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TOWARD A HOLISTIC HERITAGE CONSERVATION

WOBEC HOLISTYCZNEJ OCHRONY DZIEDZICTWA

Abstract

Many scholars have already underlined the importance and the complexity of the different components of the historic urban landscape. The UNESCO Recommendation on the Historic Urban Landscape – adopted at the General Conference on November 2011 – went beyond the notion of ‘historic centre’ and extended its application to the broader urban context and the geographical setting. Presenting the case of Caserma “Cascino” in Cagliari, the paper outlines a methodology for heritage conservation in urban contexts. The project offers a holistic approach to the conservation process. Through two main phases, it describes the employed innovative features in terms of strategies and technologies adopted for each one. The first phase focused on the understanding of the existing building complex, consisted of: a.) the historical analysis of the building, its urban context and the connection with the geographic landscape, in order to understand the cultural and social significance of the site, and b.) the documentation project to define geometry, structure, color and spatial configuration of the building, in order to determine the character defining elements and the current condition of the structure. The second phase focused on the conservation of the site, including condition repair, structural reinforcement and consolidation, and adaptive-reuse. Knowledge gained from the previous phase, in combination with issues of authenticity and reversibility, laid the groundwork for the development of the appropriate intervention strategies.

Keywords: conservation, adaptive reuse, sustainability, cultural significance, urban landscape

Streszczenie

Wielu naukowców podkreślało już znaczenie i złożoność różnych komponentów historycznego krajobrazu miejskiego. Rekomendacja UNESCO na temat Historycznego Krajobrazu Miejskiego – przyjęta na Konferencji Generalnej w listopadzie 2011 – wykraczała poza pojęcie „historycznego centrum” i rozszerzyła swe zastosowanie do szerszego kontekstu miejskiego i położenia geograficznego. Prezentując przypadek Caserma “Cascino” w Cagliari, opracowany przez Uniwersytet w Cagliari, Wydział Inżynierii Budowlanej i Środowiskowej i Architektury (DICAAR) oraz Uniwersytet Sapienza w Rzymie, Wydział Historii, Rysunku i Restauracji Architektury (DSDRA), niniejszy artykuł przedstawia zarys metodologii konserwacji dziedzictwa w kontekstach miejskich. Projekt oferuje całościowe podejście do procesu konserwacji. Poprzez dwie fazy główne opisuje innowacje zastosowane w kategoriach strategii i technologii, przyjętych dla każdej z nich. Pierwsza faza skupiła się na zrozumieniu istniejącego zespołu budynków i składała się z: a) analizy historycznej budynku, jego kontekstu miejskiego i połączeń z krajobrazem geograficznym, dla zrozumienia kulturowego i społecznego znaczenia miejsca, b) dokumentacji koniecznej do definicji geometrii, konstrukcji, koloru i konfiguracji przestrzennej budynku, by zdeterminować elementy definiujące jego charakter i obecny stan struktury. Druga faza skupiała się na konserwacji miejsca, włączając w to naprawę jego stanu, wzmocnienie konstrukcyjne, konsolidację i adaptację do nowego użytkowania. Wiedza zdobyta w poprzedniej fazie, w połączeniu z zagadnieniami autentyczności i odwracalności, położyła podwaliny dla rozwoju stosownych strategii interwencji.

Słowa kluczowe: konserwacja, adaptacja do nowych funkcji, zrównoważenie, znaczenie kulturowe, krajobraz miejski

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1. Introduction

Built in 1840, Caserma ‘Cascino’ was formerly used as a penal colony before it turned into a barrack for the soldiers of Italian Kingdom. It is located in the southeast of the Cagliari city, on the promontory of Sant’Ignazio, in the Sardegna region.

The paper presents the adaptive-reuse strategy of this old military complex, illustrating how to find a balance between conservation and rehabilitation.

1.1. Sustainable Conservation

The term conservation was defined by the English standard in 1998¹ as “the action to secure the survival or preservation of objects of acknowledged value for the future”². Instead, sustainable development is intended as the “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”³. In this perspective, the two concepts are seen as opposed to one another. A more recent trend looks at the relationships, instead of the opposition, between such terms. By consider the two terms together, one may conclude that the concept of ‘future’ links them in a dynamic relation. In fact, the future is strictly connected to the past as innovation and development are strictly connected with history and heritage. According to this theoretical assumption, it is possible to observe the effectiveness of these considerations in the reality of our (historical) cities.

Many studies have demonstrated how ancient buildings are more energy efficient. Future perspectives can concern the rehabilitation of traditional techniques that, with the help of the new technologies, capable of assuring a sustainable conservation that satisfies the aesthetic, energetic, economic and social aspects. In this way, sustained and inclusive growth would be guaranteed⁴.

2. The Historical Framework

The Caserma ‘Cascino’ complex was originated in wider context of military architecture in the Sardegna Kingdom, which led to rehabilitation and expansion of the ancient structures, as well as construction of new facilities. This historical framework gave rise to the penal colony of San Bartolomeo, later named Caserma ‘Cascino’.

¹ As James Simpson wrote “the intention in BS 7913 in 1998 was to produce a system of definitions fit for the 21st century, one which would facilitate intelligent discussion of the subject” (J. Simpson, *The Anatomy of Theory*, The Building Conservation Directory, 2008, <http://www.buildingconservation.com/articles/anatomytheory/anatomytheory.htm>).

² British Standards Institution, BS 7913:1998 Guide to the Principles of the Conservation of Historic Buildings, BSI Standards, London 1998.

³ Report of the World Commission of Environment and Development, 1987, *Our common Future* also known as the *Brundtland Report*.

⁴ S. Fai, K. Graham, T. Duckworth, N. Wood, R. Attar, *Building information modelling and Heritage documentation*, Proceedings of XXIII International Symposium, International Scientific Committee for Documentation of Cultural Heritage (CIPA), Prague 2011.

The first building of Caserma ‘Cascino’ was constructed in 1842 under the supervision of the engineer Domenico Carlo Barabino. It went through several stages of modifications over the course of history.

The same engineer Barabino oversaw the expansion of the compound in the form of an annex, called “I Rustici”.

Between 1861 and 1865, the complex went through another expansion. The engineer G. Solinas designed the new structure from the existing walls, transforming in depth the configuration of the existing buildings.

In 1926, the complex became a property of the Demanio Militare (Military estate). The function update required rehabilitation and further addition to the existing structure.

In line with this brief historical overview, the conservation project, according to the Italian Legislation in terms of Heritage Preservation (Codice Urbani, D.lgs 42/2004 e s.m.i.), elaborated an investigation of the cultural, historical and social value of the complex. An approach to guarantee the principle of minimal intervention, in agreement with the national and international criteria (ISCR – Istituto Superiore per la Conservazione, at the national level, ICCROM and ICOMOS at the international level) was established.

3. The documentation project: Methodology and Strategy

Developed by the Department of Civil – Environmental Engineering and Architecture (DICAAR) – University of Cagliari and the Department of History – Drawing and Restoration of Architecture (DSDRA) – Sapienza University of Rome, under the coordination of Professor Tatiana Kirilova Kirova, the documentation project included the following phases:

- Record Photography - Digital Photographic Portfolio (DPP);
- Topographic and architectural survey;
- Diagnostic of the stone elements and the wall configuration;
- Character-defining elements;
- Preliminary Visual Condition Report and Assessment.

These different measures had been used to define geometry, structure, color and spatial configuration of the complex, in order to determine the character defining elements and the current condition of the structure.

3.1. Record Photography – Digital Photographic Portfolio (DPP)

The record photography was intended to provide a comprehensive understanding of the configuration of the complex. An extensive selection of photos was taken during this phase, including the overall context, details of decay and defect for conditional assessment, test samples, as well as the typology of structural elements. A Nikon D 800 was used for the record photography.

3.2. Topographic and architectural survey

Topographic and architectural survey were conducted through manual recording and EDM measurement. The equipment adopted the EDM measurement were Laser Scanner 3D Leica C10 all-in-one with an accuracy of $\pm 4\text{mm}$ and a DISTO.

These data had been processed to produce 2-dimensional drawings of the site plan, floor plans, cross sections, elevations, and details.

3.3. Diagnostic of the stone elements and the wall configuration

Microbiological and mineral analysis had been used to identify the conditions of the different surfaces of the buildings. The diagnostic of the mortar and plasters had been developed to obtain a complete understanding of their conditions. This study defined the mix of aggregate and binding of the mortar and plaster, the different kind of decay, and the techniques used for their construction. This analysis had been conducted by Professor Silvana Maria Grillo from the Cagliari University and her team. The outcome of this study revealed the friability of mortar. The plaster still possessed a good adherence to the wall. The deployed stone are two different kinds of limestone: Pietra Forte and Pietra Cantone. The most common form of decay observed were a) disintegration b) crumble, c) superficial crust. The wall configuration is mainly masonry with different kind of bricks depending on its time of construction.

3.4. Character-defining elements

The Character-defining elements analysis identified the elements with a historical value, dividing them into different categories: historical and artistic interest, historical and social interest and historical and structural interest.

In this phase elements such as the carpentry, flooring, and roofing had been identified.

3.5. Preliminary Visual Condition Report and Assessment

The primary cause of deterioration was connected with humidity. Capillary action resulted in the raising moisture from the ground is affecting the lower portion of the building. Groundwater aquifer was likely to be the cause of this problem. This phenomenon was homogeneous across the entire complex (usually observed in the internal wall, where the evaporation is slower). From a visual analysis, the effects of the described form of deterioration are evident. Indeed, chromatic alteration, erosion of the mortar, as well as deterioration of the plaster are visible on the surface of the masonry wall. Moreover, the one-meter-tall concrete layer on the exterior wall, due to its impermeability and incompatibility with the masonry structure above, caused the moisture to travel up on the wall surface. Other forms of decay are of anthropic nature. For example, the presence of concrete plaster in the façade of the building (due to interventions of routine maintenance) was incompatible with the wall support. Other problems had been caused by using impermeable materials such as plastic quarts as the finishing layer, resulted in bulging and cracks of the surface materials due to the lack of perspiration.

4. The project's development phase

After a solid understanding of the building condition, pathology, and significance established in the preliminary phases, the project development phase started. The intervention for the conservation of the complex followed these criteria:

- Minimal intervention;
- Reversibility;
- Compatibility;
- Authenticity.

Attention had been paid particularly to the problematic concrete additions that altered the original integrity and compromised the material behaviour of the masonry walls. Some conservation operation on the surface of the wall included:

- Overall biocide treatment;
- Mechanical removal of the bio-deteriorated agents;
- Substitute the incompatible concrete addition with macroporous plaster;
- Removal of other materials that are incompatible with the chemical composition or morphology of the original materials;
- Recovery of the original colors of the plaster;
- Integration of the missing plaster parts with lime plaster.

The adaptive-reuse of the building was oriented to combine the needs of the owner (Comando dei Carabinieri di Cagliari), at the same time respected the structural integrity of the building. Notably, the transversal axis of the inner core and the scheme of the original project were preserved.

One aspect of the conservation project dealt with effective solutions to the humidity problems. Dynamic Buffer Zone (DBZ) was one of the strategies deployed during the intervention. The system consisted of an additional interior wall partition offset from the original masonry wall in order to promote a constant airflow between the cavity. With the same intention as the DBZ, a coffered system (vespaio areato) was installed on grade to provide rooms for air circulation underneath the floor. The original tiles – in graniglia and gres porcellanato – were fully preserved and relocated on top of the system.

Particular attention had been paid to the windows and their aesthetical impact on the buildings. Thanks to the historical and the thermographic investigation, it had been possible to identify the elements that characterized the original structure of each building. Thus, the traces of the original fenestrations filled during the recent intervention were revealed. One of the goals of these analysis was to consider the possibility of reopening these fenestrations, in order to recreate the original exterior configuration of the building as a part of the overall rehabilitation. With respect to the authenticity, the original frames were maintained, and the original wooden shutter were inserted where missing. Moreover, the thermal performance of the windows was upgraded.

The structural retrofitting was focused on the improvement of seismic resistance of the building through the assessment of the structural behaviour. The main intervention was concentrated on the foundation, roofs, construction of new emergency staircases, substitution of one of the floor, and crack repairs.

5. Conclusions

The presented case study aims at providing an alternative view on the possible solutions and strategies of the adaptive-reuse of heritage buildings.

In all its phases, the project took into consideration the recommendations of the Italian Ministry of Culture and Tourism (MiBACT), the international recommendations of ICOMOS,

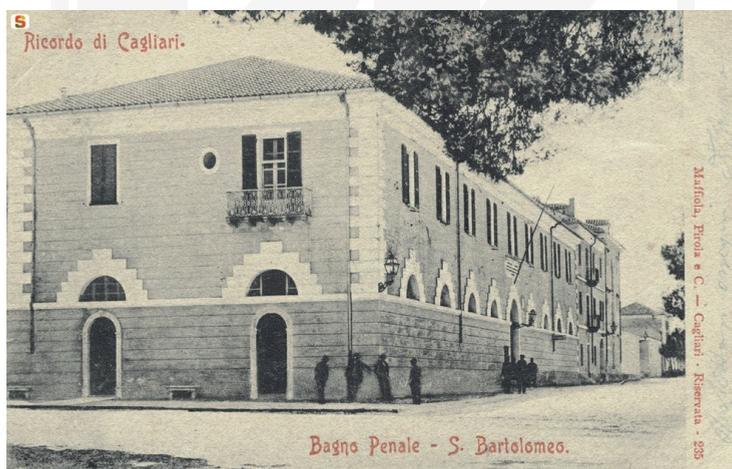
UNESCO and the International Charters on heritage conservation. In 2010, the World Heritage Convention on the conservation and sustainable development defined sustainable development as a careful balance of environmental, social and economic dimension, in order to meet the needs of current and future generations. The document also underlines the fundamental role of World Heritage in fostering strong communities, supporting the physical and spiritual well-being of its individuals, and promoting mutual understanding and peace. In line with these considerations, all the choices had always taken into account the strategic location of this complex and its relationship to the urban and natural landscape. According to the current Italian debate on the enhancement and rehabilitation of the periphery, heritage conservation can be seen as a support to the social and economic rehabilitation of the urban periphery. The approach allowed not only a mere conservation project, but a project of urban restoration, strengthen the integration between the outskirt of the city and its main core.





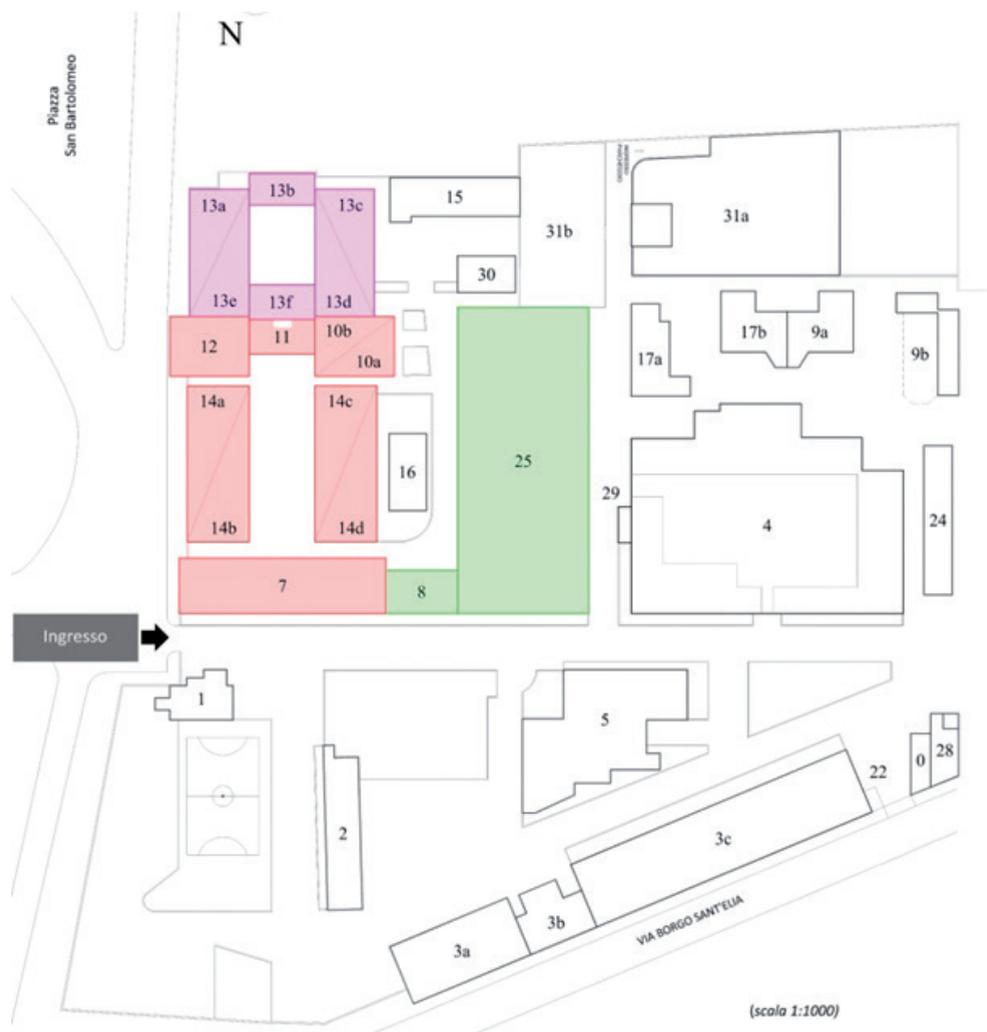
III. 1. Localization of Caserma 'Cascino' within its urban context, on the promontory of Sant' Ignazio, in Cagliari

II. 1. Umiejscowienie Caserma 'Cascino' w jego miejskim kontekście, na przylądku Sant' Ignazio w Cagliari



III. 2. Historical postcard depicting the penal colony of San Bartolomeo in Cagliari, 1904

II. 2. Historyczna pocztówka przedstawiająca kolonię karną w San Bartolomeo w Cagliari, 1904



Planimetria Generale

Corpi architettonici dell'antico Bagno Penale - cronologie

- primo insediamento (prog. Domenico Carlo Barabino) - ante 1842
- primo ampliamento (prog. Efsio Crespo) - 1860 circa
- secondo ampliamento (progg. Boraggini, Solinas) - ante 1862-64 e 1869-70

III. 4. Map of Caserma 'Cascino' and its development phases over time

II. 4. Plan Caserma 'Cascino' i jego fazy rozwoju



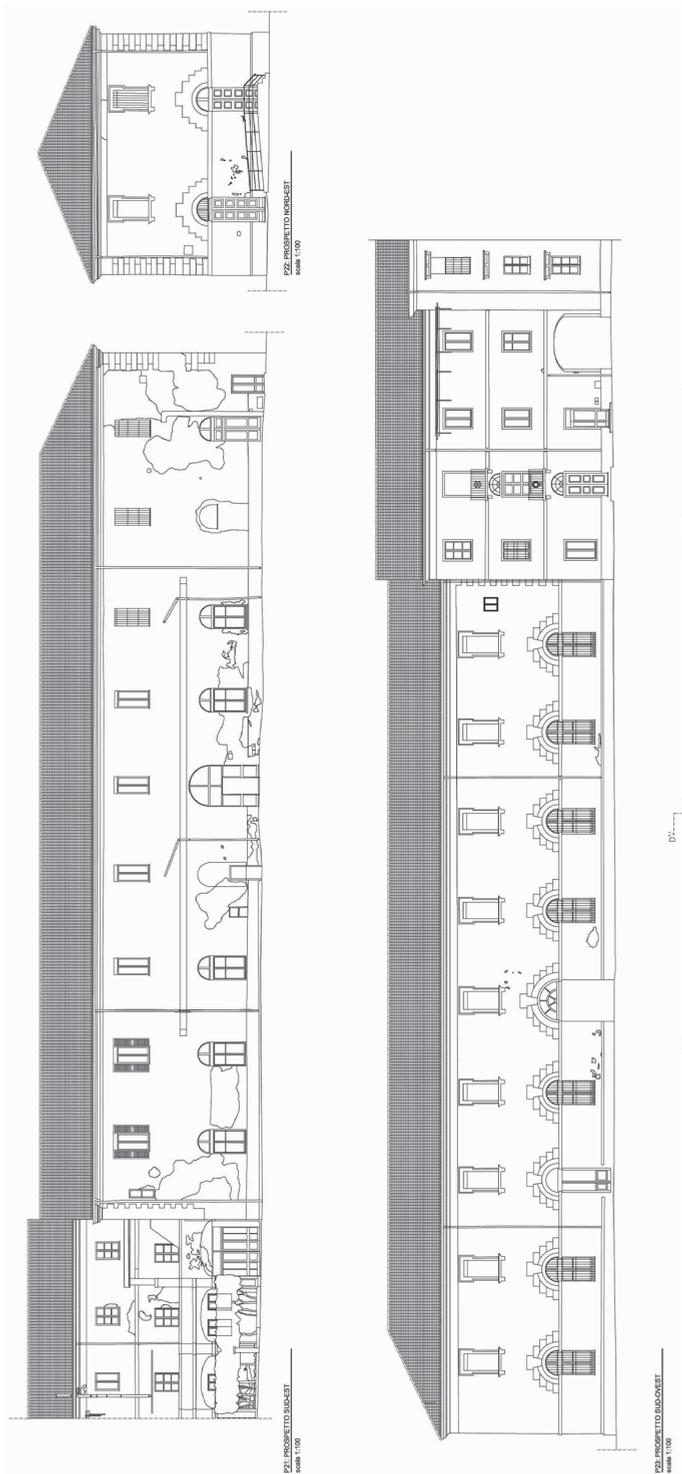
III. 5. The photo presents the main façade of Caserma ‘Cascino’

II. 5. Fotografia głównej fasady Caserma ‘Cascino’



III. 6. The photo presents the capturing phase of the architectural survey using Laser Scanner 3D Leica C10 all-in-one

II. 6. Fotografia przedstawiająca fazę zapisu architektonicznego pomiaru przy użyciu skanera laserowego 3D Leica C10 all-in-one



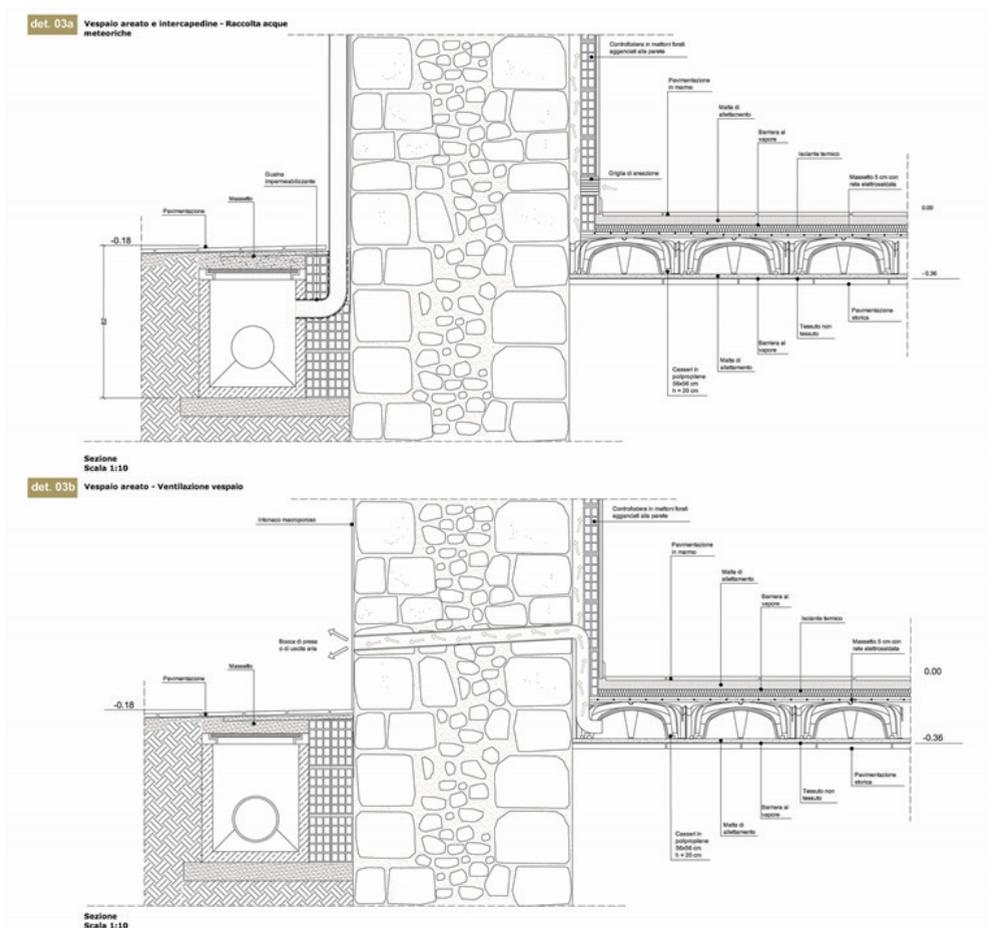
III. 7. Images of the front elevations of the building n.7 of Caserma 'Cascino', scale 1:100

II. 7. Rysunki elewacji frontowych budynku n.7 Caserma 'Cascino', skali 1:100



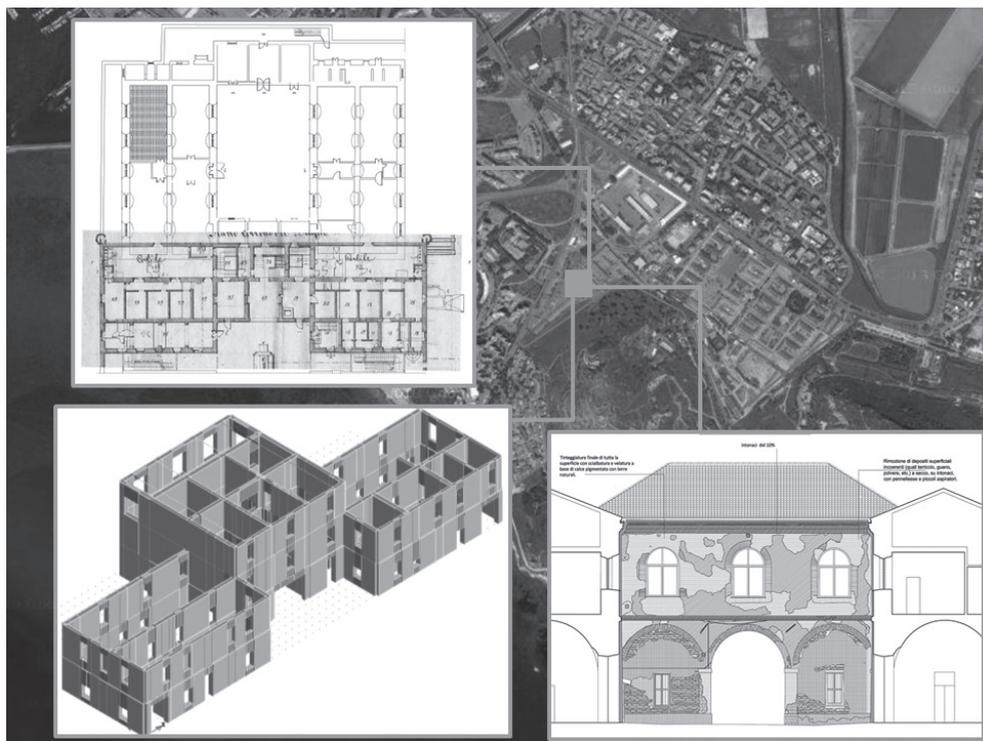
III. 8. Photos present the deterioration of the masonry structure of the external walls

II. 8. Zdjęcia przedstawiają zniszczenia struktury murów ścian zewnętrznych



III. 9. Detail of the solution adopted for the replacement of ground floors with a coffered floor (vespaio areato), relocating the original tiles on its top, detail in scale 1:10

II. 9. Szczegóły rozwiązania przyjętego dla wymiany stropu parteru z kasetonową podłogą (vespaio areato), relokacja oryginalnych płytek ceramicznych na jej górnej powierzchni, szczegóły w skali 1:10



III. 10. The image presents the analysis developed for the adaptive re-use of the complex with respect to the compatibility and authenticity issues

II. 10. Ilustracja przedstawiająca analizę opracowaną dla adaptacji ze zmianą funkcji zespołu, z poszanowaniem kwestii jej stosowności i autentyczności

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