Microclimatic Analysis

Solar Access
Wind Conditions
Topography
Vegetation & Soil Conditions
Water/Water runoff
Goals

Identify and establish the microclimate design determinants

Solar Access – Sun Angles

Confirm sun path for solstices and equinox

At solar noon:

12/21 \[ \beta = 90 - 23.5 - L \]

3/21 & 9/21 \[ \beta = 90 - L \]

6/21 \[ \beta = 90 + 23.5 - L \]

where \( L \) = latitude

Solar Access – Sun Path Diagram
Solar Access – Openings/Filters

Verify solar orientation and obstructions

L: p.142, Fig 6.14

Solar Access – Solar Envelope

Confirm solar envelope of buildings on adjacent and adjoining sites

Wind Conditions – Direction and Speed

Obtain climate data
Wind – Channels or Obstructions?
Verify distance to openings and barriers

Wind Conditions + Topography
Verify changes in terrain
Locate changes in local terrain

Topography – Elevation
Verify location of changes in elevation
Vegetation & Soil Condition

Trees & ground cover
  Soil surface color
  Soil type

Vegetation & Soil Conditions – Trees

Confirm location and species of trees
  Coniferous
  Deciduous

Vegetation & Soil Conditions

Verify locations and conditions
  Vegetation
  Surface color
  Soil type
  Hardscape
Water/Water Runoff

Verify water table and drainage patterns

Final Site Summation

Compile findings on site diagrams

Microclimatic Design
Case Study

Microclimates

Interactive
Seasonally dynamic
Occur outside and inside the building

Location & Climate

Compare site opportunities to the climatic issues

L: p. 300 Fig. 11.28&d
Climatic Design Priorities

Assess design priorities

“...Region 14
1. Allow natural ventilation to both cool and remove excess moisture in the summer.”

L: p. 114

Regional Precedents

Identify local vernacular precedents

Vernacular Side-Gallery House, Charleston, SC

Climatic Form Givers

Identify local climatic form-givers
Design Strategies

Evaluate design strategies

Contemporary Translation

Shutter House for Photographer
Tokyo, 2003,
Shigeru Ban


Develop Alternatives

Assess and adapt generic models

Cold   Temperate   Hot & Dry   Hot & Humid

L. p. 333-6, Fig. 11.12 b-e
Develop Alternatives

Evaluate possible design solutions within the site context

External Factors

Evaluate external impacts for sun, wind, and water

Internal Factors

Evaluate internal impacts for sun, wind, and water
Integrate with Building & Site

Microclimates complement and activate the building design

AIA Climate Zones

Each analysis describes:
- Climate
- Psychrometric profile
- Design priorities
- Basic conditions
- Temperature cycles
- Relative humidity
- Wind speed
- Sunshine
- Degree-days
Psychrometric Profile

Zone 4