Built Heritage

RESEARCH ARTICLE

Open Access

Seventeenth-century Seville houses: a survey by the *Alarife* Juan De Legarra (1637)

Pilar Moya-Olmedo[1*], María Núñez-González[2*] and Fernando Vilaplana-Villajos[2*]

Abstract

Despite the wealth of preserved information, research on the domestic architecture of Seville has been limited. Much of this historical data is available in survey books that were formally compiled in Seville from the Modern Age onwards. These books had detailed descriptions and sometimes illustrations provided by surveyors who were commissioned by owners or tenants.

The intention of this study is to illustrate that the information contained in building surveys goes beyond simple descriptions or measurements often accompanied by drawings. They are a comprehensive account that, even centuries later, help reconstruct the architecture, material culture and everyday life that no longer exist. Our research contributes to the understanding of the domestic architectural history of Seville by focusing on one specific survey (a collection of drawings and a written description) extracted from the Hospital de las Cinco Llagas Collection, which is found in the Seville Provincial Council Archive. At least one of the drawings and the written survey can be attributed to the *Alarife* (architect or master builder) Juan de Legarra, who signed them in 1637.

This research explores the architectural development of the city, offering fresh insights into its architecture, heritage, and history. It supplements existing historical, visual, and written records derived from prior studies with a meticulously curated bibliography. Additionally, it uses visualisation techniques to reconstruct buildings, augmenting the research.

This endeavour has yielded anticipated benefits, particularly in facilitating visual analysis. The surveys have proven to be invaluable for historical inquiry, yielding unexpected insights through the thorough analysis of both written and graphic sources which serve as a basis for hypothetical construction plans due to their detailed descriptions. Furthermore, this study has contributed to enriching both historical and architectural terminology.

The incorporation of digital technologies into this architectural context allows us to expand our knowledge through the exhaustive compilation of building records. It also facilitates in-depth analysis of architecture, which could result in an up-to-date architectural catalogue that would stimulate interest in preserving a legacy that, until recently, was at risk of being lost.

Keywords Historical documentation, Survey, Cultural heritage, Virtual architecture, Domestic architecture, Archaeology

*Correspondence:
Pilar Moya-Olmedo
pilar.moya.olmedo@upm.es
María Núñez-González
mngonzalez@us.es
Fernando Vilaplana-Villajos
fvilaplana@us.es
Full list of author information is available at the end of the article

1 Introduction

In recent years, technical disciplines, previously rarely represented in historical research, have given rise to many new studies. The analysis of written documentation is, evidently, the main tool of historical studies, and its use is common in different investigations and fields. Sometimes studies combine texts with archaeological data or, as in the research presented here, analyse written descriptions. These include the study of cities or, in other specific cases, unique buildings and their surroundings.

The case study presented here aims to broaden the scope previously mentioned with an analysis that incorporates both written and graphic historical sources. Immeasurably important, this methodological approach multiplies the original data available and, given the quantity and quality of the information collected in graphic documentation, contributes to research beyond the architectural scope. The unusual circumstance of having concurrently produced written and graphic sources, especially in the case of domestic architecture, has allowed us to improve our methodology based on verification dynamics, which have already been implemented on previous occasions. This case study, like a 'Rosetta Stone', has allowed us to confirm the spatial/construction hypotheses suggested within the written sources. Written sources, written not only in an archaic version of our language but also in a guild dialect, that have been viewed as largely lost can now be more precisely understood.

Undoubtedly, recent research has been greatly enriched by the transversality and multidisciplinary nature of publications. In this context, we trust that the approach of the following study, arising from the field of architecture, specifically from the area of graphic expression, in which the authors teach and develop their research, can be extrapolated to research in different areas and different contexts.

1.1 Architecture and drawings in 17th-century Seville

In the 17th century, Sevillian architects faced financial constraints, leading to the need for cost-effective and simplified projects that could extend over time with frequent interruptions. This context diminished the individuality of craftsmen, who continued to entrust their building skills to guilds.

At the beginning of this century, Seville was still an important centre of world trade, although it was beginning to show signs of economic decline. Nevertheless, during this period, secular religious orders carried out a great deal of building activity, which mainly involved the construction of new buildings and the renovation or modernisation of existing ones.

The architectural panorama was anchored in a tradition that lasted for most of the 17th century. This architectural tradition was interpreted by masters based on architectural treatises that were rarely circulated, architectural manuscripts that were circulated but never printed, and collections of drawings that were grouped and arranged with a clear didactic intention (Sancho Corbacho 1983).

The medieval term 'senior master' (the architect in charge of the design, construction, or maintenance of main buildings) was still used at the same time as architect and *alarife* (the mayor of the builders' guild, masons and carpenters alike), all with similar but different meanings (Cómez Ramos 2011). All master builders had good knowledge of drawings and geometry and were able to draw. The use of drawings was constant, as seen from the continuous references made to them. We also know that it was compulsory to be able to draw to pass the master's examination.

From the 16th century onwards, it was customary for each work to have a plan or sketch that accompanied the technical requirements, which were also drawn up by the master builder. Unfortunately, most of the project documentation has been lost, basically because once it was in the hands of the contractor and no longer needed, it was often forgotten or was returned only to disappear after the masters died (Fig. 1).

Architectural drawings in the 17th century followed the solutions developed during the Renaissance. At that time, drawing was based exclusively on orthogonal projections or the dihedral system of plan, elevation, and section. Drawings could be traces or sketches. Traces were carefully executed, sometimes accompanied by measurements, legends, specifications and even shading and scratches to give them a greater sense of reality and were always completed for construction purposes. A sketch was the representation of a first idea or approximation, and although they were the most common and were often mentioned, few have survived (Fig. 2).

1.2 Approach to Sevillian architecture

Following in the footsteps of other researchers such as Collantes de Terán (2022; 2017; 1977) and Pérez Escolano (1981), Núñez-González (2021a) recently carried out an in-depth analysis of 16th-century Sevillian domestic architecture using approximately 400 written surveys. With the information described, she was able to obtain conclusive results on house layouts. Furthermore, after comparing the findings from the late 15th and early 16th centuries, she found that Sevillian houses maintained the structure of past centuries. However, owing to the remaining drawings from the 17th century, this period can verifiably be considered transitional in terms of spatial organisation. The model was composed of a *casapuerta* (the first room of the Sevillian house, which was accessed from the street and that had diverse uses,

Types of documentation of architects 17th century			
produced or used	treaties		
	manuscripts		
	collections of drawings		
produced and used	survey	literary	
		graphic	traces
			sketches
	specifications	literary	
		graphic	traces
			sketches
	site plans	graphic	sketches

Fig. 1 Types of documentation handled by architects in the 17th century (Source: the authors)

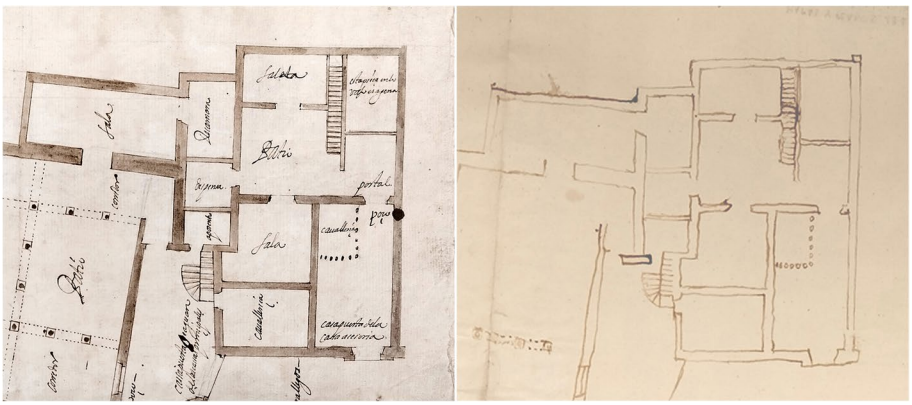

Fig. 2 Trace/sketch drawings (paper and dun ink/paper and sepia ink), Juan de Legarra/anonymous, legajo 44, year 1637 (Source: Hospital de las Cinco Llagas Collection, ADPSE, Seville, Spain)

from housing mezzanines with haystacks, mangers or shops to serving as a distribution space towards the courtyard and the upper floors by its stairs; also called a doorway), one or two galleries with arches and/or balconies, a courtyard, rooms, and in some cases, a kitchen and a cattle pen. The height of the house was low, and only the street façade and some volumes of the courtyard usually had two floors. A well was always present in the house (Figs. 3, 4 and 5).

The *casapuerta* stands out for its multifunctionality. It was the first space accessed from the street, with a surface area of approximately 20 square metres (m^2). It sometimes housed the stables and the outbuildings for the stable hands or servants. It usually had a staircase leading to the upper floor, which could be covered with a sloped tiled roof or a flat roof (*azotea*); the latter was another important space in all Sevillian houses, always present in both large and small houses, and its use has

Fig. 3 Casapuertas and galleries (Source: the authors)

Fig. 4 Corridors, passages, and small courtyards (Source: the authors)

Fig. 5 Courtyards, examples of 17th-century architecture in the historic centre of Seville (Source: the authors)

been preserved to date. The most noteworthy aspect of the evolution of the house is, on the one hand, the diminishing size of the *casapuerta* and its later change in nomenclature to *zaguán* and, on the other hand, the growing importance of the staircase in the layout of the courtyard.

1.3 Who was the alarife Juan de Legarra

This master builder is known from two articles (López Martínez, 1928; Cruz Isidoro 1995), which have many errors (Legarra appears to be documented as Legara or Segarra, the latter appearing most often; mistakenly propagated by López, the spelling is thought to be the result of confusion with typography).

Legarra was born around 1600 in Guipúzcoa, in northern Spain, where architectural influences were taken from Aragon and Castile and where despite the austerity marked by the council of Trent, Italian architectural forms were used in churches featuring classical structures. Legarra later moved to Seville with his family, where he began his apprenticeship as a bricklayer.

Legarra's first attributed work as a master builder was completed in 1621, and after 1629, he specialised in valuations and litigations. In 1633, he was mentioned as 'senior master of monasteries and convents of the ordinary area of this archbishopric', and it is known that Legarra held a similar position as master for the Hospital de la Sangre, with several visits and documented projects (it was during this period that the houses in Gallegos Street were surveyed). He was also linked to the position of 'Master of the City', 'Architect of the Town Hall', 'Architect of the Lonja de Mercaderes', and 'Architect of the Cathedral' as a substitute in all cases.

Legarra was not one of the best-known figures of his time, and yet from the information found thus far, only partly collected in this article, it is believed that he was in fact a popular and influential master of 17th-century Sevillian architecture.

2 State of the art

Fortunately, studies on the history of architecture in Spain based on virtual reconstruction are continually increasing. These studies contain a wealth of innovative approaches and notable representatives. A more detailed analysis shows that most historical studies do not include an architectural graphic analysis based on plans and drawings dated to the time of the case studies, much less contain a written description to accompany it, unlike the study presented here. Presumably this is due to the lack or scarcity of graphic information.

Some approaches to cities are strongly similar to those presented in this article. An example of this includes the study of the city of Toledo (Passini 2011), on which extensive research has been carried out based on historical

documents, resulting in an urbanistic and architectural analysis, undoubtedly favoured by the extensive conservation of the original subject. Along the same lines are the studies carried out for the cities of Granada (Orihuela-Uzal 2015) and Málaga (Orihuela-Uzal 2022). These examples are of unquestionable value. However, they differ from the present work in scale and show no evidence of the use of historical architectural graphic documentation that corroborates the written information used, unlike the study presented here.

Other approaches with similar intentions for virtual reconstructions include those of Aparicio-Resco, who developed methodologies with other authors (Aparicio-Resco et al. 2021; Rodríguez-Hernández et al. 2021), including reconstructions of several buildings. These studies stand out, and while some are completely theoretical, others focus on specific heritage and are based on an archaeological perspective on existing evidence. Another case is that of López-Salas, both independently (2021a; 2021b; 2017) and in the company of other authors (Silva-Sánchez et al. 2022). Although this approach is very similar, it is exclusively focused on the Monastery of Samos and its surroundings during a specific period and, while valid, cannot be compared either by scale or by context.

Other works of interest are those of Núñez-González (2021a; 2021b), who has carried out extensive research on the architecture of the city of Seville using the documentation of 16th-century master builders, similar to Moya-Olmedo's (2023) work on the territory of Uclés in Castilla-La Mancha, based on inspection records of the Order of Santiago in the late 15th and early 16th centuries. In addition, these two authors have continued to collaborate (Moya-Olmedo and Núñez-González 2022; Núñez-González and Moya-Olmedo 2023) on domestic architecture, heritage, and the work of Seville's master builders in the 16th and 17th centuries. All these are approaches to the same theme, the reconstruction of architecture from solely written documentary sources.

Regarding the concept of virtual archaeology, we highlight the works of Gómez (2009), López-Menchero (2013), Aparicio-Resco and Figueiredo (2016), Aparicio-Resco (2021) and Pietroni and Ferdani (2021). These studies are very specific to their field but delve into a series of interesting aspects that enrich the vision of a purely architectural study. All of them provide an approach to the subject but at the same time give enough freedom to look for other diverse ways of proceeding.

The study of architectural history through the use of virtual reconstruction is a recurring theme among historians and archaeologists. Although many of these previous studies use historical written sources and/or archaeological or fiscal evidence of past construction, this study presents a unique approach that uses written and graphic evidence of a moment in history in tandem. With this article, we hope that the contribution of architects in the analysis of historical graphic documentation can enhance these studies in the future, as Harris also argues (2015).

3 Objectives

The main aim of this research is to improve the knowledge of the architectural and domestic reality of the city of Seville in the 17th century by reconstructing the architecture that was built in this context.

To achieve this goal, extensive research has been performed on the houses on Gallegos Street based on exhaustive work with both bibliographic sources and existing documentation. From the beginning, it became clear that despite the lack of preservation of houses, there was potential for substantial progress due to the discovery of the building's written and graphic surveys.

Consequently, it was thought that a secondary purpose, no less important, should be to showcase our own methodology, where for the first time, written and historical graphic sources are included. This is believed to be of interest to the scientific community since, in our ample experience, these documents rarely appear together to provide information on the same construction.

This study also uses a more complete approach consisting of a 'schematic' or compositional' volumetric architectural model. This model facilitates a more nuanced connection between the houses under examination and domestic styles previously scrutinized, as well as permit us to do the same with other houses that we hope will be studied in the future.

4 Sources

4.1 Approach to the Sevillian archives

Most documents related to the investigation of Seville's domestic architecture are preserved in local archives: the Provincial Council of Seville Archive (ADPSE), the Cathedral of Seville Archive (ACS), and the Provincial Historical Archive of Seville (AHPS). The ACS houses the largest collection of surveys on Sevillian domestic architecture, spanning from the early 16th century to the 19th century, and predominantly written in nature. Specifically, the ACS holds two books with 772 surveys from 1542 to 1543. The ADPSE, on the other hand, houses books detailing the properties of the Bubas, Cardenal, and Cinco Llagas Hospitals, encompassing approximately 360 houses and dating from 1542 to 1585.

Among the graphic documents produced by master builders, those preserved in the ADPSE and ACS are notable, with the former (554 drawings of plots) outnumbering the latter (Núñez-González 2021a, 42–61). Most of these drawings were compiled in books owned

by charity hospitals such as Amor de Dios and Espíritu Santo, which are collectively known as the reduced hospitals. Furthermore, the protocols and the Misericordia Hospital collection in the AHPS deserve special mention. This collection is composed of a book of surveys compiled in the early 1600 s (220 houses) and others dated to the 17th century.

In view of the large amount of documentation that has been preserved, it was decided from the outset to focus exclusively on Seville's domestic architecture with the information contained in 'survey books'. Survey books were the mechanism by which the Church and some secular institutions, such as hospitals, knew the condition of the buildings they owned or which came into their possession and whether the properties they rented were being effectively used or maintained. The reports and drawings were the results of visits made by masters working for the institutions to 'measure and value' these buildings. This type of information was frequently recorded in previous centuries. In fact, in Seville, survey books were formalised from the beginning of the 16th century. They were always written in nature and could sometimes include drawings if considered necessary.

Additionally, for the specific context of this research, documentation from only the Hospital de las Cinco Llagas was consulted. The hospital books always included written surveys that described the situation, boundaries, tenants, ground floor room dimensions, number of floors, and coverage of these rooms. However, they did not supply detailed information about the upper floors. Sometimes these surveys also included descriptions of construction details, finishes, or installations.

The way in which the masters described the buildings was simple, though it superficially appears complex (to make the survey more readable, the original content has been minimally manipulated with the introduction of capital letters and punctuation marks. Red numbering was used to aid in the sequencing of spaces, normal underlining was used to highlight spaces, and underlining with dots was used to highlight construction elements). In addition to the masters' own biases, the problems of complexity can be summed up as two fundamental issues: the jumps made in documenting the routes so that advancing or retreating causes problems in tracking inside the buildings, and the masters' imprecision with the measurements of the rooms inside the buildings, so that sometimes the layout, orientation or size are not specified.

In general, architectural surveys supply basic information and, depending on the master, provide detail in the description. The basic data include the following:

- The façade. Although the height of the building is not described, the materials and sometimes their condition are mentioned; the doors to the street are also listed, and access doors are described if they exist.
- Description of the rooms. Rooms are defined by their length and width, usually in Castilian varas. Sometimes the description includes the type of floor, roof, and other elements such as chimneys or wells. They always distinguish whether the room is covered with a roof or with another room above. They also described the roof system and its conditions.

In this study, the first stage involved finding and selecting the documentary sources that would serve as the base and then transcribing and analysing what they contained. The second stage involved entering the information into a computer programme for analysis, drawing and cataloguing (Fig. 6).

5 Methodology

Throughout their years of research, the authors have always attempted to add a historical-archaeological vision to their study of architecture, relying not only on the documentary information collected in the many written sources and the few graphic sources handled but also on the archaeological and material reality (when possible). As architects, the authors feel that historical and archaeological knowledge has always been considered essential for understanding and placing architecture in context.

With the houses on Gallegos Street, we must highlight the limitations in their historical and archaeological situation. This is the first time that we have studied a domestic style with a written description of a specific building in a specific period with incredibly detailed drawings of the same construction, and yet, there are no remains to compare with these observations, beyond a simple approximation of the plot (Fig. 7).

In this context, the method used to draw the described building was to formulate hypotheses about plan, elevations, sections, and volumes. This helped in understanding the construction and its subsequent architectural analysis, by 'translating the written and graphic into [the] digital'. This process can be described as follows (Fig. 8).

6 Virtual building development

There are two documents that address the digital visualisation of heritage: the London Charter (2009) and the Seville Principles (2017). These documents reflect the conceptual breadth of cultural heritage and its specific needs. Both are primarily guidelines for visualisation, although their greatest virtue is that they do not override

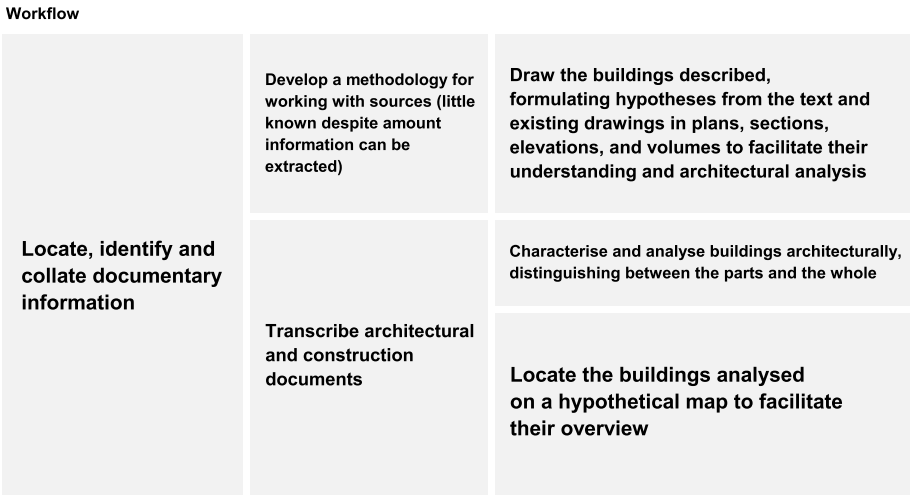

Fig. 6 Workflow (Source: the authors)

other ways of studying, documenting, and understanding heritage.

Some of these principles have been considered in this proposal. Namely, these are the principle of complementarity (computer-assisted visualisation should be understood as complementary to other tools), the principle of authenticity (an attempt has been made to make evident what is real and what is not in the computer-assisted visualisations through the provision of different documentation), the principle of historical accuracy (which mandates that any computer-assisted visualisation of the past must be supported by sound historical research and documentation), and the principle of scientific transparency (any computer-assisted visualisation must be transparent and verifiable by other researchers since its validity and scope will depend largely on the ability of others to confirm or refute the information).

All of these have been considered. However, in the specific case of reconstructing the houses on Gallegos Street, due to our training as architects, we clearly rely on the existence of a plan drawn with detail and precision by Legarra in 1637.

With such a clearly legible drawing of a floor plan and a complementary text that confirms the depiction, the virtual reconstruction presented here allows us to doubt the veracity of the solutions provided only in elevation and section and its transfer to the 3D reconstruction. This modelling is not exempt from the constraints of reality and has been developed in the most scientific way possible.

Furthermore, our reconstruction does not require a fiscal scale for historical architectural evidence; the plan itself is the evidence, as can be corroborated by a comparative reading of the text and drawing. The authenticity of the reconstruction should only be questioned in the 3D model, where although there is no fiscal evidence, our daily work in architecture leads us to believe that the final solution must have been close to our visual hypotheses.

In this context, the aim was to produce simple drawings, which are preferred for historical reconstructions (recovering the line drawings imposed at the beginning of archaeology and architectural history as academic disciplines) (Favro 2012).

7 The survey signed by Legarra

The documents processed in the article to virtually recreate the houses that were 'measured and valued' by Legarra were found in File 44 of the Hospital de las Cinco Llagas Collection ADPSE. Specifically, this includes a written survey and a drawing signed by him (Fig. 9) in 1637, along with two other drawings of the same construction without signatures.

In addition to the written description of the building, which closely follows the established practice previously discussed for hospital buildings, this document uniquely makes it possible to compare the text with different drawings. With a simple analysis of the documentation, it is possible to conclude that they are all the same construction, encompassing two houses, one main house and one accessory, situated in a cul de sac on Gallegos Street (now Sagasta Street) (Fig. 10). These properties were owned by the treasurer of the Hospital de la Cinco Llagas, Diego de Yanguas, who donated them to this institution in 1637, as depicted in his will (Fig. 11).

These details are also confirmed by the written survey and the legend of the drawing, both signed by Legarra:

> *Plan and pitipié [scale of a map or plan to calculate real distances and measurements] of the houses of*

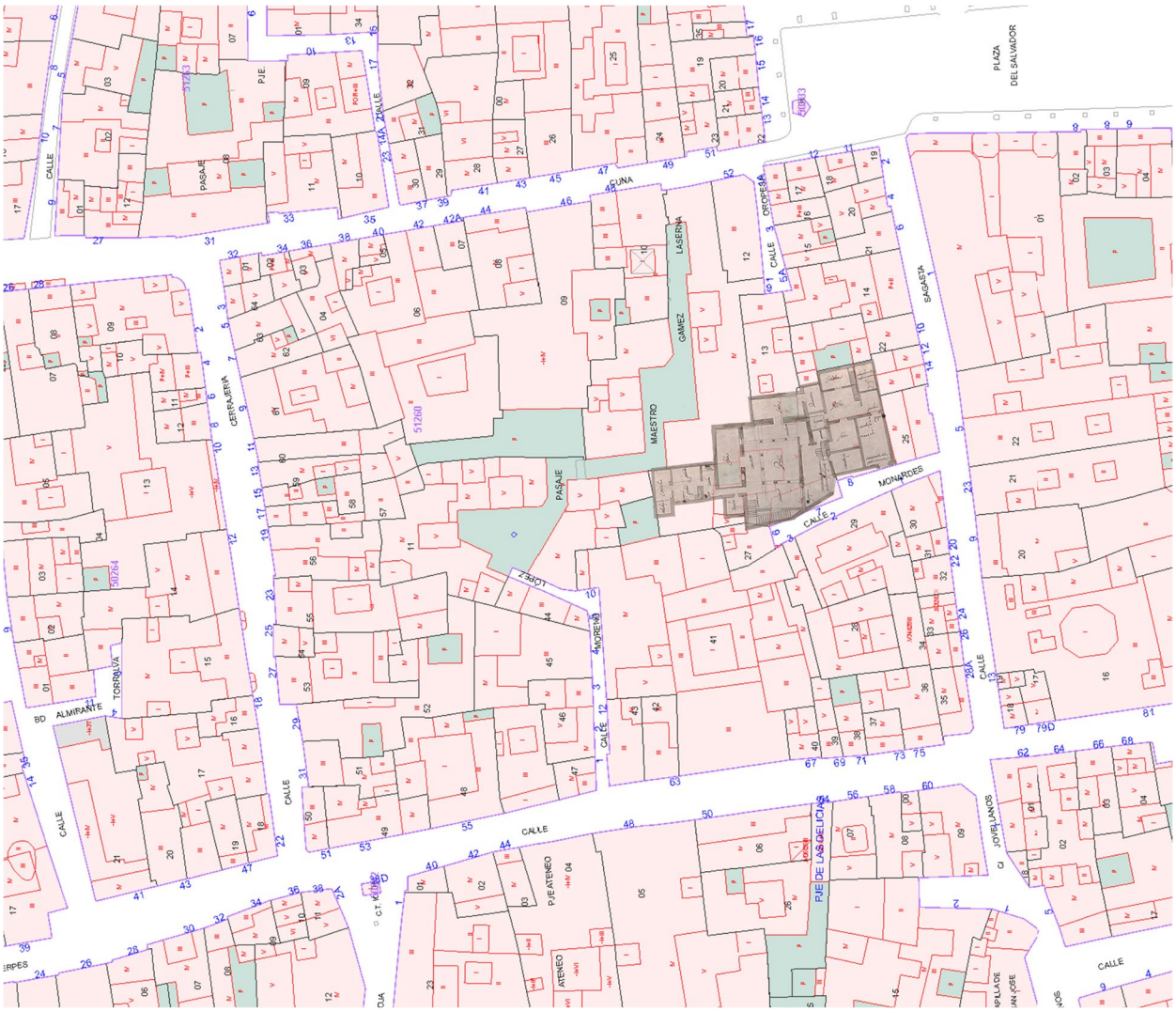

Fig. 7 Comparison of the current land registry parcels and the parcel drawn by Legarra in 1637 (Source: Spanish Cadastre Electronic Office and the authors)

Gallegos Street main and accessory of the pious work and hospitality of convalescents that the treasurer Diego de Yanguas left in the Hospital de la Sangre of this city of Seville, done the said ground floor and pitipié by me Juan de Legarra on 26th June 1637.

Legarra's authorship of the survey and signature on the trace can be proven; however, the other two drawings, resembling sketches and sharing stylistic similarities, are not the work of the same author (they do not feature the same typeface) and cannot be dated. The authors of these sketches are skilled professionals familiar with graphic representation and the significance and value of proportions. They could have been drawn by Antonio Rodríguez (a carpenter who would become Legarra's assistant) or by another master.

All the survey documentation reflects the classicism that characterised 17th-century Seville. The text was written in a style that can be classified as part of the so-called chained procedural, which was executed quickly with a continuous link between the letters, barely lifting the pen from the paper. The abundance of abbreviations, connections, and letters intertwined with words was customary, posing the greatest challenge in understanding this script (Fig. 12).

All drawings correspond to the orthogonal conception, with emphasis on the representation of plans (horizontal sections). The trace signed by Legarra is sober and uses double lines to delimit spaces. It has a *pitipié* to show scale in reference to Castilian yards. Washes are used to show wall thickness, highlight

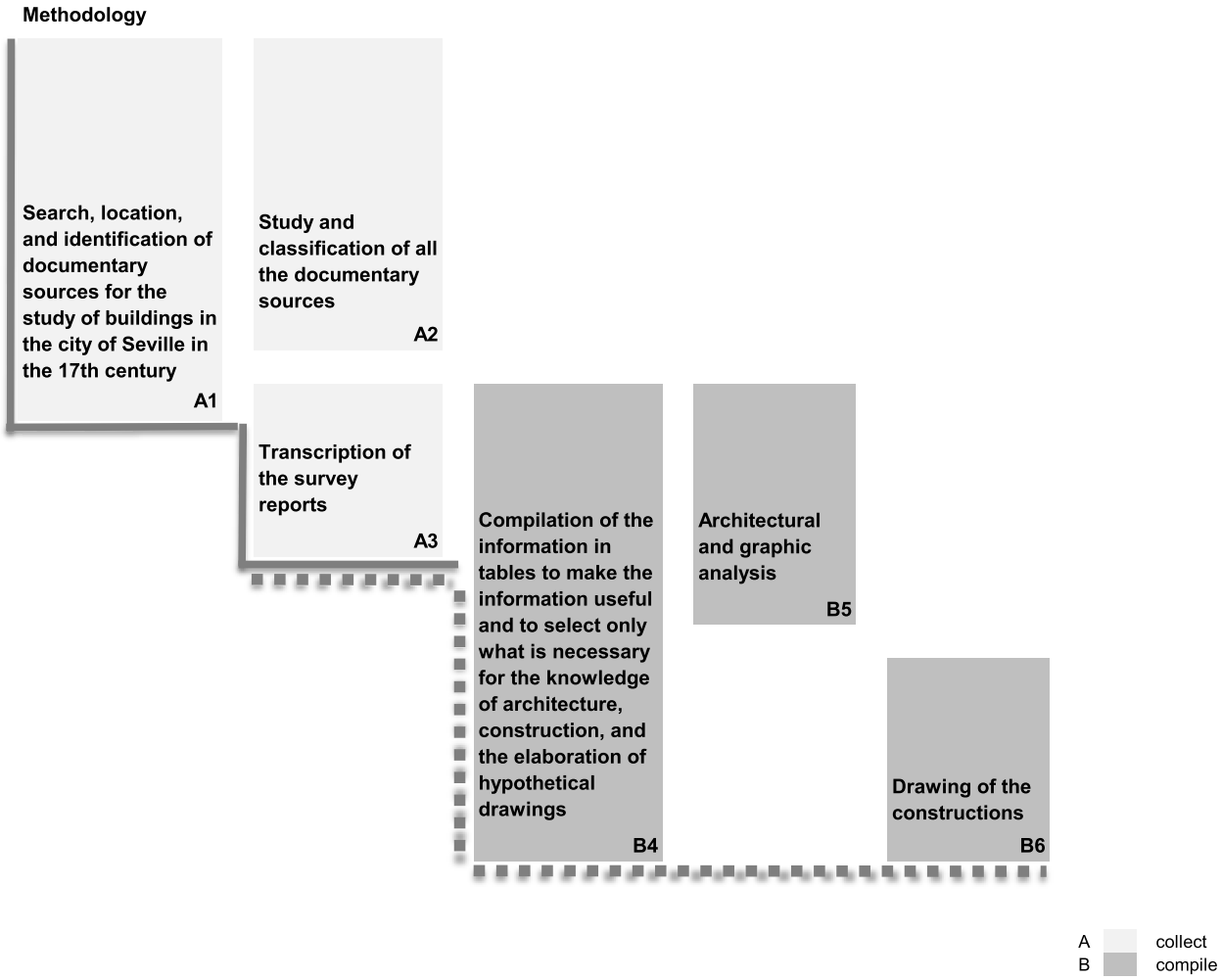

Fig. 8 Methodology (Source: the authors)

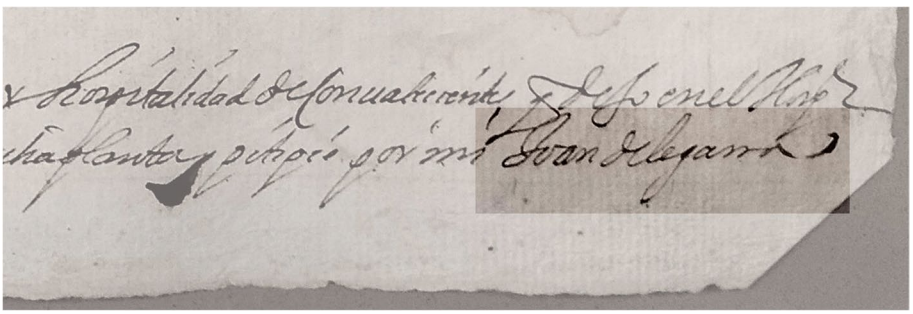

Fig. 9 Legarra's signature (detail) [drawing (paper and ink)], Juan de Legarra, File 44, year 1637 (Source: Hospital de las Cinco Llagas Collection, ADPSE, Seville, Spain)

specific areas, and the use of spaces. Stairs and some unique elements are shown (Fig. 13).

All the documents are executed on paper. While the trace is on high-quality laid paper, the sketches are on relatively low-quality paper. Ink is used thickly to write or trace or diluted to mark sections, depth of planes or highlighted areas in the drawings. This collection can be included in what could be called 'work documentation' and is composed of written documentation and drawings of unequal artistic and practical value that

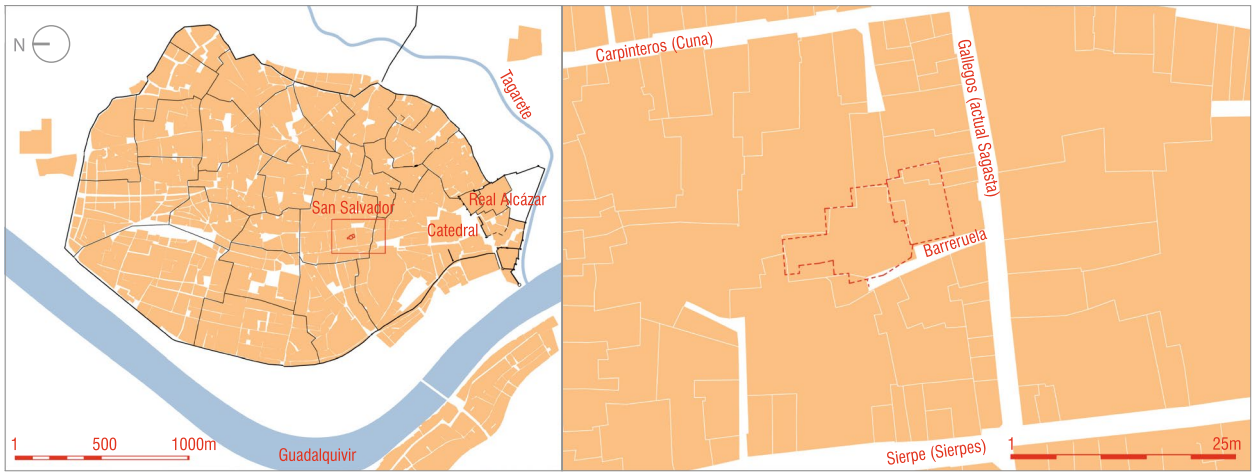

Fig. 10 Plan of 17th-century Seville. Locations of the houses surveyed by Legarra (Source: the authors)

Fig. 11 Will of Diego de Yanguas, treasurer of the Hospital de las Cinco Llagas. Book 9, folios 163 and 165, year 1637 (Source: Hospital de las Cinco Llagas Collection, ADPSE, Seville, Spain)

have technical coherence (Fernández Martín, 2003) (Fig. 14).

7.1 Some preliminary considerations

The difficulties in carrying out the modelling primarily stemmed from the descriptions provided by the masters. However, their architectural ability helped the process. One of the main challenges was the absence of an upper floor description in the survey, despite detailed information about the ground floor. This was especially problematic given that the resulting structure was a complex house with many rooms and varying heights.

When modelling the hypothesis, we considered the location of the plot, the boundaries and the geometry. In addition, some criteria regarding graphic expression were applied to formulate the hypothesis, including the following:

– The thickness of the walls or partitions for the upper floors continued, as shown for the lower floor, typically being either half of a Castilian vara (42 cm) or two thirds of a Castilian vara (56 cm) (Fig. 15).

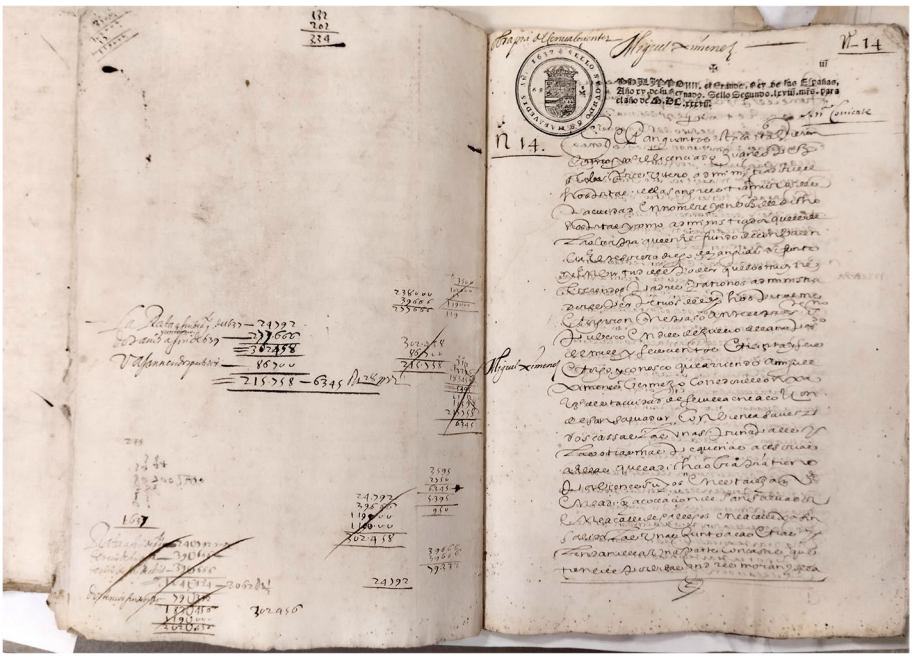

Fig. 12 First page of survey 14, File 44, year 1637 (Source: Hospital de las Cinco Llagas Collection, ADPSE, Seville, Spain)

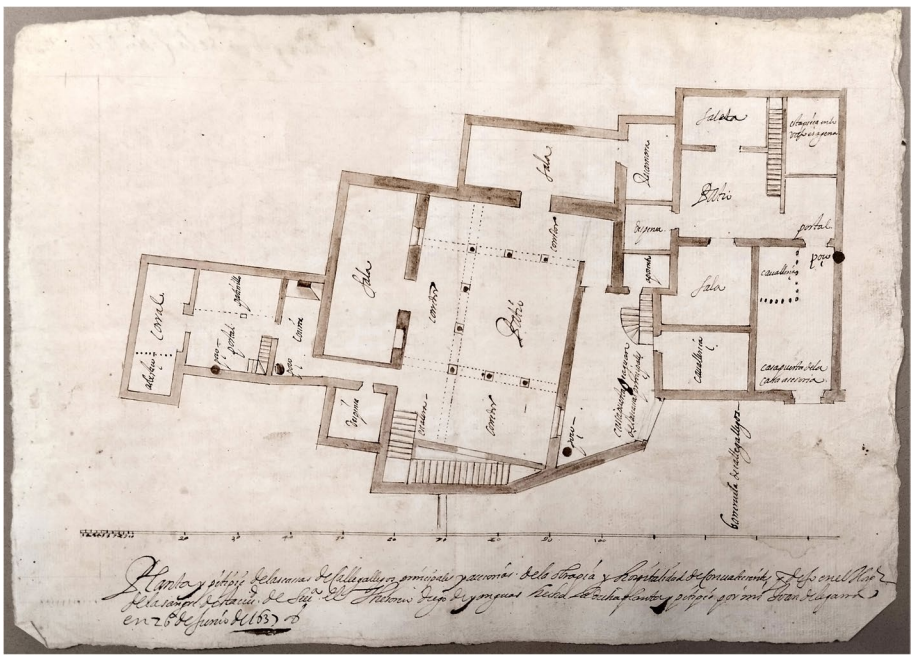

Fig. 13 Trace signed by Legarra [drawing (paper and dun ink)], Juan de Legarra, legajo 44, year 1637 (Source: Hospital de las Cinco Llagas Collection, ADPSE, Seville, Spain)

– Staircases, whose position and dimensions are shown, were depicted following the drawings or with a minimum width of a Castilian vara (84 cm).

– The presence of flat or sloping roofs, though not explicitly described, was illustrated with hypotheses about their typology and drainage based on their position within the overall structure.

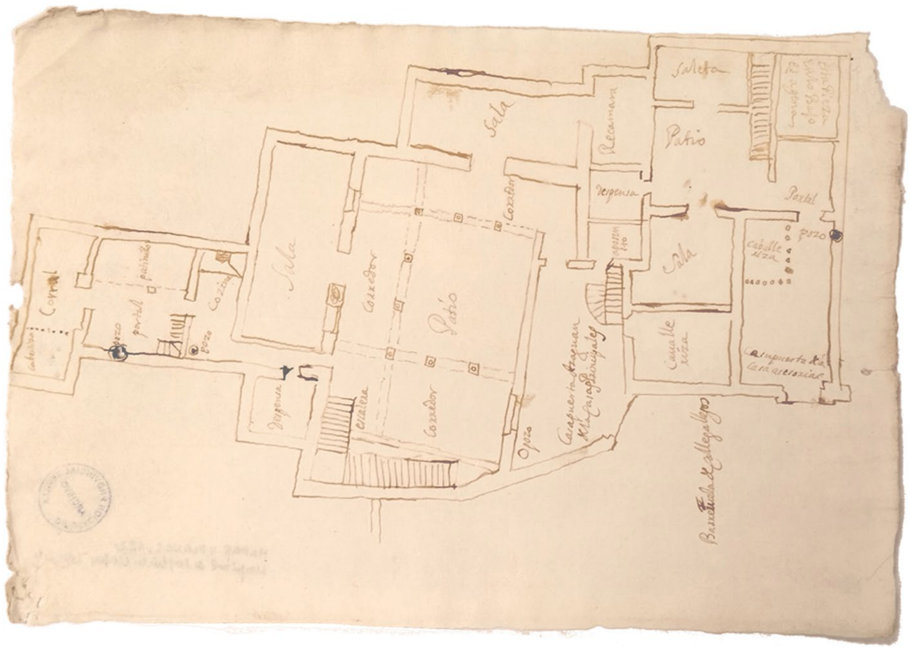

Fig. 14 Sketch [drawing (paper and sepia ink)], anonymous, file 44, 17th century (Source: Hospital de las Cinco Llagas Collection, ADPSE, Seville, Spain)

– Each element named in the drawings was assigned a number to enhance the ease of cross-referencing with the written survey and the plan drawing.
– Individual elements, such as wells and chimneys, were integrated into the construction.

In general, overloading the drawings with excessive information was avoided. However, unique elements, including some carpentry or decorative components, were included.

Surveying units of measurement 17th century

Castilian vara*	**3**	**feet**	**83.6 cm**
feet or third	**1**	**feet**	**27.9 cm**
palms	**3/4**	**feet**	**20.9 cm**
inches	**1/12**	**feet**	**23.2 mm**
fingers	**1/16**	**feet**	**17.4 mm**

*** Castilian vara 83.6 cm vs. yard 91.4 cm**

Fig. 15 Principal measurements used in surveys in the 17th century (Source: the authors)

7.2 The written survey

Survey number 14 of File 44, taken from the Hospital de las Cinco Llagas Collection, describes the houses as follows (see Supplementary Material 1):

In the city of Seville on the 20th day of the month of June of the year 1637 by order of Mr. Juan López de los Olivos, administrator of the *Hospital de la Sangre* outside the walls of this said city, Francisco Rodríguez carpenter and Juan de Legarra, master mason, who has been guild master in this city and are currently masters of the works of the *Hospital de la Sangre*, this day measured and surveyed some of the main houses and other accessories that are in the Sant Salvador district on the street of Gallegos, on the dead-end street, on which the houses belonged to Diego de Yanguas and which Miguel Ximénez currently has for life, whose property belongs to the *Hospital de la Sangre*, which is bordered on one side by Andrés Morán's houses (...) First, the façade of the street was measured, which has, from the corner of the houses of the Donzellas chapel to the accessory houses where two corners and a nook are formed, a length of 22 *varas* and two thirds and it is nine and a half *varas* high, in some parts more, and the walls of the majority are made of masonry and rammed earth and grilles at the top and the wall is whitewashed. On the wall, there are three grilles, one large and two small (...); [1] and from here we entered the *casapuerta* and measured in the middle. It is ten and a half *varas* long and the two ends are no more than four *varas* wide; In this *casapuerta* there is a well with an iron parapet and on the right hand side is a staircase that goes up to the mezzanine and the hayloft and is made of

masonry with an iron handrail. In this *casapuerta* in front of the street door is an old-style gate and this *casapuerta* or hallway is two floors high with the same amount above [which is] the size of a room; [2] and from this *casapuerta* the stable was entered, which is three *varas* and three quarters wide and five *varas* and two thirds long, and which has three stalls and a small window with its grille, and this stable is twice double-height with a mezzanine in the middle and this and the *casapuerta* have cobblestone floors; [3] From there, a small chamber was entered that is next to the middle door and is two and a quarter *varas* wide and three *varas* long and is paved with plastered brick and is twice double-height with a mezzanine in the middle that serves as a hayloft, with part of the mezzanine hanging over the accessory house; [4] From there, through the middle door that is on the right hand side of the street door, we entered a small passage that is linked to the first corridor of the main courtyard, which is a *vara* and a half wide and as long as the passage wide and this is doubled with the hayloft mezzanine above; [5] From here to the courtyard and corridors, which are ten *varas* and a half wide and fifteen *varas* and a half long, we measured in the middle, and they are paved with side-by-side brick, and the first corridor is a single height, finished with a flat roof and the other two are two floors high with fourteen marble columns, eight below and six above and eight hands of iron railings; [6] From the first corridor, a room was entered that is four *varas* minus a sixth wide and nine *varas* and a sixth long, and is paved with side-by-side brick and is two floors high; [7] From here, we entered a bedroom that is two *varas* and two thirds wide and five *varas* long minus one twelfth and is paved with plastered brick and is doubled in size with another chamber above it; [8] From the second corridor, we moved to another room that is four and a quarter *varas* wide and eleven *varas* long and is paved with side-by-side brick and is two floors high, and the thresholds are marble slabs instead of *almatraias*, and within the thickness of the wall, the sides of the doors are lined with tiles up to two *varas* high; and from here to the third corridor that is bordering the street door where the old-style gate mentioned above is, in this corridor is the main masonry staircase that has three flights, two landings and 23 steps with nosing and is lined with tiles. Under the flights of this staircase is a chamber that on one end is two and a third *varas* wide and on the other nothing because it ends in a sharp angle and is seven and a third *varas* long; [9] This corridor was entered, next to the staircase that goes to the kitchen and lower service, which is one *vara* and a sixth wide and five *varas* and two thirds long and is twice double-height with a mezzanine in the middle; [10] and from this passage to the left hand a chamber was entered that is three *varas* wide, and is square, and twice double-height with a mezzanine in the middle; [11] and from this passage, the lower kitchen was entered, which is two and a half *varas* wide and six and a third *varas* long and is two floors high. In this lower kitchen there is a well bordering the alley; [12] and from here we entered a little courtyard that is five *varas* wide and five and a third *varas* long, and the *portal* is twice double-height with a mezzanine, with a staircase in the middle that goes up to the upper service and below this *portal* there is a well and all high and low is paved with plastered bricks; [13] and from this *portal* a pen and shed was entered that is two *varas* and two thirds wide and eight *varas* and one eighth long and is paved with edged bricks and everything is whitewashed (...).

Here, we entered an accessory house in which the street façade is five and a half *varas* wide and has a medium-sized fence and the wall is whitewashed and nine *varas* high. [14] From here, we entered the *casapuerta*, which is five and a half *varas* wide and nine *varas* long and is paved with edged brick. [15] In this place, there is a stable with its mezzanine on top, and this *casapuerta* is doubled with the same on top and the top is divided into two parts and finished with a flat roof. [16] From here, we entered a *portal* that is three and a quarter *varas* wide and four *varas* minus a sixth long and is paved with side-by-side brick and is two floors high, and the rest of this place at the top is five *varas* higher than the upper neighbouring house. [17] Here, we entered the *courtyard*, which is five and a half *varas* wide minus two fingers and six and a third *varas* long, and at this place begins the staircase of the courtyard, which is made of masonry, which is on the right hand side, and the courtyard is paved with side-by-side brick. [18] And from here, we entered a room that is at the entrance to the *courtyard* on the left hand side, which is four and a half *varas* wide and is square, and in one corner has an entrance that is two *varas* deep and long and this room has side-by-side paving and is doubled twice; [19] And from the courtyard, we entered another chamber that is two and three quarter *varas* wide and three *varas* long and is two floors high and the top serves the main house and is paved with plastered brick; [20] And from the *courtyard,* we entered another room, which is on the right hand side of the *portal,* and which is three *varas* and two fingers wide and six *varas* minus two fingers long, and is paved with plastered brick and is two floors high, and in this is the stairwell. This house is all whitewashed (…) And they said it and signed it (Fig. 16).

8 Data, hypotheses, and analysis of the houses based on the survey

The houses on Gallegos Street were two independent houses, although some rooms were twinned. For instance, room [18] was in the accessory house, but its upper floor access and use were directed towards the main house. Room [16] initially served as an entryway, with part of it walled up. The ground floor was part of the adjacent house, while the upper section, spanning approximately 5 Castilian varas, was reserved for the accessory house. The following table shows the route according to the survey, with spaces, dimensions, and finishes (Table 1).

These houses were situated in a cul de sac, with Andrés Morán's house bordering one side and some houses linked to the Virgins' Chapel of Seville Cathedral on the other. According to the measurements taken during the survey, the total surface area was 543.79 m^2, which was much larger than the average area of the plots surveyed in nearby neighbourhoods. The distribution of the usable spaces was as follows: 288.12 m^2 on the ground floor, 133.06 m^2 on the first floor, and 22.10 m^2 on the second floor of the main house, along with 125.15 m^2 on the ground floor, 92.10 m^2 on the first floor, and 14.49 m^2 on the second floor of the accessory house.

The main house had rooms that are characteristic of Seville's main houses, including a stable with a mezzanine, a porticoed courtyard with marble columns, a service area, and a complete house. The accessory house, in contrast, may have been used exclusively for services.

The affluence of the owner can be seen in the house's location on one of the main streets in the neighbourhood, the generous surface area of the properties (443.28 m^2 for the main house and 231.74 m^2 for the accessory house), and the distinctive finishes and details. Notable elements include a marble-columned gallery in the main courtyard [5] with iron railings, with the main room of the house [8] featuring marble slabs instead of the usual tiled thresholds and walls decorated with tiles up to a height of 2 Castilian varas; additionally, the main staircase was embellished with wooden nosing and lined with tiles. Notably, there is a window with an old-style grille in

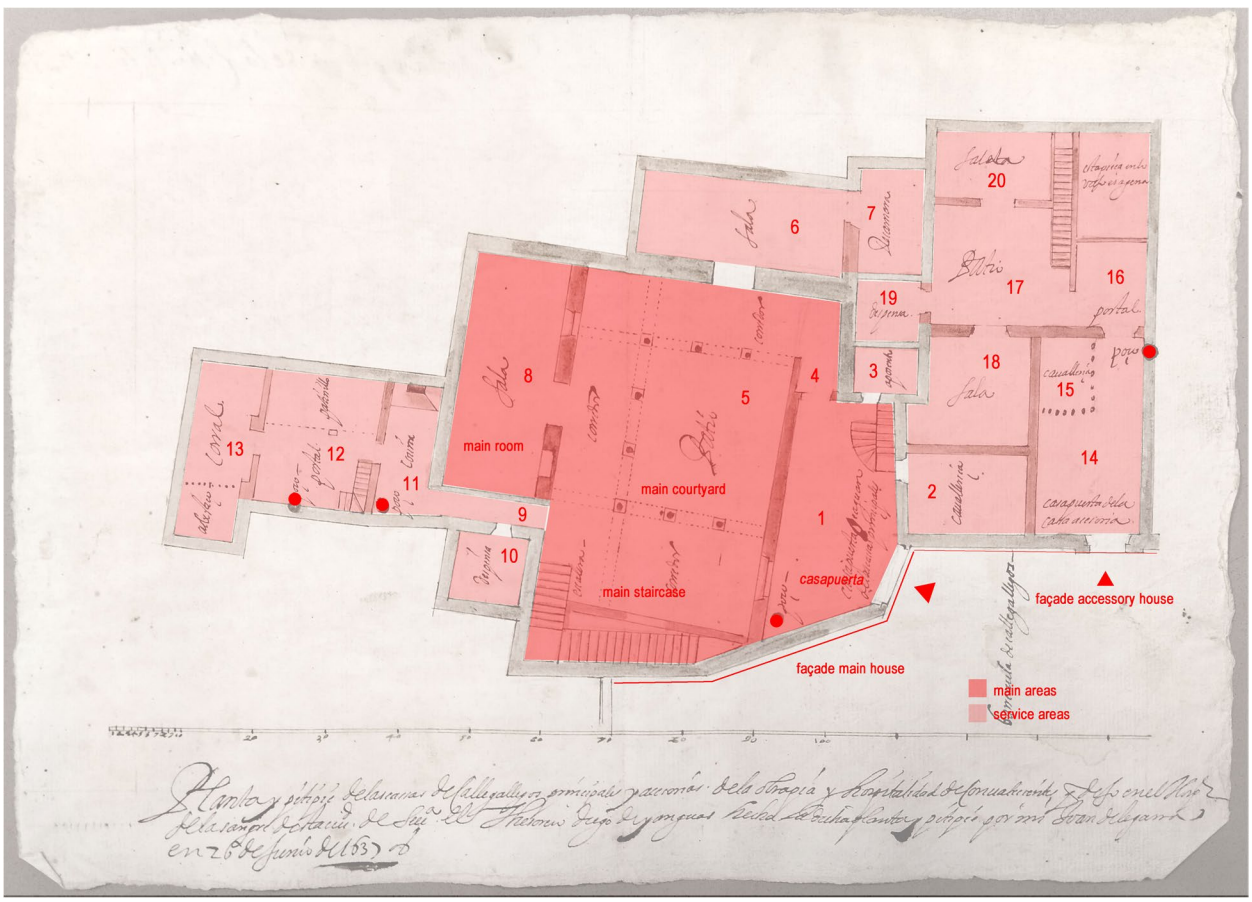

Fig. 16 Floor plan with indications of access points and areas of the house and the route according to the survey (Source: Hospital de las Cinco Llagas Collection, ADPSE, Seville, Spain and the authors)

Tab 1 Table showing the route according to the survey, with spaces, dimensions, finishes and some characteristics

Number	Part of the house	Dimensions (width/length/height) always Castilian varas	Description of finishes	Special characteristics
Main house				
	Façade	22 and two thirds varas /-/ 9 and a half varas	Masonry and rammed earth; whitewashed; grilles in the openings	
1	*Casapuerta*	4 varas/10 and a half varas /-	Cobblestone floor; an extra floor above	Well; old-style grille; masonry staircase and iron handrail to mezzanine and hayloft
2	Stable	3 and three quarters varas / 5 and two thirds varas /-	Cobblestone floor; twice extra floor above	Small opening
3	Chamber	2 and a quarter varas/3 varas/-	Plastered brick floor; an extra floor above	Over accessory house
4	Passage	1 and a half varas/1 and a half varas/-	An extra floor above	
5	Main courtyard and corridors	10 and a sixth varas/15 and a sixth varas/-	Side-by-side brick floor; first corridor with roof, other two with an extra floor above	14 marble columns (8 downstairs, 6 upstairs); iron handrails
6	Room	4 varas minus a sixth/9 and a sixth varas/-	Side-by-side brick floor; an extra floor above	
7	Bedroom	2 and two thirds varas /5 varas minus a twelfth/-	Plastered brick floor; an extra floor above	An extra room above
8	Main room	4 and a quarter varas /11 varas/-	Side-by-side brick floor; an extra floor above	Thresholds with marble slabs; wall lined with tiles up to 2 varas high
	Main staircase			3 flights, 2 landings and 23 steps, with nosing and lined with tiles, underneath there is a chamber
9	Kitchen and low service	1 and a sixth varas/5 and two thirds varas/-	An extra floor above with mezzanine	
10	Chamber	3 varas/3 varas/-	An extra floor above with mezzanine	Square shape
11	Kitchen	2 and a haf varas/6 and a third varas/-	An extra floor above	Well
12	Little courtyard	5 varas/5 and a third varas/-	Plastered brick floor; an extra floor above with mezzanine	Well; staircase to upper service
13	Pen and shed	2 and two thirds varas/8 and an eighth varas/-	Edged brick floor	
Accessory house				
	Façade	5 and a half varas/-/9 varas	Whitewashed walls; grille in an opening	
14	*Casapuerta*	5 and a half varas /9 varas/-	Edged brick floor; an extra floor above	Two extra rooms above; and a rooftop
15	Stable			Mezzanine
16	*Portal*	3 and a fourth varas /4 varas minus a sixth/-	Side-by-side brick floor; an extra floor above	5 varas higher than the neighbouring house
17	Courtyard	5 and a half varas minus two fingers/6 and a third varas/-	Side-by-side brick floor	Masonry staircase
18	Room (pantry)	4 and a half varas /4 and a half varas/-	Side-by-side flooring; twice extra floor above	Square shape, entrance to another square-shaped space 2 varas
19	Chamber	2 and three fourths varas /3 varas/-	Plastered brick floor	An extra room above is accessed from the main house
20	Room	3 varas and 2 fingers/6 varas minus 2 fingers/-	Plastered brick floor; an extra floor above	Inside is a stairwell

the *casapuerta* opening into the main courtyard, and four wells are distributed throughout the two houses, which shows the tenants' concern for lighting the main rooms for health and appearance (Fig. 13).

9 Results and discussion

As we have seen, the analysis of the survey of the houses on Gallegos Street and their subsequent virtual reconstruction have helped improve our knowledge of the architectural and domestic reality of the city of Seville in the 17th century. Despite the lack of preservation of the houses under scrutiny, substantial progress has been made using the building's historical written and graphic documentation.

Our methodology, in which written and historical graphic sources have been used together for the first time, has not only helped reconstruct the architecture, material culture and everyday life of the past but also provided the possibility of comparing and contrasting our interpretation of historical written documents with their graphic equivalent. This work also allows us to compare previously studied architectural styles and provides us the possibility of comparing others in the future. Furthermore, it has enriched both historical and architectural terminology.

By analysing the architecture, drawings and buildings of the city of Seville, this work delved deeper into domestic architecture. Thus, this study contributes to a future catalogue of other lesser-known Sevillian architecture of the 17th century. These results, although valuable, are only the beginning. We are convinced that there must be an undetermined number of buildings waiting to be reconstructed that will no doubt help complete our understanding of 17th-century Sevillian domestic architecture.

Regarding the virtual reconstructed model, as teachers of architectural drawing, we are aware of the difficulties that often arise in understanding graphic information. This challenge occurs even when we can compare graphic information with a written description, as is the case for the houses on Gallegos Street. As a result, we believe that, in addition to historical and graphic studies, there is great interest in producing spatial reconstructions since these volumetric models often help viewers understand and compare architectural styles (Fig. 17).

The spatial reconstruction included in this study facilitates our understanding of the house. Although it was never intended to be the basis of this study, the rendering serves as an approximation, based on the detailed measurements in the documentation, which help establish a hypothetical relationship between the known part of the whole and the complete building (Figs. 18 and 19).

This reconstruction is supported by the London and Seville Principles. Among these, the approach to the principles of complementarity stands out, where computer visualisation is complementary to other documentation that does not need any other information to be understood. Similarly, the principle of authenticity is important, as assumptions were included in only the

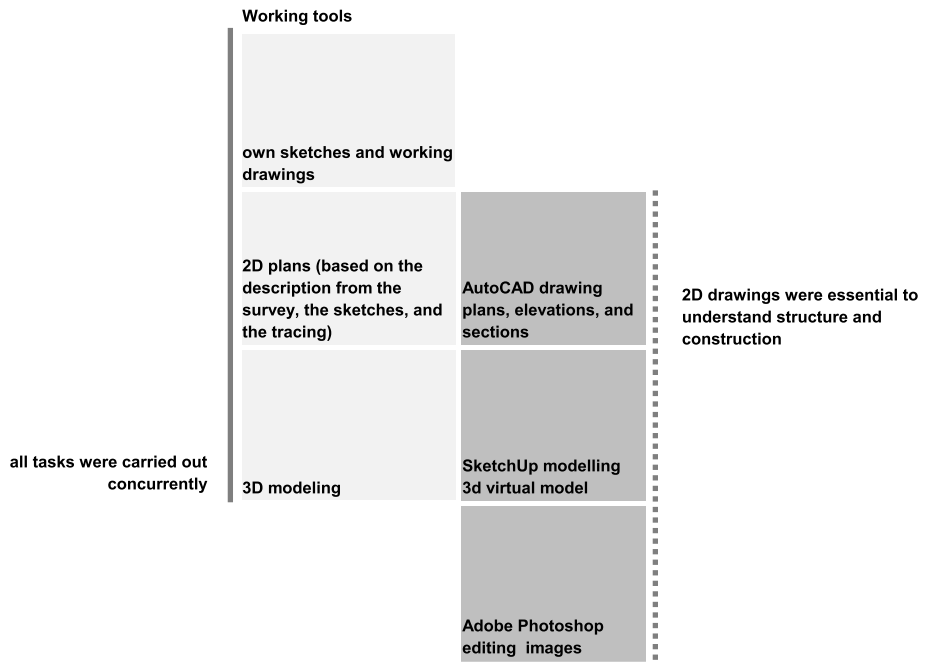

Fig. 17 Working tools (Source: the authors)

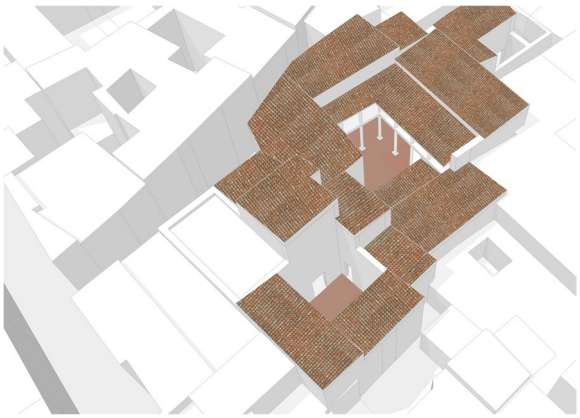

Fig. 18 Reconstruction of the houses on Gallegos Street according to the survey (Source: the authors)

volumetric recreation, as previously indicated in our study. Based on previous experience, we understand that these assumptions are minimal, rigorous, and historical, with an essential aim of achieving historical accuracy.

Regarding the state of the art, we have mainly felt alone during our many years of research due to our particular way of approaching the subject of recreating architectural drawings from historical documentation. Although many authors mentioned here have without doubt served as an inspiration for us, none fully adjusts to our context in time or in form.

The approaches used in the studies of cities based on historical texts, developed by Passini (2011) or Orihuela (2022; 2015), present close and somewhat familiar models to our methodology. However, specifically for the second, the most similar of the two, we believe the results were not confirmed with drawings from the same period, unlike the study presented here. López-Salas's (2021a;

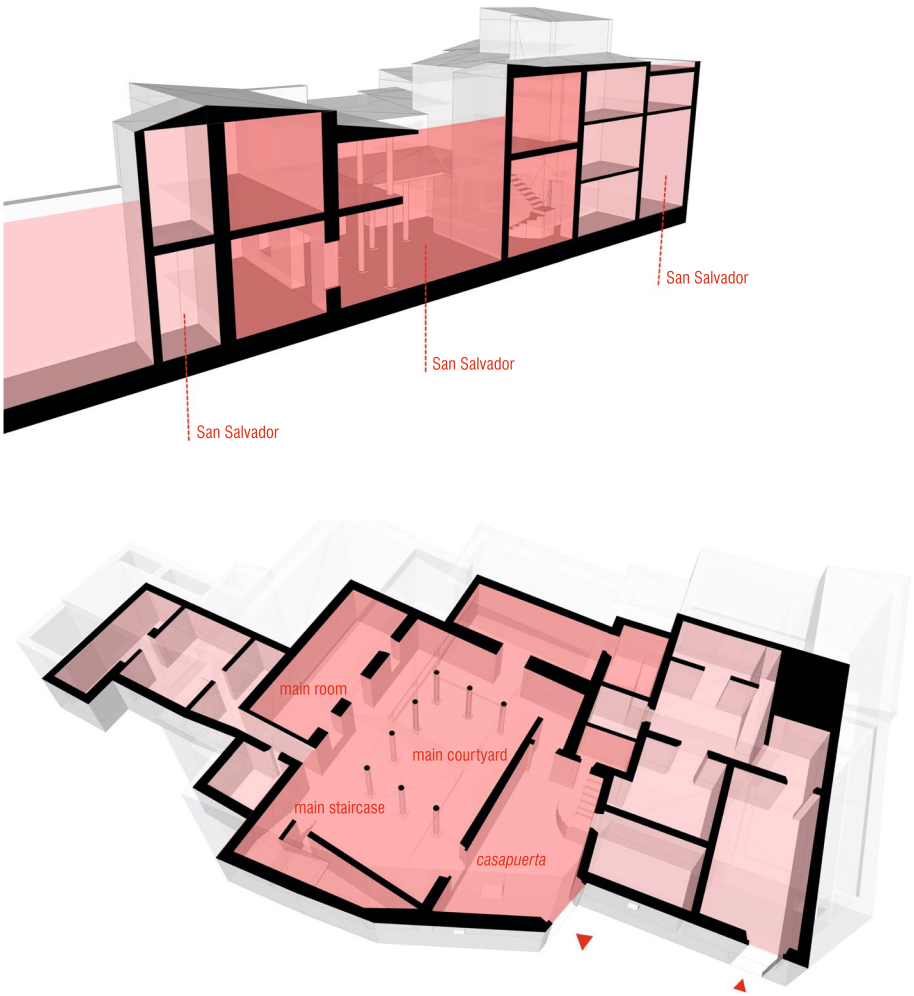

Fig. 19 Section and floor plan volumetrics recreating the houses on Gallegos Street according to the survey (Source: the authors)

Fig. 20 Houses on Gallegos Street in 1637 and present-day buildings (Source: the authors)

2021b; 2017) research on the monastery of Samos and its surroundings is similar in this regard. From an architectural point of view, the methodology presented shares the use of written sources (demarcation books), but again, to our knowledge, the results were not confirmed with historical graphic documentation.

We considered Aparicio (2021) and Aparicio and Figueiredo (2016) a useful reference because his theoretical approach to the how and why of virtual reconstruction also resulted in reconstructions of concrete remains. However, this approach, always from an archaeological point of view, was far from our approach in drawing or architecture.

Additionally, regarding the concept of virtual archaeology, the works of Gómez (2009), López-Menchero Bendicho (2013) or Pietroni and Ferdani (2021) gave us the freedom to find our own path even though their work represented views on issues less familiar to us as architects.

Virtual reconstruction is emerging as a discipline of its own, parallel to archaeology, but this development is less evident in the comparison with architecture. This difference has forced us to avoid various methodological standardisations inherent to other disciplines because their use in architectural extrapolation is not immediate.

We also highlight how the development of digital technology has completely changed the method of recording and documenting architectural heritage, making it better, more efficient and more precise (Münster, Koehler and Hoppe 2013). At the same time, our objective must go beyond the simple accumulation of data (Münster, Friedrichs and Hegel 2018).

Overall, we conclude that the virtual reconstruction of architecture cannot be anything other than a pragmatic tool placed at the service of the recovery of the history of architecture (Fig. 20).

10 Conclusions

Surveys are an essential source of information for the modern history of the city of Seville, both for their descriptive richness and for the thoroughness with which the masters took down the details in their writing. The texts allow us to understand the surveys not only as a tool for quantification but also as a tool for qualifying or classifying the constructions. These texts thus serve as a repository of history, of the life cycle of the construction and of those who inhabited it.

This architecture, which is of significant heritage value, should have received an adequate level of protection, despite the problems in safeguarding or even finding these houses. Today, new circumstances aid our understanding of these assets, which in turn can promote their conservation or restoration. However, these efforts must be supported by precise documentary knowledge encompassing textual, graphic and historiographic dimensions.

The objective of this research was to make a significant contribution to our understanding of the historical and architectural context of Seville at a given time, as well as to shed light on the evolution of architecture in general and Sevillian domestic architecture of the 17th century in particular.

The main challenge of studying Sevillian architecture through surveys is that, unfortunately, most of the buildings contained in them have disappeared over the years. The absence of physical structures underlines the importance of the available documentation, as it forms the basis of our understanding of this architecture and its place in history.

This article has presented a systematic list of the sources of information used and a method developed over years of research that partially mitigates the numerous obstacles encountered. All of these findings contributed to reconstruct the history of a simple Sevillian house that the builder Juan de Legarra 'measured and valued' in 1637.

Abbreviations

ADPSE	Provincial Council of Seville Archive
ACS	Cathedral of Seville Archive
AHPS	Provincial Historical Archive of Seville

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s43238-024-00124-5.

Supplementary Material 1.

Acknowledgements

The authors would like to thank Esperanza Carbajo Cruces for her invaluable help. The authors are members of the research group Expregrafica. Place, Architecture and Drawing (PAIDI-HUM-976).

Authors' contributions
Conceptualization, M.N.-G., and P.M.-O.; investigation, M.N.-G., and P.M.-O.; resources, M.N.-G., and P.M.-O.; writing, original draft preparation, M.N.-G., and P.M–O; writing-review and editing, M.N.-G., P.M.-O., and F.V.-V. All authors read and approved the final manuscript.

Funding
This research is the result of the project R + D + I Herramienta digital y método de evaluación del paisaje urbano para la salvaguarda y protección de la piel de los conjuntos históricos a partir del caso de Sevilla. PID2020-115786GB-I00. PI: María Dolores Robador González. Funded by MCIN.
This research is the result of the of the project R + D + I Grant *Calling a spade a spade: (Re)constructing fifteenth and sixteenth-century housing with words and images*. PID2022-136565NB-I00. PI: María Elena Díez Jorge; co-PI: Ana Aranda Bernal. Funded by MCIU/AEI/ 10.13039/501100011033 and by ERDF, EU.

Availability of data and materials
Not applicable.

Declarations

Competing interests
The authors declare that they have no competing interests.

Author details
[1]Departamento de Ideación Gráfica Arquitectónica Escuela Técnica Superior de Arquitectura, Universidad Politécnica de Madrid, Av. de Juan de Herrera 4, 28040 Madrid, Spain. [2]Departamento de Expresión Gráfica Arquitectónica Escuela Técnica Superior de Arquitectura, Universidad de Sevilla, Av. de Reina Mercedes 2, Seville 41012, Spain.

Received: 30 October 2023 Accepted: 21 March 2024
Published online: 11 May 2024

References

AparicioResco, Pablo, and César. Figueiredo. 2016. El grado de evidencia histórico-arqueológica de las reconstrucciones virtuales: hacia una escala de representación gráfica. *Revista Otarq* 1: 235–247. https://doi.org/10.23914/otarq.v0i1.96.
Aparicio-Resco, Pablo. 2021. Guía para la documentación de reconstrucciones virtuales de bienes patrimoniales. *Revista Schema* 2: 129–146.
Aparicio-Resco, Pablo, Alejandro García Álvarez-Busto, Iván. Muñiz-López, and Noelia Fernández-Calderón. 2021. Reconstrucción virtual en 3D del castillo de Gauzón (Castrillón, Principado de Asturias). *Virtual Archaeology Review* 12 (25): 158–176. https://doi.org/10.4995/var.2021.14940.
Collantes de Terán Sánchez, Antonio. 2017. La casapuerta en la vivienda sevillana en la transición de la Edad Media a la Moderna. Boletín de la Real Academia Sevillana de Buenas Letras. *Minervae Baeticae* 45: 171–182.
Collantes de Terán Sánchez, Antonio. 1977. *Sevilla en la Baja Edad Media: la ciudad y sus hombres*. Sevilla: Ayuntamiento de Sevilla.
Collantes de Terán Sánchez, Antonio. 2022. *La casa sevillana*. Sevilla: Real Academia Sevillana de Buenas Letras.
Cómez Ramos, Rafael. 2011. *Ordenanzas urbanas de la construcción en la Baja Edad Media castellana. In História da Construção-Os Construtores, coord. Maria do Carmo Ribeiro and Arnaldo Sousa Melo*. Braga: CITCEM.
Cruz Isidoro, Fernando. 1995. Sobre el arquitecto Juan de Segarra, teniente de maestro mayor del Concejo Hispalense. *Laboratorio De Arte: Revista Del Departamento De Historia Del Arte* 8: 417–429.
Favro, Diane. 2012. Se non è vero, è ben trovato (If not true, it is well conceived): digital immersive reconstructions of historical environments. *Journal of the Society of Architectural Historians* 71 (3): 273–277. https://doi.org/10.1525/jsah.2012.71.3.273.
Fernández Martín, María Mercedes. 2003. *Dibujos sevillanos de arquitectura de la primera mitad del siglo XVII*. Sevilla: Universidad de Sevilla, Secretariado de Publicaciones.
Gómez Robles, Lucía, and Victoria Quirosa García. 2009. Nuevas tecnologías para difundir el patrimonio cultural: las reconstrucciones virtuales en España. *Erph_Revista Electrónica De Patrimonio Histórico* 4: 150–173.
Harris, Dianne. 2015. Architectural History's Futures. *Journal of the Society of Architectural Historians* 74 (2): 147–151. https://doi.org/10.1525/jsah.2015.74.2.147.
López Martínez, Celestino. 1928. *Arquitectos, escultores y pintores vecinos de Sevilla*. Sevilla: Rodríguez, Jiménez y C.
López-Menchero Bendicho, Victor Manuel. 2013. International Guidelines for Virtual Archaeology: The Seville Principles. In *Good Practice in Archaeological Diagnostics: Non-Invasive Survey of Complex Archaeological Sites*, edited by Cristina Corsi, Bozidar Slapsak and Frank Vermeulen, 269–283. New York: Springer. https://doi.org/10.1007/978-3-319-01784-6_16.
López Salas, Estefanía. 2017. Drawing the past shape of the monastic town of Samos and its immediate environment through an archival document. In *Mapping urban changes*, edited by Ana Plosnić Škarić, Ivo Babić, and Bojana Bojanić Obad Šćitaroci, 494–515. Zagreb: Institute of Art History. https://ducac.ipu.hr/project/wp-content/uploads/Mapping_urban_changes_Mapiranje_urbanih_promjena.pdf. Accessed 11 December 2023.
López Salas, Estefanía. 2021a. Digital Samos A digital approach to the monastery of San Julián de Samos. https://digitalsamos.udc.es/index.html. Accessed 2 Oct 2023.
López Salas, Estefanía. 2021b. Making an animation as a means of dissemination and as a tool for research into historical sites: the case study of San Julián de Samos. *International Journal of Humanities and Arts Computing* 15 (1–2): 133–151. https://doi.org/10.3366/ijhac.2021.0266.
Moya-Olmedo, Pilar. 2023. Rendering Uqlīsh: Virtual reconstruction of the architecture of the order of santiago in the territory of uclés through the order's inspection records. *Virtual Archaeology Review* 14 (29): 45–67. https://doi.org/10.4995/var.2023.19215.
Moya-Olmedo, Pilar, and María Núñez-González. 2022. Converso houses in the 16th century in the former Jewish Quarter of Seville. *Heritage* 5 (4): 4174–4203. https://doi.org/10.3390/heritage5040216.
Münster, Sander, Kristina Friedrichs, and Wolfgang Hegel. 2018. 3D reconstruction techniques as a cultural shift in art history. *International Journal for Digital Art History* 3: 39–59. https://doi.org/10.11588/dah.2018.3.32473.
Münster, Sander, Thomas Koehler, and Stephan Hoppe. 2013. 3D modeling technologies as tools for the reconstruction and visualization of historic items in humanities. A literature-based survey. In *Across space and time: Papers from the 41st Conference on Computer Applications and Quantitative Methods in Archaeology, Perth, March 25-28*, edited by Arianna Traviglia. Amsterdam: Amsterdam University Press.
Noemí, Silva-Sánchez., Tim Kinnaird, Marcos Fernández-Ferreiro, Estefanía López-Salas, Sam Turner, and José-Carlos. Sánchez-Pardo. 2022. Written in soil and paper. Investigating environmental transformations of a monastic landscape by combining geoarchaeology and palynology with historical analysis at Samos (Spain). *Journal of Archaeological Science: Reports* 45: 103575. https://doi.org/10.1016/j.jasrep.2022.103575.
Núñez-González, María. 2021a. *Arquitectura, Dibujo y Léxico de Alarifes en la Sevilla del Siglo XVI: Casas, Corrales, Mesones y Tiendas*. Sevilla: Universidad de Sevilla; Fundación Focus.
Núñez-González, María. 2021b. Drawing and architectural analysis of San Ildefonso's Baths in Seville (1542). *VLC Arquitectura* 8 (2): 117–150. https://doi.org/10.4995/vlc.2021.13625.
Núñez-González, María, and Pilar Moya-Olmedo. 2023. Women in the Sevillian House (16th Century): Real estate market analysis and architectural study. Estoa. *Journal of the Faculty of Architecture and Urbanism* 12 (24): 80–91. https://doi.org/10.18537/est.v012.n024.a07.
Orihuela-Uzal, Antonio. 2015. Casas andalusíes en el libro de habices de las mezquitas de Granada del año 1527. In *In La Casa Medieval en la Península Ibérica*, edited by María Elena. Díez Jorge and José Navarro Palazón, 465–485. Madrid: Sílex.
Orihuela-Uzal, Antonio. 2022. Análisis arquitectónico de las casas y otras posesiones del Cabildo de Málaga, según las descripciones del Quaderno del año 1527. In *In Abierta de par en par. La casa del siglo XVI en el reino de Granada*, edited by María Elena. Díez Jorge and Antonio Orihuela Uzal, 45–103. Madrid: CSIC.
Passini, Jean. 2011. *La Judería de Toledo*. Toledo Madrid: Editions of Sofer.
Pérez Escolano, Víctor. 1981. Entre el rigor y la retórica: Casa y ciudad en la Sevilla Moderna. *Archivo Hispalense: Revista Histórica Literaria y Artística* 64 (196): 63–74.
Pietroni, Eva, and Daniele Ferdani. 2021. Virtual restoration and virtual reconstruction in cultural heritage: Terminology, methodologies, visual

representation techniques and cognitive models. *Information* 12(4): 167. https://doi.org/10.3390/info12040167.
Rodríguez Hernández, Jesus, Jesus R. ÁlvarezSanchís, Pablo AparicioResco, Miguel Ángel Maté-González, and Gonzalo Ruiz-Zapatero. 2021. Reconstrucción virtual en 3D del "Torreón" del oppidum de Ulaca (Solosancho, Ávila): mucho más que una imagen. *Arqueología de la Arquitectura* 18: 1–19. https://doi.org/10.3989/arq.arqt.2021.015.
Sancho Corbacho, Antonio. 1983. *Dibujos arquitectónicos del siglo XVII*. Sevilla: Servicio de Publicaciones del Ayuntamiento de Sevilla.
The London Charter. 2009. https://www.londoncharter.org. Accessed 2 Oct 2023.
The Seville Principles. 2017. International Principles of Virtual Archaeology. https://icomos.es/wp-content/uploads/2020/06/Seville-Principles-IN-ES-FR.pdf. Accessed 2 Oct 2023.

Publisher's Note