

Editors C. Mileto, F. Vegas, A. Hueto-Escobar, S. Manzano-Fernández

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# EARTHEN HERITAGE

CONSERVATION, ADAPTIVE REUSE AND SUSTAINABLE DESIGN



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Universitat Politècnica de València

## Editors

C. Mileto, F. Vegas, A. Hueto-Escobar, S. Manzano-Fernández

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*Conference UPV*

**EARTHEN HERITAGE. CONSERVATION, ADAPTIVE REUSE AND SUSTAINABLE DESIGN**

The contents of this publication have been double-blind peer-reviewed by the program Committee.

The contents of this publication have been evaluated by the Scientific Committee which it relates and the procedure set out

<https://ocs.editorial.upv.es/index.php/Heritage/Heritage2025/about/editorialPolicies>

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## Publisher

2025, Editorial Universitat Politècnica de València  
Cno. de Vera, s/n.  
46022 Valencia (SPAIN)  
[www.lalibreria.upv.es](http://www.lalibreria.upv.es) / Ref.: 6846\_01\_01\_01

ISBN: 978-84-1396-365-5

ISBN for the Complete Work: 978-84-1396-310-5

Print on-demand

DOI: <https://doi.org/10.4995/Heritage2025.2025.21178>



**EARTHEN HERITAGE. CONSERVATION, ADAPTIVE REUSE AND SUSTAINABLE DESIGN**

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<https://ocs.editorial.upv.es/index.php/Heritage/Heritage2025>

This volume has been published thanks to the support of the project “Re-Habitat – Restoration and sustainable rehabilitation of traditional dwellings in historic contexts”, funded by the Department of Innovation, Universities, Science and Digital Society of the Generalitat Valenciana (CIAICO/2022/035)

# Preface

**C. Mileto, F. Vegas, A. Hueto-Escobar, S. Manzano-Fernández**

Research Centre for Architecture, Heritage and Management for Sustainable Development (PEGASO),  
Universitat Politècnica de València, Valencia, Spain

The “HERITAGE2025 International Conference on Earthen and Vernacular Heritage: Conservation, Adaptive Reuse and Urban Regeneration” has been organized within the framework of three research projects. The first of these, the research project “**Earth4Future** - Sustainable Reuse of Earthen Architecture and its Lessons for Contemporary Architecture”, is funded by the Spanish Ministry for Science and Innovation (PID2022-139154OB-I00) and directed by the Universitat Politècnica de València. The second research project, “**Re-Habitat**– Restoration and sustainable rehabilitation of traditional dwellings in historic contexts”, is funded by the Department of Innovation, Universities, Science and Digital Society of the Generalitat Valenciana (CIAICO/2022/035) and directed by the Universitat Politècnica de Valencia. Finally, the research project “**ENACT 15mc** Envisioning Neighbourhoods and Co-Creating Thriving Communities in the 15-Minute City” is cofunded by the European Union (through Driving Urban Transitions Partnership, DUT, AEI, PCI2023-145946-2) and directed by the Norwegian University of Science and Technology, in collaboration with other associations, bodies, and universities including the Universitat Politècnica de València.

The project “**Earth4Future** Sustainable Reuse of Earthen Architecture and its Lessons for Contemporary Architecture”, with a research team directed by the Universitat Politècnica de València, together with other universities both within and outside Spain, primarily aims to research the energy behaviour and viability of compatible interventions in earthen constructions within Spain. This seeks to identify solutions which increase energy efficiency and reduce emissions without jeopardising cultural, heritage, and social values. This project analyses issues such as respect for heritage values, real economic cost, environmental impact, and energy efficiency based on studies carried out on historic earthen constructions together with contemporary applications of earthen techniques in new constructions.

Furthermore, the project “**Re-Habitat**– Restoration and sustainable rehabilitation of traditional dwellings in historic contexts”, with a research team led by the Universitat Politècnica de València and made up of researchers from universities both within and outside Spain, focuses on the analysis of historic buildings in urban and rural settings. By analysing similar parameters within the Comunidad Valenciana, it seeks to propose guidelines and intervention criteria that are compatible with heritage and are economically viable, environmentally sustainable, and energy efficient.

Analysis on a larger scale features the project “**ENACT 15mc** Envisioning Neighbourhoods and Co-Creating Thriving Communities in the 15-Minute City” directed by the Norwegian University of Science and Technology and different collaborators. This project examines the potential of redesigning historic urban spaces and improving quality of life, active mobility, accessibility and social relations, in order to achieve the concept of “15-minute cities”, through case studies such as Trondheim, Gdańsk, Valencia and Oxford.

The three projects are considered complementary, as they all seek to promote sustainable architecture and urbanism linked to heritage, energy efficiency, and community development, always aiming to strike a balance between tradition and innovation. This is a response to critical challenges such as climate change, population loss, the disappearance of traditional crafts, and the need for vibrant, inclusive, and resilient cities. This further highlights the pressing need to promote research, increasing awareness and action in multiple sectors, actively aiding the transition to more sustainable societies in terms of heritage and urbanism.

Given that these research projects display certain commonalities, particularly in relation to the challenges and perspectives for the future detailed above, and offer the potential for joint discussion, the main themes have been combined in the HERITAGE2025 International Conference. The themes established for the conference are: **1. Vernacular architecture** (study and cataloguing of vernacular architecture; study of traditional materials, techniques and construction crafts; mechanisms of sustainability of vernacular architecture; restoration and conservation of vernacular architecture; energy efficiency and sustainable design projects; management and maintenance); **2. Earthen architecture** (study and cataloguing of earthen architecture; study of traditional materials, techniques and construction crafts; mechanisms of sustainability in earthen architecture; restoration and conservation of earthen architecture; energy efficiency and sustainable design projects; management and maintenance), **3. Urban and rural historical sites** (studies of historic urban and rural areas; intervention and regeneration projects; management and maintenance, threats and opportunities in historic areas: tourism, infrastructure and identity; proximity economy and traditional commerce in historic contexts); **4. From tradition to contemporaneity** (contemporary projects inspired by tradition; traditional sustainability mechanisms applied to contemporary architecture; integration of contemporary projects in historical contexts; reinterpretation of traditional techniques for their application in contemporary architecture).

The Scientific Committee is made up of 89 renowned researchers and specialists in the themes analysed, hailing from 25 different countries from five continents. All the contributions to the conference – abstracts as well as final texts – have been subject to a strict peer review evaluation system by the members of the Scientific Committee. Of the 244 proposals submitted, a total of 150 papers written by 328 authors from 30 countries of five continents has been selected for final publication.

The papers selected have been published in three volumes appearing in print and online format and titled *Vernacular Heritage: Documentation, Conservation and Adaptive Reuse*, *Earthen Heritage: Conservation, Adaptive Reuse and Sustainable Design*, and *Historic Settlements: Conservation, Regeneration and Management*.

The “HERITAGE2025 International Conference on Earthen and Vernacular Heritage: Conservation, Adaptive Reuse and Urban Regeneration” was held on 10-12 September 2025 at the Universitat Politècnica de València, Spain. The conference was carried out with the sponsorship of: WHITRAP – World Heritage Institute of Training and Research for the Asia and Pacific Region under the auspices of UNESCO; ISCARSAH – International Scientific Committee on the Analysis and Restoration of Structures of Architectural Heritage, technical committee of ICOMOS; ICOMOS CIAV – International Council on Monuments and Sites; International Committee of Vernacular Architecture; ICOMOS ISCEAH – International Scientific Committee in Earthen Architectural Heritage; and PROTERRA – Ibero-American Network of Architecture and Earthen Construction. The organization, publication and development of the conference was made possible by funding from the Spanish Ministry for Science and Innovation for the research project “Earth4Future - Sustainable Reuse of Earthen Architecture and its Lessons for Contemporary Architecture” (PID2022-139154OB-I00) and the Department of Innovation, Universities, Science and Digital Society of the Generalitat Valenciana for the project “RE-HABITAT – Restoration and sustainable rehabilitation of traditional dwellings in historic contexts” (CIAICO/2022/035). The Higher Technical School of Architecture, PEGASO - Research Centre for Architecture, Heritage and Management for Sustainable Development, and the Department of Architectural Composition of the Universitat Politècnica de Valencia have also contributed to the development of this conference.

Finally, we wish to thank the authors who have contributed to the quality, range, diversity, and richness of the publication with their papers and studies. We are indebted to all the members of the advisory and scientific committees for their work throughout the entire review process for abstracts and papers. And above all, we would like to thank the organizing committee for their invaluable help in setting up the conference, the style and language reviewers for their corrections, and all collaborators for their inestimable work in the management and organization of each and every phase of the process.

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# Traces of Vernacular Architecture in the Royal Palace of Portici (Naples, Italy) between Knowledge and Restoration

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**Topic:** T1.4. Restoration and conservation of vernacular architecture

**How to cite:** Buono, Lorenza Elisa; (2025). Traces of Vernacular Architecture in the Royal Palace of Portici (Naples, Italy) between Knowledge and Restoration. In C. Mileto, F. Vegas, A. Hueto-Escobar & S. Manzano-Fernández (Eds.) *Earthen and Vernacular Heritage: Conservation, Adaptive Reuse and Urban Regeneration*. September 10<sup>th</sup> – 12<sup>th</sup>, 2025, Valencia (Spain). edUPV. <https://doi.org/10.4995/HERITAGE2025.2025.19481>

## Abstract

*The aim of the paper is to examine Palazzo Caramanico, west wing of the Royal Palace of Portici (Naples), as the living material testimony of the oldest rural farmhouse. Built in the 16th century and conceived as a rural house, it was transformed, during the early 18th century, first into a noble Maison and then into the Royal Palace. Despite changings over time, of ownership and amplification, the Palace still retains the typical constructive design of vernacular architecture from Neapolitan kingdom: low-rise buildings in local yellow tuff, characterized by two levels: the ground floor for services and animals, the first floor for the residence. The Palace, which eventually became the property of the University of Naples, has been deeply intertwined with major historical events since the early 18th century. However, following changes have significantly altered the complex, impacting both its internal and external surfaces. The study, grounded in an interdisciplinary approach, seeks to trace the history of these transformations to better understand the remnants of vernacular architecture over time. It also aims to establish possible strategy and sceneries for the conservation, enhancement, and the storytelling of this complex heritage, which embodies rural, noble, royal, and institutional dimensions.*

**Keywords:** Royal Palace of Portici; Bourbonic residence; Carlo III of Bourbon; vernacular residence; Miglio d'Oro; cultural heritage; Vesuvius

## 1. Introduction

The script examines the transformation of a particular farmhouse into aristocratic residences in the 18th century: Palazzo Caramanico. Originally a rural building, it underwent a transformation into a noble palace in the early 18th century and subsequently became part of the Reggia di Portici in Naples.

The present study focuses on the adaptation of architecture and landscape to the requirements of new aristocratic ownership, thereby creating a sacred and royal space. This research employs

a multidisciplinary approach, ranging from iconography to material analysis, combining various methods to achieve the most reliable results.

The study of the palimpsest of Palazzo Caramanico ultimately aims at the preservation and enhancement of the architectural qualities typical of rural architecture that have survived to the present day, through the noble function.

The urban expansion of Naples originally extended beyond the city itself, extending from the Sebeto River to Mount Vesuvius.



Fig. 1 – *Reggia di Portici*.

## 2. Vernacular Architecture in Portici: A Historical and Territorial Analysis

This area collectively received the designation "*foris fluben*", although each location retained its distinct name. The territory outside the river was divided into four *casali*, of which one was flat (San Giovanni a Teduccio) and three were sloping (San Giorgio a Cremano, known as Crematum; Portici, known as Castanetum; and Ercolano, known as Ripa). Of these topographical features, the central area, Portici, was distinguished by a rich chestnut forest, hence the name *Castaneta*, and was further distinguished by two additional parts: one deserted—at the foot of Vesuvius—due to the eruptions, and one washed by the sea (Alagi, 1984).

The cities experienced a challenging existence due to the recurrent eruptions of Mount Somma, which resulted in the inundation of the lands with lava and debris. This led to a continuous and increasingly unsystematic evolution of nature as the territory was reclaimed, transforming it into areas characterised by extreme naturalistic features. This transformation is evident in the depictions of the region, as evidenced by the works of Masculo (1633) with its title "Il Vesuvio prima dell'eruzione del 1631" and Didier Barra (1647) with its title "Veduta di Napoli". Within

this unspoiled territory, a few scattered farmhouses were built on the foundations of those houses destroyed by magma, and with simple forms, they predominantly expressed their productive function. The ideal location for such endeavours was on the hills, a considerable distance from the sea, for the purpose of cultivating vineyards and orchards.



Fig. 2 – *Il Vesuvio prima dell'eruzione del 1631* (Masculo, 1633).



Fig. 3 – *Veduta di Napoli* (Didier Barra, 1643).

## 2.1. Development of the territory during the Bourbon era

In 1738, with the international recognition of Charles of Bourbon as the King of the Two Sicilies, the Bourbon dynasty was established. This event marked the onset of significant transformations within the kingdom, including the flourishing of several architectural masterpieces such as the Royal Palace of Caserta, the Royal Palace of Capodimonte, and the Royal Palace of Portici, along with notable engineering works such as the *Miglio d'Oro* (Golden Mile).

The transformation of Portici can be attributed to the personal fascination of Queen Amalia and King Charles with the city, which, at the time, was still in a rural and undeveloped state. The king himself described it as a *locus amoenus*, a pleasant place suitable for the construction of a new royal summer residence that would cater to his various interests. The vast expanses of greenery would satisfy his love of hunting, while the presence of the *Granatello* port would satisfy his passion for fishing. Consequently, the construction of the *Miglio d'Oro*, also known as *Strada Regia delle Calabrie*, was initiated over the ruins of the ancient Roman road that connected Capua to Regium, with the objective of enhancing the connection between the royal palaces of Naples and Portici.

These significant events led to a drastic transformation of the Vesuvius territory, to the point that the Bourbon court, in an effort to be closer to the sovereign, began urbanizing the Vesuvius region, sometimes acquiring existing rural buildings to convert them into villas, and at other times constructing new architectures.

## 2.2. Identification of 17th-century farmhouse construction archetypes

From the medieval period until the 17th century, rural families residing on the slopes of Mount Vesuvius initiated the construction of farmhouses, which were spaced apart from one another with the intention of securing a

substantial portion of land for cultivation and productivity.

The rural dwellings present in the Vesuvius area at the time can be categorised into three distinct types:

- Those arranged around a common courtyard;
- Those arranged in block form;
- Those arranged in a linear arrangement.

The most prevalent type of building was the courtyard house, distinguished by the presence of an internal courtyard, from which common facilities such as the oven, rainwater cistern, stable, and chicken coop were accessible (Casale, 2015).

The archetypal *masseria* is composed of two floors: the living space, situated on the upper one, and ancillary terraneous rooms such as the stable, the warehouse, or the woodshed.

The entrance is often characterized by a cramped, lintel design, featuring a step that functions as a rainwater or wastewater runoff barrier in the absence of adequate sewer systems or levelling. The staircase connecting the floors is almost always external in full masonry. The roof, composed of a wooden structure with a scaffolding system consisting of beams and boards, is covered with tiles.

The ceiling, as previously mentioned, is wooden, and the vaulted ceiling (called "*lamia*") is found only in the ground floor rooms intended for elevation.

Balconies, loggias, terraces, pillars, and other architectural elements are conspicuously absent in traditional rustic architecture. The arch is infrequently employed to support stairs and doorways, and facades are devoid of friezes, with the cornice being scarcely mentioned.

In more developed hamlet houses, the only decorative element is the portal, which is also made of local stone.



Fig. 4 – Detail of *Capania Felix* (Antonio Bulifon, 1642).

### 3. The case study of Palazzo Caramanico

#### 3.1. From the origin to the transformation

A thorough analysis of historical maps, including those by Giovanni Antonio Magini (1620) and Antonio Bulifon (1642), reveals that the landscape of Portici was depicted as a small village founded on a hill with minimal development and an extensive natural terrain. This territory, akin to other regions within the vicinity of the Vesuvius mountain, had been dedicated predominantly to agricultural practices. Nonetheless, since Roman times, it had been traversed by the Capua-Regium road, which facilitated the connection of the estates.

Along this route, several rural residences were established; among them, after the eruption of Vesuvius in 1631, there was a farm owned by the farmer Cuto, situated on the hill and characterised by the typical arrangement of Vesuvius farm estates (Jones, 2017). These estates typically comprised a courtyard building developed over two floors with vaulted rooms and dual access, the main one on the Capua-

Regium road and the secondary one leading to the agricultural property. Due to its strategic location, this building was acquired in the early 18th century by the noble d'Aquino family. Presently owned by an aristocratic family, the estate underwent a transformation into a modest upper-class palace, yet it retained the qualities and features of the original villa, becoming more sophisticated solely through the period's decorative style. This process has rendered the building the most enchanting of the palaces along the Vesuvius coastline.

Upon arriving in Portici, King Charles selected this location for the construction of a new summer royal palace. A survey was conducted to select the most picturesque location for the new royal residence.

The King acquired the Palazzo Caramanico, widely regarded as the most beautiful in the Vesuvius landscape, along with the adjacent Palazzo Palena, which was also owned by the d'Aquino family. The King began to use the site as a royal residence, while still maintaining the original rural aspects and layout.

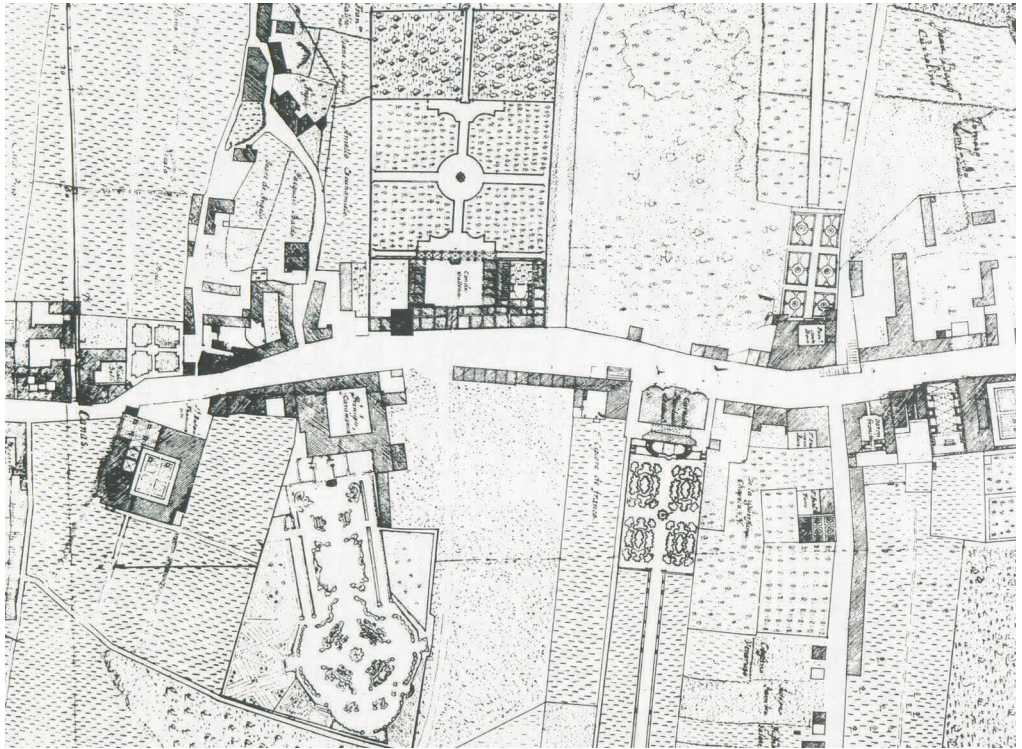


Fig. 5 – *Detail of I dintorni del Palazzo Caramanico prima della costruzione della Villa Reale* (ASN, Piante e Disegni, Cartella X, n.° 22).

The Vesuvius farmhouse, having been transformed into an aristocratic palace, was again preserved and became the Royal Palace in 1738. However, in 1741, the initial endeavour to repurpose the d'Aquino palaces as a royal residence proved unsatisfactory. Consequently, the decision was made to construct a new royal

palace. However, it became evident that the new project had to contend with the existing structures, and thus the new palace was designed to incorporate and adapt to the original architecture, even following its orientations, architectural style, and composition (de Seta, 1980).

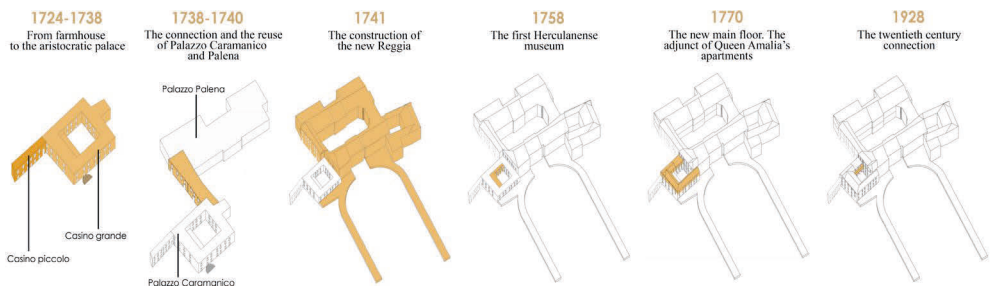


Fig 7 – *Evolution of the complex* (Author, 2025).

In 1770, there was a further transformation of the manor, as a new noble floor was added: the original two-story building was elevated by a third level, which was dedicated to the residence of Queen Amalia. The new floor was not connected to the lower floors, but was solely linked to the more modern royal complex.

### 3.2. Analysis of the State of preservation

The historical research, which was carried out through various sources, has been compared with the material analysis of the structure. This comparison has allowed for a more thorough understanding and verification of the changes that have occurred over time. These transformations underscore the complexity of the palace, which, despite the changes that have transpired throughout its history—particularly those that ensued following the unification of Italy, leading to the conversion of the Royal Palace into the High School of Agriculture, thereby compromising the quality of the interior spaces—still permits the discernment of the characteristics of its original rural reality.

The analysis of the historical evolution is primarily derived from the study of the typological characteristics of Vesuvian architecture, which have already been defined,

with particular attention given to cornices, decorations, the presence of lamia, the absence of balconies in the original rural villa, and the distribution of interior spaces, among other elements. This approach unveils compositional and decorative disparities between the architecture of the original *masseria* and that of the eighteenth-century royal palace. These disparities are attributable to the evolving preferences and construction methodologies of the era. These distinctions are most pronounced in the courtyard, which has undergone substantial modifications, resulting in the loss of the original layout of the rural villa. A rich palimpsest of transformations attests to the changing needs and uses of the palace over time. These transformations include the enlargement of the portico and the subsequent elevation in 1758, when the palace housed the Herculaneum Museum; the elevation of the new main floor and the subsequent roofing with a Palladian system in 1770, which was completely detached from the original roofing of the estate, which, like other Vesuvian farms, was characterized by flat roofs used as terraces (Pane, 1936), the definition of a steel walkway door crossing the courtyard in the twentieth century at the time of the School of Agriculture was established in 1936.



Fig 6 – View from Via Università (Author, 2025).



Fig. 7 – The second floor of Palazzo Caramanico (Author, 2025).

The presence of dichotomous transformations between the historic floors and the more modern third floor is also evident in the interior spaces. This observation is corroborated by an analysis of the disparate construction techniques employed in the original building and the raised floor of the late eighteenth century.

The analysis reveals the presence of masonry vaulted ceilings in all rooms on the first two floors of the building and the presence of con canniccio vaults on the third floor. Additionally, a discrepancy in room height is observed between the rustic floors and the current floor.

#### 4. Conclusion

The wealth of information, archival, and material collected thus far corroborates the profound significance of Palazzo Caramanico. The edifice stands as a testament to the architectural and constructive intricacy of the Vesuvian farm system. Moreover, it functions as a pivotal repository for the historical, social, and political analysis of the city of Portici. It exemplifies a multifaceted approach to the preservation of rural architecture, integrating a noble-regal function that facilitated the preservation and interpretation of the farmhouse's material and constructive characteristics, as well as its original plan layout. However, this approach entailed the complete loss of the original agrarian function and substantial modification of certain rural architectural features.

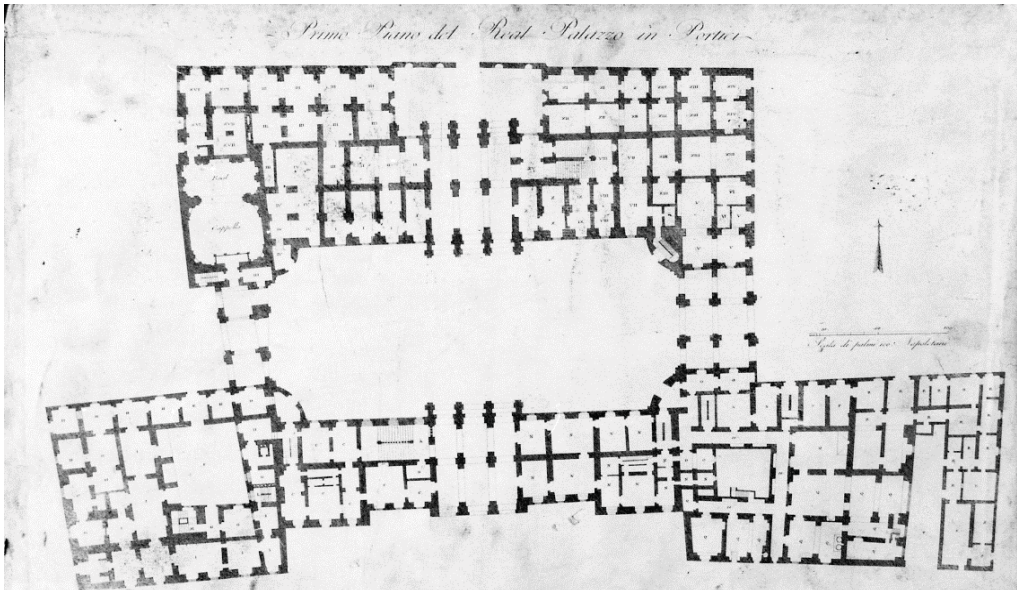


Fig 8 – First loor plan of the Royal Palace of Portici. Segoni Vincenzo (1740 Ca. / 1820 Ca). Museo Archeologico di Napoli. Palazzo Caramanico bottom left.

While the reuse of the structure from the Bourbon period to the present has ensured the preservation of the architectural complex, in more recent times there has been a paucity of efforts to enhance it. In comparison to the more contemporary Royal Palace, it is in a state of semi-abandonment and degradation.

This study, derived from the author's master's thesis, aims to elucidate the criteria for restoration interventions. These interventions should prioritize the enhancement and highlighting of this exceptional specimen of architectural evolution, emphasizing the historical transformations that occurred up to the 20th century.

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