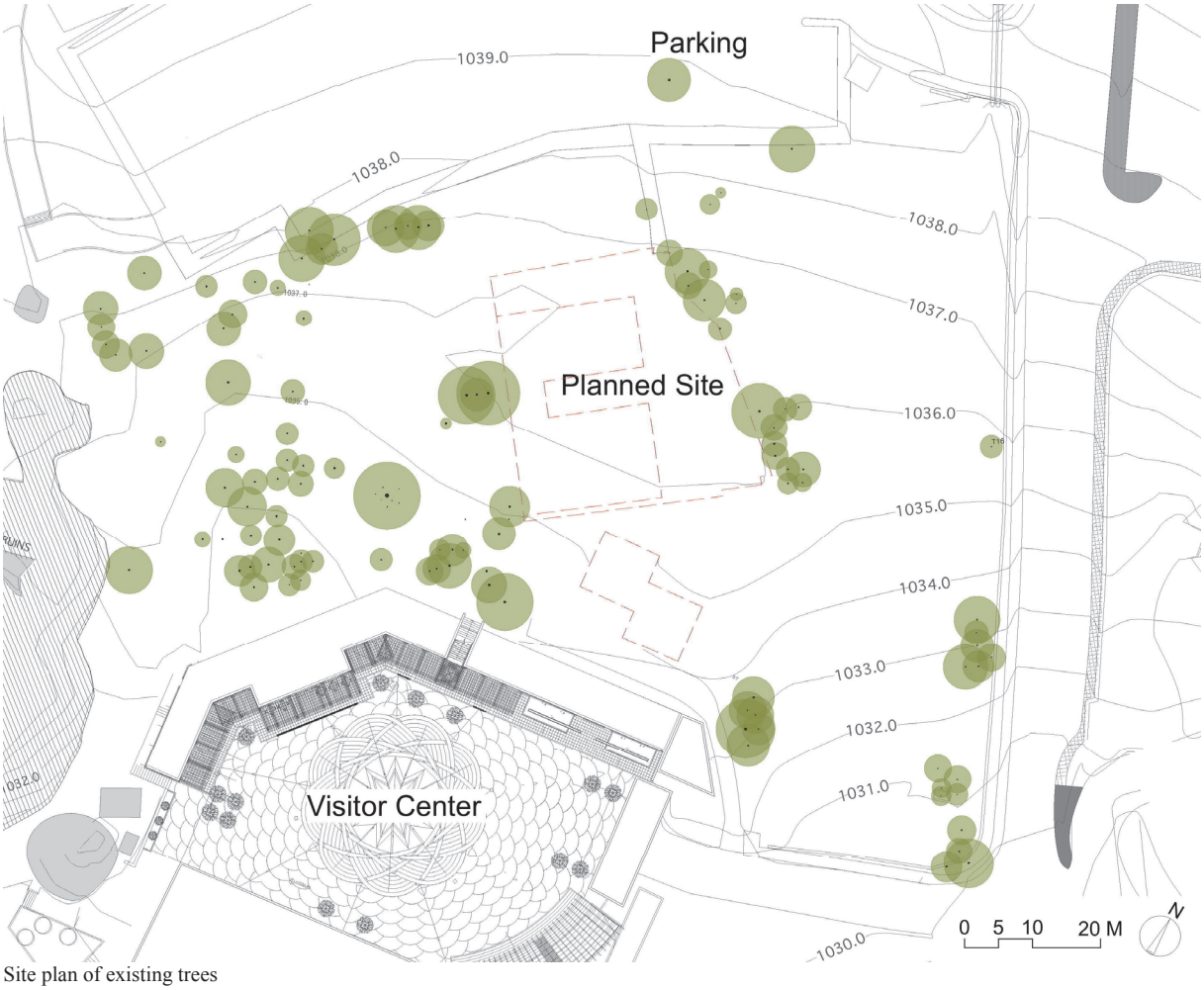


Design 3: Single-story building with standardized walls

The Petra Museum's rooftop garden, using the landscape of the surrounding mountains, with the courtyard reflecting an image of paradise.

### 3) Preservation of existing trees

Petra is a ruined nomadic city in a semiarid area near the desert. Unlike Japan, which has an annual precipitation of over 1500 mm, Petra sees rain only during the winter, with an annual rainfall of only 200 mm. A river called *wadi* has running water only in the winter, yet there are clusters of pines and other 10 m high tall trees on the site and its surroundings that would normally be cut down during construction. Architectural designs to preserve positively these existing trees are critical.



Site plan of existing trees


Trees on the planned site


Trees on the west side of the planned site

## 4) Exhibiting the ruins

The existing Petra Museum houses and conserves many conventional artifacts, including statues and chapiters, many of which are currently on exhibit internationally, such as in Switzerland last year and presently in Leiden, Holland. A few are paper and leather items, but the majority are stone figures that should look magnificent when displayed in the sunlight. The current trend in museum design, however, is to install artwork in huge exhibition cases on the interior walls illuminated by artificial light. In our proposal, we designed the space to include a courtyard and galleria, as well as indoor spaces into which outside light can easily be provided when required.



Design 4: Single-story building with complex curved walls
Exhibition room with irregular curved walls and sunlight

## 5) Reference form symbolizing Petra's Culture

The area's mountains produce an undulation of enormous reddish-brown sandstone with tombs cut vertically into the cliff faces of the ravine. Features of these sites include engraved loophole decorations, crowsteps, obelisks, sequential columns, and a theater, and more, dating from the era of the Roman Empire. Making reference to these in the museum will make it possible to produce an environment that befits Petra.



Tomb with a crowstep (a staircase for the deceased that symbolizes the ancient Nabatean culture)



Tomb with stone pillar obelisks



Theater

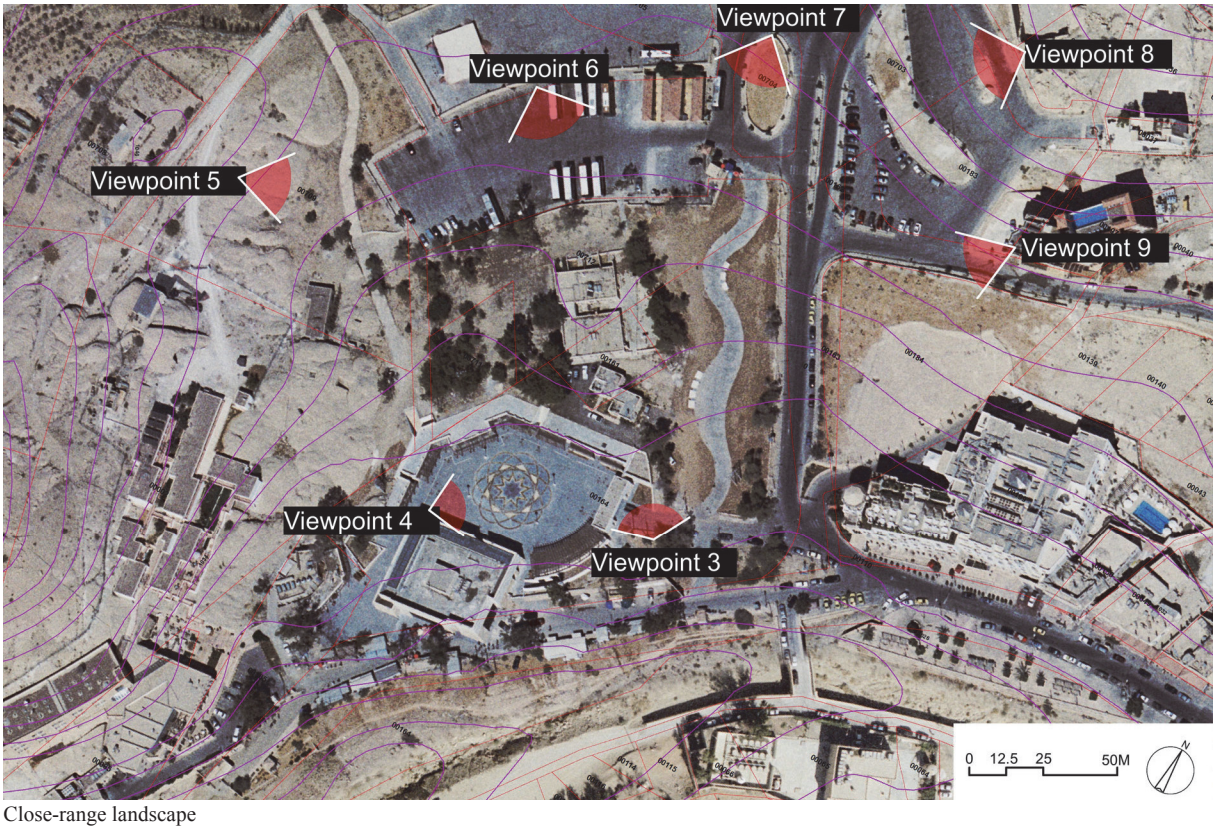


Temple with sequential columns

## Location map of viewpoints for landscape simulation




Middle-range landscape (Image ©2013 Digital Globe, Map ©2013 Google, ORION-ME)




Close-range landscape

## Photographs of present condition from each viewpoint



Viewpoint 1: From the roof of the PDTRA office



Viewpoint 2: From the entrance to the Al-Hussein Bin Talal University



Viewpoint 3: From the entrance to the Visitor Center's Plaza



Viewpoint 5: From the rocky stretch on the west side of the



Viewpoint 4: From the Visitor Center's plaza



Viewpoint 6: From the parking lot on the north side of the site



Viewpoint 7: From the rotary on the north side of the site



Viewpoint 8: From the parking lot on the east side of the site



Viewpoint 9: From the Petra Moon Hotel's roof on the east side of the site

**Comparison of four designs**

| | | Design 1: Partly two-story building with walls referencing tomb elevations | Design 2: Partly two-story building with simple curved walls | Design 3: Single-story building with standardized walls | Design 4: Single-story building with complex curved walls |
|---|---|---|---|---|---|
| Outer Wall | Curved wall | N/A | Simple 2-D curved surfaces | N/A | Irregular curved surfaces<br>Base of wall: Curved surface similar to tree roots |
| | Flat wall | Referencing tomb elevations | N/A | Standardized walls | N/A |
| Roof | | Flat surfaces | Simple 3-D curved surfaces | Flat surfaces | Complex 3-D curved surfaces |
| No. of floors | Two-story building | 2nd floor exhibition rooms<br>Same floor level | 2nd floor exhibition rooms<br>Same floor level | N/A | N/A |
| | Single-story building | N/A | N/A | Exhibition rooms on different levels connected by sloping corridor | Exhibition rooms on different levels connected by sloping corridor |
| Court-yard | Views of forest on west side | N/A | Views from rooftop passage and exhibition room corridors | N/A | N/A |
| | Preservation of existing arbor | Courtyard | Courtyard | Courtyard | Courtyard |
| | Flower and water | Flowerbeds | Flowerbeds<br>Cascade | Flowerbeds | Flowerbeds |
| Exhibition room | | Rectangle | Curved surface exhibition rooms and ceilings | Rectangle | Curved surface exhibition rooms and ceilings |
| Rooftop garden | | Same floor level<br>Borrowed scenery<br>Crowstep (Staircase for the deceased) | Same floor level<br>Borrowed scenery<br>Curved roof | Different floor level<br>Borrowed scenery<br>Crowstep (Staircase for the deceased) | Different floor level<br>Borrowed scenery<br>Curved roof |

**Design 1: Partly two-story building with walls referencing tomb elevations**

This design includes a courtyard that preserves existing trees and is distinguished by referencing an image of the tomb elevations on the outer walls. There is an entrance hall with an atrium on the first floor that leads up to the exhibition rooms on the second floor. All exhibition rooms will be located on the second floor. The northern extremity of the building is a single-story construction due to the sloping land.



Viewpoint 1: From the roof of the PDTRA office
The color of the museum reflects the color of the local sandstone.



Viewpoint 3: From the entrance to the Visitor Center's plaza
The color of the museum reflects the color of the local sandstone. Demonstrating the contrast between the geometric roof and the form symbolizing Petra's culture.



Viewpoint 4: From the Visitor Center's plaza



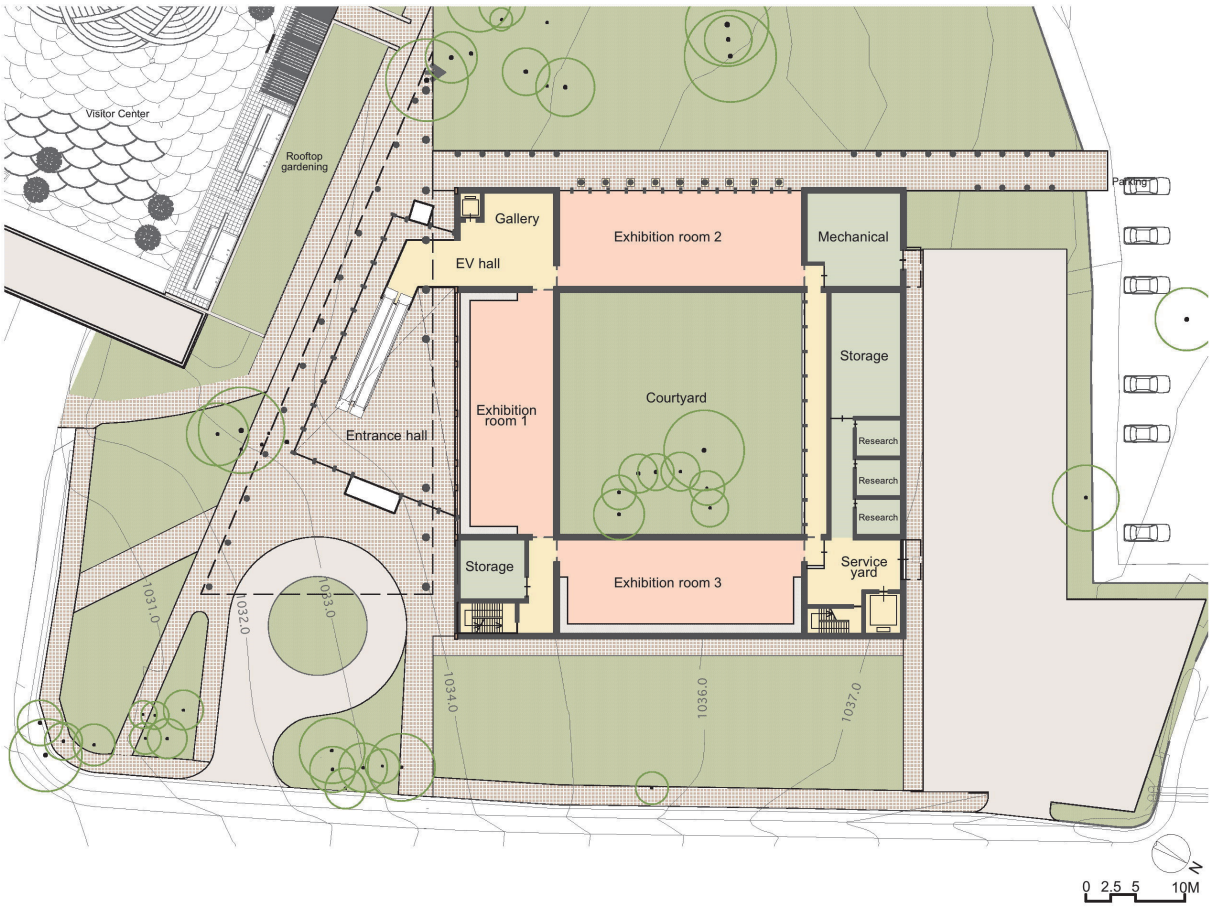
Viewpoint 9: From the Petra Moon Hotel's roof on the east side of the site
The appearance is divided into small scale.



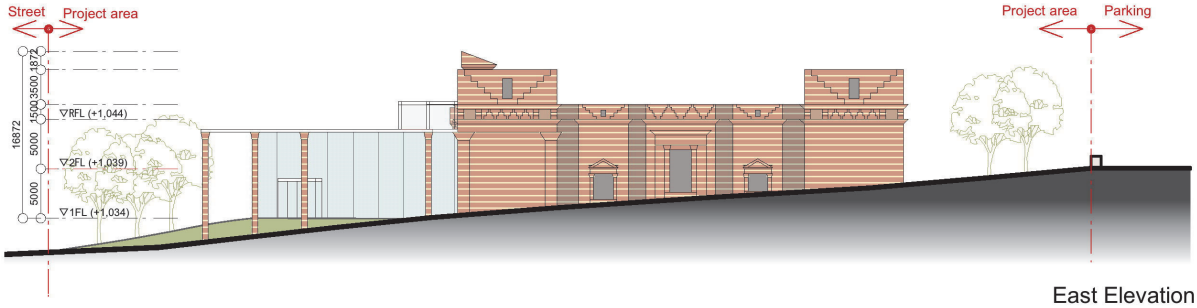
Viewpoint 5: From the rocky stretch on the west side of the site



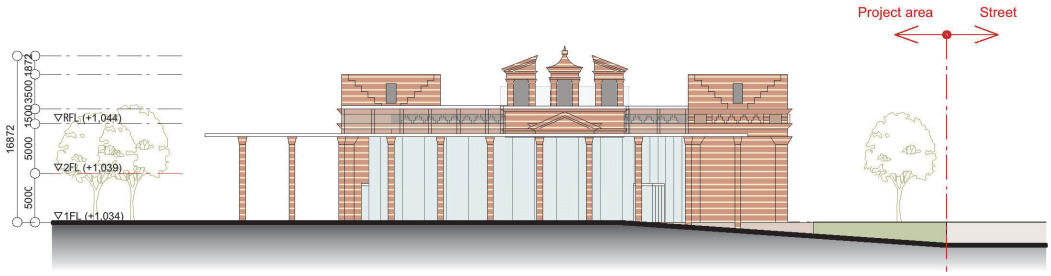
Entrance hall




Second Floor Plan




East Elevation




South Elevation

0 2.5 5 10M

**Design 2: Partly two-story building with simple curved walls**

The entrance hall for Design 2 is located on the first floor and all exhibition rooms are located on the second floor, but, because of the sloping land, the northern extremity of the building is a single-story construction. The walls of the exhibition room use simple two-dimensional (2-D) curved surfaces, the roof uses simple 3-D curved surfaces, and natural light comes in from the top and sides so that the exhibits can be enjoyed by artificial and natural lighting simultaneously. Existing trees are preserved in a courtyard that includes a cascade. The forest on the west side of the site can be seen from the museum's exhibition room corridors and the rooftop garden passages.



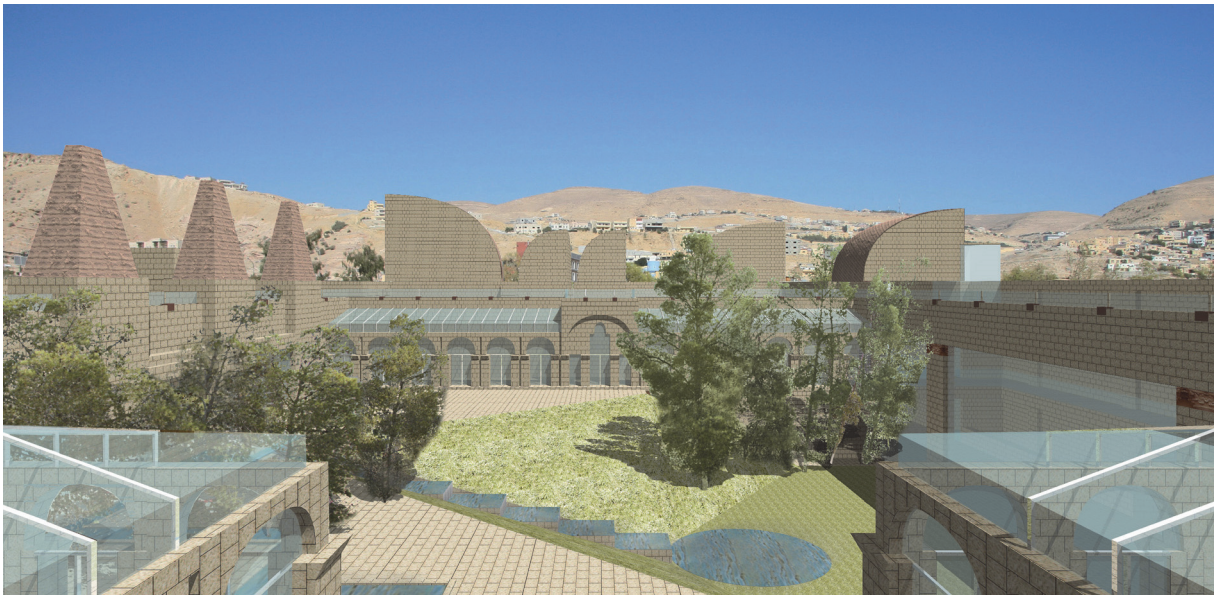
Viewpoint 1: From the roof of the PDTRA office
The simple curved wall harmonizes with the landscape of the sandstone mountains.



Viewpoint 3: From the entrance to the Visitor Center's Plaza



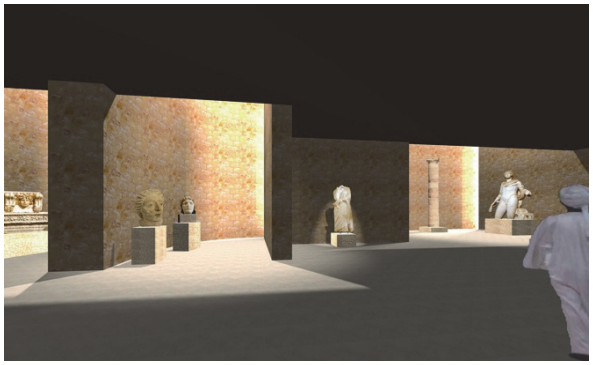
Viewpoint 7: From the rotary on the north side of the site
Many stands appeared in this area this year. While beneficial for an active market town, it is important to plan an appropriate location for these stands.



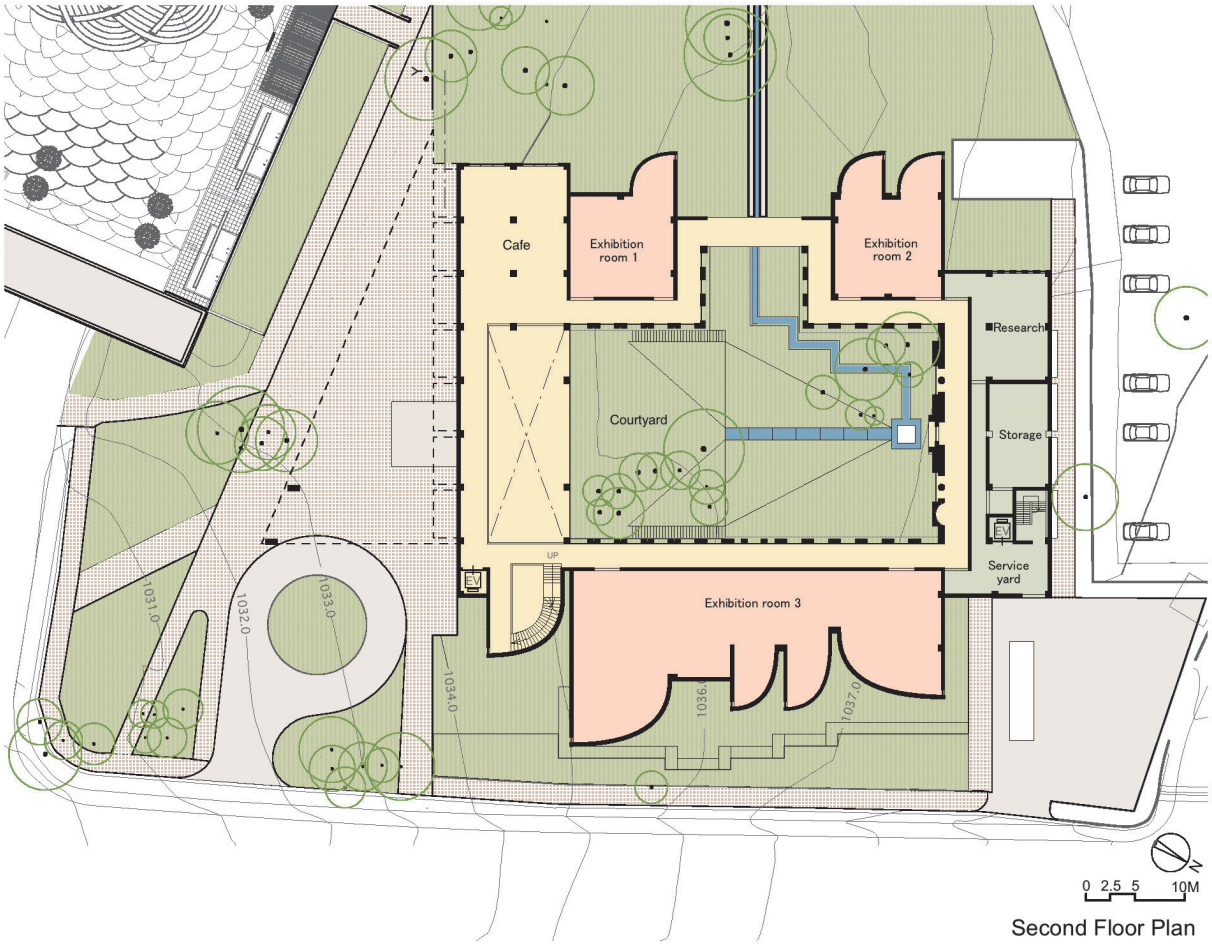
The courtyard with cascade and the rooftop garden, which uses the landscape of the surrounding mountains
This courtyard preserves the existing trees.



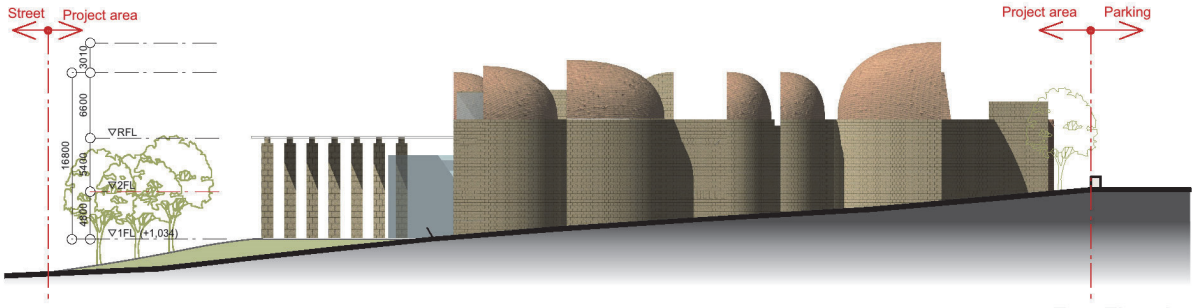
Entrance Hall



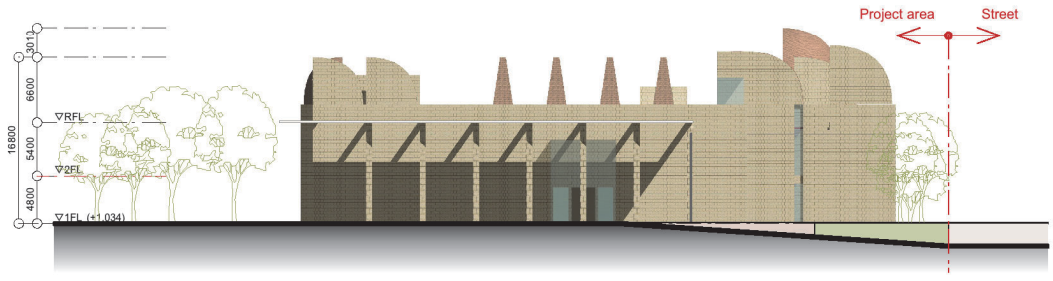
Exhibition room with simple curved walls and sunlight




Second Floor Plan




East Elevation




South Elevation

0 2.5 5 10M

**Design 3: Single-story building with standardized walls**

In line with the present slope of the land, the floor levels of all exhibition rooms have been planned to gradually incline from the entrance towards the back of the interior. A sloped corridor on the courtyard side connects each exhibition room. Some of the partition walls between adjacent exhibition rooms will be operational and staircases will connect the exhibition rooms. Flat walls are unitized and loophole decorations (multiple crowsteps) adorn the top parts, forming rooftop breast walls. In addition, the rooftop symbolizes the ancient Nabataean culture: the rooftop garden will be accessed by a crowstep that connects various levels of the rooftop alcove. The surrounding mountains will be used as borrowed scenery.



Viewpoint 1: From the roof of the PDTRA office
Visitors can walk on the roof.



Viewpoint 3: From the entrance to the Visitor Center's Plaza



Viewpoint 8: From the parking lot on the east side of the site



Viewpoint 6: From the parking lot on the north side of the site



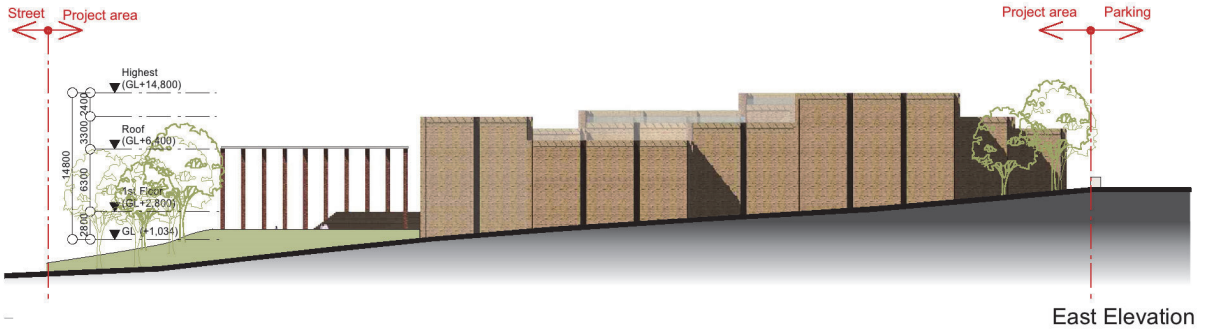
The rooftop garden will be accessed by a crowstep (a staircase for the deceased, which symbolizes the ancient Nabateaan culture) that connects various levels of the rooftop alcove.



Sloped corridor surrounding the courtyard




First Floor Plan




East Elevation




South Elevation

0 2.5 5 10M

**Design 4: Single-story building with complex curved walls**

In line with the present slope of the land, the floor levels of all exhibition rooms have been planned to gradually incline from the entrance towards the back of the interior. A sloped corridor on the courtyard side connects each exhibition room. Some of the partition walls between adjacent exhibition rooms will be operational and staircases will connect the exhibition rooms. The walls have irregular 2-D curved surfaces, but, up on the roof, this changes into complex 3-D curved surfaces. The bottom of the walls extends towards the ground like the roots of a tree. The complex 3-D curved surfaces represent the undulation of the rocks in nature and harmonize with the undulation of the mountains that are visible in the background as borrowed scenery.



Viewpoint 1: From the roof of the PDTRA office
The complicated curved walls and roof, which harmonizes with the sandstone mountains.



Viewpoint 3: From the entrance to the Visitor Center's Plaza



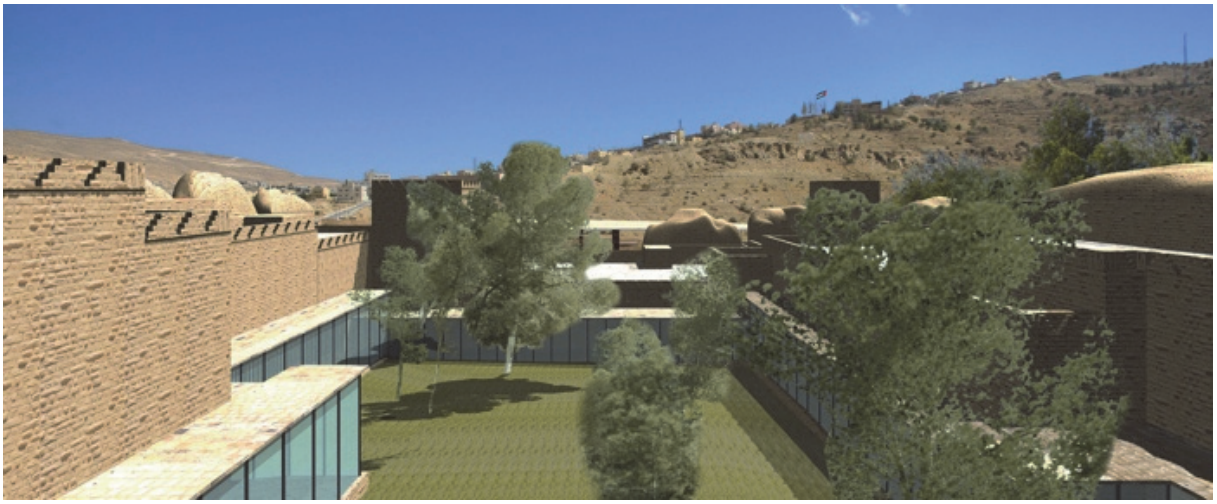
Viewpoint 9: From the Petra Moon Hotel's roof on the east side of the site
The appearance is divided into a small-scale oblong.



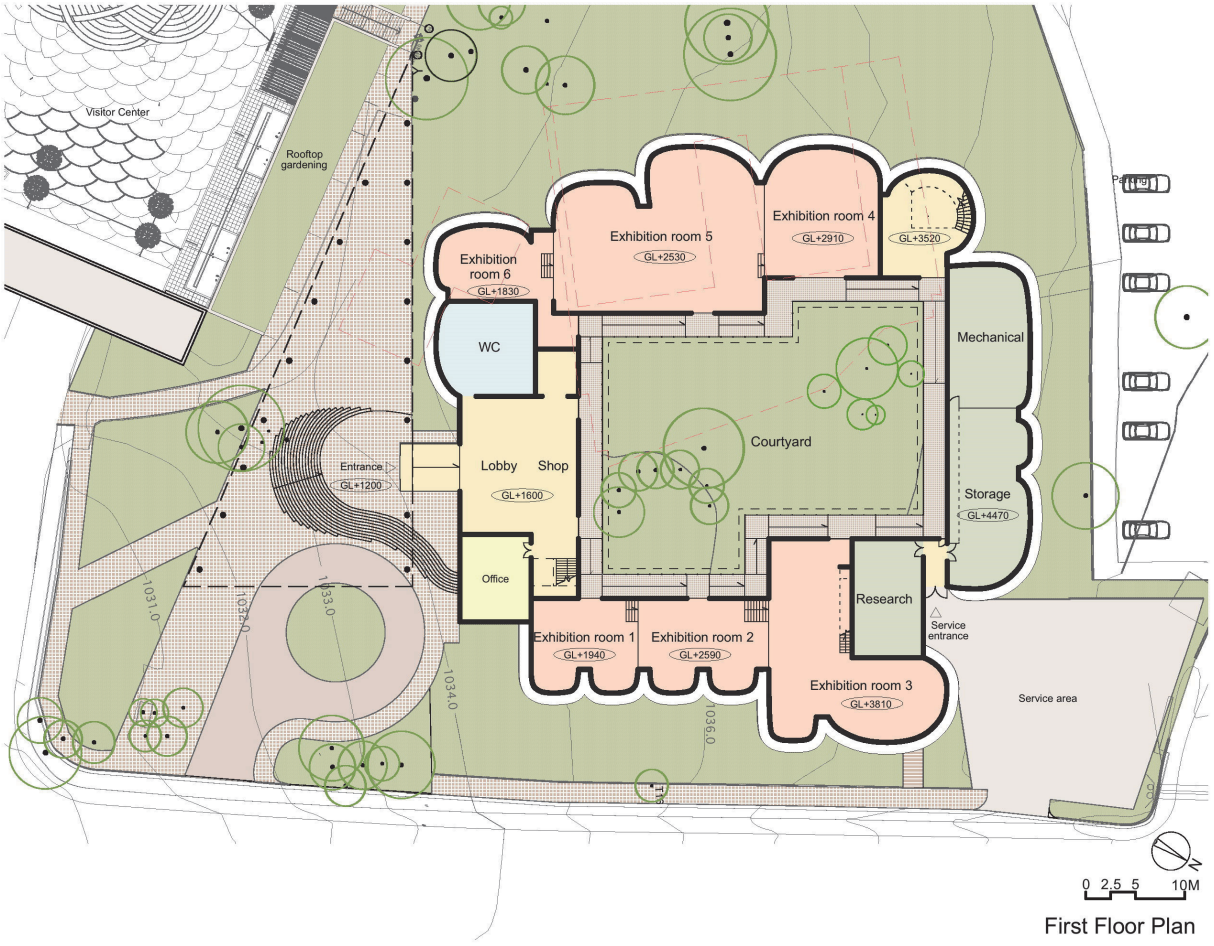
Viewpoint 2: From the entrance to the Al-Hussein Bin Talal University



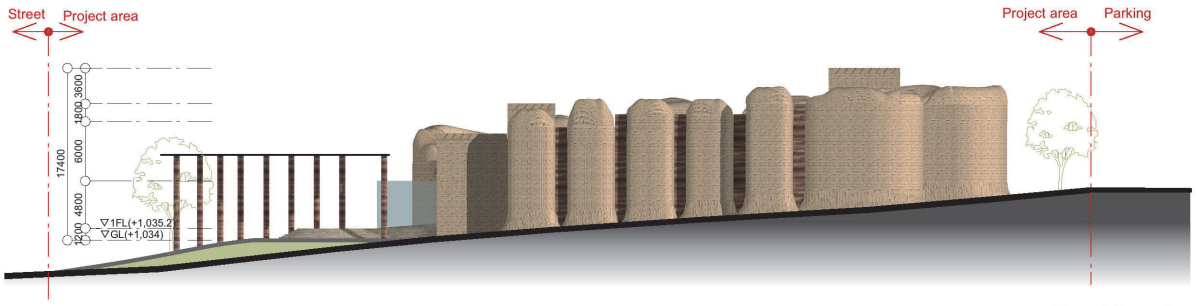
Exhibition room with irregular curved walls and sunlight



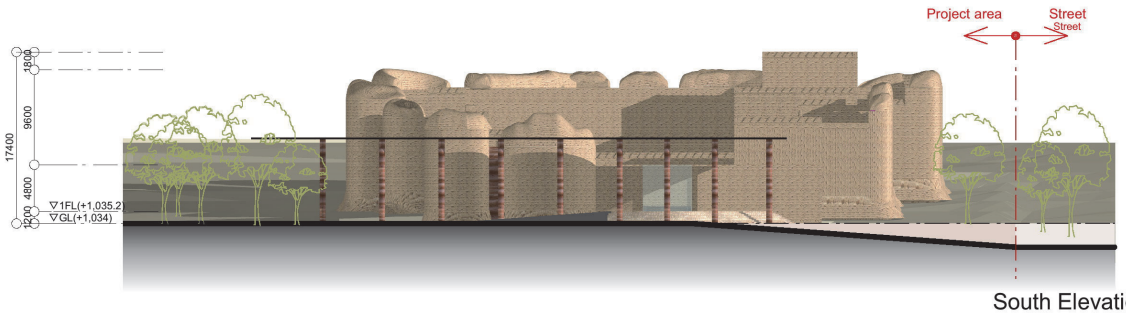
Courtyard that preserves existing trees




First Floor Plan




East Elevation




South Elevation

0 2.5 5 10M

The results of the simulation show that, in terms of a preventive environmental assessment, it is unlikely that the present scenery would be harmed and, if the relevant items shown in the four designs are taken into consideration when carrying out construction, any negative impact on the scenery would be negligible. Furthermore, in terms of the creative environmental assessment, Petra's natural environment could potentially be presented in a more appealing manner as a cultural monument, resulting in a positive impact on the scenery.

(Reported by Shigeyuki Okazaki and Hideaki Tembata)