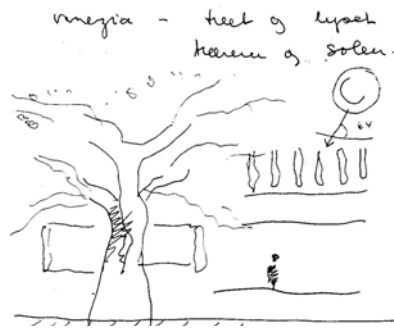


ARCH 5516 • LUMINOUS AND THERMAL DESIGN

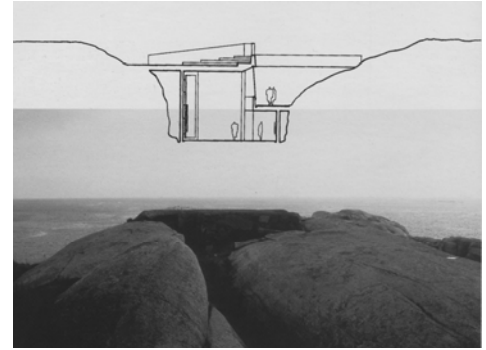
ECOLOGICAL DESIGN FOR THE 21ST C

“Architecture has the task of discovering and preserving these [site] memories, interpreting and manifesting them, making them comprehensible to the inhabitants.”

-Sverre Fehn



Sverre Fehn, Concept Sketch for Nordic Pavilion, Tree and Sun



Sverre Fehn, Proposal for an Art Gallery Verden Ends (the end of the Earth)

PROJECT ONE:

Site & Bioclimatic Design Charette: Between Earth and Sky

Friday, January 25, 10:00 a.m.: Phase 1 pin-up on mezzanines

Monday, January 29, 10:00 a.m.: Phase 2 due: pin-up in the courtyard

Time period: 1 week; estimated minimum 18 hours

Grade weighting: To be submitted and graded with Project One: Daylighting (15% of Project One)

Electronic Reading:

- Knowles, Ralph. *Ritual House*, Washington: Island Press, 2006, pp. 3-73 (Chapters on Sheltering, Migration, Transformation, and Metabolism).

Design Charette Objectives:

The objectives of charette are to:

- *Explore site and bioclimatic forces as they influence daylighting, thermal, and architectural design.*
- *Investigate poetic and pragmatic daylighting and thermal design opportunities and considerations related to site, bioclimatic, and ecological forces.*
- *Consider the architectural and environmental implications of site, climate, and place.*
- *Investigate processes and tools for site and bioclimatic analysis and design.*

Problem Statement

In his essay, “Between Earth and Sky,” Gennaro Postiglione states that: *“Every site constitutes a kind of archive in which the different stories intertwined in its evolution are conserved. Every site holds a key that guarantees the preservation of its meaning, even when the transformations caused by humankind tend to erase the traces and memories.* Norwegian architect Sverre Fehn, suggests that it is the role of the designer to “preserve, interpret, and manifest” the story of a given place or site. A “bioregional” approach to daylighting and thermal design celebrates the ecological characteristics and history of a given place.

In this design charette you are asked to evaluate Rapson Hall at the site and building scales and develop preliminary design proposals that explore the bioclimatic “story” or “narrative” of your site and program for the “Minnesota Zero-Emission/Zero-Energy Design Lab” at the College of Design (see mnZED program brief for details).

PHASE 1: Pin-up Due: Friday, January 27, 10:00 on mezzanine (pin-up by 9:45)

Site and Bioclimatic Analysis: A Story of “Place”

(Site and bioclimatic study: suggested time limit: 1/2 day)

Before beginning, please complete the reading for the charette. Take time visit the site under varying conditions (clear vs. overcast conditions; morning vs. afternoon; calm vs. windy day; etc.). After you have become familiar with the “moods” and qualities of the site, develop a graphic analysis of the site and bioclimatic design opportunities. Your team is asked to use words, images, collage, sketches, or other graphic or media to create an analysis and to define your interpretation of the “narrative” or “story” of the site and building. Prepare an “informal” graphic presentation for January 27. Divide the workload between your team members. Please consider:

1. Site and Bioclimatic Forces and Features: Prepare an analysis of the physical forces and features of the site and building (e.g. annotated photos, Ecotect weather data, site/building diagrams, and/or mapping overlays to consider the site and building phenomena and building metabolism). You should consider:
 - o Context: Google Earth photos: adjacent buildings impacts; optional Ecotect Solar Tool studies of site
 - o Seasonal changes for your climate (sky conditions, temperatures, relative humidity, weather patterns)
 - o Sun path for your climate and site
 - o Prevailing wind patterns for your climatic and site
 - o Views into and out of the site (existing or proposed)
 - o Noise and other sources of pollution (existing or mitigated)
 - o Impacts of adjacent buildings (existing or proposed)
 - o Contours, drainage, water features; phase change of water and seasonal issues (existing or proposed)
 - o Vegetation, landscape issues, wildlife habitat (existing or proposed)
 - o Pedestrian and vehicular circulation (existing or proposed)
 - o Other: identify any other factors that may influence the ecological site and building design response.
2. Site and Luminous and Thermal Phenomena: Use annotated photographs to capture the quality and character of the luminous, and thermal experiences and phenomena on the site; consider the opportunities to celebrate diurnal or seasonal phenomena (sun, wind, water, rain, snow, landscape, habitat, day/night, etc.).
3. Indoor Environmental Quality Assessment: Assess the existence of lighting, thermal, acoustical, indoor air pollution or other environmental quality problems that could be mitigated as a result of the proposed project.
4. Site/Building Journey: Use photographs or annotated diagrams to assess the movement and experience through the site and building; consider the sequence of luminous, thermal, and site events (inside/outside).
5. Construction & Enclosure: Use photos or diagrams to assess the relationship between the inside/outside; consider materiality, degree of enclosure, elevations and skin, and connection to site and place. Develop an inventory, written or graphic, of the existing materials, structural systems, and other building systems that may impact the proposed project.
6. Experiential and Poetic Opportunities: Use text, images, or diagrams to consider the experiential and poetic ecological opportunities of the site and building.
7. CONCLUSIONS: Site and Bioclimatic Design Interpretation and Story?: Develop a summary of the bioclimatic and ecological design opportunities you have found on the site and at the building scales, What do you want to elevate and reveal through design? How would you describe the story of the site and building?

PHASE 2: Due: Monday, January 28, 10:00 in the courtyard (pin-up by 9:45)

Site & Bioclimatic Design “Charette”

You are asked to develop concept studies and at least THREE design proposals exploring the building siting and massing based on your “Site & Bioclimatic Analysis” and related “design concepts” for the mnZED Lab. Keep in mind that this is a “charette,” which is intended to open ideas.

PART A: 1/32” Site/Massing Physical Concept Models (study models):

(suggested time limit: 1/2 day)

1. 1/32” Concept Models: Based on your site analysis and conclusions develop at least SIX different concept studies using physical models at 1=32” that interpret the design opportunities of “place” and “site” for the “mnZED Lab” (minimum of 2 for each team member). Use balsa wood, cardboard, or other modeling materials. Feel free to generate as many ideas as possible. Include the new portion of Rapson in the 1/32” study models (consider using one base model of Rapson with alternative additions). Be mindful of the impact of adjacent surfaces and buildings (e.g. plan and sectional sketches are useful to explore relationships to adjacent buildings and spaces inside and outside). Photo-document your studies and related concepts to integrate into your graphic presentation.

PART B: 1/16" Scale Proposals: 1/16" Computer Studies and Drawings

(suggested time limit: 1/2 day)

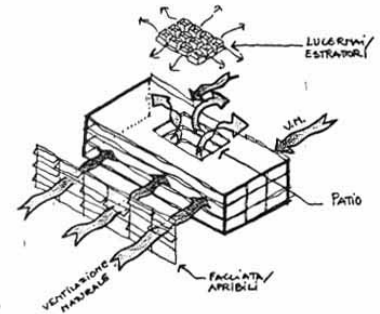
You are asked to select THREE of your "concept models" for further development via drawings and computer renderings at the scale of 1"=16' (at least one per team member).

1. **Site/Building Plan and Section Drawings:** Develop annotated plans and section drawings (include the earth/site) at 1"=16' to illustrate your site and bioclimatic design concepts related to daylighting and thermal design to illustrate three of your selected concept models (one per team member).
2. **Concept Diagrams and/or Isometrics (see diagram below):** Develop annotated concept diagrams to illustrate your site and bioclimatic design concepts for the 1/16" proposals (one per team member).
3. **Ecotect Data:** Include your bioclimatic data from Ecotect. Include a brief summary of the climatic design implication for the data (team only).
4. **Qualitative experience:** Include words, images, writing, etc. or other media that capture the quality of light and thermal experience for each 1/16" proposal (one per team member).
5. **Optional:** Please add any additional images or studies that would be useful to explain your design investigations:
 - o Optional 1/16" study models: build the study models from balsa wood with a chipboard site. You can focus only on the "old Rapson" portion of the building at the 1/16" scale.
 - o Optional Time Sequence Studies: Photograph your 1/16" models outside to study the diurnal and seasonal transitions (e.g. use a 45°NL sunpeg to photo models at June, Sept/Mar., and Dec. 21 at 9:00, noon, and 3:00).
 - o Solar Path Studies: use the Solar Tool from Ecotect at the building massing scale (e.g. morning, noon, and afternoon for June, March/Sept, and Dec. 21).
 - o Time sequence photographs of the 1/16" study models (see #2 above).
 - o Other relevant issues.

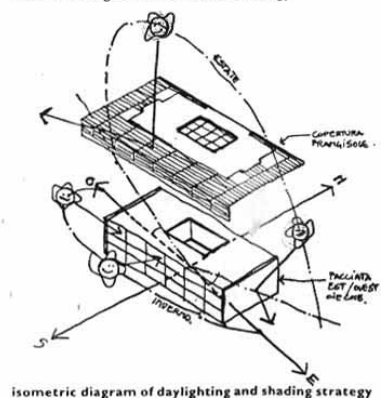
Submission Requirements: Design Charette

The design proposals should include models and graphic representations using a 24"x36" vertical presentation format. Keep in mind that this is a "charette"; sketches are acceptable. *Please identify the name of the team member who developed the 1/32" and 1/16" design proposals. Label all plans, elevations, sections and other diagrams. Include graphical scale and indicate "north" direction on all plans.*

1. **Phase 1: Site and Bioclimatic Analysis:** include a graphic summary with all site and bioclimatic analyses from Phase 1 (team)
2. **Phase 2: Physical Concept Models at 1/32"**
 - SIX Site/Massing Concept Models: 1"=32'-0" (minimum of two studies per team member)
 - Photo-documentation of 1/32" models for graphic presentation
3. **Phase 2: Graphic Presentation for each 1/16" proposal**
 - Site/building plans: 1"=16'-0" (one per team member)
 - Site/building sections: 1"=16'-0" (one per team member)
 - Site/building concept diagram(s) and/or isometrics of design proposal (see right; one per team member)
 - Supporting photos, sketches, text as useful (team)
 - Ecotect weather data (team)
4. **Phase 2: Optional**
 - 1/16" physical models
 - Time sequence studies of models
 - Ecotect Solar studies at the site/building massing scale



isometric diagram of ventilation strategy



isometric diagram of daylighting and shading strategy

Grading Criteria: To be submitted for grading with Project One (the Charette will be 15% total grade for Project One: Daylighting)

Grading Criteria

- Clarity and craft of "Site & Bioclimatic Analysis"
- Overall craft of presentation boards and drawings
- Clarity, craft, and execution of design intentions demonstrated in the models and drawings