CLIMATE, ARCHITECTURE AND HOUSING

BUILDINGS, ENVIRONMENT AND CONSTRUCTION

prof. eng. Angelo Bertolazzi | Department ICEA

Erasmus+ KA 131- 2026| Volos

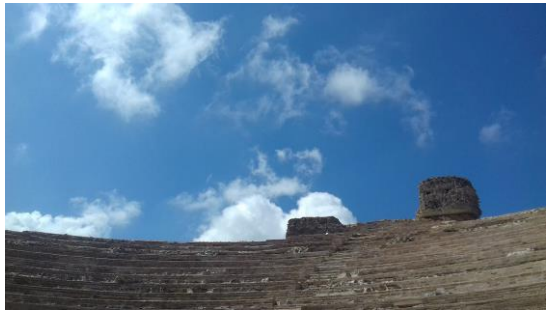
Keyword 1

Sustainability : fulfilling the needs of current generations without compromising the needs of future generations, while ensuring a balance between economic growth, environmental care and social well-being.

The concept of sustainability was introduced during the first UN conference on the environment in 1972, although only in 1987, with the publication of the Brundtland Report, was the goal of **sustainable development** clearly defined which, after the UN conference on the environment development of 1992, has become the new paradigm of development itself.

Keyword 1

Environmental sustainability means guaranteeing the availability and quality of natural resources for future generations (**air, water, raw materials**)



Social sustainability means guaranteeing quality of life, safety and services for citizens (**education, leisure, city**)

Economic sustainability means ensuring economic efficiency, income for businesses and reducing economic inequalities (**efficiency, income, parity**)

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From their relationship arises what is defined as

sustainable development and a society will be all the more evolved if there are no imbalances between these areas. The three topics become themselves the pillars of sustainable development :

Economic – The efficient and responsible use of resources results in long-term profitability and business viability

Environmental – Reducing waste and carbon footprints while maximizing energy efficiency helps to reverse negative impacts on the environment such as pollution and global warming.

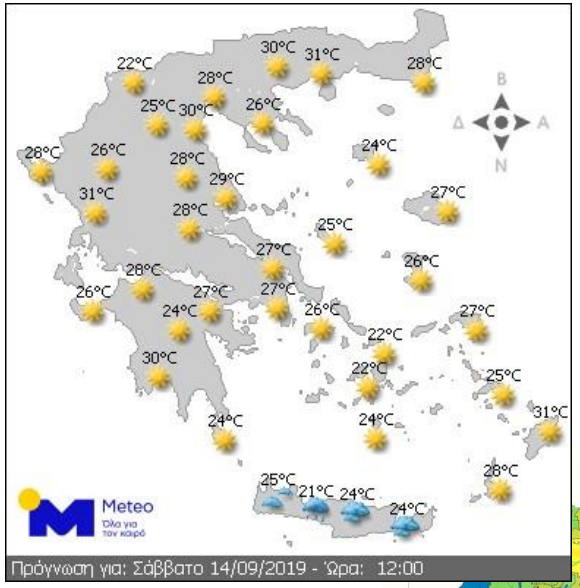
Social – A focus on initiatives like employee safety, wellness, and diversity and inclusion supports the creation of healthier communities that can sustain themselves.

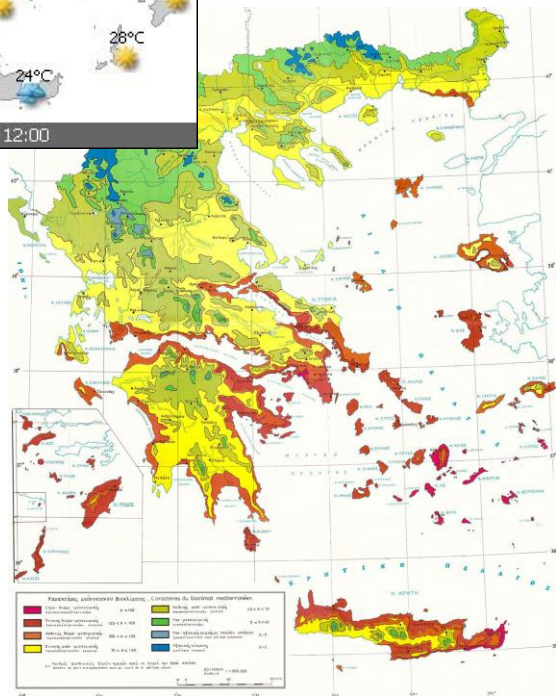
Keyword 2

Climate is the description of the long-term pattern of weather in a particular area.

The difference between weather and climate is a **measure of time**. Weather is what conditions of the atmosphere are over a short period of time (1 day, 1 month…less than 30 years), and climate is how the atmosphere "behaves" over relatively long periods of time (almost 30 years).

Studying climate is important, since it involves people **around the world**, human health, animals, and many types of ecosystems.

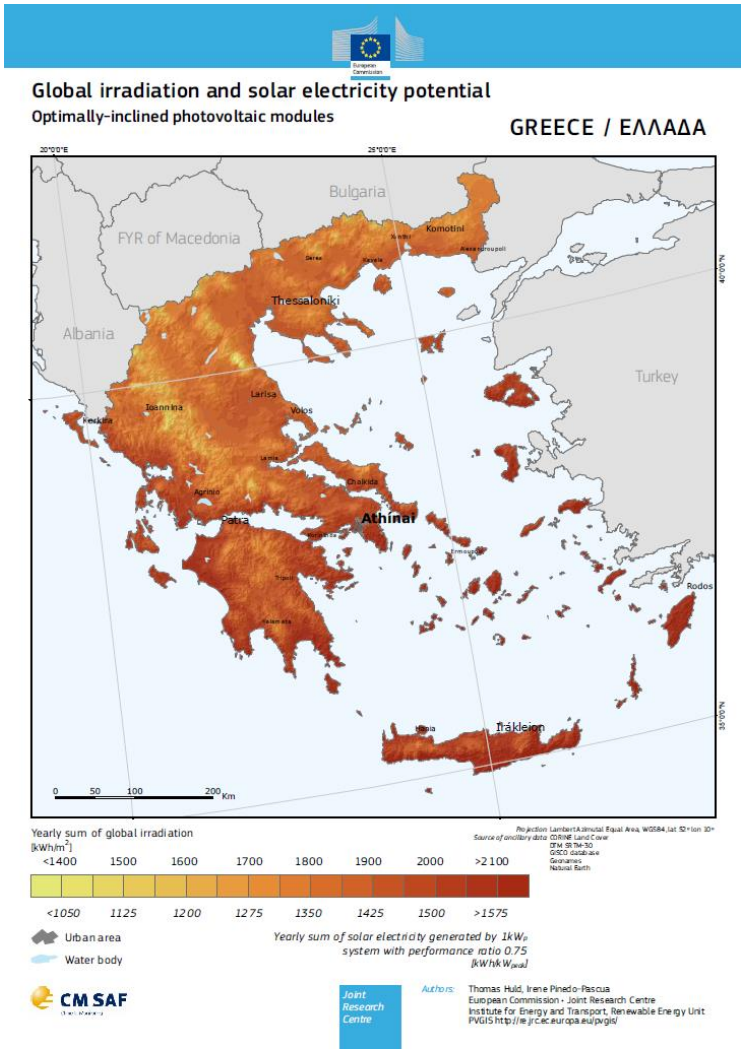




Keyword 2

Climate change adaptation is the process of adjusting to current or expected effects of climate change. For humans, adaptation aims to moderate or avoid harm, and **exploit opportunities**; for natural systems, humans may intervene to help the adjustment.

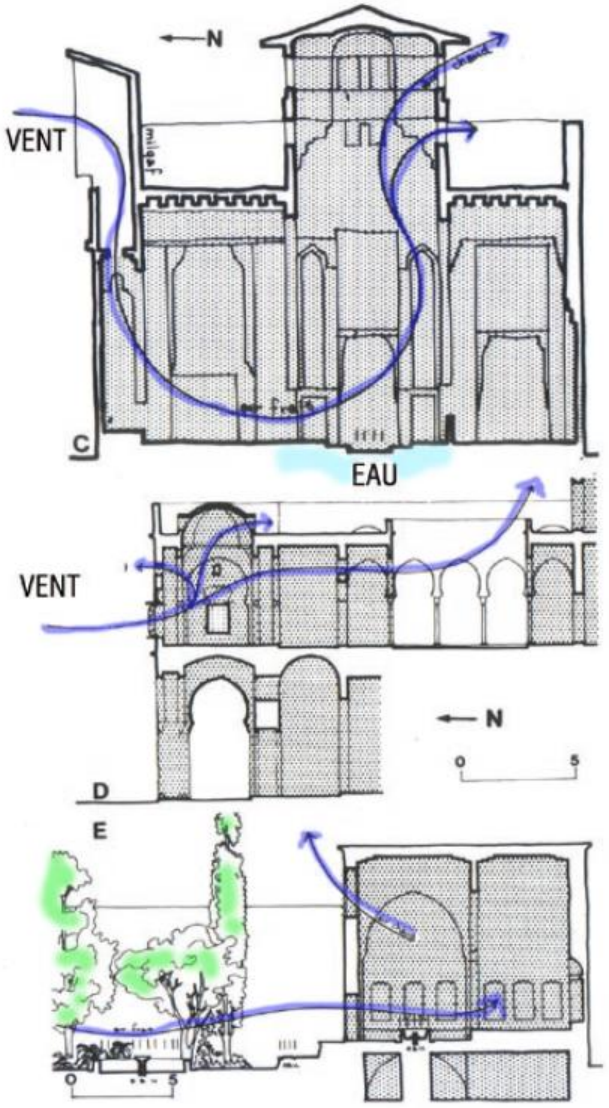
Adaptation refers to a process or action that changes a living thing so that it is better able to survive in a new environment, whereas **resilience** describes the capacity or capability to anticipate and cope with shocks, and to recover from their impacts in a timely and efficient manner.



Keyword 2

The architecture must adapt to the **climate**, using the **solar** and **wind energy** effectively inside a home. This allows to reduce the need for mechanical systems by appropriate design strategies such the size of an opening , to **shadow** the opening to achieve comfortable temperatures and to use the **natural ventilation** (vertical and/or horizontal) to get a good indoor air quality.

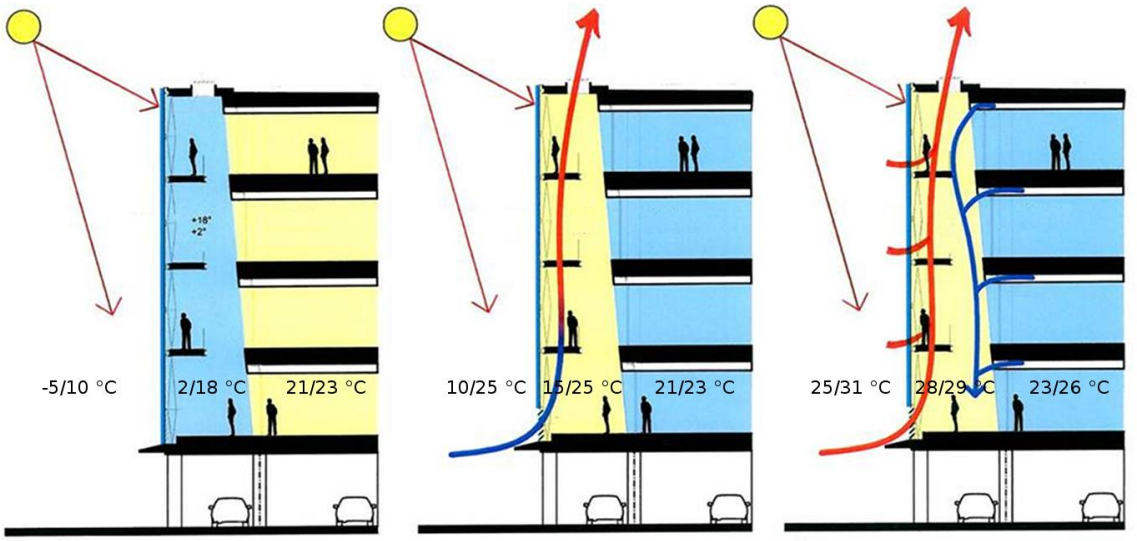
In the **Mediterranean countries** the **sun** and the **wind** were common tools for the improvement of building adaptation to hot climate.



Keyword 2

Today we can use **climate-adaptive building envelopes**, such **facades** and **roofs** that interact with the variability in their environment in a **dynamic way**.

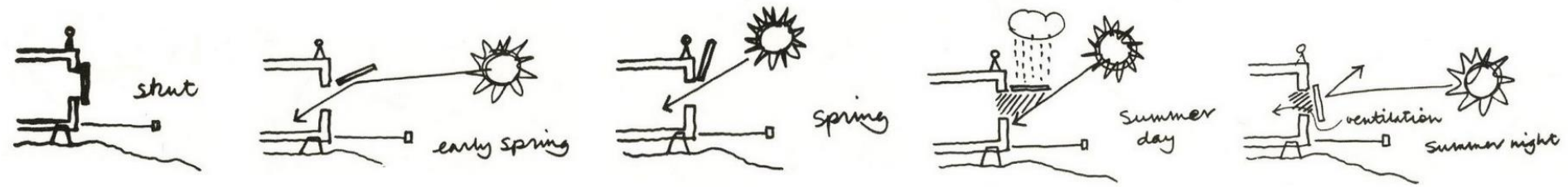
The challenge is to transform the **climate** (sun, air, wind and water) into a **construction material**, using its potential.



Winter:
heat storage

Spring/Autumn:
cooling with natural ventilation

Summer:
cooling with recovery air



Air, Son, Lumière, 1933

The interest for the **climate** in architecture comes from the Modern Movement.

Le Corbusier , within the IV CIAM, (1933), set the firs idea of an architecture strongly linked with the nature, during it's conference **"Air, Son, Lumière"** held in the Polytechnic School of Athens.

ARCHITECTURE MODERNE

AU CONGRÈS INTERNATIONAL D'ATHÈNES

AIR, SON, LUMIÈRE

Conférence par LE CORBUSIER prononcée devant le Parthénon.

LE CONGRES D'ATHENES

AIR, SON. LUMIERE

Mesdames,
Messieurs,

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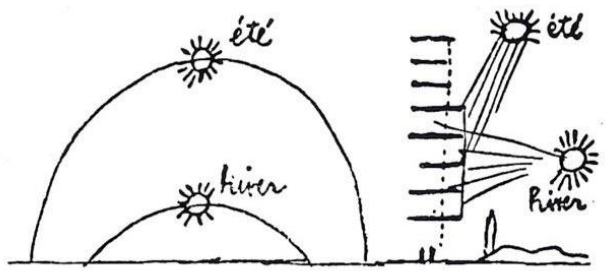
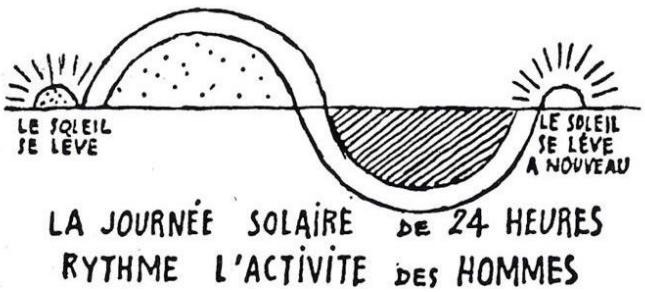
FONDATION LE CORBUSIER

Vue panoramique d'Athènes

1126

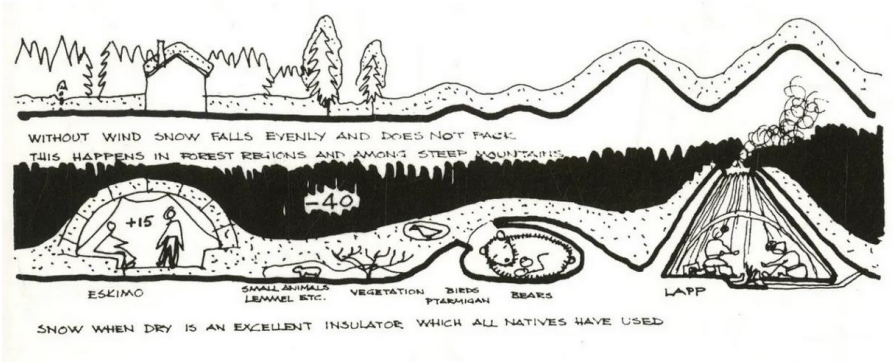




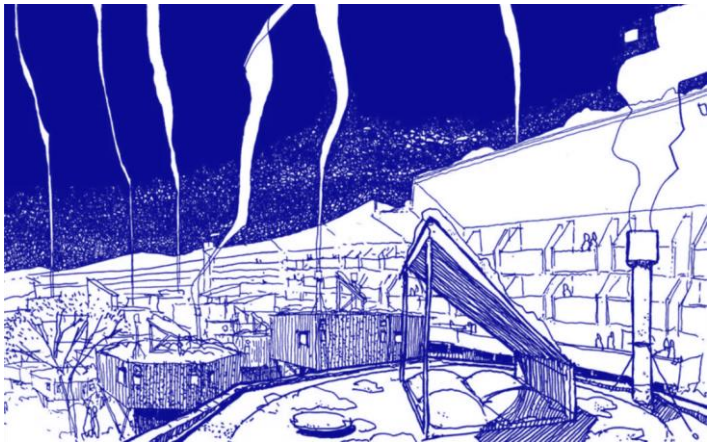
Resolute Bay, 1959-70

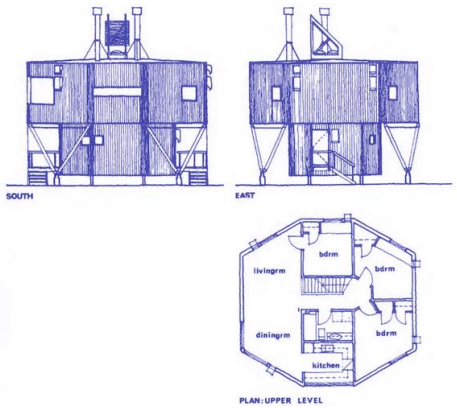
In 1959, at the last CIAM congress organized by TEAM 10, Ralph Erskine presented **“The Subarctic Habitat”**. The projects presented at the meeting had to provide solutions to problems of habitat in **extreme contexts**. Later Erskine published an article “Architecture and town planning in the north” where he proposed a specific **Arctic architecture, adapted to the harsh climate**, and dedicated to indigenous populations. this theorical experience made him, in the eyes of the international community, the unofficial arctic architect.

Finally Erskine built the first settlement in the Artic climate, the new city of **Resolute Bay** (1970).



Resolute Bay , 1970





Giudecca, Venice

Giudecca, Venice

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Giudecca since XIV century maintained a residential function. In the late XIX century a small industrialization process started confirming this function. Since the XX century it become a laboratory on the housing,

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in 1983 **Aldo Rossi** designed a masterplan for refurbishment of *Campo Marte* area.

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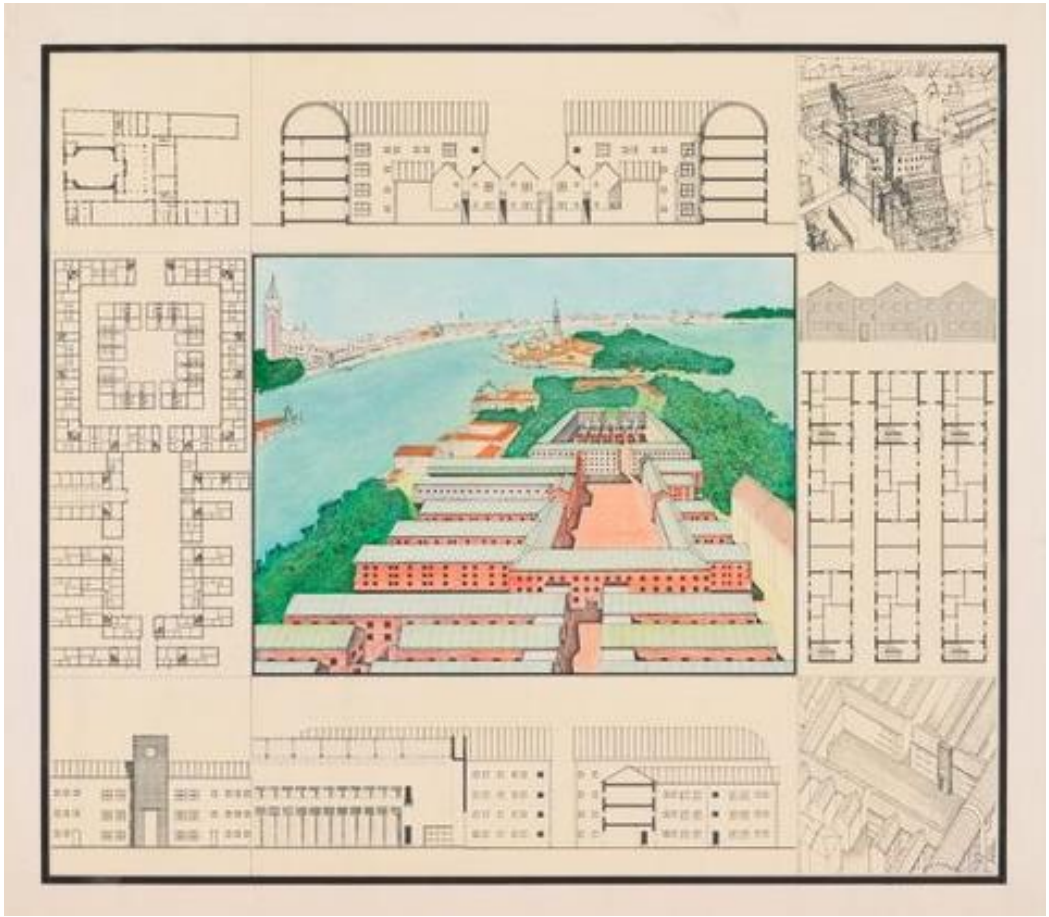

Aldo Rossi, masterplan for Campo Marte, 1983

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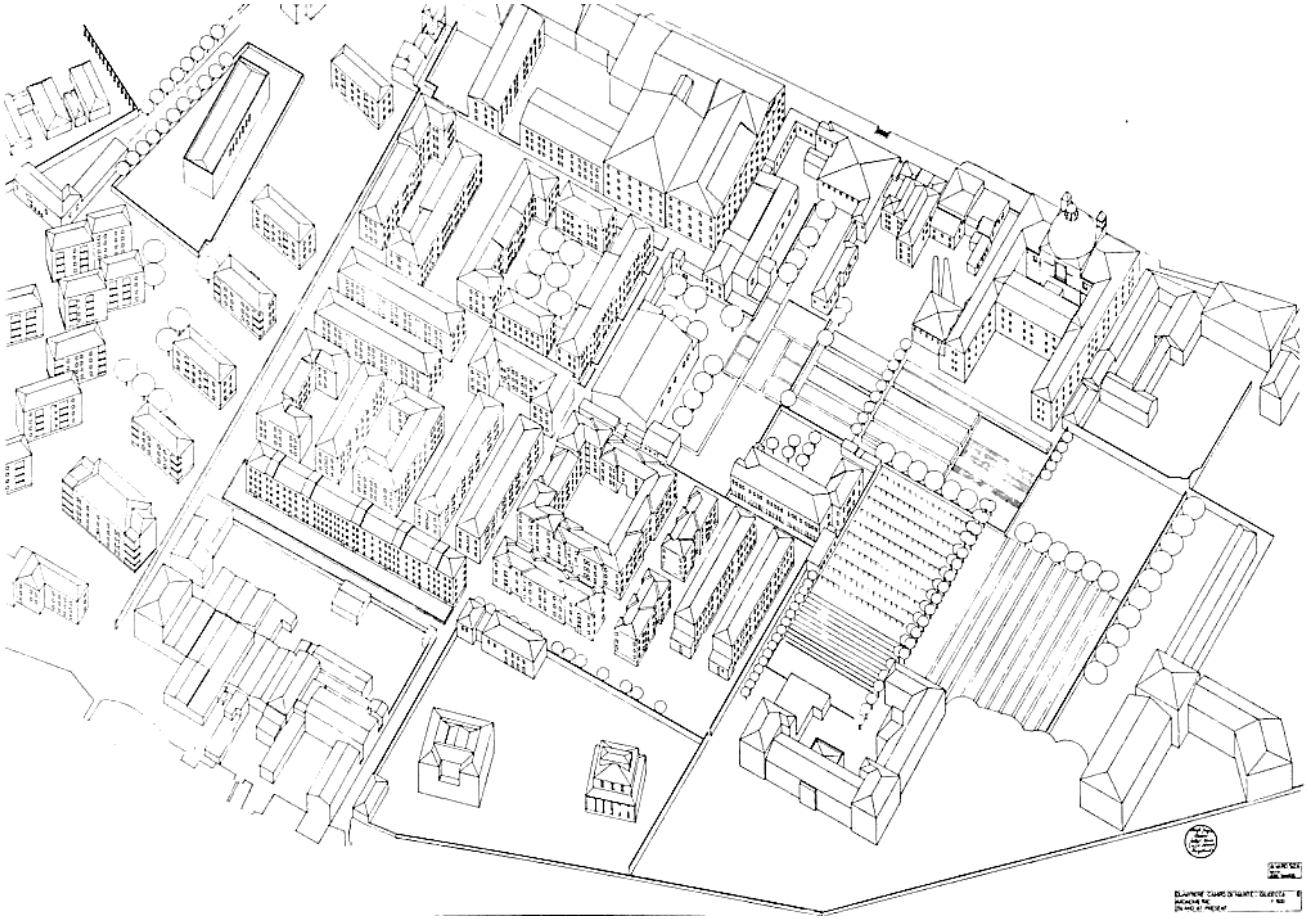

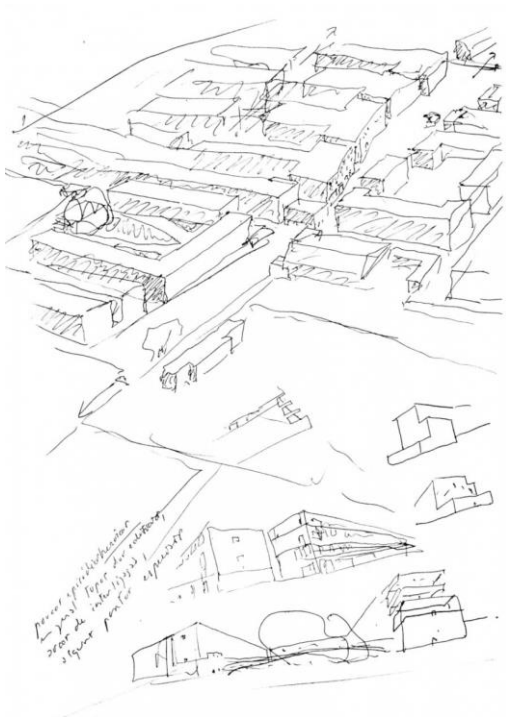

Alvaro Siza, competition for *Campo Marte*, 1985

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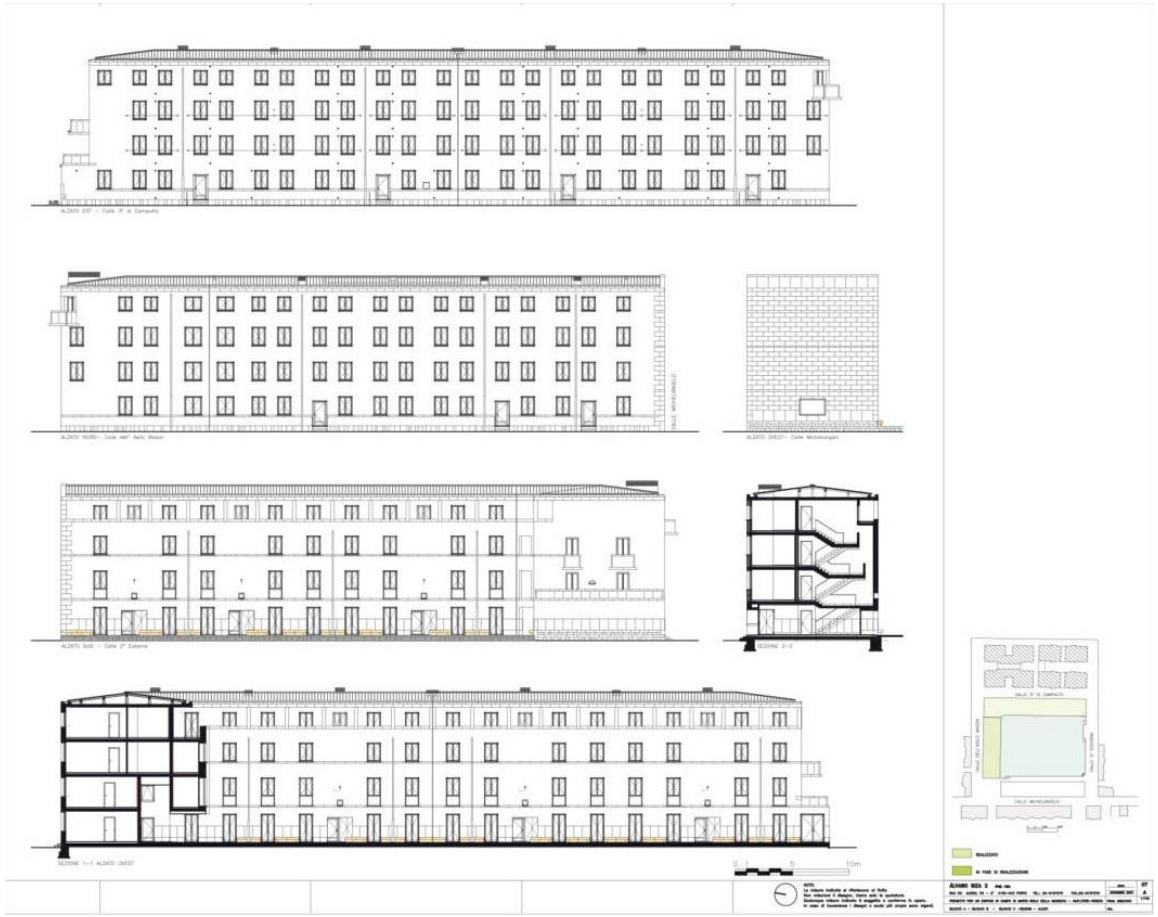

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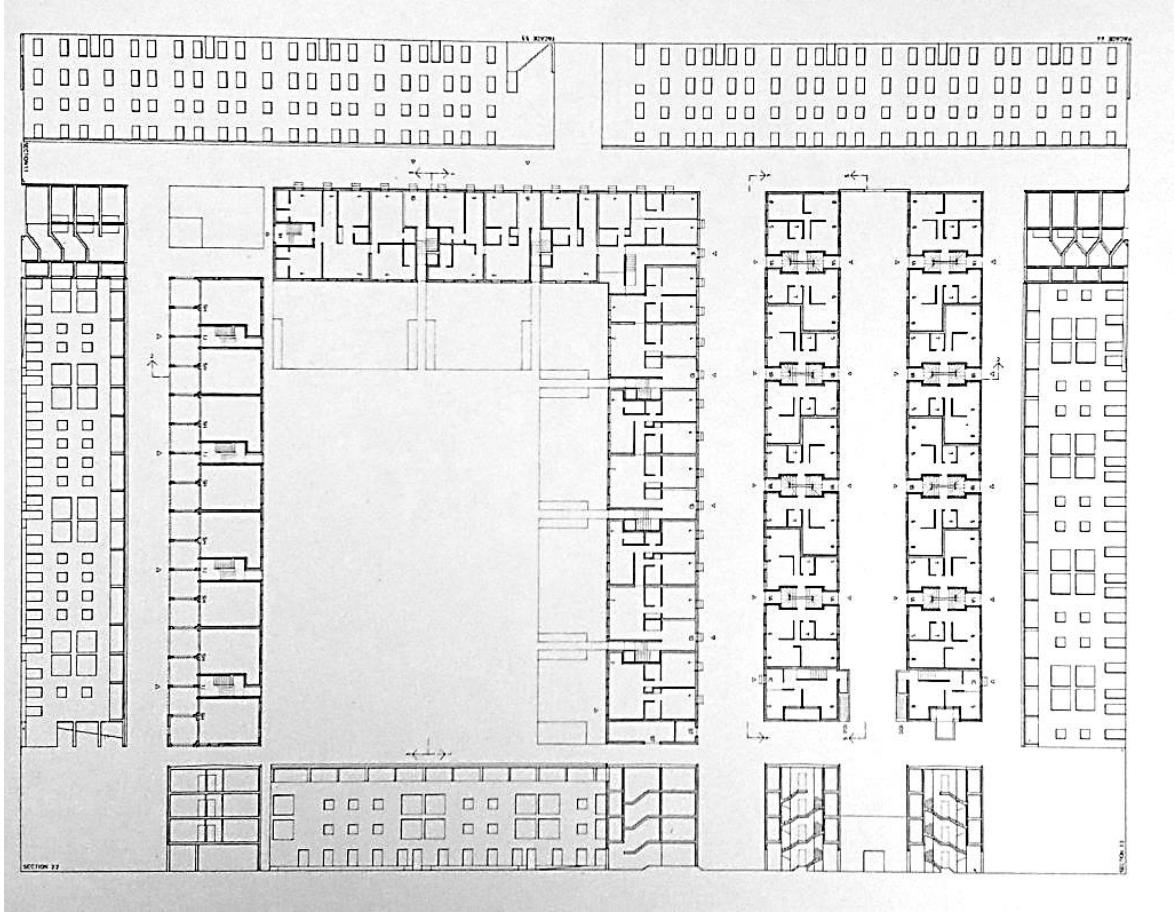

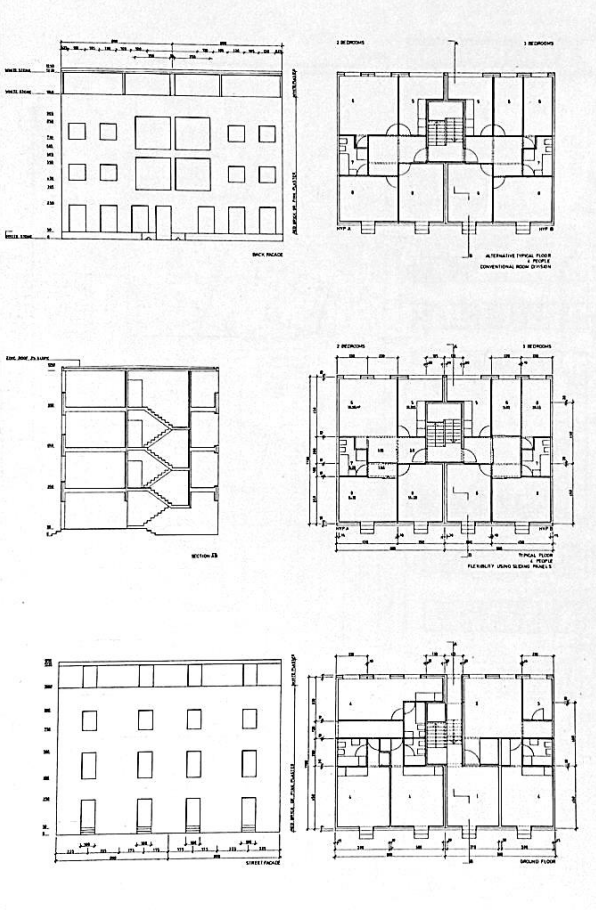

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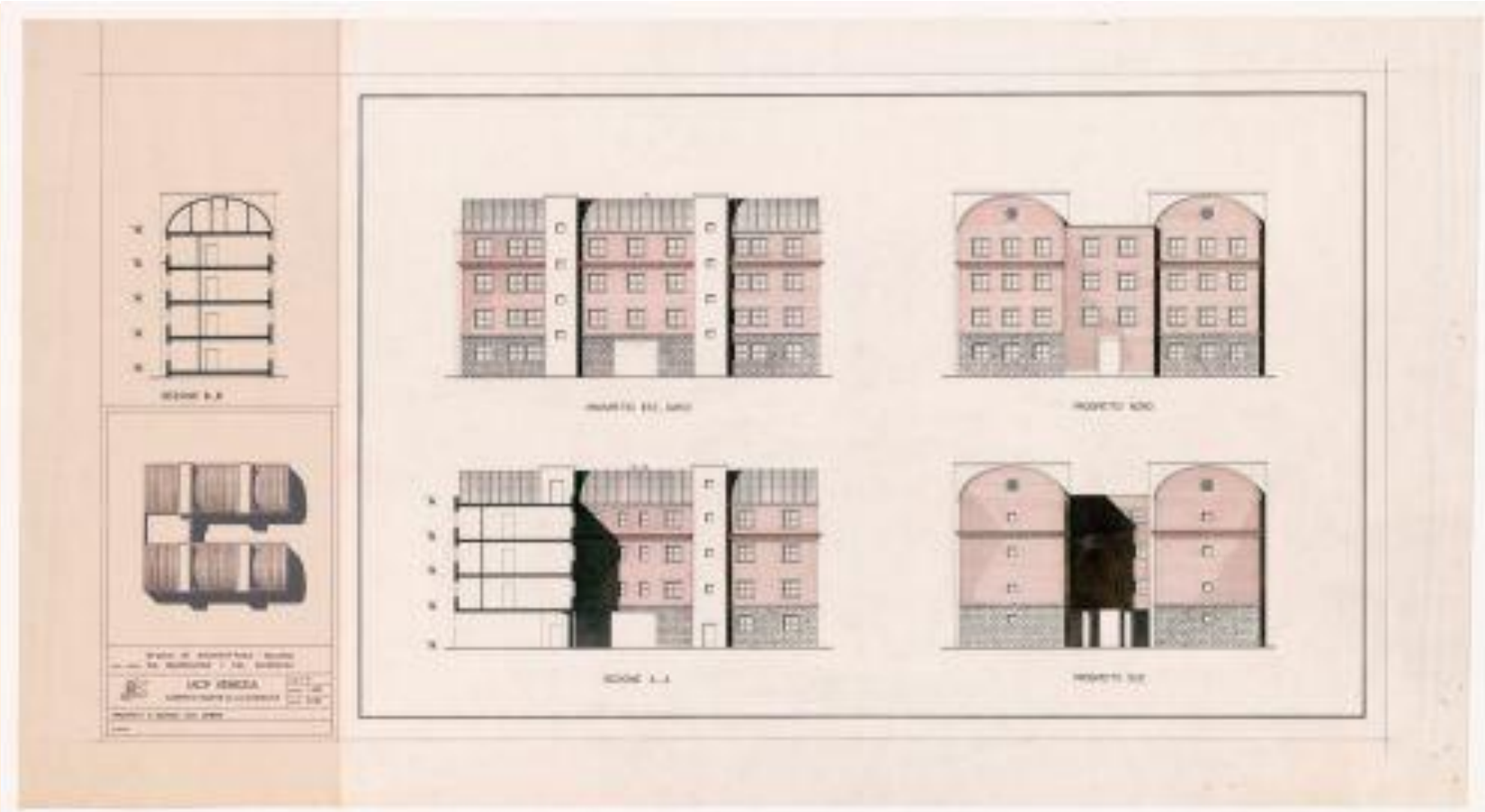

Aldo Rossi residential buildings for *Campo Marte*, 1985

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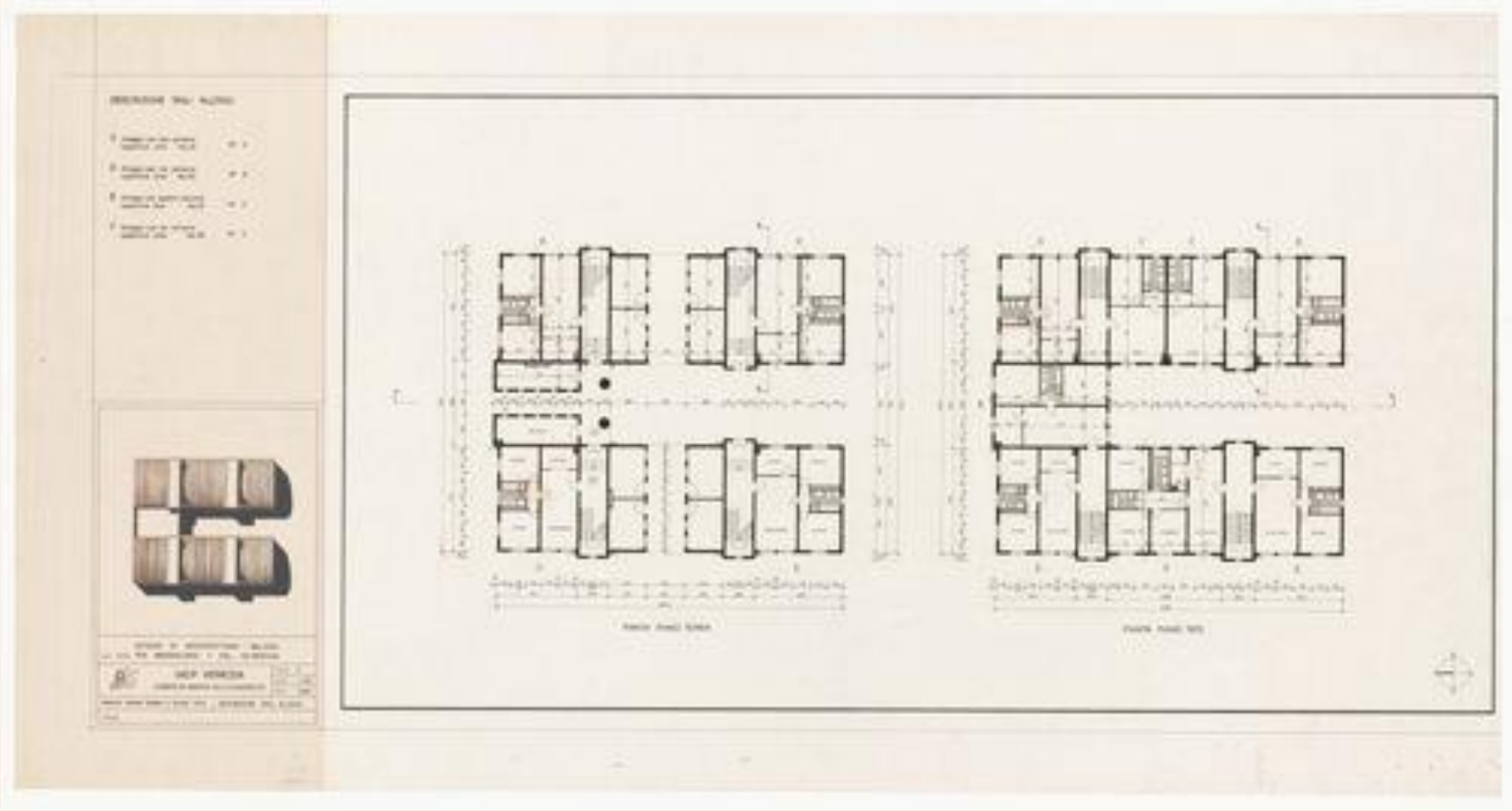

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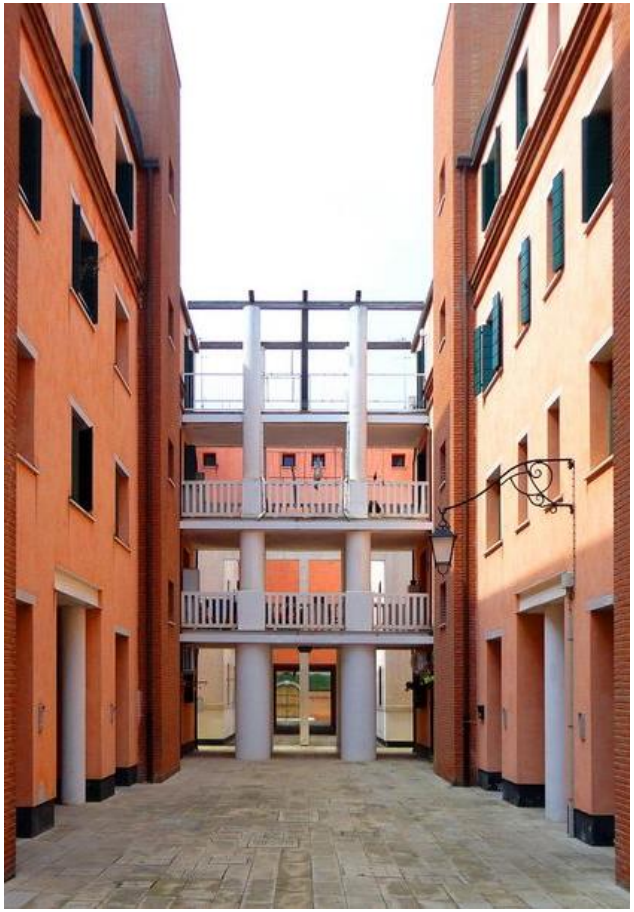

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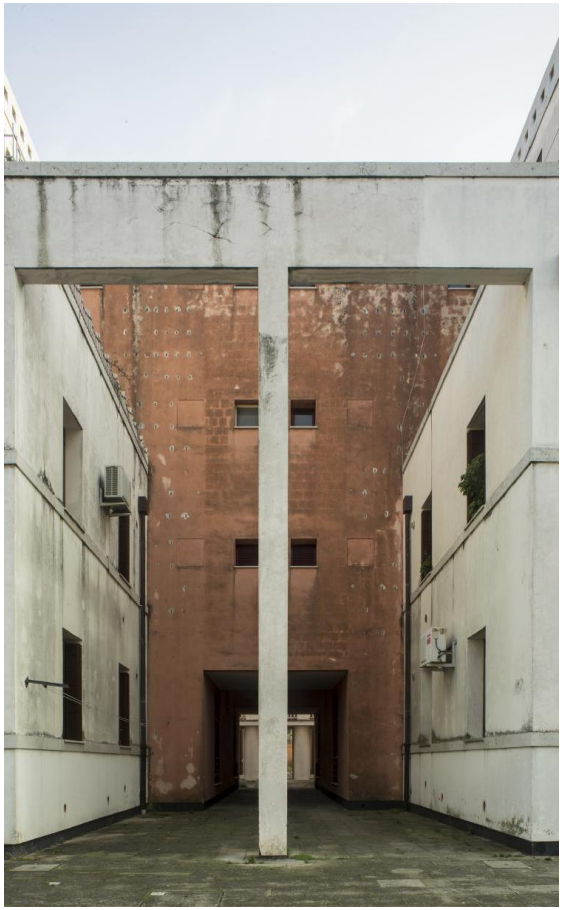

Carlo Aymonino, residential buildings for *Campo Marte*, 1985

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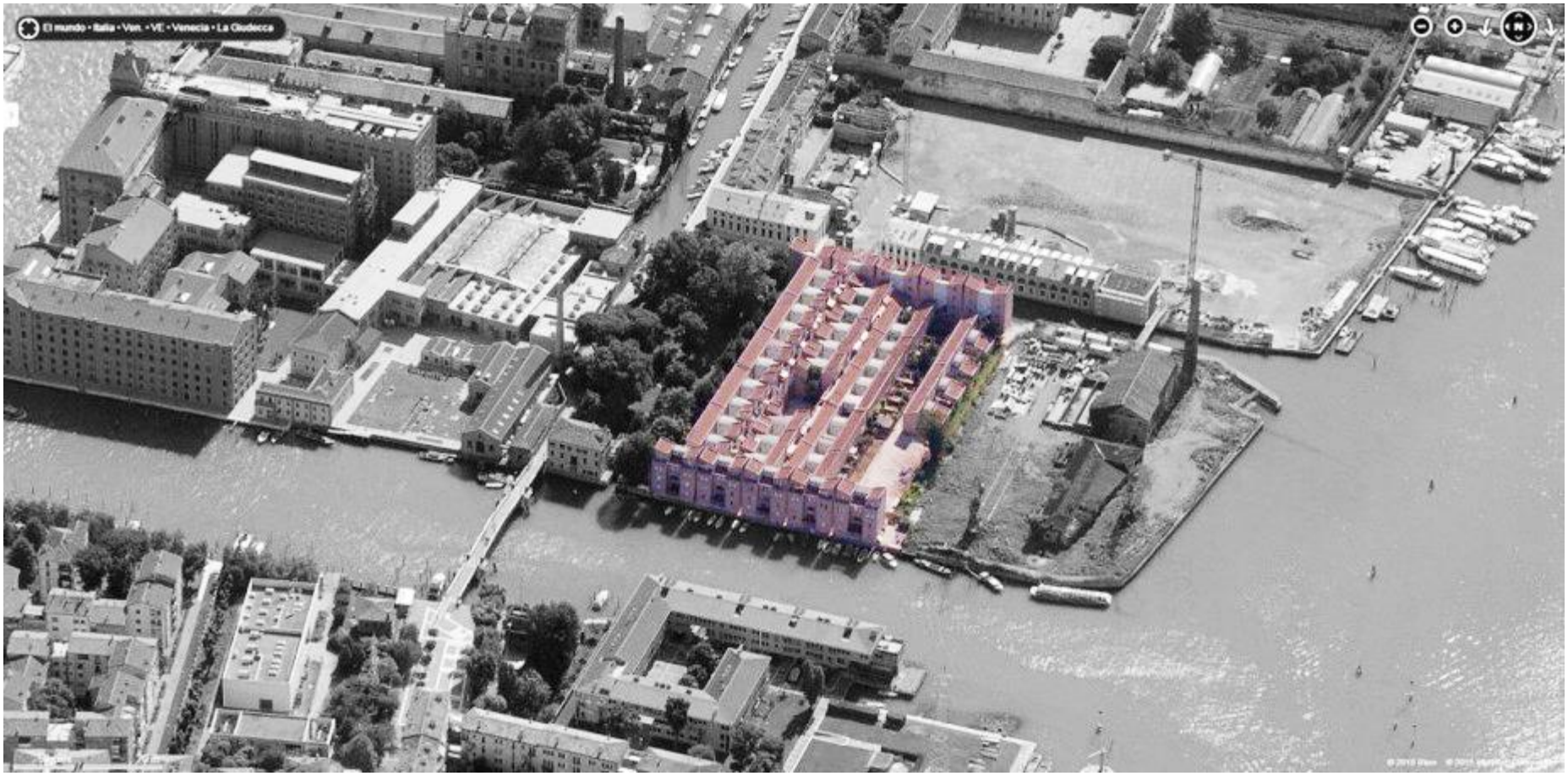

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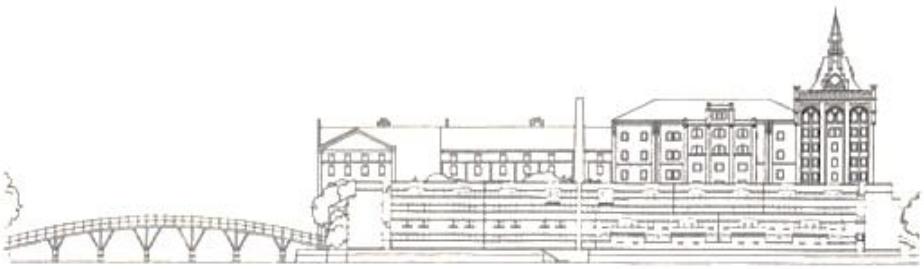

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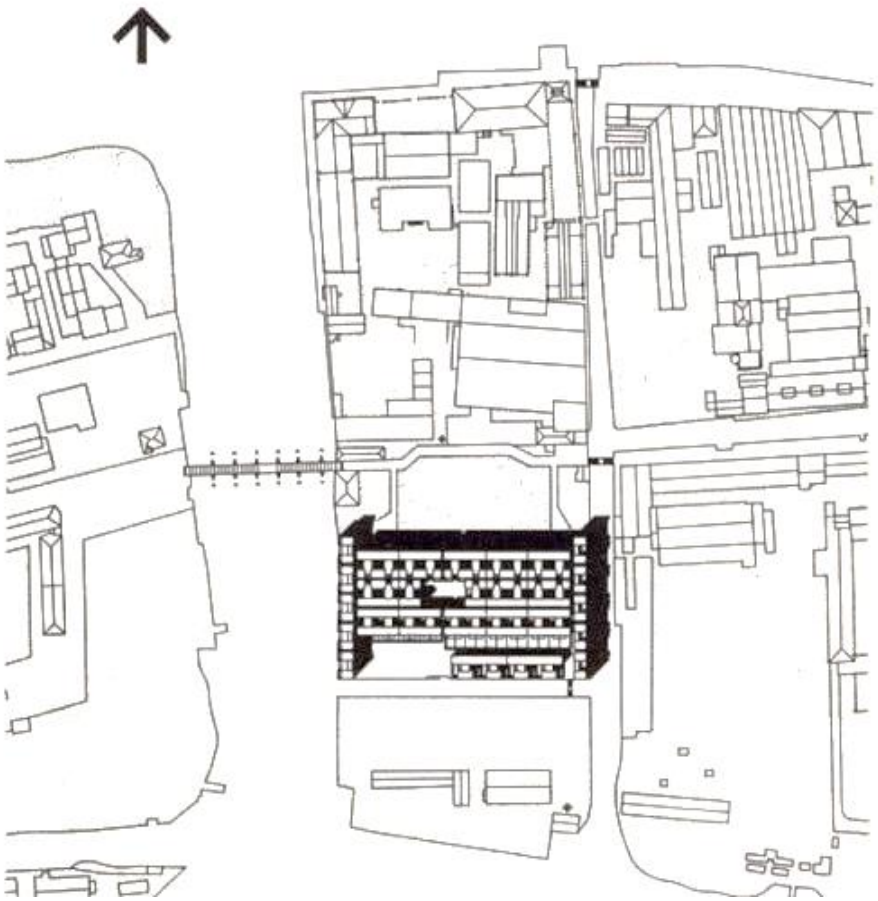

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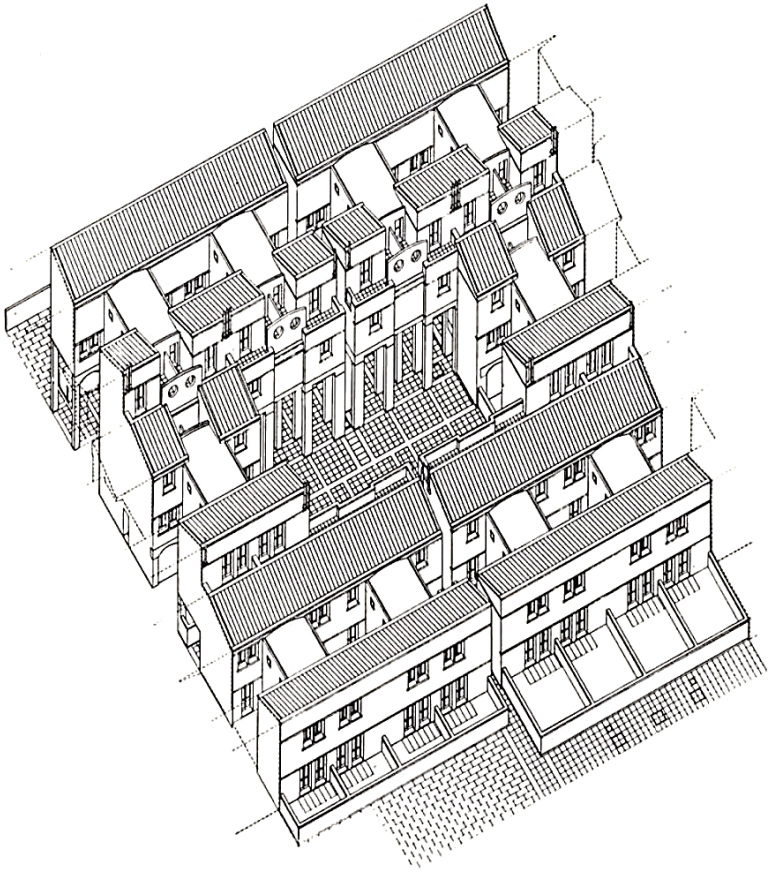
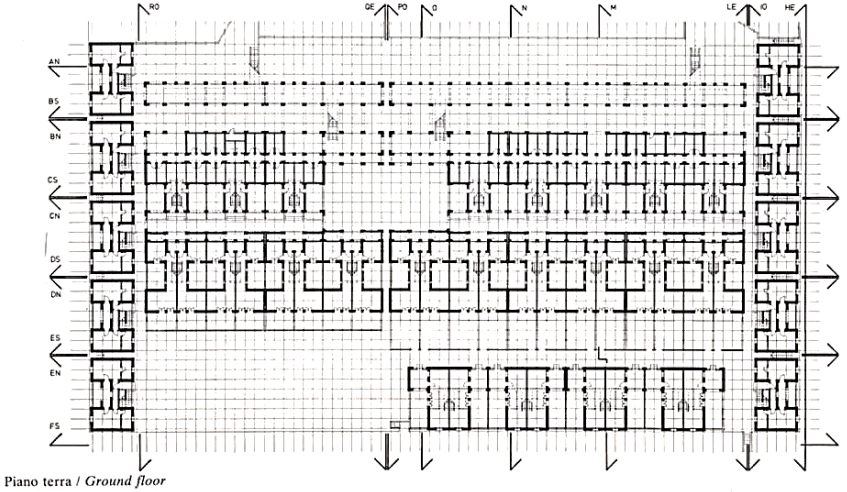
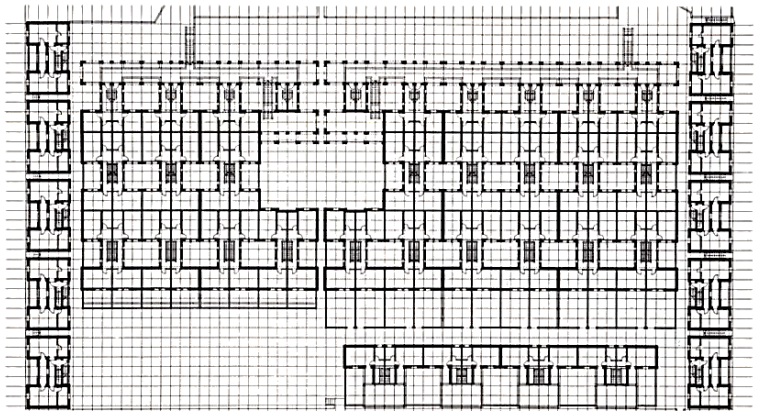




Piano terra / *Ground floor*



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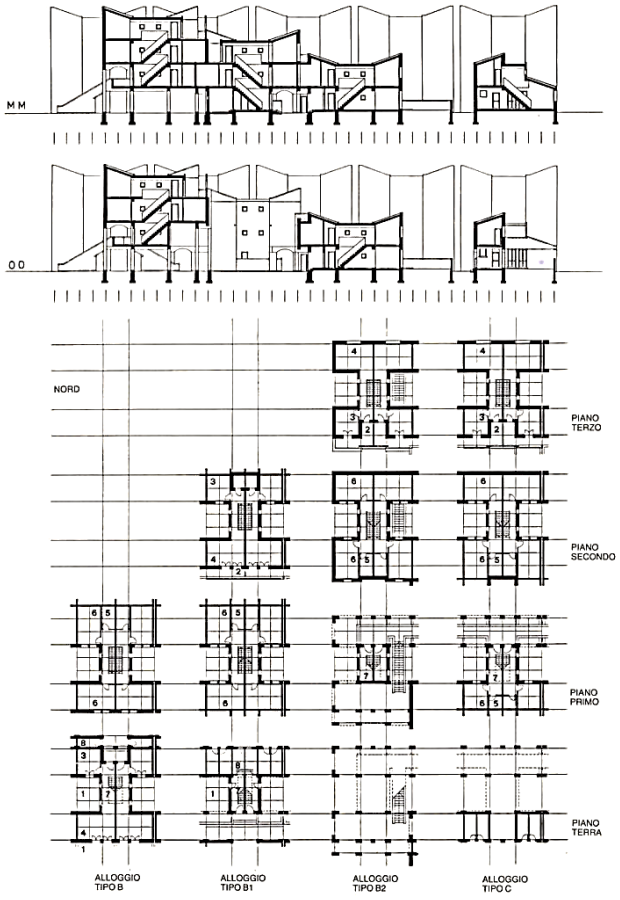

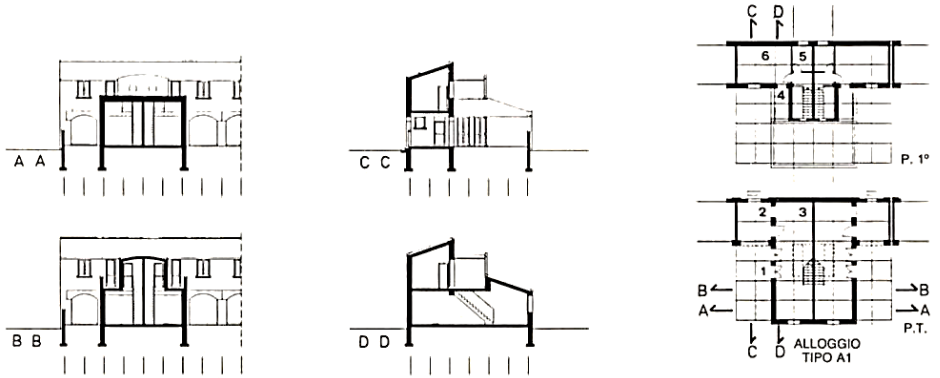

Piante e sezioni degli alloggi a schiera: 1) giardino; 2) portico; 3) cucina, pranzo-soggiorno; 4) terrazza; 5) bagno; 6) camera / *Plans and sections of the buildings in rows: 1) garden; 2) portico; 3) kitchen, dining-living room; 4) terrace; 5) bathroom; 6) bedroom*

Piante e sezioni degli alloggi a torre: 1) giardino; 2) loggia; 3) cucina; 4) pranzo-soggiorno; 5) bagno; 6) camera; 7) ingresso; 8) terrazza / *Plans and sections of the tower buildings: 1) garden; 2) loggia; 3) kitchen; 4) dining-living room; 5) bathroom; 6) bedroom; 7) entrance; 8) terrace*

Gino Valle, residential buildings for *Giudecca*, 1984

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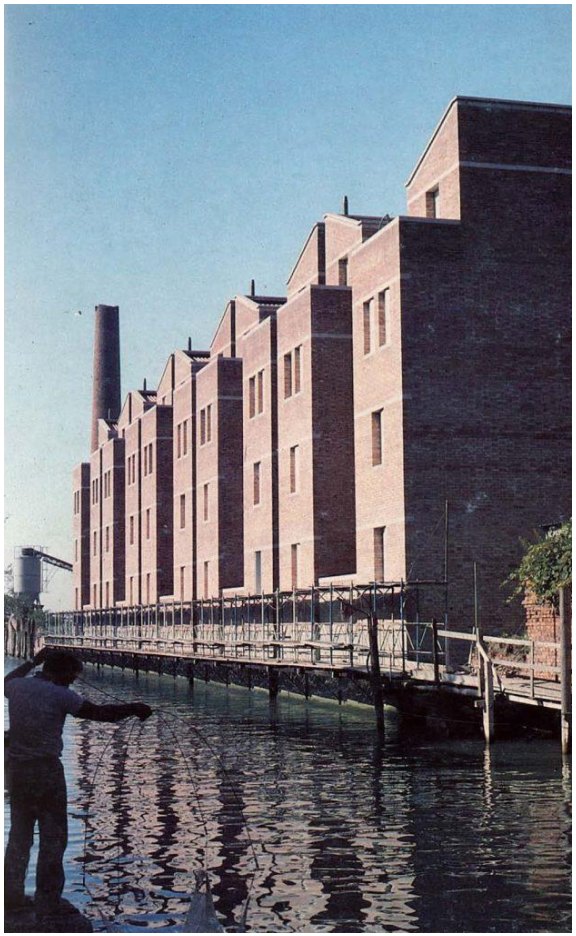

Gino Valle, residential buildings for *Giudecca*, 1984

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Cino Zucchi, residential district *ex-Junghans*, 1995

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Openings and climate in Venice

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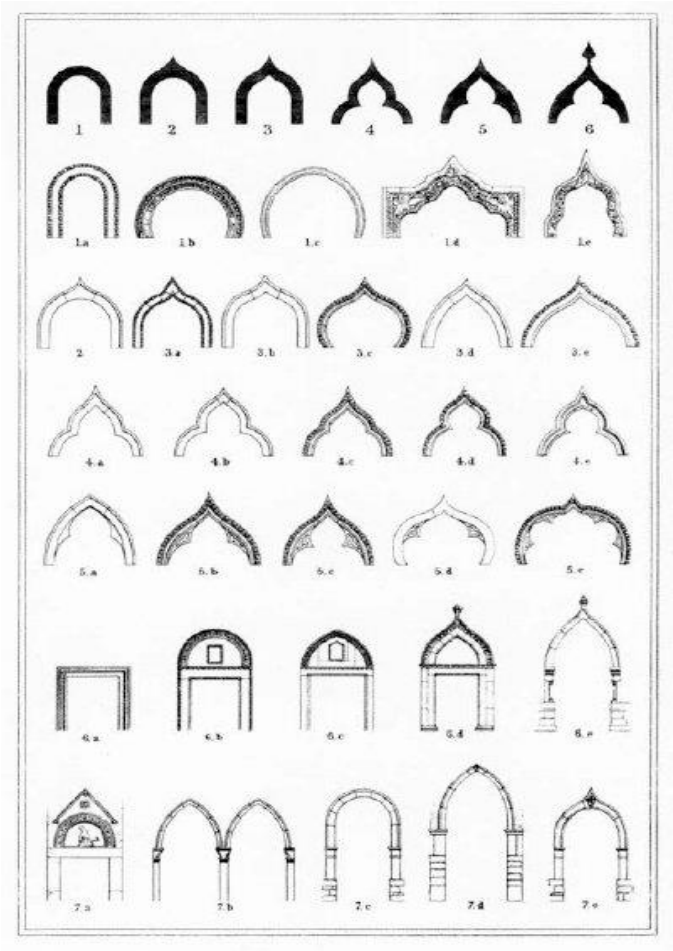

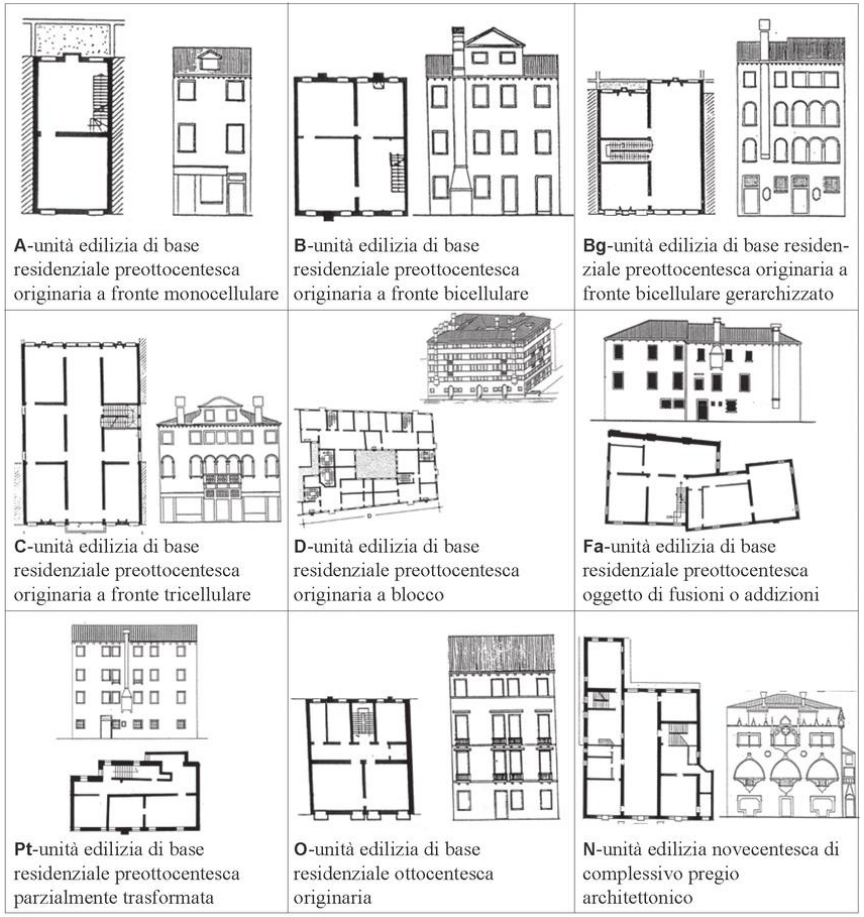

A-unità edilizia di base residenziale preottocentesca originaria a fronte monocellulare

B-unità edilizia di base residenziale preottocentesca originaria a fronte bicellulare

Bg-unità edilizia di base residenziale preottocentesca originaria a fronte bicellulare gerarchizzato

C-unità edilizia di base residenziale preottocentesca originaria a fronte tricellulare

D-unità edilizia di base residenziale preottocentesca originaria a blocco

Fa-unità edilizia di base residenziale preottocentesca oggetto di fusioni o addizioni

Pt-unità edilizia di base residenziale preottocentesca parzialmente trasformata

O-unità edilizia di base residenziale ottocentesca originaria

N-unità edilizia novecentesca di complessivo pregio architettonico

Openings and climate in Venice

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Openings and climate in Venice

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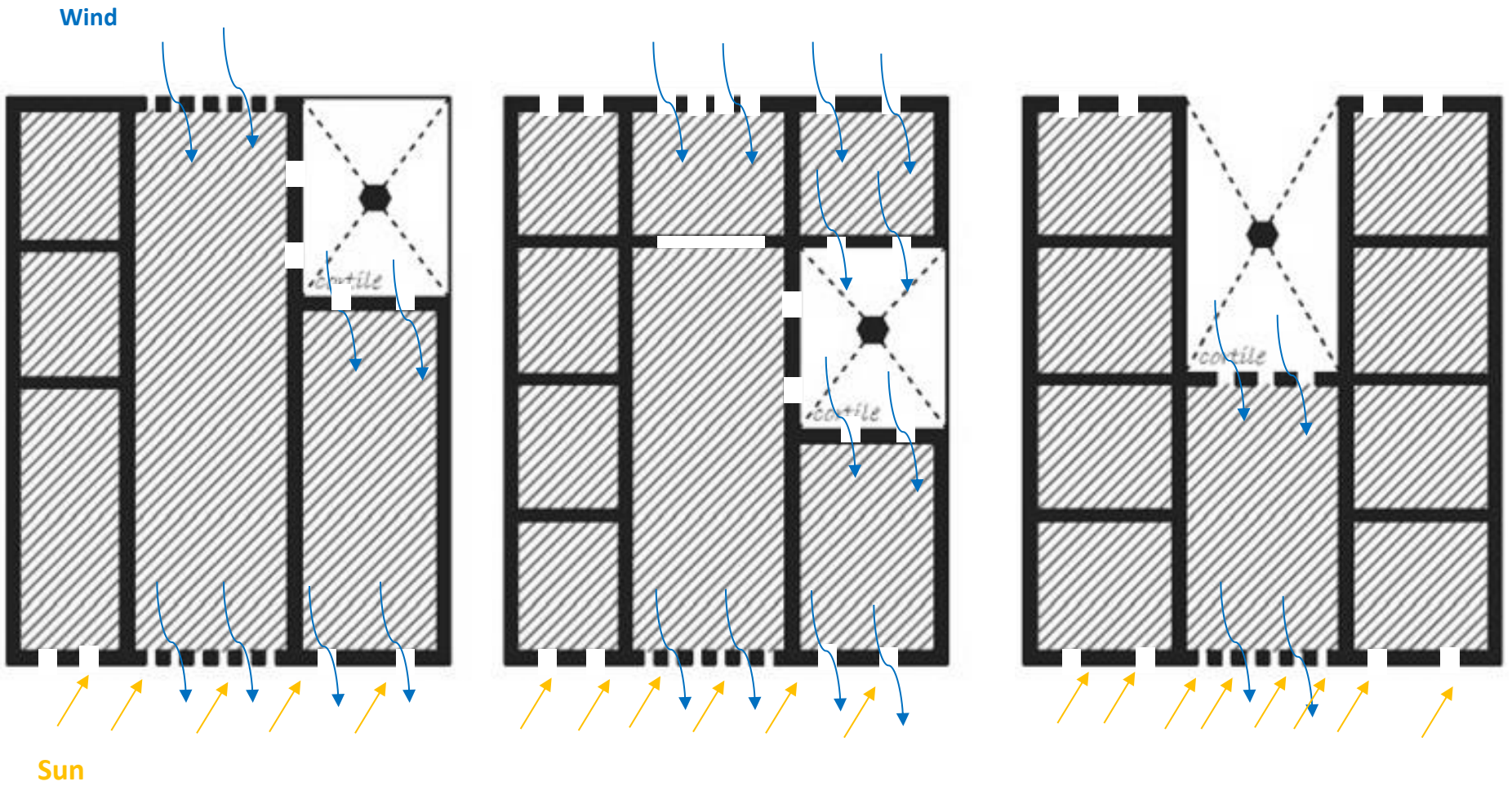

Openings and climate in Venice

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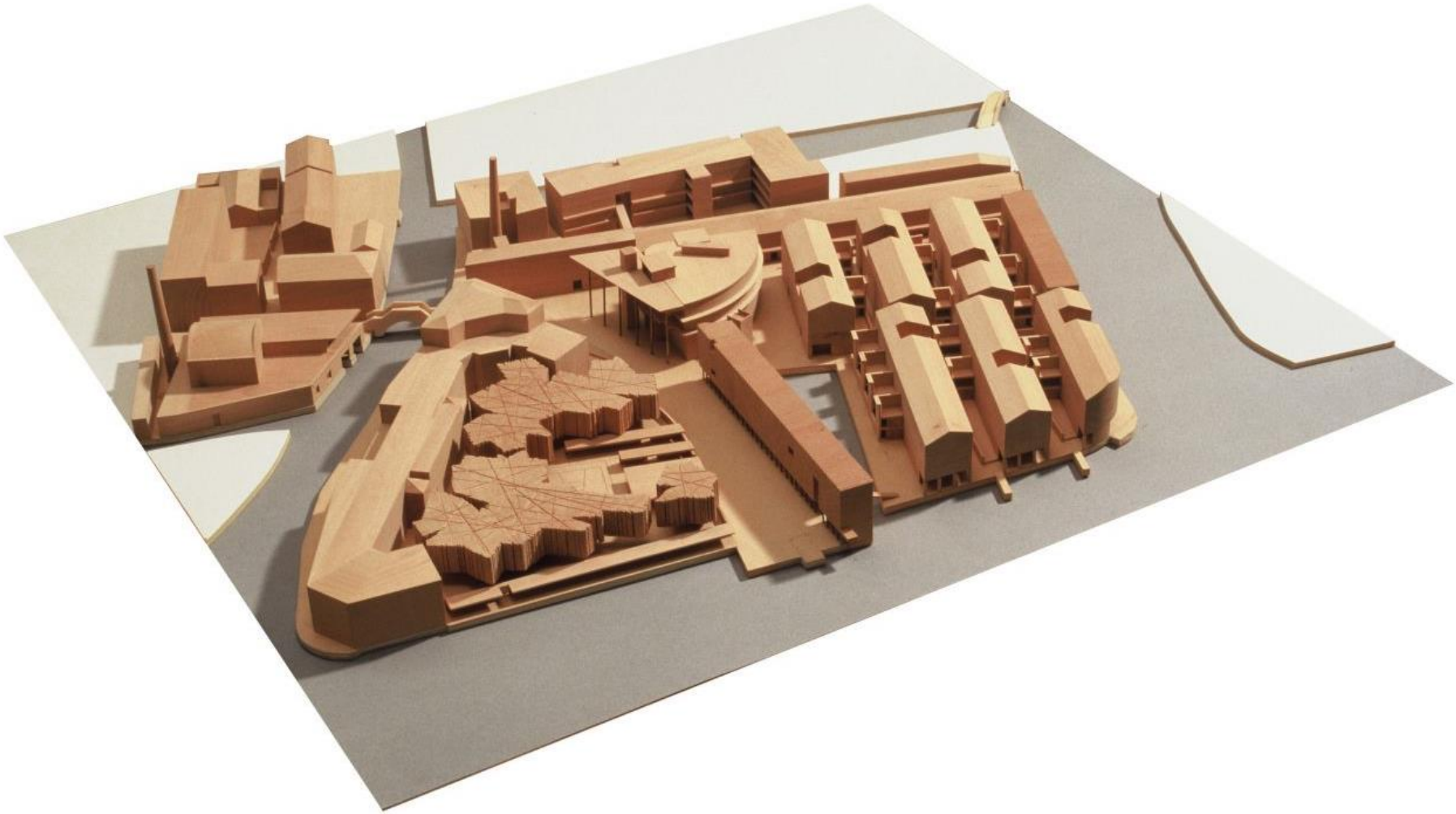

Cino Zucchi, Building E, *ex-Junghans*, 1999

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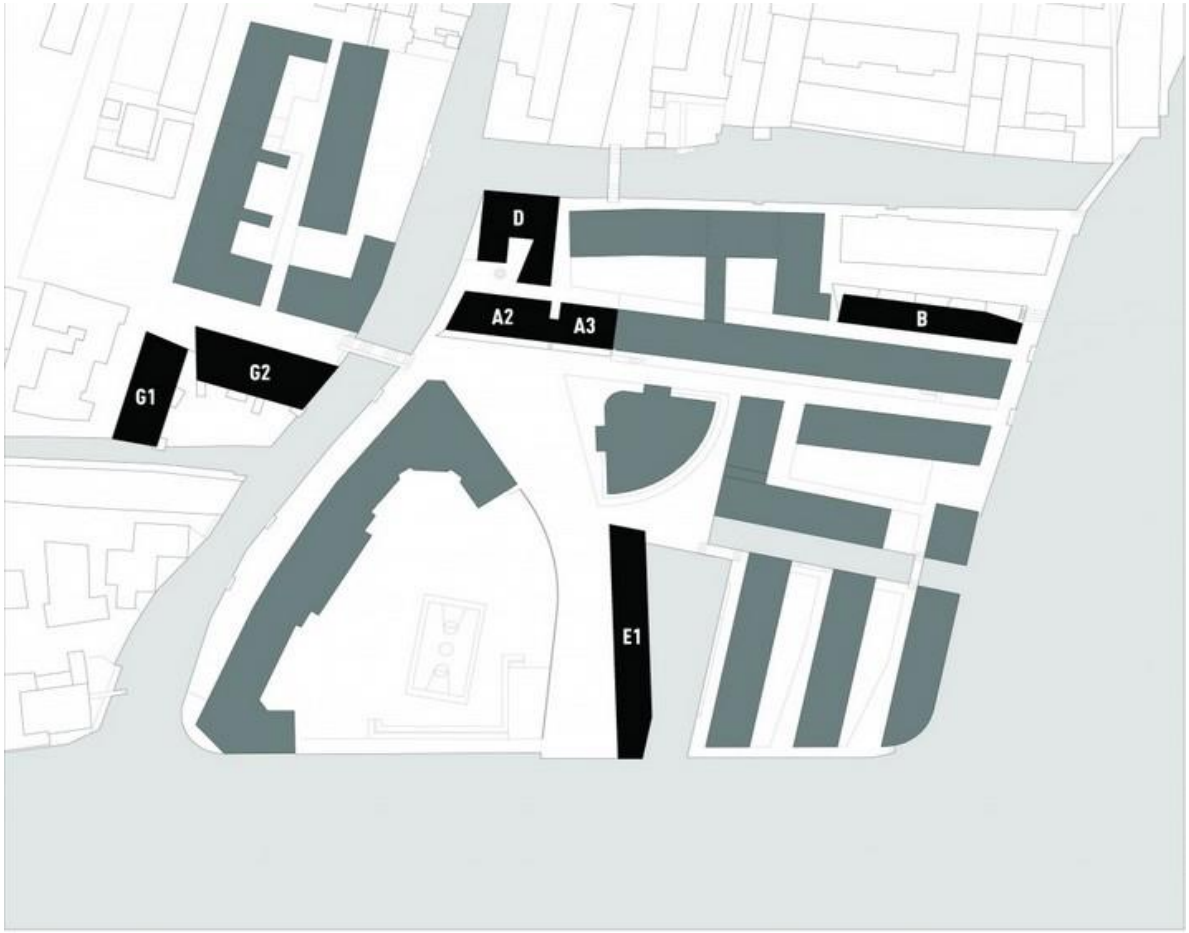

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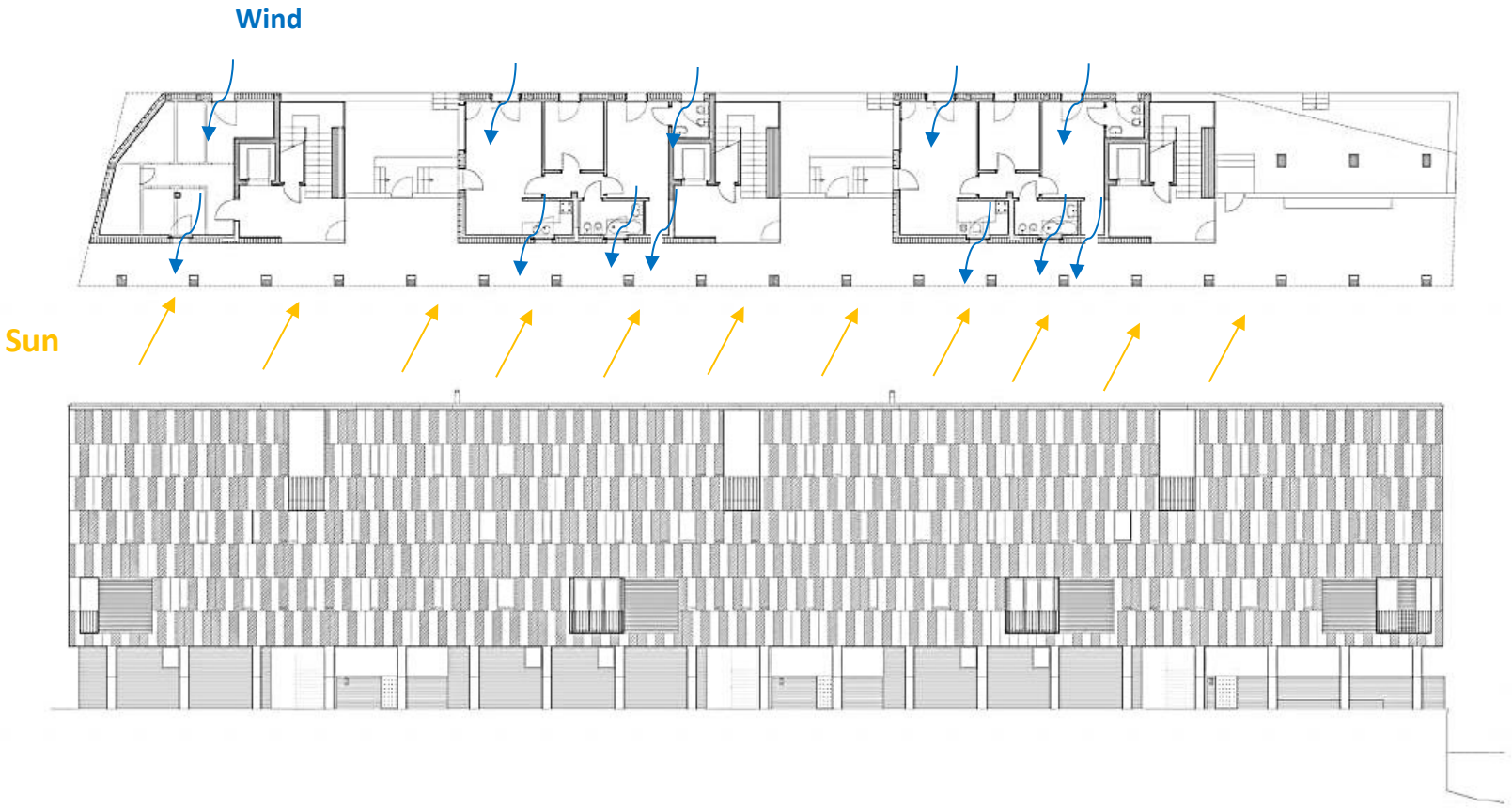

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Cino Zucchi, Building E, *ex-Junghans*, 1999

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Cino Zucchi, Building D, *ex-Junghans*, 1997

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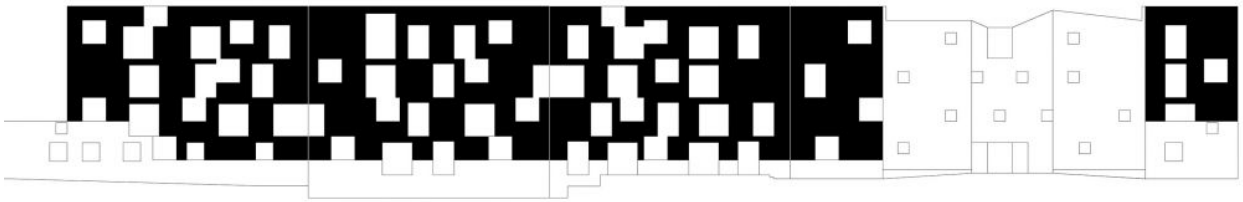
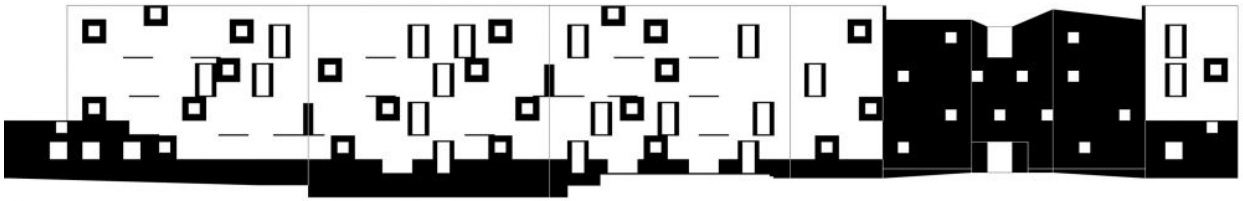
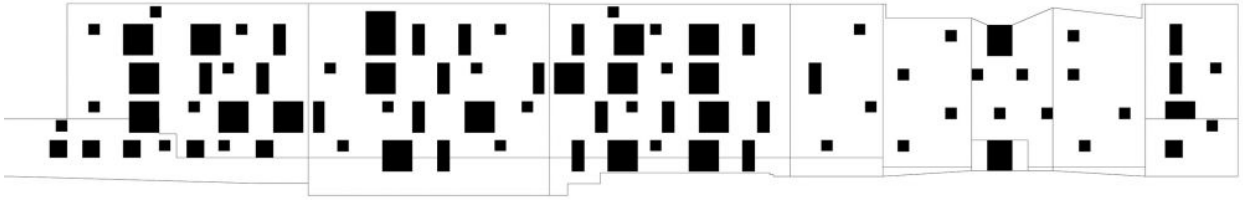


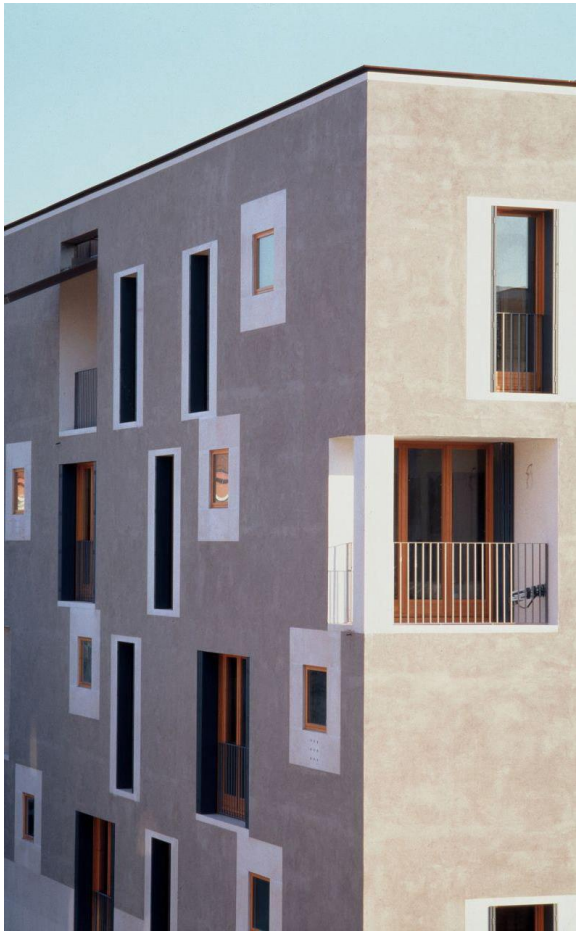
plaster



stone



glass



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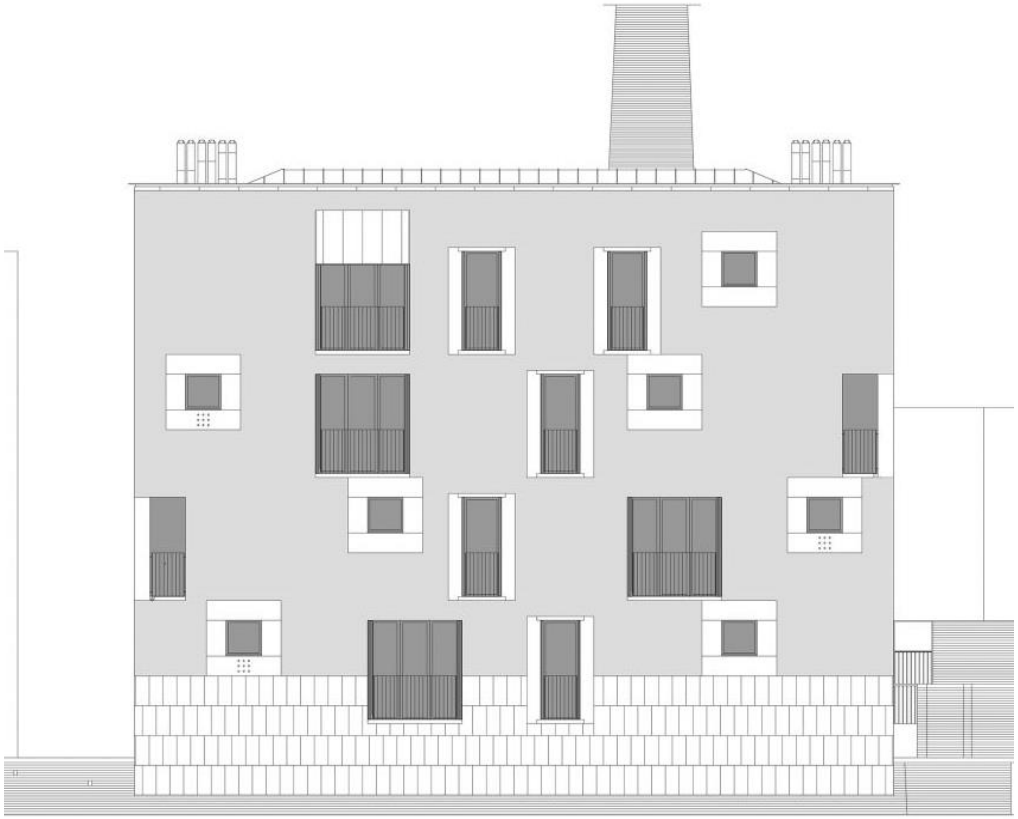

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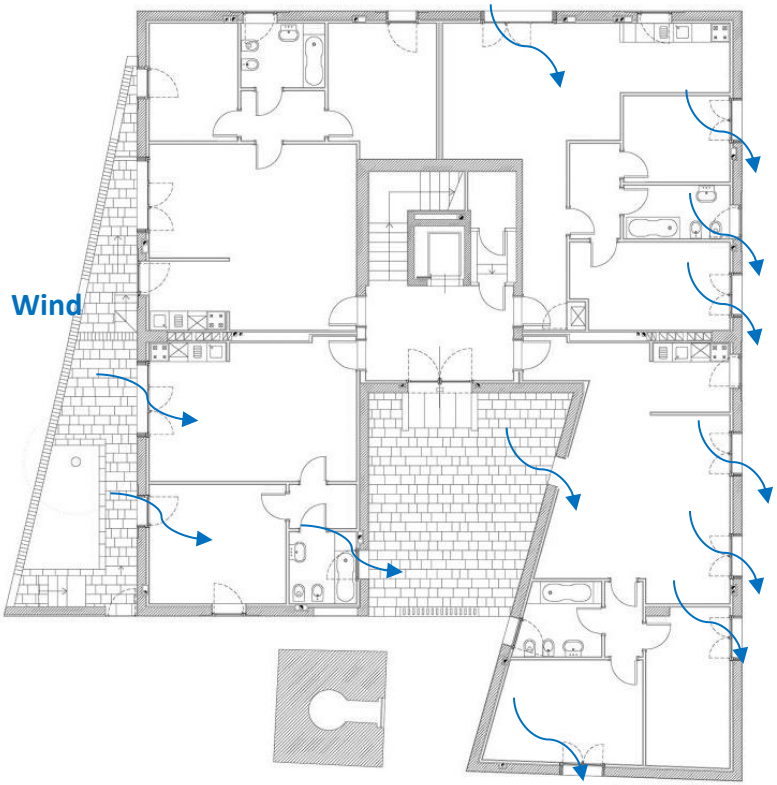

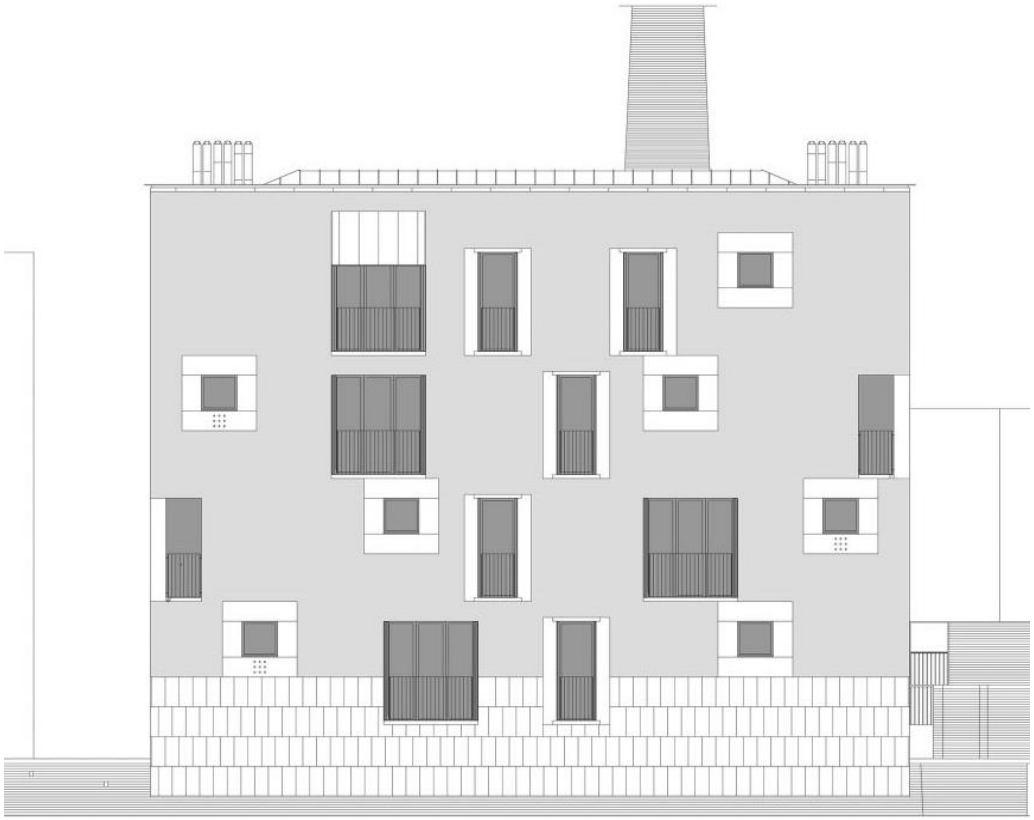

Cino Zucchi, Building D, *ex-Junghans*, 1997

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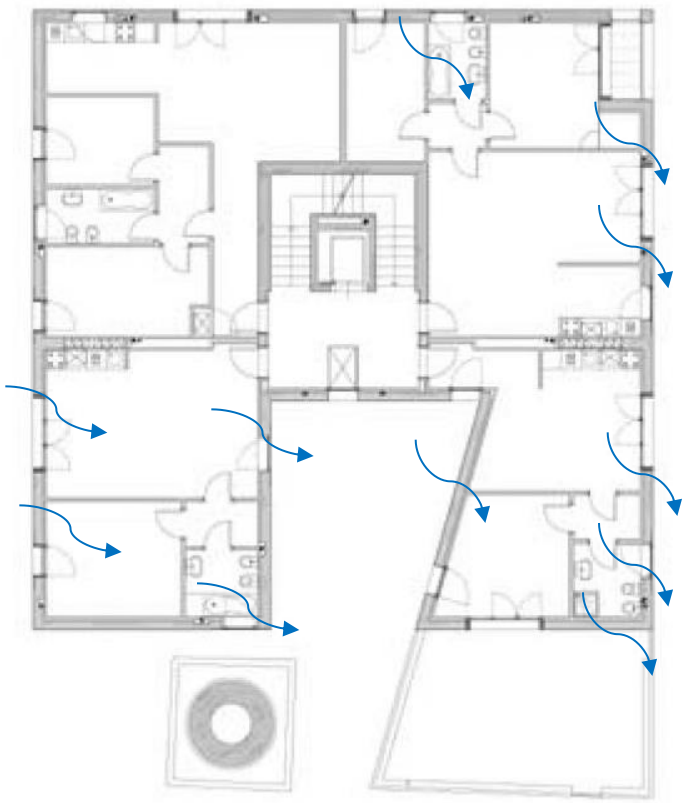
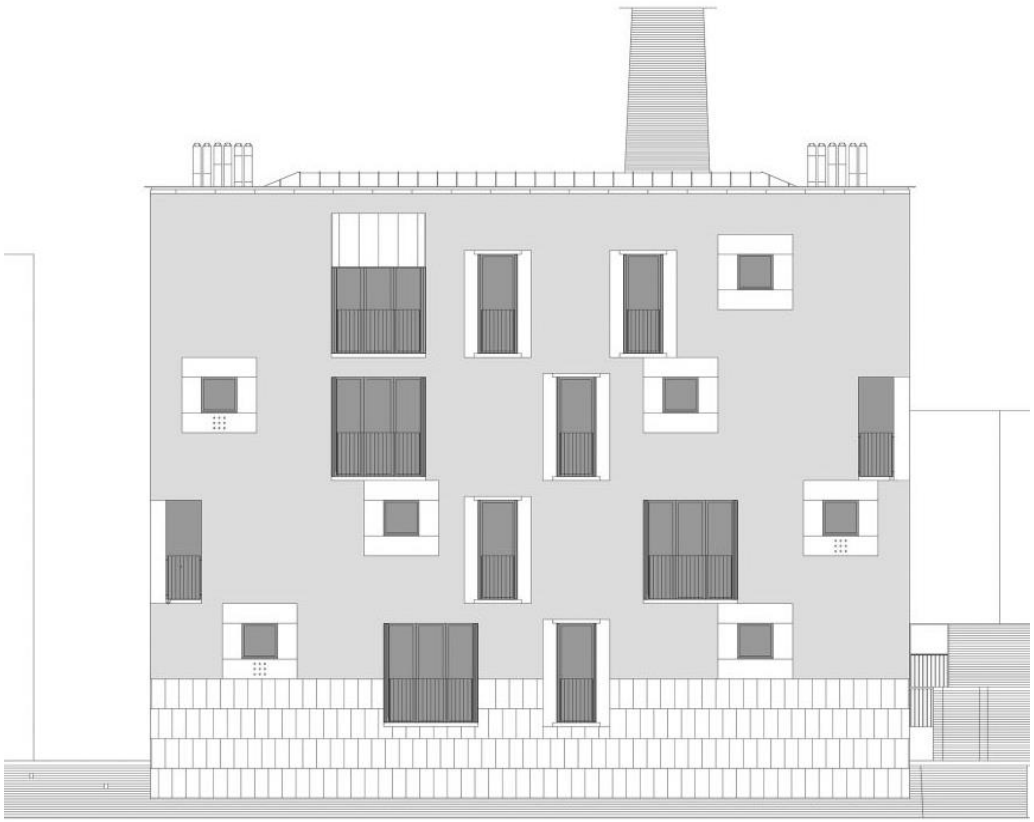
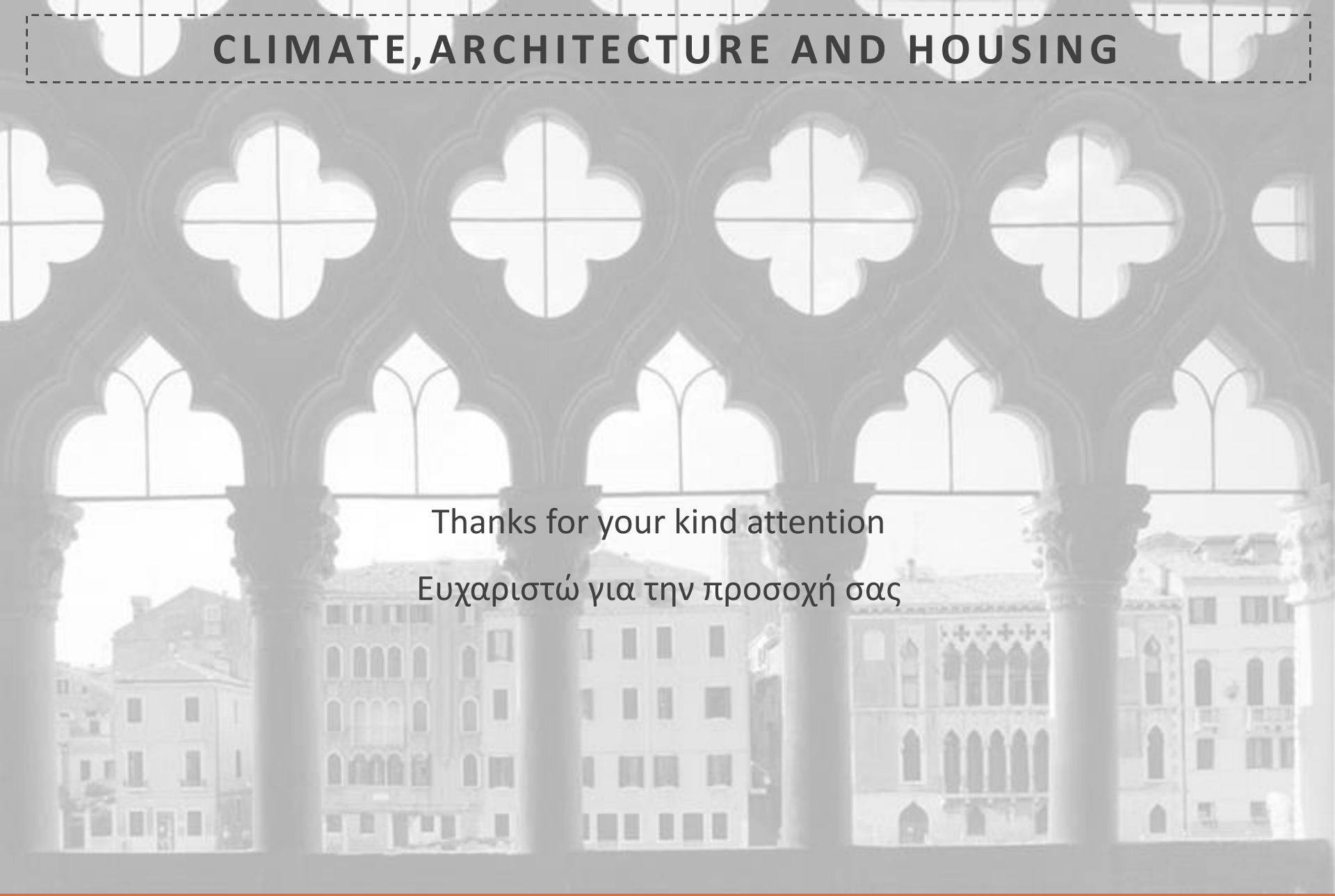




Cino Zucchi, Building D, *ex-Junghans*, 1997



Thanks for your kind attention

Ευχαριστώ για την προσοχή σας