Makino Museum of Plants and People

Project Data

1] PROJECT DATA

Designation:	Makino Museum of Plants and People
Year [of completion]:	1999
Author:	Naito Architects and Associates
Function:	Museum + Botanical Garden
Structure:	Reinforced Concrete + Steel + Laminated Wood (Roof frames)
Number of floors:	2[above ground]
Owner:	Public [Kochi Prefecture]
Environmental Assessment:	CASBEE [New Construction, 2004 edition]
Rating:	2.9

2] LOCAL CONTEXT

Country:	Japan
Location:	Kochi
Context:	Natural Park [habitat conservation and green field site]
Site [characteristics]	gentle slope area, on the ridge of forested mountain, in the vicinity of sea coast, outskirts of Kochi city

4] PROJECT AREAS

Site area:	44600m2	
Total floor area:	7360m2	
Constructed area:	5700m2	13% [of Site Area]
Number of users:	~ 70 visitors/day	

Project Description

"The purpose of this building was not only to house and research the vast collection of plant specimens and publications by Dr. Tomitaro Makino, the "Father of Japanese Botany", but also to exhibit some of them to the public. The site is adjacent to the Makino Botanical Garden on Mount Godai in the outskirts of Kochi City, and stands on gently sloping land running along a ridge near the top of the mountain. The site is divided into different areas, and the planned area for the building was quite large. Firstly, therefore, we studied how the facility could be positioned without making it too conspicuous. In the end, we divided it into two buildings (one mainly for archive storage, administration and research, the other mainly for public display), linked together by a passageway of just over 170m in length."

in Japan Sustainable Building Database

"A building that would become one with this abundant landscape – that was the image I received when I first visited the site on a spur of Mt. Godai. […] Damp fallen leaves represent a state of organic life on the verge of decomposing and returning to nature […] a state of hugging the ground. Taking my intuited glimpse of their beauty as my point of departure, I began to grope toward the figure of the building. […]Mt. Godai is not a large mountain, but the visitor discovers a unique atmosphere within its environs.[…] I sought a building that would respond naturally to this air and conjoin with it to foster the environment. So many years from now, Kochi's lush greenery will likely cover and conceal this building. […] The building will be buried in the forest, leaving only its central court and interior spaces, encompassed by roof."

Hiroshi Naito

Care has been taken to blend with surroundings using large roofs and low-level buildings. Low-level building arrangement done in order to limit impact on the local wind environment, and limit loads on the structure.

Trees and plants have been transplanted to avoid impact on landscape trees, based on surveys and studies of vegetation, plant phases and large-diameter trees in the construction site. More than 500 different trees were planted around the buildings, and a biotope was created using natural wind flow and water environment facilities.

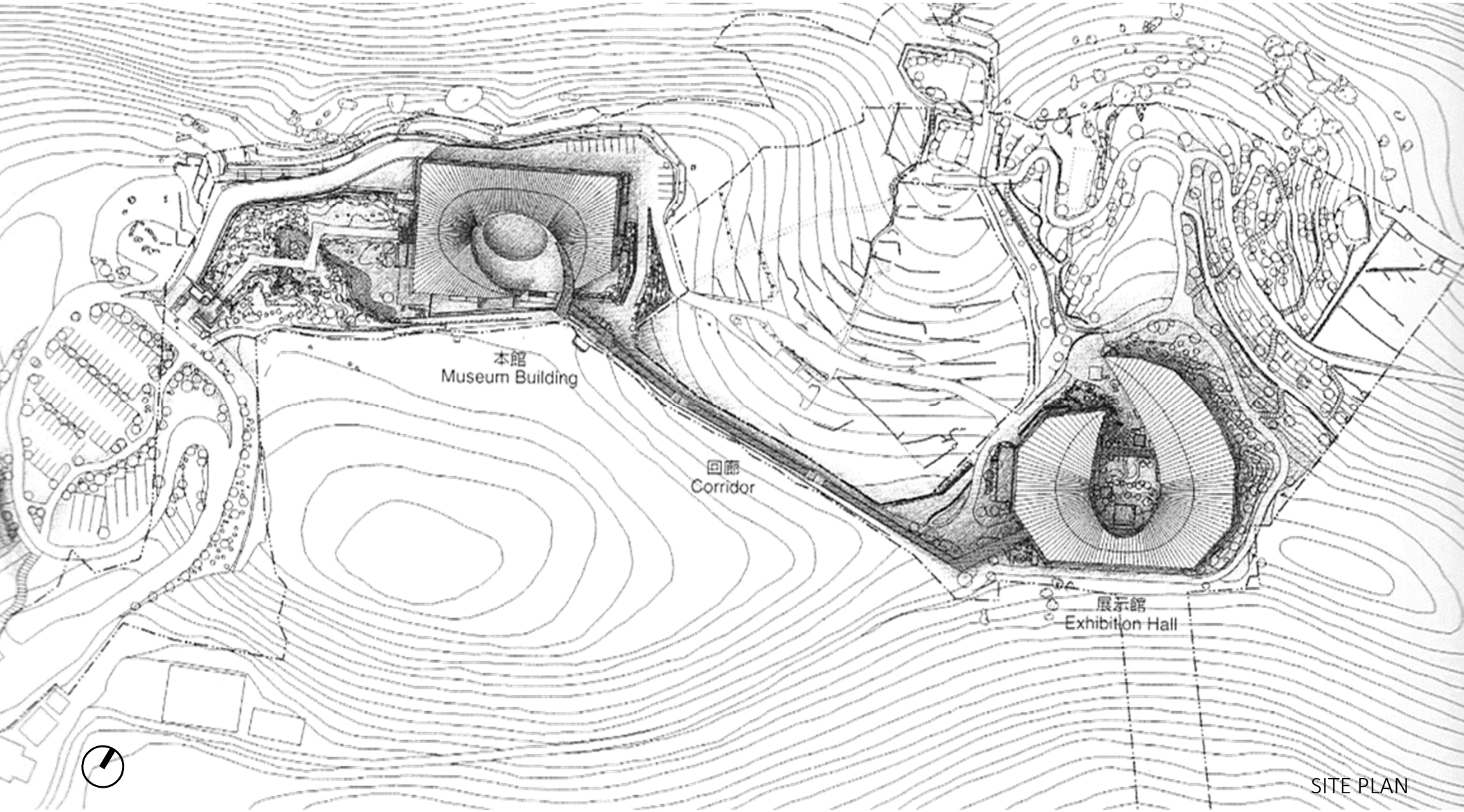
Improved indoor environment and sunlight screening was obtained through creation of shades using deep canopies, low eaves and trees, and reduction of heat entering building by using roof materials with high sunlight reflection factor. External air cooling was prepared via cool tubes, using cool breeze from tree shade created by planting deciduous trees around external air intakes, and draw in cool breezes from tree shade in the summer. Reduction of energy load results of using pre-cool external air before it reaches the air conditioners.

Locally produced cedar and cypress, as well as laminated wood from Oregon pine, was used, as well as rubble excavated from the site to create masonry around outer walls.

Use of rainwater was planned for roof sprinklers and water circulation to channels in the courtyard. Rainwater butts have been installed in the underground pit of the Exhibition Building. The water is used for roof sprinklers and water circulation to canals in the courtyard. The four ponds in the courtyard also have a cooling effect.

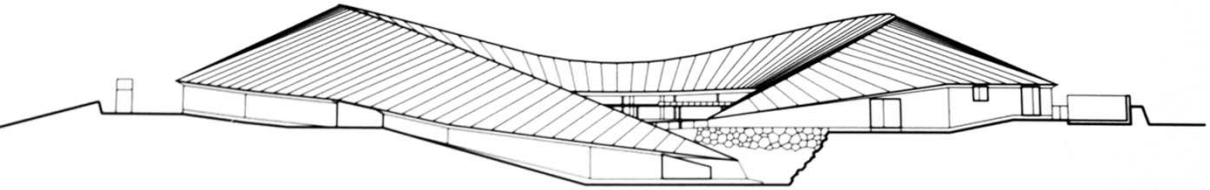
in Japan Sustainable Building Database (adapted)

Technical Drawings: Plans, Sections and Elevations

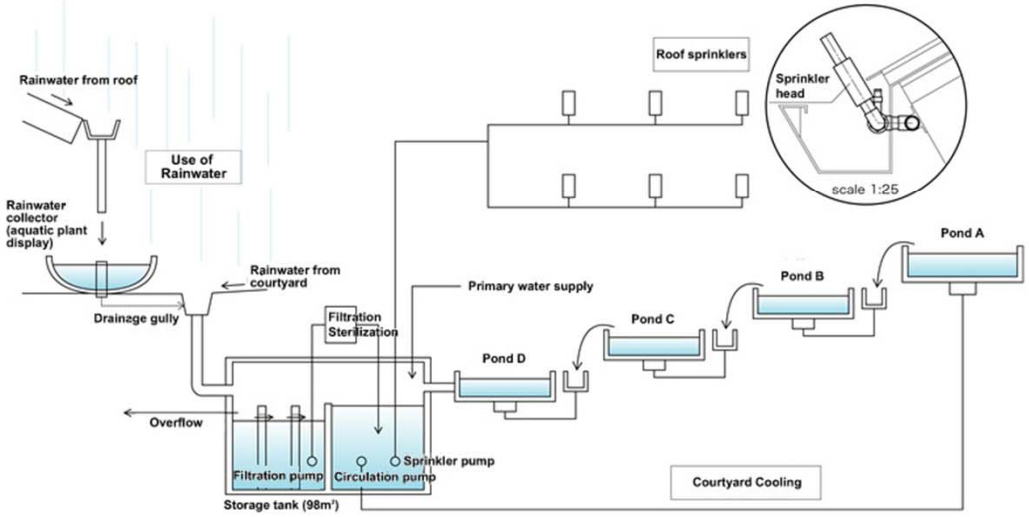


SITE PLAN

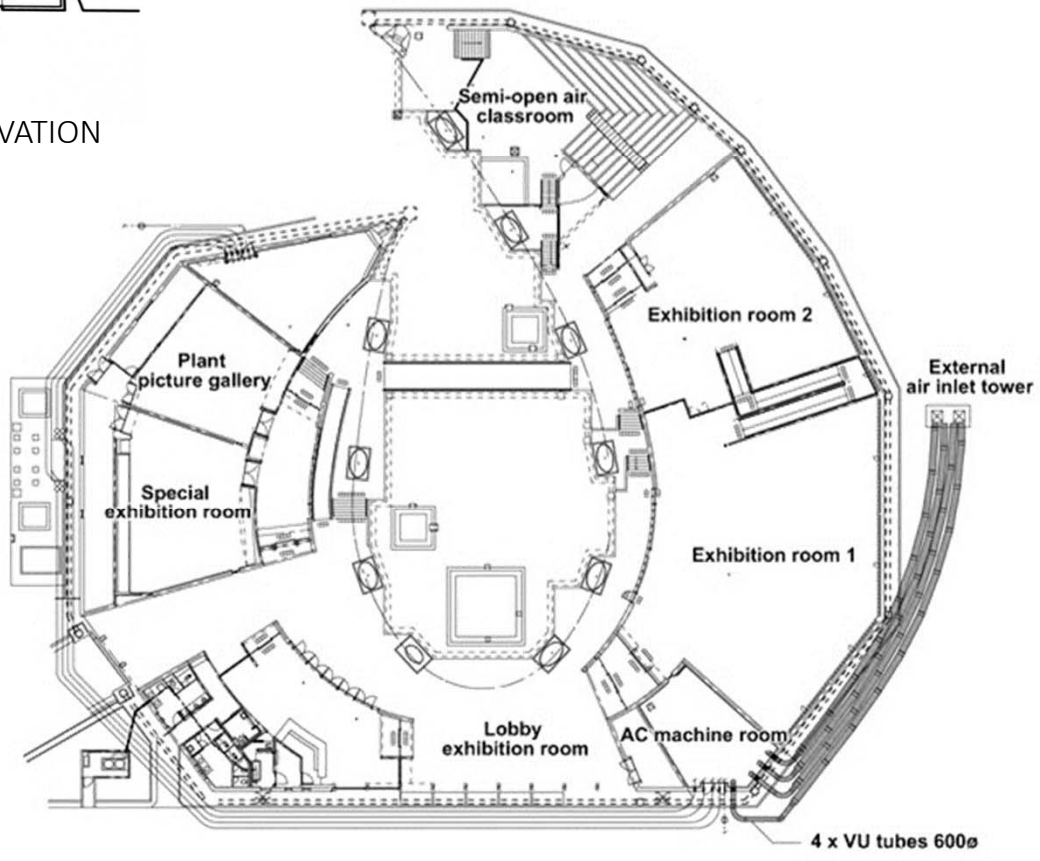
Technical Drawings: Plans, Sections and Elevations



EXHIBITION HALL . NORTH ELEVATION



RAINWATER RECYCLING SYSTEM



EXHIBITION HALL . 1F PLAN

Photos

aerial view ↵

museum building courtyard 2F [reception] ↵

exhibition hall ↵

exhibition hall ↵

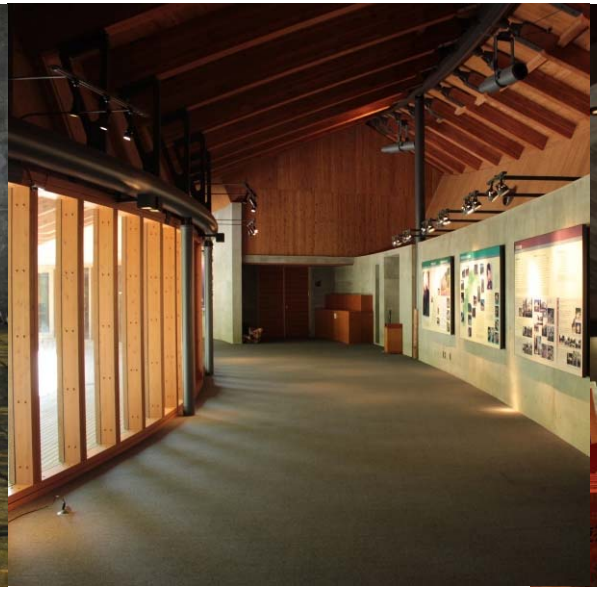
museum building 1F [library] ↵

Photos

views of the exhibition hall courtyard ↵

roof eaves ↵

courtyard water surfaces ↵



exhibition room ↵

shop + restaurant ↵

Ecosystem interpretation options [digest]

1 Landscape design exclusively with diverse native plant species, and introduction of more than 500 trees

2 Transplantation of trees and plants in order to avoid construction impacts

3 Form design [setting, circulation, volume and height] in order to blend in with the landscape and alter as less as possible the topography

4 Creation of biotope courtyards and microclimate control through vegetation, wind flows and water surfaces

5 External air cooling system for energy efficiency using deciduous trees shade

6 Reuse and filtering of rain water for roof sprinklers and water circulation in the Exhibition building courtyard

7 Reuse of rubble excavated from the site as building material

8 Reuse of rainwater and filtering through ponds for water species exhibition on the Musem Building

9 Iconic design, visual form and varied views of landscape/nature from the interior and courtyards

10 Scientific-educational learning opportunities and outdoor recreation leisure amenities

11 Roof structure design, in alliance with trees and rock mounds, in order to minimize wind patterns alteration, and preparedness for typhoon

12 Bioclimatic design with deep eaves, vegetation and reflective roof materials

13 Use of locally (municipality) produced cedar and cypress wood

…






image credits and sources: ©Naito Architects and Associates + ©Catarina.Vitorino