STATI GENERALI DEL PATRIMONIO INDUSTRIALE 2026

a cura di
Edoardo Currà, Fabio Fatiguso, Antonella Guida, Antonio Monte
Marina Docci, Graziella Bernardo, Elena Cantatore, Alessandro Mattioli, Claudio Menichelli

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3° STATI GENERALI 2026 DEL PATRIMONIO INDUSTRIALE

BARI, MATERA, LECCE
5-8 Febbraio 2026

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Presentazione

I Terzi Stati Generali del Patrimonio Industriale proseguono il percorso avviato a partire dal 2018 e sono volti a rappresentare in modo organico le realtà patrimoniali – tecniche, economiche, culturali e sociali – legate alla produzione e al lavoro sull'intero territorio nazionale. Nel promuovere l'iniziativa quadriennale, una sorta di "Olimpiade dell'archeologia industriale", AIPAI intende permettere di tracciare un bilancio degli studi e delle esperienze maturati e di delineare strategie e visioni per il futuro, favorendo il confronto tra studiosi, operatori, istituzioni e comunità locali. Il patrimonio industriale comprende le testimonianze materiali e immateriali della civiltà del lavoro e risponde a istanze conoscitive e tensioni progettuali che coinvolgono non solo la ricerca accademica, ma anche le comunità e il mondo produttivo, in relazione alle sfide culturali, socio-economiche e ambientali contemporanee. Il suo riconoscimento è il risultato di processi complessi, rilevanti per l'evoluzione delle città e dei paesaggi industriali e post-industriali. In tale prospettiva, il confronto periodico consente di approfondire significati e valori dell'eredità industriale secondo gli approcci consolidati dell'archeologia industriale. Il congresso è articolato in dieci aree tematiche e ha previsto la presentazione di contributi singoli, sessioni specifiche e attività di formazione dottorale, oltre a visite e performance. Un dovuto ringraziamento al Politenico di Bari, all'Università della Basilicata e al CNR ISPC di Lecce, insieme ai partner e agli sponsor, per aver ospitato e supportato l'organizzazione dell'iniziativa. Tanto più importante la localizzazione nei prestigiosi centri di ricerca del "Levante di Italia" che permette anche la realizzazione di uno speciale panel dedicato alla costruzione di una rete patrimoniale industriale dell'area mediterranea promossa da AIPAI in collaborazione con TICCIH.

The Third Estates General of Industrial Heritage continues the process begun in 2018 and aims to provide a comprehensive representation of the heritage and social realities linked to the memories of production and labour throughout the country. In promoting this four-year initiative, a sort of "Olympics of industrial archaeology", AIPAI intends to take stock of the experiences gained and outline strategies and visions for the future, encouraging dialogue between scholars, operators, institutions and local communities.
Industrial heritage includes the tangible and intangible evidence of the recent past of working civilisation and responds to cognitive demands that involve not only academic research but also communities and the productive world, in relation to contemporary cultural, socio-economic and environmental challenges. Its recognition is the result of complex processes that are relevant to the evolution of cities and industrial and post-industrial landscapes. In this perspective, periodic discussion allows for a deeper understanding of the values of industrial heritage according to established approaches in industrial archaeology.
The conference was divided into ten thematic areas and includes individual presentations, thematic sessions and doctoral training activities, as well as visits and performaces. We would like to express our gratitude to the Polytechnic University of Bari, the University of Basilicata and the CNR ISPC in Lecce, together with our partners and sponsors, for hosting and supporting the organisation of the initiative. The location in the prestigious research centres of "Eastern Italy" is all the more important, as it also allows for the creation of a special panel dedicated to the construction of an industrial heritage network in the Mediterranean area promoted by AIPAI in collaboration with TICCIH.

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3.2.
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URBAN WATER INFRASTRUCTURES OF THE 20TH CENTURY IN HISTORICAL CONTEXTS: THE CASE STUDY OF THE *GRABIGLIONI* IN THE *SASSI* OF MATERA, ITALY

Le infrastrutture idriche urbane del XX secolo nei contesti storici: il caso di studio dei Grabiglioni nei Sassi di Matera, Italia

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Keyword
Historical water infrastructure; urban transformations; engineering of the 20th century; *Sassi* of Matera. Infrastrutture idriche storiche; trasformazioni urbane; ingegneria del XX secolo; Sassi di Matera.

Abstract *The Sassi of Matera represent a historical model of intelligent urbanization, integrating architecture with the natural environment through an advanced water management system. The Grabiglioni, natural watercourses, were key to controlling surface runoff and were complemented by artificial cisterns and channels, helping maintain ecological balance. These waterways shaped Matera's unique morphology, including the Civita spur and the districts of Sasso Barisano and Sasso Caveoso. This system, in use for centuries, remained largely intact until the early 20th century, when the channels were roofed over to construct roadways and underground sewer collectors. Archival research has uncovered original design documents detailing the construction of these underground infrastructures. These records reveal materials and building techniques, offering insights into past construction practices and enriching our understanding of historical technological knowledge within its cultural and environmental context. To preserve and disseminate this information, the drawings have been digitized, making them accessible with modern tools. These early 20th-century structures, still functioning today, are vital to managing urban rainwater. Yet, due to their underground location, they remain largely unknown and undervalued. This study aims to highlight their historical and functional significance, bringing attention to an essential but overlooked aspect of Matera's heritage.*

1. INTRODUCTION

The Sassi of Matera stand as an extraordinary testament to the ingenuity of human settlements in negotiating complex environmental conditions, demonstrating a remarkable integration of urban form, architecture, and natural systems. The distinctive geomorphology of the *Gravina* – a deep ravine shaped by the confluence of the calcareous *Murge* plateau to the east and the clay-rich formations of the *Avanfossa Bradanica* to the west – [1] has profoundly influenced the spatial configuration of Matera, fostering the development of an urban landscape in which water management was both central and transformative. Within this context, historical water infrastructures, particularly the *Grabiglioni*, assumed a critical role in sustaining ecological and urban balance. These natural watercourses, complemented by

[1] F. BOENZI *et al.*, *Gravine*, in *Italia, Atlante dei tipi geografici*, pp. 164-166, Istituto Geografico Militare Italiano, Firenze, 2004; V. FESTA, L. SABATO, M. TROPEANO, *Geological map of the "Gravina di Matera" Canyon 1:5000 scale*, in "Italian Journal of Geosciences", reprint from Volume 137 (CXXXVII), number 1, February 2018.

an intricate network of cisterns, channels, and public reservoirs, exemplify a sophisticated hydraulic apparatus capable of intercepting, conveying, and storing rainwater with remarkable efficiency [2]. Functionally and morphologically, the *Grabiglioni* shaped the unique urban fabric of the *Sassi*, including the *Civita* spur – the fortified historic nucleus – and the districts of *Sasso Barisano* and *Sasso Caveoso*. Over centuries, this system maintained the resilience of the urban-environmental equilibrium, until early twentieth-century interventions – including the roofing of watercourses and construction of subterranean sewer collectors – significantly altered the hydraulic regime and urban morphology (Fig. 1).

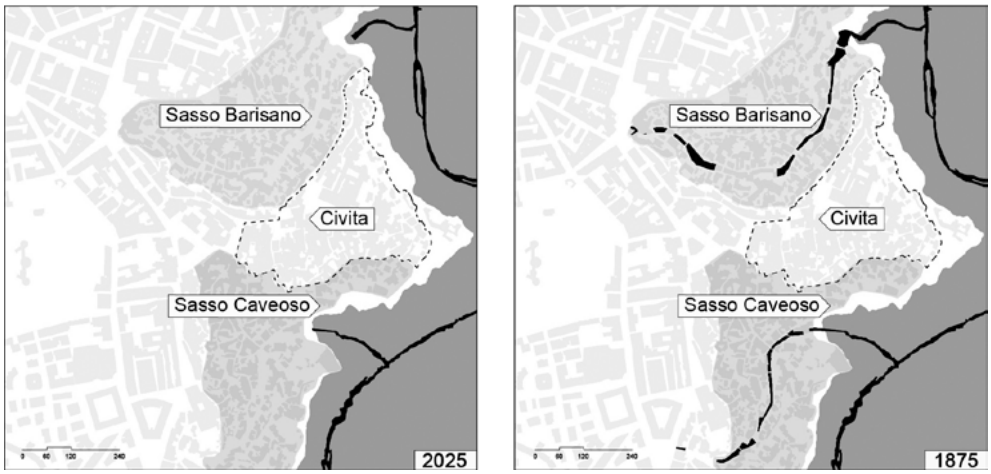

Fig.1. Cartographic representation of the *Sassi* illustrating a comparison between the current urban configuration and the same contemporary layout with the 1875 *Grabiglioni* configuration superimposed, in order to reveal the historical spatial relationships embedded within the present-day urban fabric.

Despite their historical significance, these underground water infrastructures remain largely unknown and underappreciated within contemporary heritage discourse[3]. Archival sources reveal the original designs, construction techniques, and material specifications of these infrastructures, offering a window into early twentieth-century engineering practices and a rich repository of technological knowledge embedded in its cultural and environmental context. Digitization and vectorization of these historical records enable both preservation and accessibility, facilitating a nuanced understanding of these largely invisible yet operationally vital systems[4].

The present study situates the *Grabiglioni* within this broader framework, emphasizing their historical, technical, and functional significance. By employing an interdisciplinary methodology that integrates archival research, digital reconstruction, and geospatial analysis, the study not only reconstructs the spatial and technical evolution of the *Grabiglioni* but also highlights their enduring relevance to urban water management. This research thereby addresses a critical epistemological gap, offering insights into the complex interplay between human intervention and natural processes in shaping Matera's unique urban and environmental heritage.

[2] G. GAMBETTA, A. STATUTO, *Matera e l'acqua. Collana Parco Murgia*, Centrostampa, Matera, 2016; R. ERMINI, G. SPILOTRO, *Letture idromorfiche del territorio: la Città di Matera,* Libria, Melfi, 2022.

[3] D. ALTAMURA, R. ERMINI, *Multidisciplinary Analysis of Inaccessible Historical Water Infrastructures and Urban Transformations: The Case Study of the* Grabiglioni *in Matera, Italy*, in "Geographies", 5, 48, 2025, https://doi.org/10.3390/geographies5030048.

[4] D. ALTAMURA, E. LAMACCHIA, R. ERMINI, A. GUIDA, N. MASINI, *Interdisciplinary investigation approach to analyse historical water infrastructures and urban transformations: the case study of the Grabiglioni in the Sassi of Matera, Italy*, in *Proceedings for the CEES 2025 - International Conference on Construction, Energy, Environment and Sustainability,* 2025.

The understanding of their historical evolution constitutes an essential interpretive key for understanding both the logics of urban development and the subsequent criticalities. The covering of these streams, the construction of sewer collectors, and the superimposition of new vehicular roads irreversibly altered the original functionality of the system, generating hydraulic and environmental imbalances that are still evident today within the historic fabric and the surrounding urban areas.
The Industrial Heritage represented by these water urban infrastructures appears today in a condition of cognitive marginality, often overlooked or only marginally considered within strategies of conservation and enhancement. It is in response to this gap that the present study is situated, aiming to propose an innovative knowledge-based approach grounded in archival research, the digitization of historical sources, and the digital reconstruction of infrastructures. This approach seeks not only to restore a more comprehensive and scientifically grounded vision of the historical dynamics of this heritage, but also to provide operational tools useful for future research, recovery interventions and sustainable management.

2. MATERIALS AND METHODS

The research aims to show the *Grabiglioni* of the *Sassi* of Matera, and the inner built sewer collector, as a Cultural Heritage of extraordinary importance, whose relevance goes well beyond their initial technical role. They represent a prime example of urban industrial heritage, serving as evidence of layered expertise in construction and management that, over time, accomplished an exceptional balance between natural environmental processes and human intervention. The development of the proposed methodology has been determined by the inaccessibility of the infrastructures under study – a condition arising from urban stratifications that have erased their original points of entry, from their functional role as components of the sewer system, and from the consequent safety concerns. By their very nature, sewer environments – confined, unsanitary, and potentially contaminated – render any form of direct exploration both impracticable and inadvisable. This impossibility has precluded the use of conventional surveying instruments, compelling a radical methodological rethinking: inaccessibility is thus not conceived as a limitation, but as a fundamental operational premise and an opportunity to experiment with an alternative approach – one grounded not in empirical observation, but in archival investigation and interpretive reconstruction based on historical sources. The investigation is situated within the broader field of digital reconstruction of lost or otherwise unobservable architectural and infrastructural heritage, an interdisciplinary domain that integrates archival research, surveying methodologies, and advanced digital tools.
The proposed methodological framework allows for transparent and traceable management of information, providing means to evaluate degrees of certainty, informational gaps, and interpretive hypotheses. Established applications of this approach include studies on the Farnese Theatre in Parma[5], the equestrian monument of Francesco III d'Este[6], and the Basilica of San Giovanni in Conca[7], as well as investigations into historical infrastructures[8], convent complexes, and mural cycles, demonstrating

[5] A. ZERBI, S. MIKOLAJEWSKA, *Digital Technologies for the Virtual Reconstruction and Projection of Lost Decorations: The Case of the Proscenium of the Farnese Theatre in Parma*, in "DISEGNARECON", vol. 14, n. 27, 2021, 5.1–5.11.
[6] F. GHERARDINI, S. SIROCCHI, *Systematic Integration of 2D and 3D Sources for the Virtual Reconstruction of Lost Heritage Artefacts: The Equestrian Monument of Francesco III d'Este (1774-1796, Modena, Italy),* in "Heritage Science", 10, Article 96, 2022.
[7] G. GUIDI, M. RUSSO, *Diachronic 3D Reconstruction for Lost Cultural Heritage,* in *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences XXXVIII-5/W16*, 2011, pp. 371-376.
[8] R. MORGANTI, A. TOSONE, M. ABITA, D. DI DONATO, *The Lost Heritage of Roman Iron and Steel Bridges: Virtual Reconstruction of Two Case Studies,* in *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information* Sciences, XLII-*2/W15*, 2019, pp. 799-806; J. XU, M. GARRAMONE, Y. WANG, M. SCAIONI, *Integration of HBIM/GIS to*

the versatility of the method in digitally reconstructing heritage that no longer exists. By combining philological rigor, interdisciplinary integration, and advanced digital tools, this methodology transforms historical documentation into active scientific knowledge, offering an effective framework for the valorization and transmission of invisible heritage.
The operational workflow is structured into three principal methodological steps, each subdivided into specific sub-steps:

1. "Data acquisition" step encompasses the systematic collection and selection of historical and documentary sources, including technical drawings, plans, sections, and elevations, alongside iconographic and photographic materials. This step also involves a preliminary survey of the surface area through direct observation and photographic documentation, aimed at identifying elements and traces useful for guiding subsequent analytical strategies.
2. "Data development" step entails the digitization of selected historical documents, the vectorization of technical drawings and plans, and the critical evaluation of historical sources, with the purpose of integrating available information and assessing its coherence, reliability, and informational potential.
3. "Data intersection" step involves the critical overlay of vectorized historical technical drawings onto the contemporary state of the site, incorporating orthorectification procedures and georeferencing within a GIS environment. This step ensures a methodologically rigorous connection between historical sources and the present urban context.

3. RESULTS

The research builds upon a pre-existing Systematic Literature Review (SLR) previously conducted[9] to explore the historical relationship between the territory of Matera and its historical water management systems. This earlier analytical step established a comprehensive interpretive framework by synthesizing 50 key studies drawn from diverse disciplines – including architecture, history, geology, hydrology, and urban planning – and by highlighting the relevance of "grey literature" as a primary source of information. Of these 50 documents, five were identified as duplicates; consequently, although the overall steps of the process yielded a total of 50 records, the actual number of unique documents amounts to 45 (Fig. 2).
The SLR traced the evolution of Matera's water infrastructures, from prehistoric rainwater collection systems to medieval cisterns and modern aqueducts, underscoring its profound influence on the city's urban development and providing theoretical guidelines for subsequent research steps.
This step builds upon that foundation to critically assess the current state of research, with particular reference to the *Grabiglioni*, and to identify key epistemological gaps and enduring issues surrounding their historical interpretation and infrastructural function–areas which call for further investigation through primary sources. It was precisely in response to these gaps that the archival research step was conceived, which was conducted primarily at the *Archivio di Stato di Matera* (State Archive of Matera) and the *Archivio Storico Comunale* (Historical Archive of the Municipality of Matera). This step was directed at the recovery and analysis of historical technical and administrative documentation pertaining to the *Grabiglioni* infrastructures and its transformations over time.

Preserve Infrastructure Heritage along the Chinese Eastern Railway (CER), in *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information* Sciences, XLVIII-*M-2*, 2023, pp. 1645-1652.
[9] D. ALTAMURA, *Matera and Water: Systematic Literature Review and Guidelines for Future Scientific Research,* in *Proceedings of the Dot.AT.i 2025 "Knowing and Connecting"*, Catania, Italy, 30 January 2025.

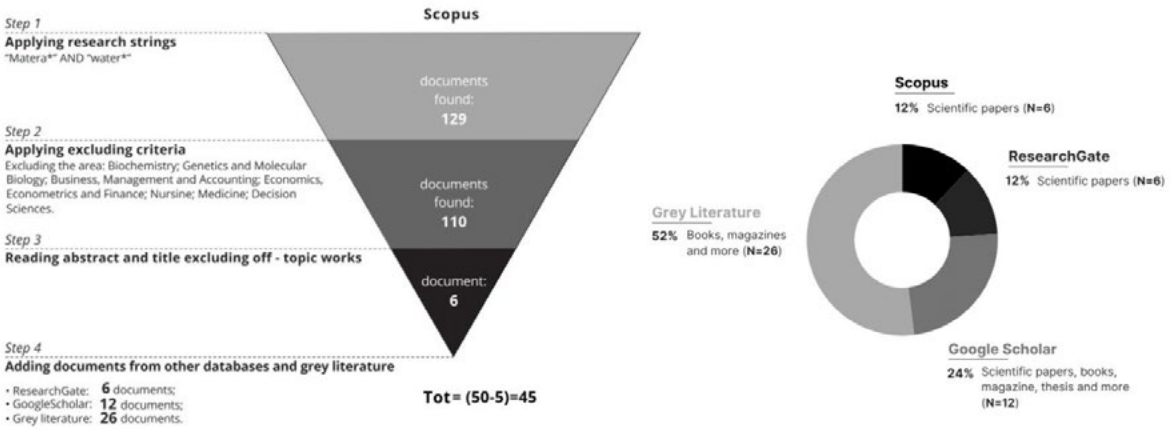

Fig.2. Diagrams of the sequential steps and the progressive reduction in the 45 documents selected of the SLR with the number of documents retrieved from each consulted database.

Building upon this foundation, the present study began with an exploratory site visit and preliminary photographic survey, conceived as a reconnaissance operation aimed at direct engagement with the territory and at contextualizing the infrastructural system within its contemporary urban setting. This was followed by a bibliographic investigation, which refined the conceptual framework derived from the SLR and identified the relevant disciplinary and thematic domains to be activated. On this basis, a multidisciplinary research team – bringing together expertise in history, architecture, hydraulic engineering, and hydrology – was assembled to address the complex and interrelated dimensions of the investigation through a coordinated and integrated methodological approach.

The selected documentation was then subjected to a systematic process of digitization, followed by the vectorization of historical technical drawings and cartographic materials through the use of 2D and 3D digital representation software. This critical step enabled the extraction of relevant geometries and spatial configurations from archival sources, rendering them interoperable, analyzable, and metrically consistent within a contemporary spatial framework. The subsequent step involved a targeted in-situ survey focused exclusively on recording the surface geometries of the area, given the previously discussed impossibility of accessing the underground components of the infrastructure. The empirical measurements thus obtained served a critical role in the validation and cross-verification of the vectorized data derived from the archival sources. These surface measurements provided a metrical reference framework for assessing the spatial accuracy and internal consistency of the reconstructed digital models.

The culmination of this methodological trajectory was represented by the superimposition and intersection of the digitized and vectorized historical representations with the current georeferenced spatial data. This integrative operation allowed for the detection of geometric discrepancies and representational inaccuracies embedded within the original technical drawings–errors likely attributable to the instrumental and epistemological limitations of the time in which they were produced. These distortions were subsequently corrected through a critical process of spatial realignment, based on the identification and use of extant segments of the *Grabiglioni* system that remain intact and unchanged in their original configuration.

In parallel, geospatial data concerning the study area were acquired and developed in Q-GIS software, in order to construct a comprehensive, updated, and georeferenced cartographic base. This digital spatial infrastructure served as the foundational platform upon which the results of the historical-documentary elaborations were layered and analytically assessed.

This final process, far from constituting a mere act of graphical validation, assumed the character of a historical and spatial recalibration of the entire infrastructural system. It produced a refined interpretative representation that is not only more faithful to the original layout of the *Grabiglioni*, but also more analytically robust and scientifically verifiable. As such, the methodology advanced herein offers a meaningful contribution to the understanding of an infrastructural artifact that, while physically obscured, remains fundamental to the urban palimpsest of the *Sassi*.
The diachronic analysis of historical cadastral maps[10] from 1875 to 1898 revealed that, up to the first half of the twentieth century, the transformations undergone by the *Grabiglioni* – then referred to as *Fossi* – did not substantially compromise the ecosystemic balance of the historical water system (Fig. 3).

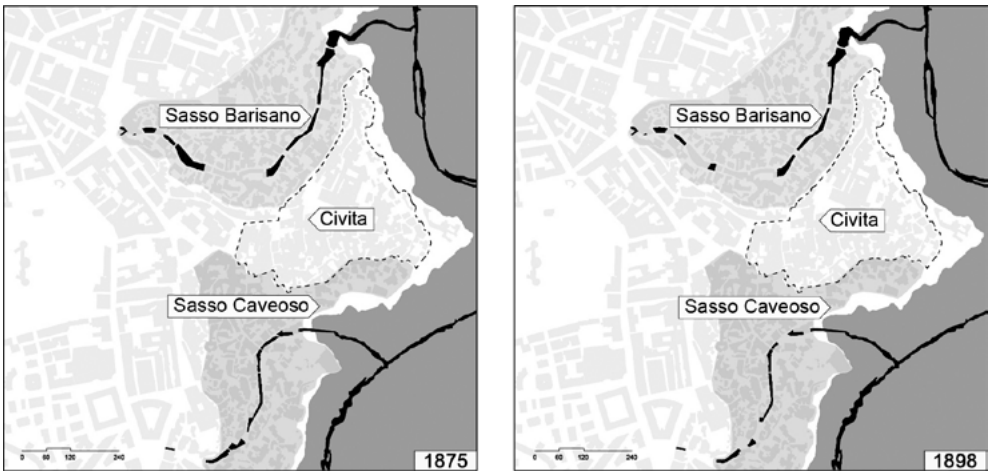

Fig. 3. Cartographic representation of the *Sassi* illustrating a comparison between the *Grabiglioni* configuration at 1875 and 1898 superimposed on the current urban fabric, in order to reveal the transformations produced over time.

These cartographic sources depict a hydrological structure that remained functionally intact, despite incremental anthropogenic modifications: pedestrian pathways developed along the direction of the watercourses, partially narrowing their riverbeds; small bridges enabled transversal crossings; and in some sections, the channels were already covered, with buildings erected above them. This configuration illustrates a progressive integration of hydraulic infrastructure into the urban fabric, while still preserving compatibility with the original morphological setting[11].
A decisive turning point occurred in the early decades of the twentieth century with the construction of subterranean sewer collectors within the *Grabiglioni*, designed to manage water flows and modernize the infrastructural system serving the *Sassi*. This intervention was conceived not in isolation, but as part of a broader infrastructural reconfiguration, which also entailed the complete roofing of the two natural watercourses and the creation of two new vehicular roads – *Fiorentini* and *Bruno Buozzi* streets – traced directly along the former riverbeds, in order to facilitate access to the *Sassi* by motor vehicles[12]. This transformation is extensively documented in a corpus of original technical drawings dated 1912, housed

[10] C. DI LENA, *Le mappe del catasto fabbricati a Matera*, in *Bollettino della Biblioteca Provonciale di Matera*, anno IX, n.14, 1988. pp. 79-96; RSDI BASILICATA, *Mappe Catastali di Impianto*, https://rsdi.regione.basilicata.it/viewGis/?project=680DED55-E1C9-6359-E9D0-27642CBCE592, last accessed: September 2025.
[11] E. VITI, T. LUPO, *Appunti di Matera Sotterranea*, vol.2: *Grabiglioni*, Edizioni Magister, Matera, 2020.
[12] C. DI LENA, *Quando l'America Scoprì i Sassi. Come si Arrivò al Risanamento dei Sassi di Matera*, Altrimedia, Matera, 2008; A. COLONNA, D. FIORE, E. VADINI, *Vincenzo Corazza e gli anni Trenta a Matera. Architetture e piani di un progettista delle istituzioni*, Libria, Melfi, 2019.

in the *Archivio di Stato di Matera* and the *Archivio Storico Comunale*. The documents include general plans, longitudinal profiles and numerous cross-sections, that describe in detail the geometric and constructional characteristics of the project.
These infrastructural components were digitized using Autodesk AutoCADand McNeel Rhinoceros softwares, ensuring full interoperability with current analytical tools. In parallel, the archival investigation yielded valuable insights into the materials and construction techniques employed, thereby contributing to the reconstruction of the technical knowledge embedded within the cultural and environmental context of the time (Fig. 4).
The integration of vectorized historical data with contemporary geospatial basemaps made it possible to identify geometric misalignments and representational inaccuracies within the original documentation–discrepancies attributable to the instrumental and epistemological limitations of the period. Through a meticulous process of spatial realignment, grounded in the analysis of surviving and recognizable segments of the infrastructure, it was possible to reconstruct a coherent digital model, both historically accurate and scientifically verifiable.
The final outcome (Fig. 4a-4b-4c) goes beyond mere graphical validation: it constitutes a true historical and spatial recalibration of the entire *Grabiglioni* historical infrastructures. The historical technical drawings depict egg-shaped sewer collectors, i.e., underground conduits designed to collect and convey wastewater. The images present three views that elucidate both their construction and functional logic: an inspection manhole (Fig. 4d), the cross-section of the collectors (fig. 4e), and their longitudinal profile (Fig. 4f). The inspection manhole (Fig. 4d) constitutes the structural element that allows access to the sewer system for maintenance operations. It is directly connected to the main conduit and is constructed with reinforced concrete walls of variable thickness, featuring an opening that merges into the primary channel. This component is essential, as it enables periodic monitoring of the sewer's condition without the need for disruptive excavation. The ovoid cross-section of the collector (Fig. 4e) clearly displays its characteristic drop-like or inverted egg shape.
This specific geometry is not incidental: the maximum height of the conduit measures approximately 2.10 meters, while its width reaches 1.40 meters. At the base lies a narrow recessed channel (known as a *cunetta*), measuring just over 35 centimeters in width, which ensures the continuity of flow even under conditions of minimal water volume. The ovoid form was intentionally adopted to optimize hydraulic performance under varying flow conditions: when water levels are low, the reduced section at the bottom concentrates the flow, increasing its velocity and preventing stagnation; when water levels are high, the entire section fills, thereby ensuring sufficient discharge capacity.
Finally, the longitudinal profile (Fig. 4f) illustrates the course of the conduit along its development, highlighting the curves and gradients that regulate the runoff. These variations are not merely structural but serve a functional purpose: they maintain a constant slope to facilitate the flow of water and prevent sediment accumulation. The dimensions provided further demonstrate how the conduit floor was carefully modeled to channel hydraulic flows with precision.

4. DISCUSSIONS AND CONCLUSIONS

The study highlights the *Grabiglioni* of the *Sassi* of Matera as a remarkable hydraulic and cultural infrastructure whose importance transcends their initial technical role. They epitomize urban industrial heritage, embodying layered constructional and managerial knowledge that harmonized environmental dynamics with human intervention. Over centuries, adaptive water management strategies sustained equilibrium between the urban fabric and the surrounding ecosystem, ensuring both resilience and sustainability.
Because of the structures' inaccessibility, the research adopted an innovative methodology, relying on the digitization and vectorization of historical maps and archival materials, complemented by modern geospatial (GIS) data. This hybrid approach produced a coherent and scientifically verifiable

interpretive model, underscoring its effectiveness for studying other inaccessible or deteriorated subterranean infrastructures. The outcomes extend beyond historical reconstruction: they create opportunities for conservation and valorization of Matera's hydraulic heritage, positioning it as an integral part of the city's broader industrial legacy.

The knowledge gained forms a solid basis for designing restoration strategies, planning maintenance actions, and developing dissemination initiatives that restore visibility to an undervalued yet crucial infrastructure. The research asserts that recovering historical water systems should not be reduced to commemorative efforts; rather, it must be understood as an operational tool for sustainable planning and territorial management. By emphasizing the hydraulic-industrial dimension, the *Sassi* of Matera can be reinterpreted and enhanced, reinstating the relevance of an "invisible" heritage essential to the city's historical logic of settlement. Ultimately, the methodology offers a replicable model for conserving and managing complex infrastructural heritage within stratified urban environments.

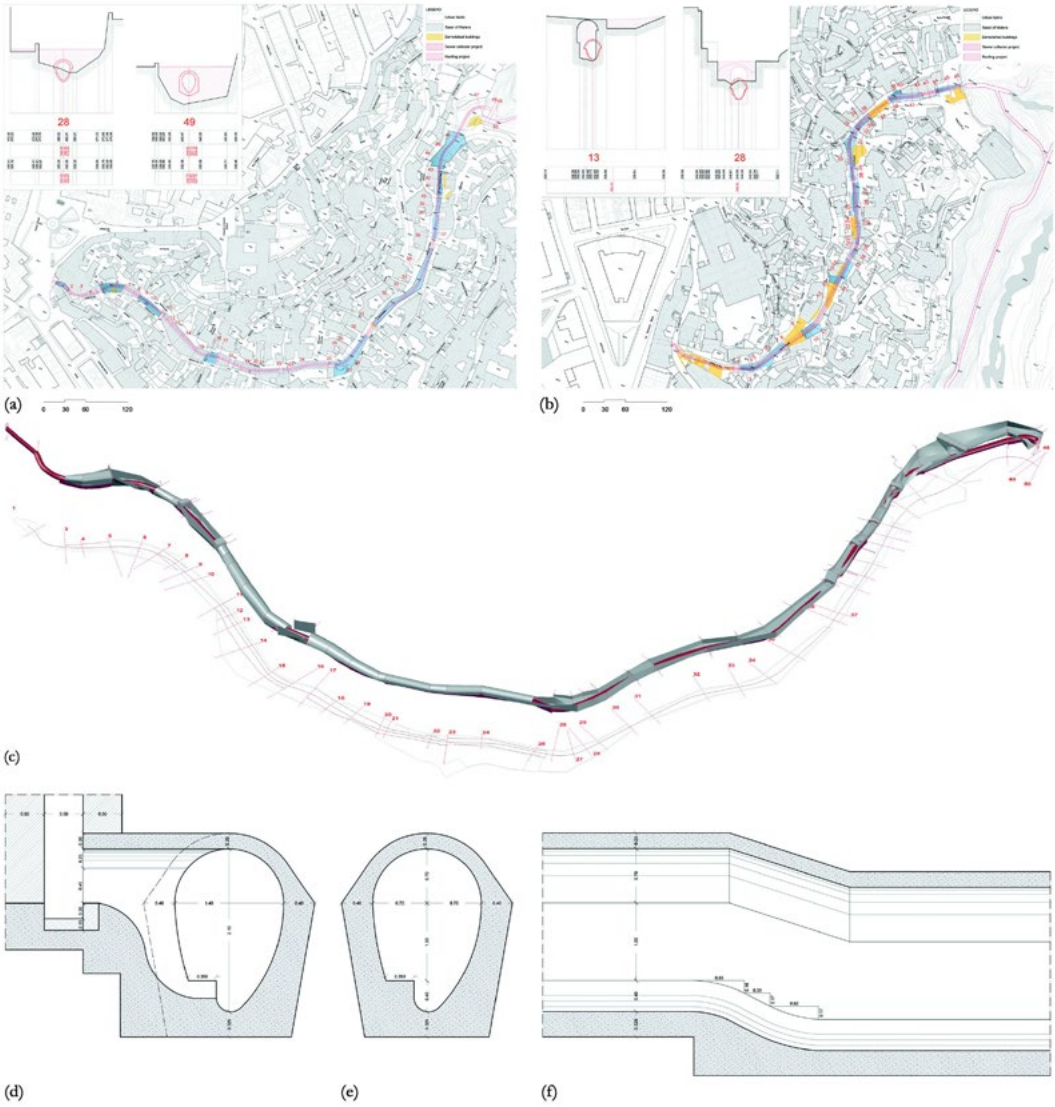

Fig.4. (a-b) Digitized plans of the current state and the project state at the first decades of the 20th century. (c) 3D model of the *Grabiglione Barisano* sewer collector. (d-e-f) Digitized details of the *Grabiglione Barisano* sewer collector.

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