HOME, THERMAL, MACHINE

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Table of Contents

Manifesto

The Notion of Feeling vs Experiencing

The way we think we experience a space is different from how it actually is.
Our mind tends to trigger a connection between the reality and emotional responses even if they are not the same as what we actually experience. We want to design an architectural space for people of different ages, based on their thermal preferences. Our brains respond to different lighting conditions and certain materials when we touch them, conveying different messages to our physical structure.

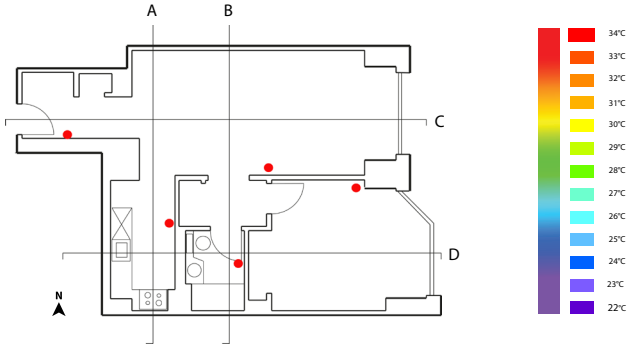
The understanding of thermal comfort is extremely subjective individually.
In the Journals of Gerontology, Nigel A.S. Taylor, N. Kim Allsopp, and David G. Parkes conducted an experiment where they tested two groups of people, aged 23 and 67 years, in a room of 24 degree Celsius. They were able to adjust the temperature whenever they feel uncomfortable. The results showed that the older people tend to feel less comfortable in the cooler temperature, and more comfortable after adjusting to a warmer temperature. Meanwhile, younger people prefer to be in a cooler temperature.

Different lighting conditions make our minds experience temperature differently.
When our eyes begin to see a certain color in a room, say a warmer light, our mind begins to tell our body to feel warmer, and a bluish tone light, cooler. Most of these conditions are due to our notion that color predicts thermal experience in combination with sensories. Similarly, people adjust the brightness of the lighting based upon their activities and comfort. For instance, if a person is working in an office setting, one doesn't want a warm, dim light, and preferably, when it's time to sleep, one doesn't want to be situated in blue lighting which prevents one from producing a hormone that regulates sleep and wakefulness.

What we see and touch affects how we perceive temperature mentally.
Heschong in Affection describes the idea of using daily objects as tools that trigger our mind and body to be aware of the sensory experience. Like the teapot, even if there is no hot tea within, we still feel the warmth and heat. This implies that our mind has that preconception of the thermal sensation of certain materials that we are aware of, or has experienced touching them even before we have the chance to make contact. Even if the actual temperature is the same when we touch, we feel that one material is colder or hotter than the other. Take metal and wood for instance, they are two very different materials that feel thermally different upon touching. When placed in the same temperature, the metal feels much colder or hotter than the other.
Take metal and wood for instance, they are two very different materials that feel thermally different upon touching. When placed in the same temperature, the metal feels much colder compare to the wood even though their temperatures are equal when tested because metal conducts heat away from your hand at a much faster rate than wood. Certain materials work better in specific climates than others; brickstones, concretes, wood, and glass work better in cooler climates. Glass would be considered as a much more effective material to use in a cooler and more humid climate, in contrast to extreme hot weather and direct exposure to sun.

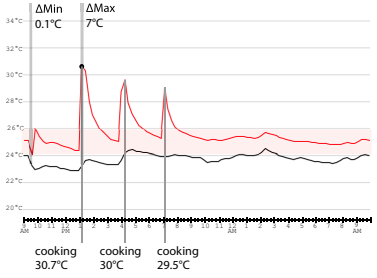
People experience different ranges of thermal conditions through their senses. We want to create a space by understanding the factors of various people's thermal delight; how does lighting, brightness and color, and different materials affect the mind and body to experience different thermal sensations.

Body and Thermal Sensation



Kitchen

09/09/18



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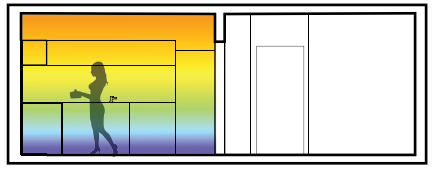
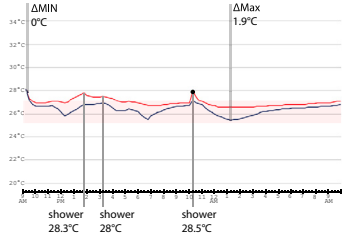


Bathroom

09/05/18



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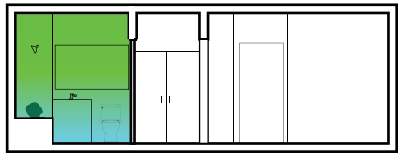
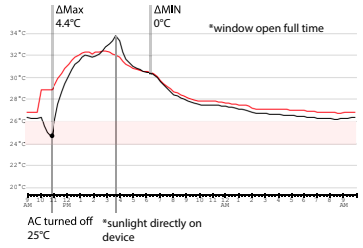
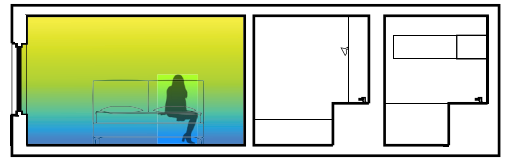


Bedroom

09/06/18

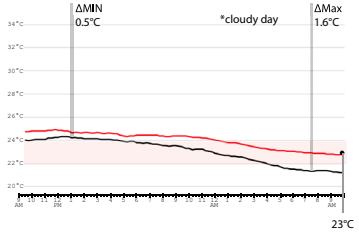


D 11:00AM



Living Room

09/08/18



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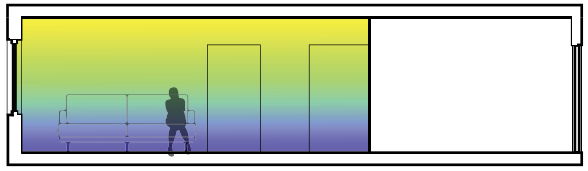

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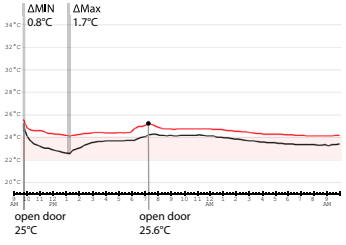

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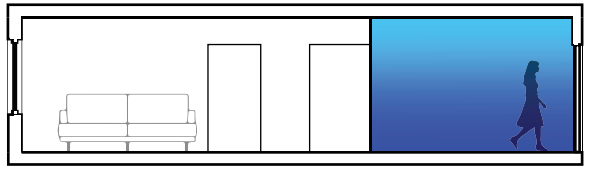
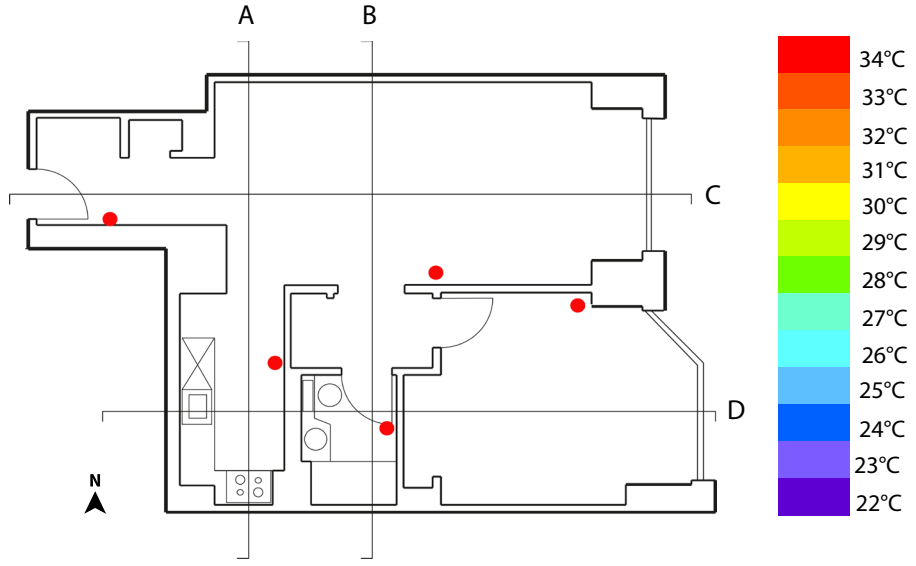


Perferred Sensation

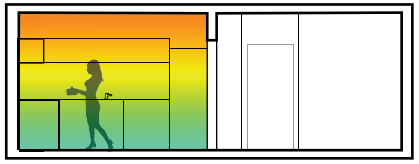
0.08 clo. | 0.06 clo. | 0.03 clo. | 0.01 clo. | 0.02 clo. | 0.42 clo. | 0.29 clo. | 0.02 clo. | 0.02 clo.



Perferred Sensation

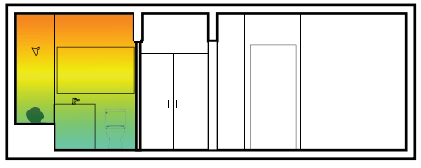
Caitlin

A Kitchen



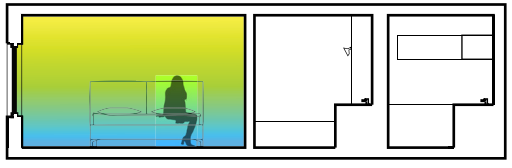
Cooking
Temp. 27°C
Humidity 77.7%
0.17 clo.

B Bathroom



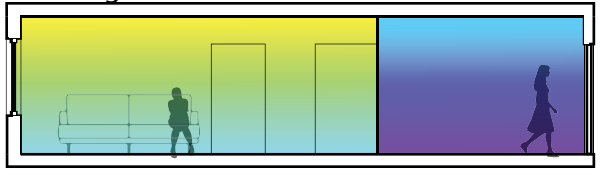
Showering
Temp. 27°C
Humidity 94.5%
0.00 clo.

D Bedroom



On bed-Resting
Temp. 25°C
Humidity 57.3%
0.17 clo.

C Living Room

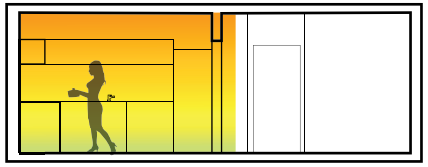


Just woke
Temp. 27°C
Humidity 64%
0.20 clo.

Walking in
Temp. 22°C
Humidity 64%
0.22 clo.

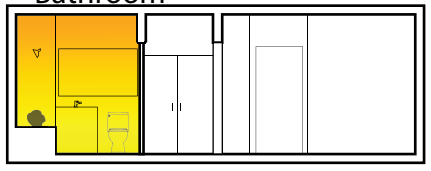
Ruodan

A



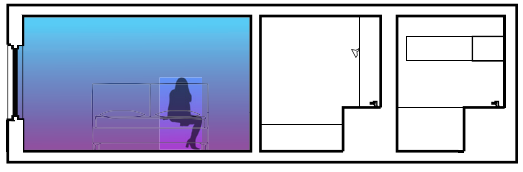
Cooking
Temp. 30°C
Humidity 60%
0.17 clo.

B Bathroom



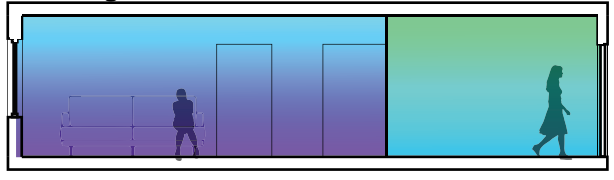
Showering
Temp 30°C
Humidity 80%
0.00 clo.

D Bedroom



Resting in bed
Temp. 24°C
Humidity 40%
0.42 clo.

C Living Room



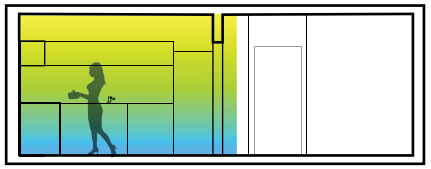
Work-sit
Temp. 25°C
Humidity 50%
0.35 clo.

Ready to go out
Temp. 27°C
Humidity 50%
0.35 clo.

Perferred Sensation

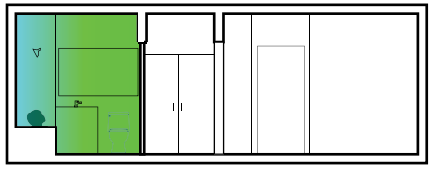
Anya

A



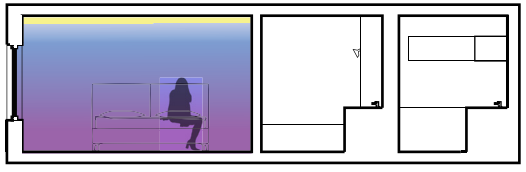
Cooking
Temp. 25°C
Humidity 81%
0.17 clo.

B Bathroom



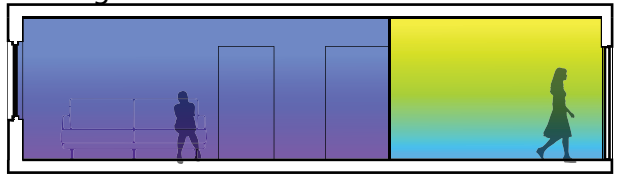
Showering
Temp. 26°C
Humidity 98.5%
0.00 clo.

D Bedroom



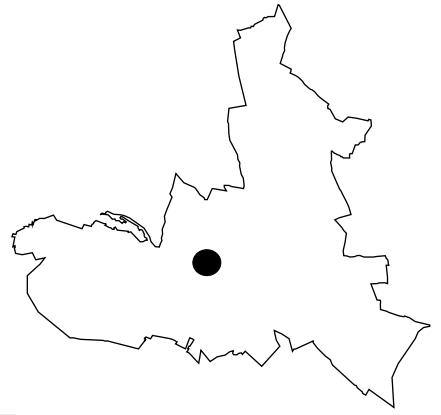
Relaxing on bed
Temp. 23.5°C
Humidity 78%
0.42 clo.

C Living Room



Breakfast
Temp. 24°C
Humidity 67%
0.17 clo.

Walking
Temp. 25.5°C
Humidity 70%
0.19 clo.



Dijon, France

Population: 152,071

Dijon was ruled by dukes who made the city and center of arts and architecture

Major employment - services (administrative, commercial, and tourist center)

Booming industries (food products, pharmaceutical, electronics, plastics, optical instruments)

Dijon is a town in Burgundy, known for their wine (vineyards) and mustard

Precedents

Church Notre-Dame of Dijon

Roman-Catholic church

A Gothic architecture of the 13th century (1220s-1250s)

Wood Timbered Roof

Tiled Roof

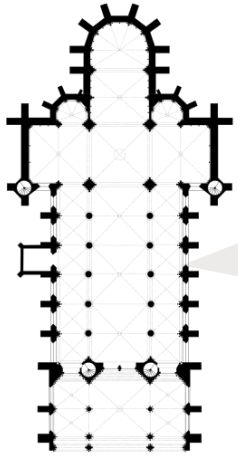
Stone

Gargoyles act as rain sprouts
corroded over time as well as the walls

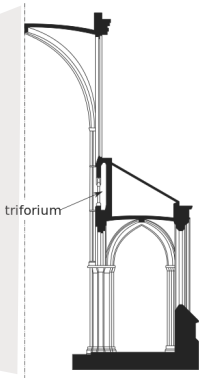
Limestone Brick Facade
Strong, dense rocks with few pore spaces
color change, corrostion over time

3 arcades (tall arches along passageway)

supported by 2 row pillars

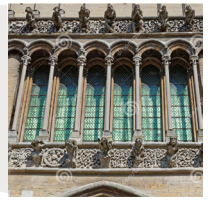


Église Notre-Dame de Dijon



Triforium
(a narrow passage in the thickness of walls), covered by slabs acts as the floor to the 3rd level, a gallery with high windows

3 levels
6 archades both sides `supported by columns



Stained Glass Windows
The windows face both North and South; but recieving northern light

Precedents

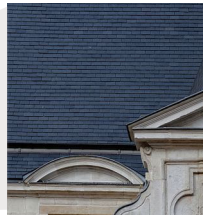
Palace of Dukes of Burgundy

Known as the Town Hall and Museum of Arts

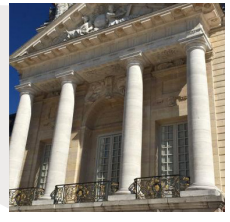
The oldest part is the 14th and 15th century Gothic ducal palace and seat of the Dukes of Burgundy

Most of it today, was built in the 17th and especially the 18th centuries, in a classical style, when the palace was a royal residence building and housed the estates of Burgundy

Limestone
Strong, dense rocks with few pore spaces
color change



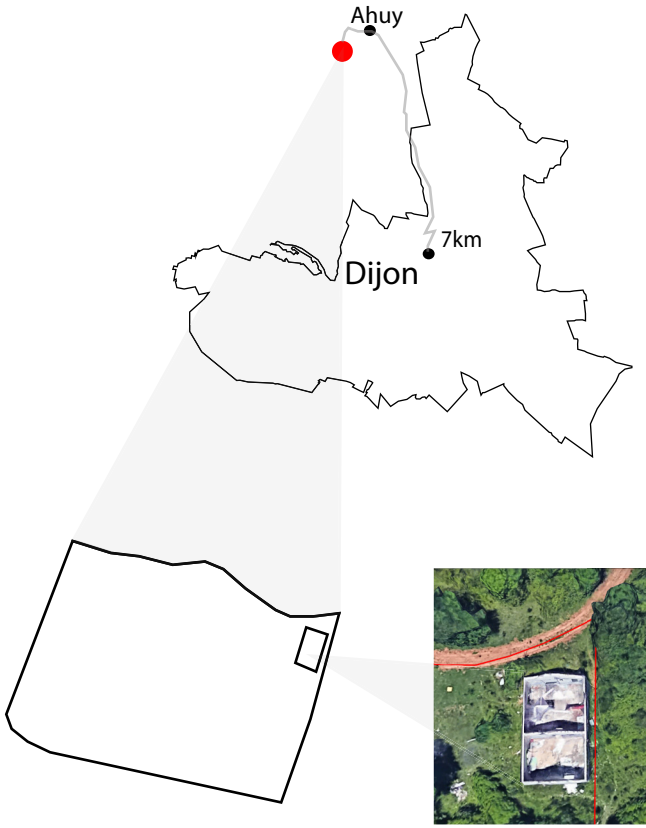
Tiled Roof



Marble

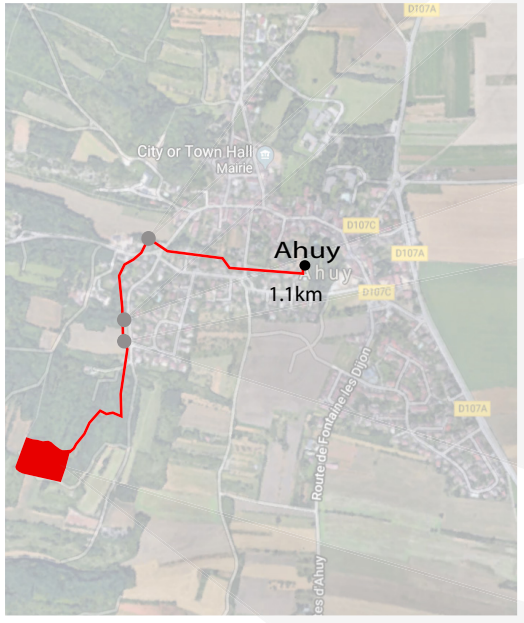
Durable and strong to hold weight

Site



Site is located surrounded by trees, grass, and open fields

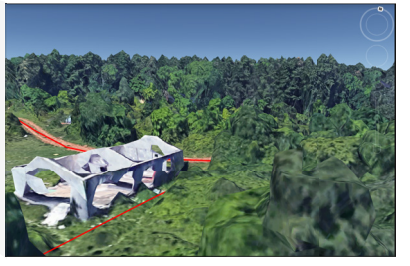
There is an abandoned small building on the corner of the site



more near the center of Ahuy, with brick and concrete

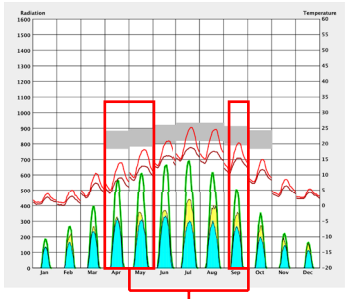
more outwards of Ahuy, near the fields

To get to the site from Ahuy , there are dirt paths at the outer place of the neighborhood



The abandoned building is unfinished, with two spaces, and one level

Climate



Best months for natural ventilation

January is the coldest month, under 5 degree Celsius (20 degree Fehrenheit)

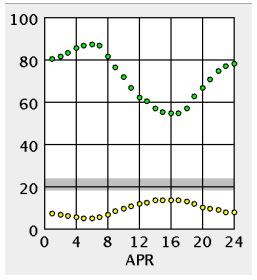
July isthe hottest month about 25 degree Celcius (90 degree Fahrenheit)

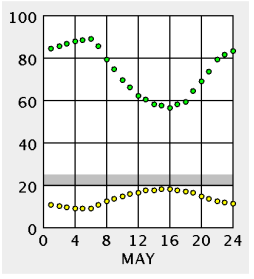
High humidity throughout the year, especially Jan, Feb, Nov, & Dec.

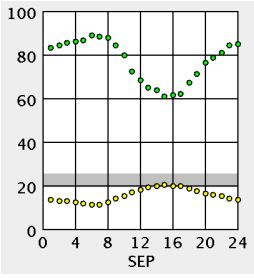
Little sun all year;
Most sun is in Jul, Aug, & Sept.
and almost none in Jan. Apr. & Dec.

Relative Humidity

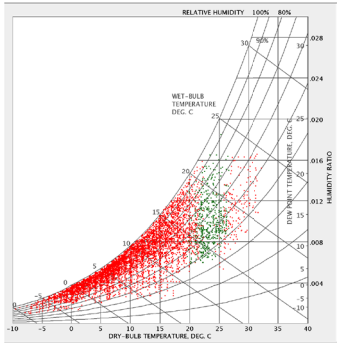
Dry bulb







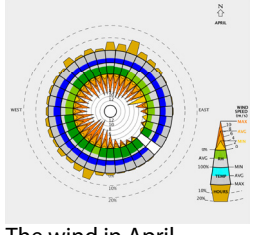
Best months for naural ventilation
based on relative humidity and dry bulb temperatures



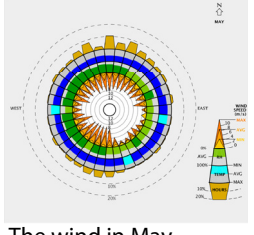
Teperature ranges from 5 to 25 degree celsius (or 20 to 90 degree Fehrenheit)

Comfort zone between 20 to 25 degrees (70 to 80 degree Fehrenheit)

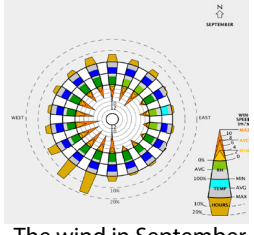
Wind Direction



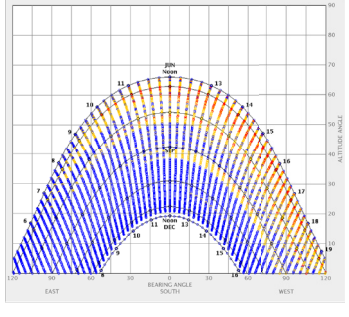
The wind in April, comes more from the Northeast and Southwest



The wind in May, comes more from the North and Southwest



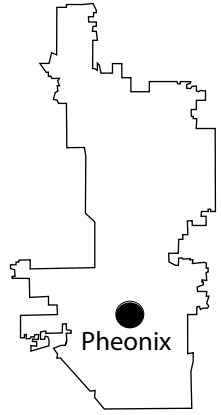
The wind in September comes more from the Southwest



Most amount of sun and hottest in July.
Little amound of sun in Sept. from noon to 16:00.
No sun in Dec.

The most beneficial time of the year for natural ventilation are:
April May and September

And the best place to put a window is Southwest and Northeast



Phoenix, Arizona

Population: 1,615,041

Phoenix is the capital city of Arizona, a relatively new city, around 200 years.

The Hohokam people (native people) occupied the now called Phoenix for more than 2,000 years

Well known for their Outdoor attractions and recreational activities such as Phoenix Symphony Hall, Phoenix Art Museum, Phoenix Zoo, and South Mountain Park, largest municipal park in United States.

The Phillip Darrell Duppa adobe house built in 1870 was known to be the oldest house in Phoenix.

There are many architectural landmarks in Phoenix, some of them included Montezuma Castle, Arcosanti, Arizona Biltmore Hotel and Frank Lloyd Wright's Taliesin West.

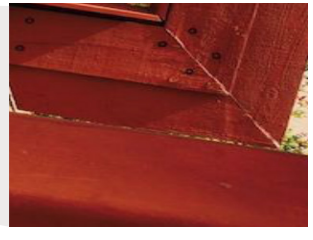
Precedents

Taliesin West
Frank Lloyd Wright

This room is facing North, giving the perfect window for maximal lighting

Canvas roofs
(allow natural light in)

Stone structure supported
by steel redwood beams



Redwod (the beams) is
weather, insect, and rot
resistant

Precedents

Arcosanti
Paolo Soleri & Colly

In the summer, the sun does not enter into the domed area

Dome roofing to
keep sun out and
effective for natural cooling

In the winter, sun warms the area,
heat is absorbed into the thermal
mass of concrete

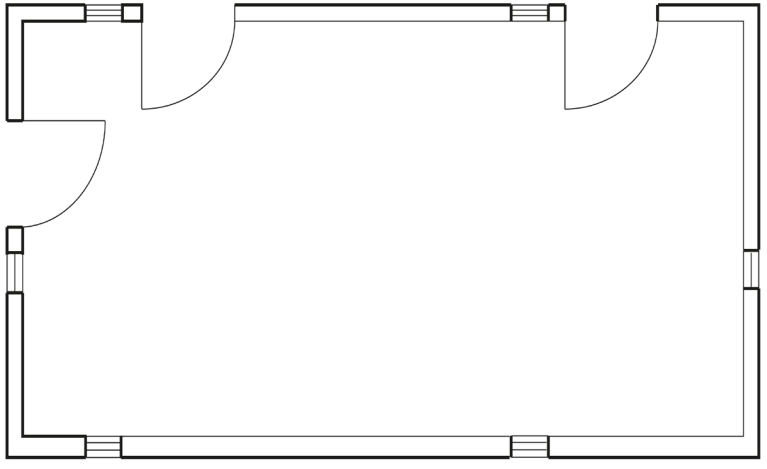
The chair is made of a
thermal mass of concrete

Precedents

Duppa Adobe House
Phillip Darrell Duppa

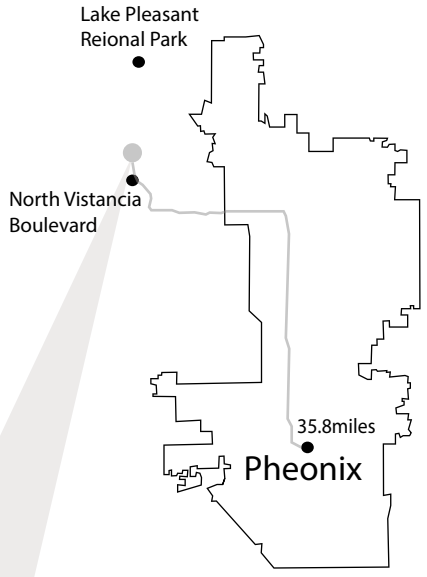
An opening placed on top of the house to allow natural ventilation

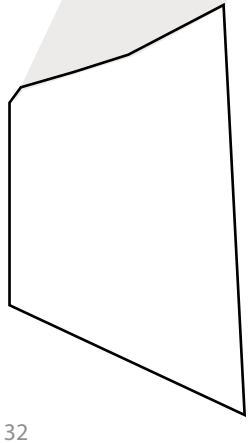
Clay sand absorbs energy from the sun, radiating heat throughout in the winter. 12-hour cycle of passive cooling and solar heating (energy-efficient)



Plan to show openings

Site

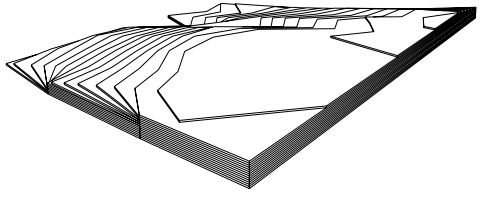




Site is located in the middle of the desert.

There are the Lake Pleasant Elementary School and Vistancia Elementary School in the housings neighborhood

Hard, rocky, and sandy grounds surrounded by cactus

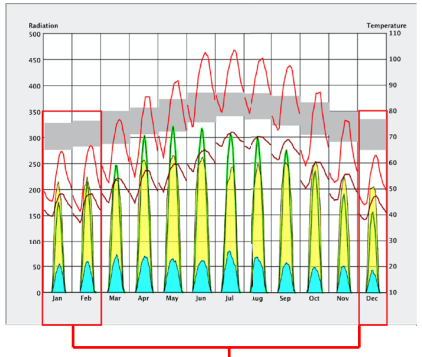


Site can be access from the housings by a walkway bridge

Site is across from the North Vistancia Boulevard neighborhod, separated by the Central Arizona Project Canal over the canal

The housings have a Mediterranean or quasi-Mediterranean style, with exterior siding is stucco, and concrete-tile roofs

Climate



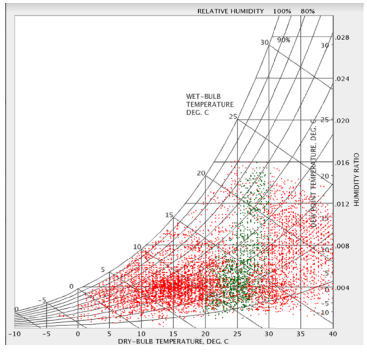
December is the coldest month at 0 degree celcius (or 32 fahrenheit)

July is the hottest month at 44 degree celcius or 100 degree fahrenheit

Low humidity in low concentrated areas but there are days that are humid

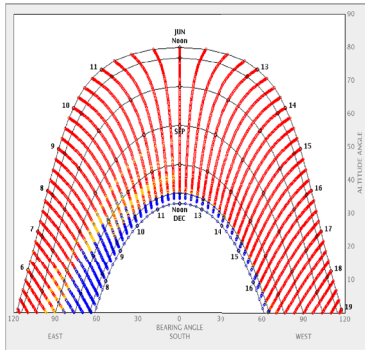
Large amount of sun all year round

Best months for natural ventilation



Temperature ranges from 0 to 45 degree celcius (or 32 to 110 degree fahrenheit).

The comfort zone is between 16 to 32 degree celcius (or 60 to 90 degree fahrenheit).

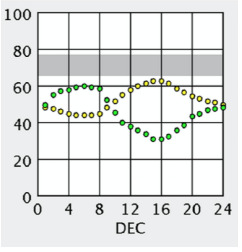


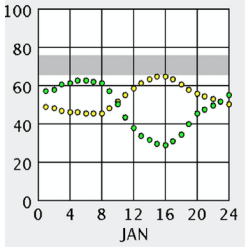
Equally large amount of sun all year.

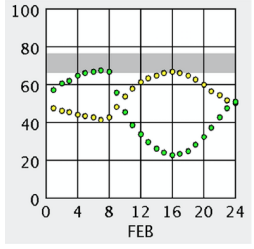
The least amount of sun is in December

Relative Humidity

Dry Bulb

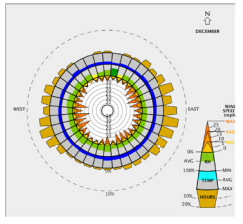


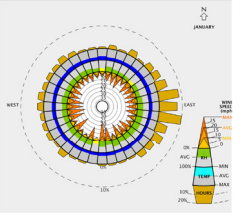


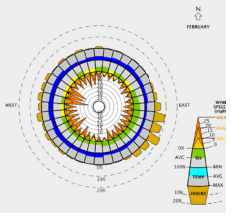


Best months for natural ventilation based on relative humidity and dry bulb temperatures

Wind Direction







The wind in December, comes more form the Southeast and Southwest

The wind in January, comes more form the East and Southeast

The wind in February, comes more form the Southeast

The most beneifical time of the year for natural ventilation are December, January, and February

The best place to put a window is at Southwest and Southeast.

Gulja, China

Population: 542,507

Gulja, also know as Yining, first built in 1762, one of the oldest city in Xinjiang, China. Located in North templete zone, with distinguish season and full sunlight.

In 1952, it become the seat of the Ili Kazakh Autonomous Prefecture.

Gulja is the chief city and the agricultural and commercial center of the Ili valley.

With a total land area of 629 km2 (243 sq mi)

It was selected as one of the China's ten livable city in 2010.

Most architecture are the combination of Islamic style and Chinese style.

Precedents

Batul Mosque

Combination of Islamic mosque and Chinese Minaret

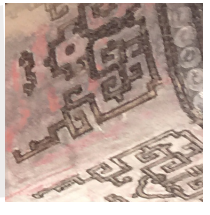
Originaly built in 1773 by the Qing government, rebuilt in 1995

The first and the biggest mosque in Ghuja

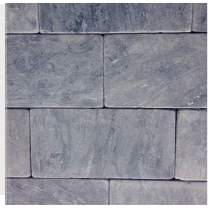
All the buildings except the Minaret were demolished because of the time

Stone tiled roof

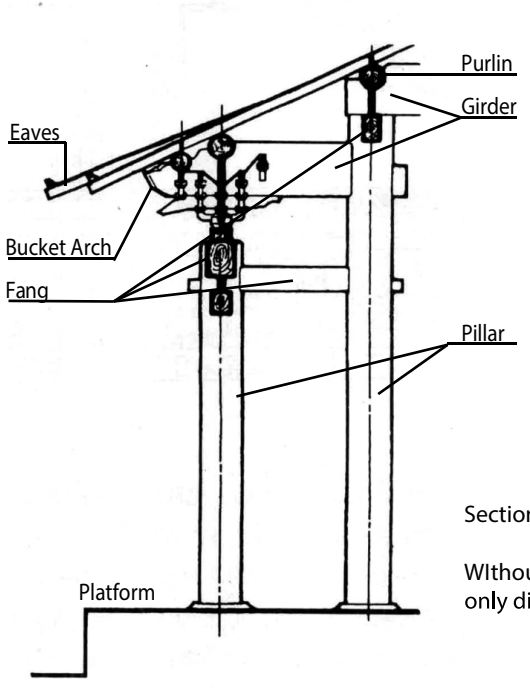
Wood structure for the old Mosque



Engraving and painting on the girder

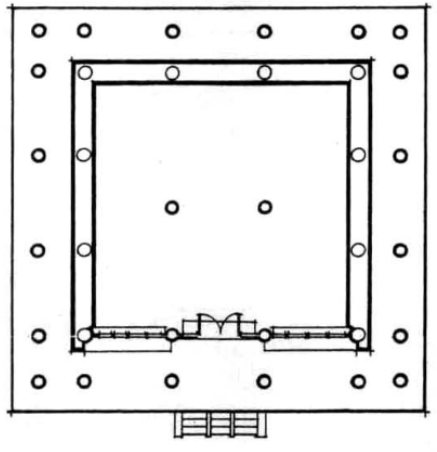


Stone base to prevent rain erosion



Section Structure on the tower

WIthout using adhesive, chinese architecture use only different wood piece to hold the structure.



Plan

Square stone base with 6x6 columns for outside corridor

4x4 columns for interior building

3x2 room in the interior buiding

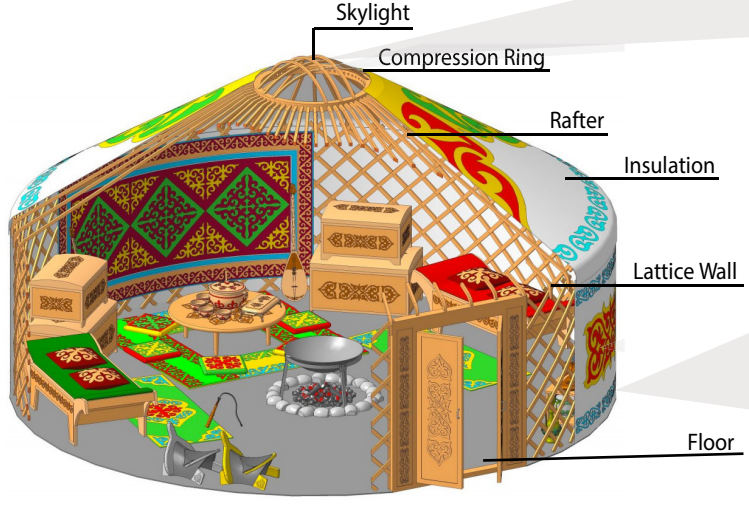
one connested with door, the otherfive have windows
4 coner roof for first and second layer, 6 coner roof for the top layer.

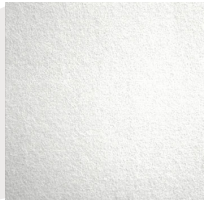
Precedents

Kazakh Yurt

Traditional Urghur House

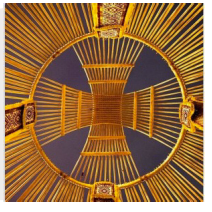
Urgur migrate through seasons, so the Kazakh Yurt is easy to disassemble and rebuilt





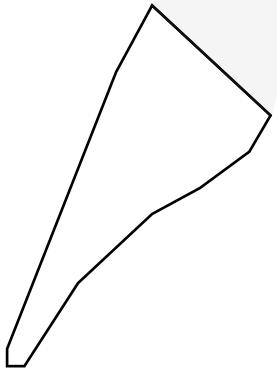
White woolen felt

Hay as insulation layer



Netted wood poles
created the base structure

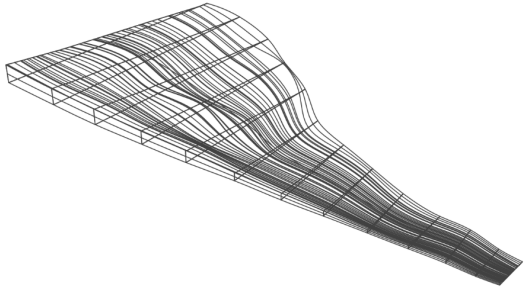
Site



Gulja(Yining) County

Ili Kazakh Autonomous Prefecture to the site is 20km distance

The site sit right above the Yining county, far away from city central



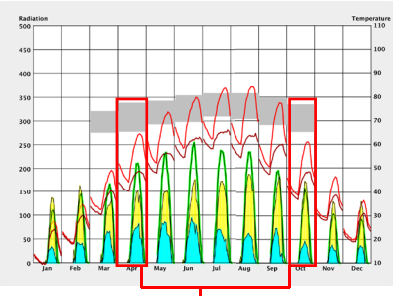
The site is surrounded by sand pile

This site is located at the foot of the mountain, located near the Lli River.

There is large area of field across the highway to the site.

Several factories, greenhouses and storage around it.

Climate



Best months for natural ventilation

January is the coldest month about -12degree celsius (10 degree Fehrenheit)

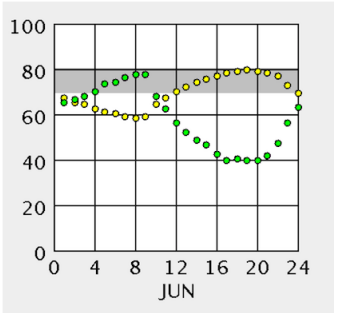
July being the hottestmonth about 25 degree (90 degree Fahrenheit)

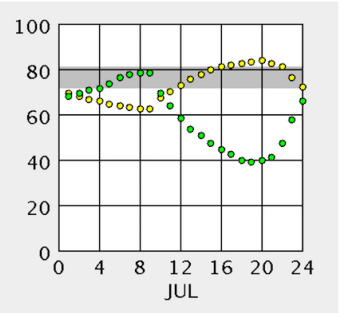
high humidity, especially Jan, Feb, Nov, & Dec.

Enough sunlight in summer but little sunlight in winter

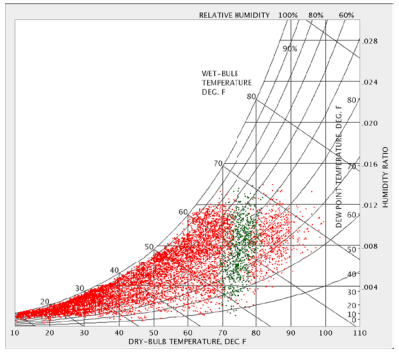
Most sun is in Jun, Jul, Aug.

Relative Humidity
Dry bulb





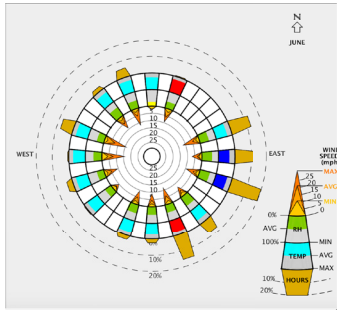
Best months for naural ventilation
based on relative humidity and dry bulb temperatures

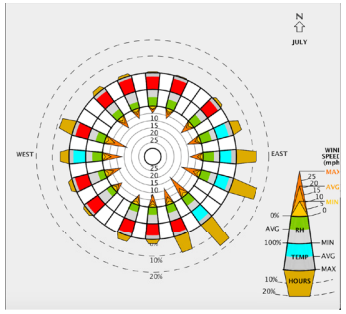


Teperature ranges from -7 to 27 degree celsius (or 20 to 80 degree Fehrenheit

Comfort zone between 20 to 25 degrees (70 to 80 degree Fehrenheit))

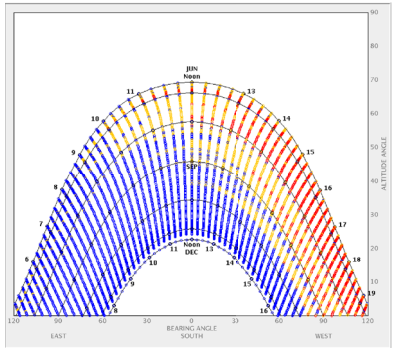
Wind Direction





The wind in June, comes more from the East and Southeast

The wind in July,
comes more from the East and Southeast



Most amount of sun and hottest in July and Aug. after noon to19:00
Warm sun in Sept. from noon to 19:00
No sun in Dec.

The most beneficial time of the year for natural ventilation are:
June and July

And the best place to put a window is South