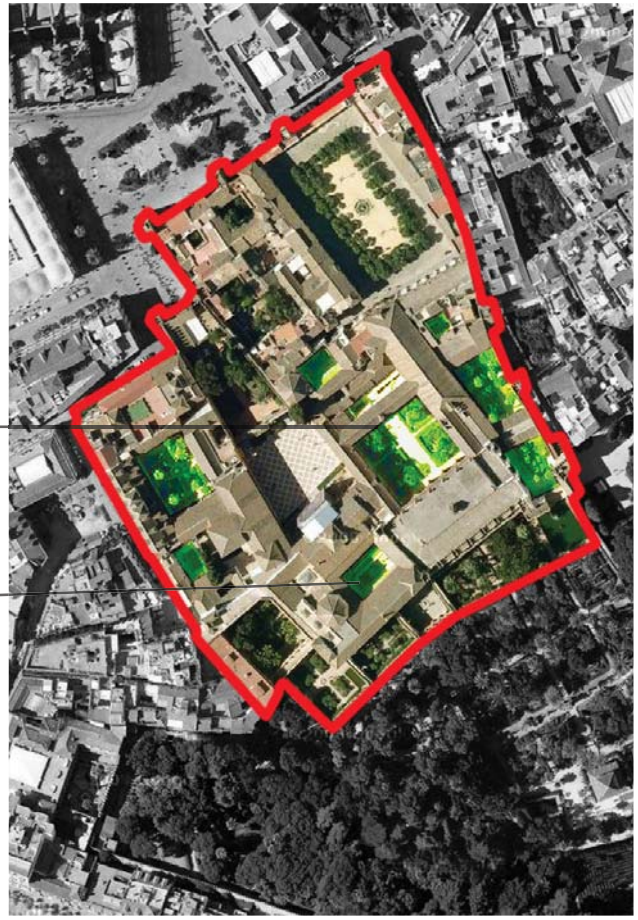
Sevilla Personal Project

Sustainable Strategies For Homes in a Hot Climate

Vernacular Sustainable Architecture of Seville

The Takhtabush - Passive ventialtion of the house using natural convection to divert cool air through the building



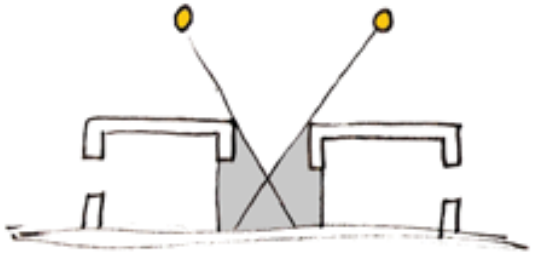
Building Bounday

Inner Courtyards

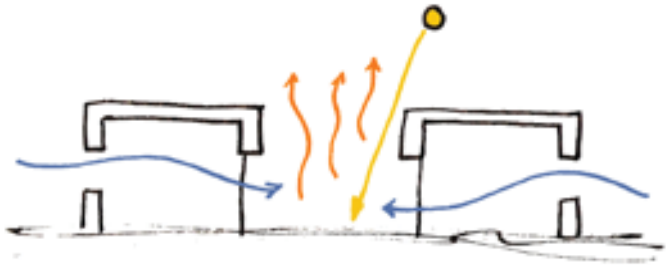
Alcázar de Sevilla, Patio de Banderas, Sevilla

Inner courtyard of most residences and public buildings often incorporate artesian fountains, cisterns, ornamental vegetation and edible plants.

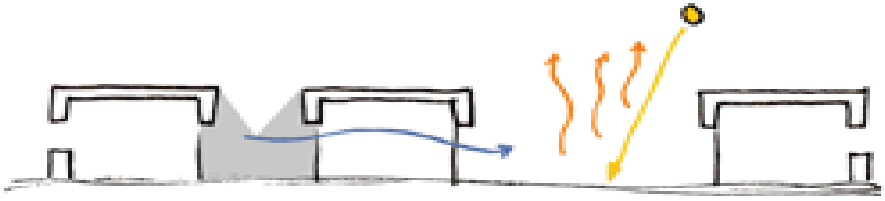
1. Smaller courtyards have solar shading



2. Larger courtyars are heated by the sun



3. Natural convection creates ventilation between the two courtyards allowing cool air to pass through



Vernacular Sustainable Architecture of Seville

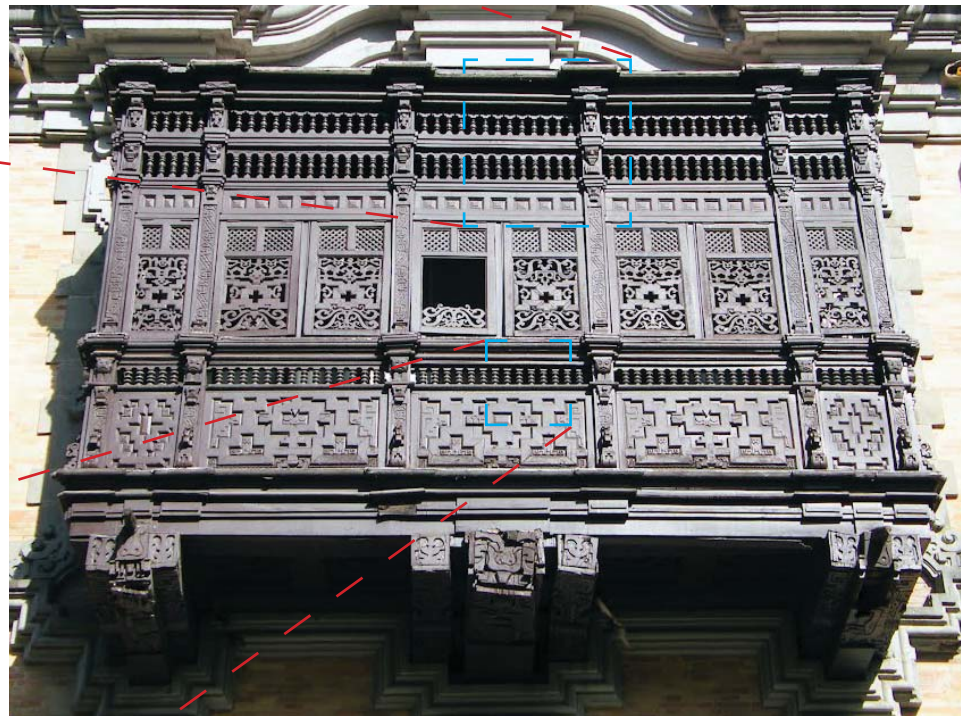
Mashribaya/ Shanasheel

Mashrabiya is a projecting window enclosed with carved wood latticework located on the second storey of a building which uses ingenious methods of micro-climate control and natural resource conservation.

Top half of the Mashribaya

The designs of the latticework are usually with smaller opening in the bottom part and larger openings in the higher parts, hence causing the draft to be fast above the head and slow in lower parts. This provides a significant amount of air moving in the room without causing it to be uncomfortable.

Bottom half of the Mashribaya



Pabellón de Perú, Av María Luisa, Sevilla

Projection from the external wall

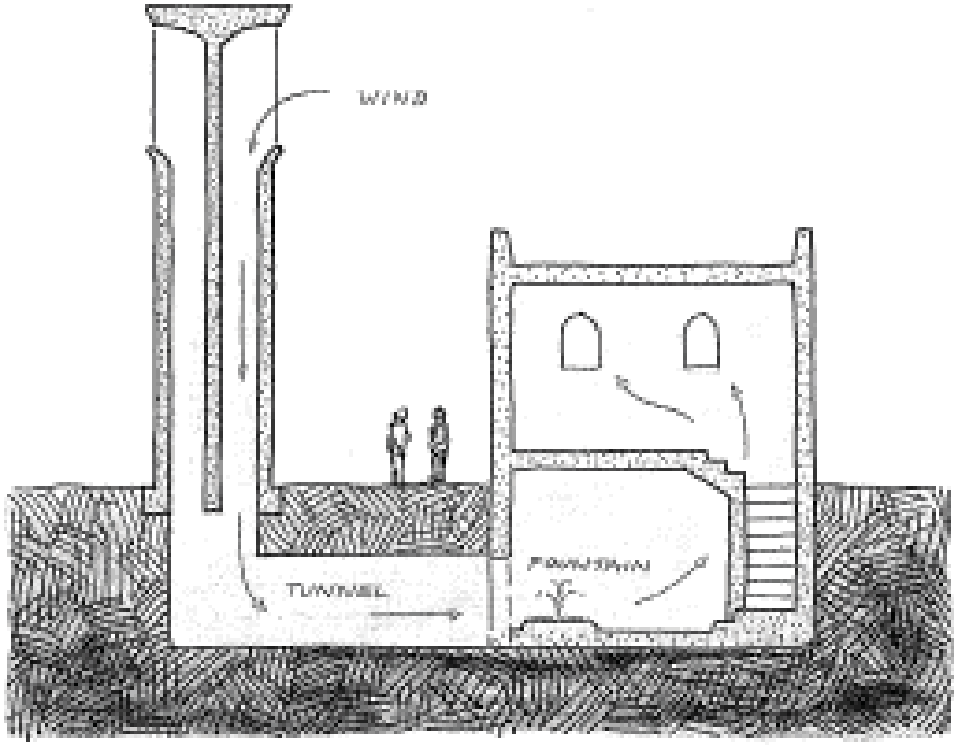
- allows air to enter from all side.
- provides shade and cover from rain or sun.

Openable Window Screens

The wooden screen gives shade and protection from the hot summer sun while allowing the cool air from the street to flow through.

Vernacular Sustainable Architecture of Seville

Wind Towers



The wind towers cool the inhabitants on summer mornings and evenings when the air is cooler than room air as they provide an effective ventilation circulating the air especially in the basements It is usually a tall, capped tower with one face open at the top. The open side faces the prevailing wind, directing the cool air down the tower into the heart of the building to maintain air flow cooling the building interior.

It does not cool the air but however relies on the rate of airflow to provide a cooling effect. In the winter however, these wind towers are closed off from the rest of the house in order to stop hot air from dissipating from the interior of the house.

La Giralda, Catedral de Santa María de la Sede ,Sevilla

Current Strategies of Sustainable Architecture in Seville

Resisting Heat Gain

Whitewashed houses

The houses are painted white with lighter colours around the balconies to deflect heat gains.

Internal walls

Textured to promote self shading

Light colours to reduce heat gains

Tiles are used on the internal surfaces as they are a high density material that require a lot of heat energy to heat up, therefore it absorbs heat and helps regulate the internal temperature.

Louvres

Almost all the windows of the houses have louvers that blcok the sun but still allow air to flow through the screens creating a passive air flow.

Claustra Wall

The claustrum is a multitude of small vents made out of plaster. These allow a uniform distribution of air flow, provide security and have a good aesthetic value. They are typically used on the higher section of the wall in order to allow the dissipation of hot air.

Flat Roofs

Low surface to volume area on the external envelope.

Narrow Terraced Housing Streets

The width of the streets are very narrow that creates mutual shading of the building and a comfortabe environment for the public on the streets.

The proximity of these dwellings to each other create covered streets below that play a major role in the passive cooling of the houses

Since most of the walls are shared, the only exposed surface becomes the roof.