

DOCUMENTATION

Summer School 2022 | Kukaldosh Madrasah Bukhara Uzbekistan

*Interdisciplinary at the monument - transfer, innovative methods
and research learning in practical projects for the preservation of the
cultural heritage of Uzbekistan*



Fachhochschule Potsdam, University of Applied Sciences
Tashkent University of Architecture and Civil Engineering
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Fachhochschule Potsdam
University of
Applied Sciences

ISBN: 978-3-947796-11-3

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Layout: Stefan Schanzenbach

Printed by WIRmachenDRUCK GmbH, p.p. Fachhochschule Potsdam

The printing of this documentation was made possible by the support of

Fördergesellschaft

der Fachhochschule Potsdam e.V.

The summer school was funded by the DAAD within the framework of the Eastern Partnership Programme with funds from the Federal Foreign Office.



Deutscher Akademischer Austauschdienst
German Academic Exchange Service

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A few remarks

on the cooperation with the Partner-Universities of Uzbekistan

by Volker Bley, Ass. jur. (Hochschulkanzler a. D.) fr. Chancellor of Fachhochschule Potsdam

Joint interest in World Cultural Heritage Sites and their conservation, preservation and restoration as parts of contemporary cities and societies is what brought faculty, staff and students of Tashkent University of Architecture and Civil Engineering, Samarkand University of Architecture and Civil Engineering, Bukhara State University and University of Applied Sciences Potsdam together for a Summer School 2022 at the Kukeldash Madrasah in Bukhara, Uzbekistan.

Looking through the results of the collaboration during two intensive weeks in September 2022, jointly produced by students under the supervision of professors and teachers from all participating universities with the superb infrastructural support of Bukhara State University and the input from some external experts makes me a bit proud. Collaboration in higher education does produce results.

While the documentation speaks for itself, I would like to use the opportunity for a few remarks concerning the legacy, the legal and the political and fiscal frame of long term international academic cooperation and collaboration of mid-sized higher education institutions.

5

Legacy:

Fachhochschule Potsdam's cooperation with universities in Uzbekistan dates back to the 1990s when Professor Dr. Martina Abri followed her interest and started collaborative projects in conserving, preserving, restoring and also renovating important landmarked buildings and sites. From 2004 onwards, the collaboration expanded.

With financial support from the cultural heritage funds of the German Foreign Office experts from the University of Applied Sciences Potsdam participated in various conservation and restoration projects, namely stabilizing and rebuilding the foundation of Tilla-Kari Mosque on the Registan und Samarkand, preserving and restoring walls and tiles at Shadi-Mulk-Aga in the grave city Shah-i-Sinda in Samarkand, conserving parts of the mosaics at Medrese Abdul-Aziz-Khan in Old Town Bukhara and developing a part of the Mausoleum Ischrat-Khane in Bukhara as a sample for future restoration work.

Based on the collaborative network established during those projects the first Uzbek-German Summer School took place in September 2007 funded by German Academic Exchange Service and the Gerda Henkel Foundation.

Successful collaboration over more than a decade bore the idea of founding a collaborative Uzbek-German Building-Faculty which materialized by forming the Uzbek-German Center for Architecture and Construction as a joint scientific institute of Tashkent University of Architecture and Construction and University of Applied Sciences Potsdam in Tashkent. The Uzbek-German-Center in Tashkent was active during the existence of the Uzbek-German master program "Bauerhaltung und Denkmalpflege" (conservation and preservation). This program – funded by the Volkswagen-Foundation – brought together four German and two Uzbek universities in collaborating in the education of Uzbek students to become experts for conservation, preservation and restoration. The underlying and multifaceted collaboration treaty I had the honor to draft and negotiate.



Political and financial frame:

It was the Uzbek side which largely financed a trip of a delegation of University of Applied Sciences Potsdam accompanying its newly elected President Prof. Dr. Eva Schmitt-Rodermund to visit our partners in Tashkent, Samarkand and Bukhara in 2019. And it was the “El-yurt umidi” Foundation with its director Prof. Dr. Adkham Bekmuradov who agreed to finance the exchange of academic staff from Tashkent Institute of Architecture and Civil Engineering to Potsdam in 2020.

In the background we held talks with the Foreign Office in Berlin and the German Embassy in Tashkent. We were also received by the Uzbek Ambassador to Germany. It seems clear to me that – despite independence of academic institutions from politics – our project of inter-institutional collaboration can only be successful in the longer term if its focus is also in the interest of the Federal Republic of Germany and the Republic of Uzbekistan. Therefore, it is important to be reminded that our collaboration is also based on the agreement between the Government of the Federal Republic of Germany and the Government of the Republic of Uzbekistan on cultural cooperation (Kulturabkommen) from 1993/2002. This treaty specifically states the value and necessity of academic exchange and scientific collaboration.

It was in 2020 when we and our project sadly lost Abdukabil Tulaganov due to a corona infection he caught while caring for his also corona infected wife. Not only was it awfully sad to lose a friend but also the project for a moment lost its political motor on the Uzbek side.

The Uzbek partners regrouped and especially Prof. Dr. Nilufar Tuhkbaeva of Tashkent University of Architecture and Civil Engineering (currently at the Korean Ajou University in Tashkent) and Prof. Sukhrob Abdullaev of Bukhara State University took over the baton.

The University of Applied Sciences Potsdam as the German partner applied for and received funding by the German Academic Exchange Service for a three-year program (2021-2023) of academic exchange including the Summer School 2022, which this documentation is about.

Legal frame:

On the initiative of Prof. Dr. Abdukabil Abunabievich Tulaganov, then Rector of Bukhara State University, and Ravshan Rashodovich Khakimov, then Rector of Tashkent Institute of Architecture and Civil Engineering, who as part of an Uzbek Presidential delegation in 2019 visited the Campus of University of Applied Sciences Potsdam, we revived the cooperation. With the signing of a renewed and far reaching Memorandum of Understanding, in which a bit later the Samarkand Institute of Architecture and Civil Engineering was included, we have embarked on a path to further develop the cooperation. Exchange of academic staff and students was at the heart of the collaboration. But the option for reviving the Uzbek-German master program in conservation and restoration and potentially the reopening of the Uzbek-German Center and widening the topic scope of the collaboration was put into the memorandum as well. We negotiated this memorandum without knowing if we would be able to secure appropriate funding.

Outlook:

As the legacy of our collaboration shows: a project's end should be the next project's beginning. This is what is being done. Bukhara Engineering-Technological Institute has joined the group of collaborators and a Memorandum of Understanding has been signed.

If all goes as planned there will be funding for an even more interdisciplinary project (2024-2026). Already during the Summer School 2022 an important nucleus for broadening the scientific focus has been laid with the participation of Dr. Marit Cremer from the Department of Social- and Educational Sciences at University of Applied Sciences Potsdam. She was embedded into the Summer School team and made contact – with support of our partners – with the social sciences departments at Bukhara State University and Samarkand State University. A Memorandum of Understanding with Samarkand State University has been signed and sealed.

Special thanks for their ongoing support of our cooperation go to the leadership of our partners, namely to Bukhara State University Rector Prof. Khamidov Obidjon Khafizovich, PhD and Vice Rector for International Cooperation Prof. Juraev Abror Turobovich, to Tashkent University of Architecture and Construction Rector Ercan Kahya, Ph.D and Dean of Faculty of Architecture Prof. Reyimbaev Shuhrat Sadullaevich, to Samarkand State University of Architecture and Construction Rector Chidem Janbay Turkyilmaz, PhD and Dean of the Faculty of Architecture Kamalova Dilnoza Zaynidinovna, PhD, to Bukhara Institute of Engineering and Technology Rector T.f.d. Prof. Barakayev N. R. and to Samarkand State University Rector Professor Dr. sc. Khalmuradov Rustam Ibragimovich, Vice Rector for International Cooperation Prof. Akhatov Akmal Rustamovich and Dean of Faculty of Psychology and Social-Political Sciences Prof. Aminjon Aymatov.

A special thank goes to Prof. Dr. Valentin Popov, Head of Department System Dynamics and Friction Physics at Technical University Berlin, Germany for his kind courier service.



Together we have reformed and regrouped our network. I believe we can proudly be looking forward to a next interdisciplinary phase of collaboration in the fields of conservation, preservation and restoration of buildings and monuments in the context of Mahallas and urban planning and development.

Potsdam,
April 18, 2023

The University of Applied Sciences Potsdam and the three partner universities – Bukhara State University, Tashkent Institute of Architecture and Civil Engineering and Samarkand State Architectural and Civil Engineering Institute – held an 8-day summer school in the Kukeldash Madrasah as part of the DAAD program Eastern Partnerships „Interdisciplinary at the Monument“.

Centrally located in Bukhara, the Kukeldash Madrasah was built in 1568-1579 and was the largest madrasa in Central Asia. In its eventful history, partial destruction, conversion measures and various utilizations took place, all of which left their marks and today offers an exciting ensemble for research. In 1920, for example, the Madrasah was severely damaged by the Red Army's shelling. In 1927, in the 1930s and 1950s, extensive repair and conversion works took place for new utilizations, which is reflected today e.g. in the wall surfaces of the interior rooms by different plasters and paintings. A detailed description of the history of construction, conversion with all utilizations of the monument does not exist to this day.

The focus of the summer school was on interdisciplinary cooperation. Students and lecturers from the Potsdam University of the three building studies (Architecture and Urban planning, Civil Engineering and Conservation and Restoration) as well as from the Uzbek side from the fields of Architecture, Civil Engineering and Applied Arts devoted themselves to the building with different tasks. A key project goal was to enable students to perceive, recognize and examine a building through long-term study on the spot under professional guidance from various disciplines. They got to know different approaches to a monument together, to practice different investigation and measurement methods and to discuss and interpret the results obtained.

These results are presented in the following documentation. Of course, with a processing time of 8 days, the goal could not be a complete documentation of the entire building. Five exemplary areas were selected, which contain both exciting interior and exterior facades as well as individual particularly decorated interiors. The importance and beauty of

Intro- duction

the originally highly decorated medrese becomes clear in this way. The selected areas were each worked on by a group composed of interdisciplinary representatives from all participating universities.

Some areas of the Madrasah (both entire building parts and individual wall areas) require prompt interventions in order not to have to accept further losses. For this reason, a traffic light system was developed within the documentation that indicates the need for an intervention: red for areas at high risk, yellow for areas at risk and green for areas that are currently not at risk.

May this documentation be a first contribution to developing a sustainable conservation concept for the entire medrasa.

We thank all partners for the success of the summer school!

Traffic Light System

A traffic light system was used to clearly show the condition of the supporting structure in individual subsections. This divides the states into three groups and provides instructions for action for each state group.

The three possible states are red, yellow and green according to the traffic light colors.

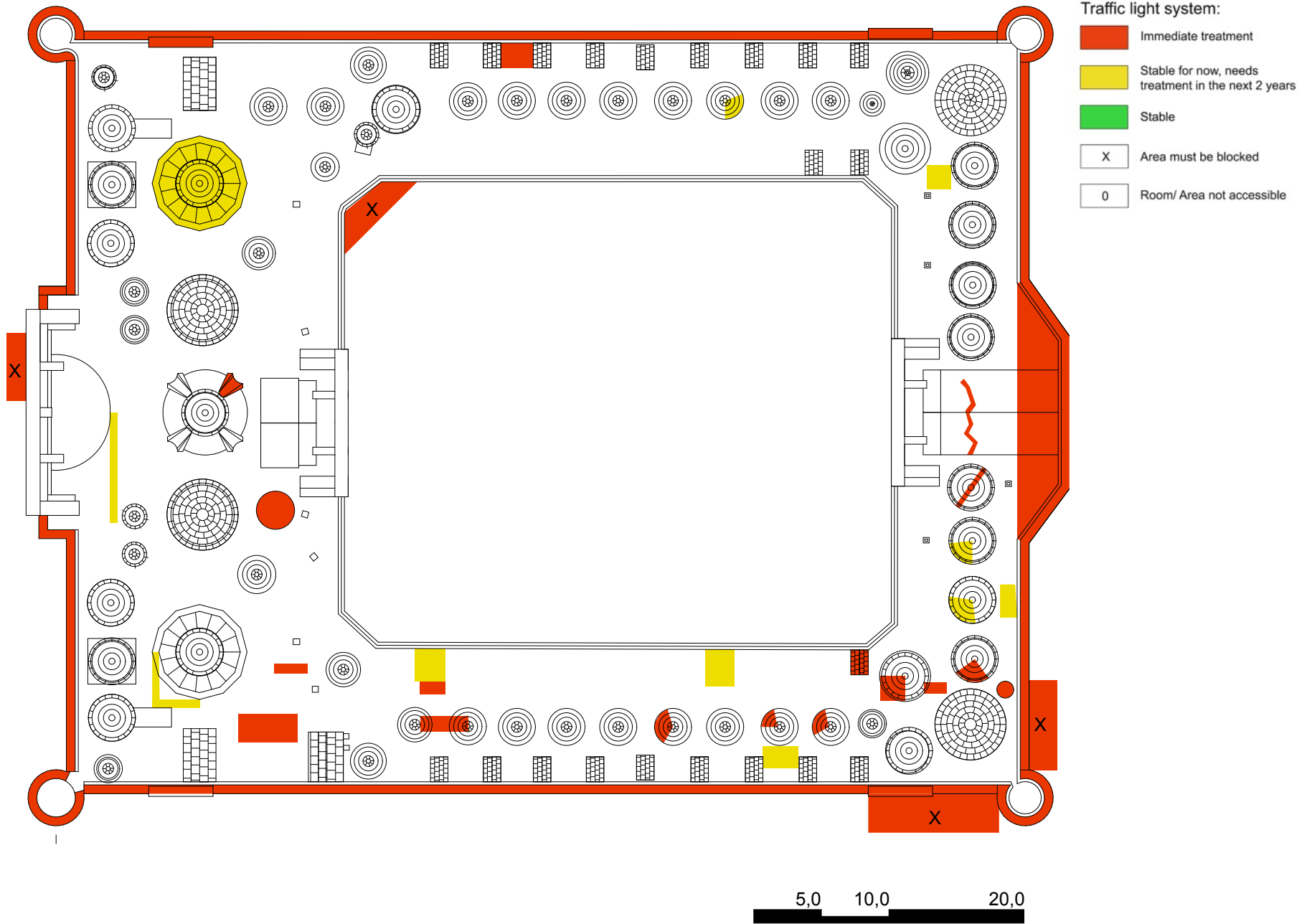
In red areas, the structure is so severely damaged that action must be taken immediately (within one year). It is recommended to block these areas. Red areas with a „X“ must be blocked because pieces can fall off any time.

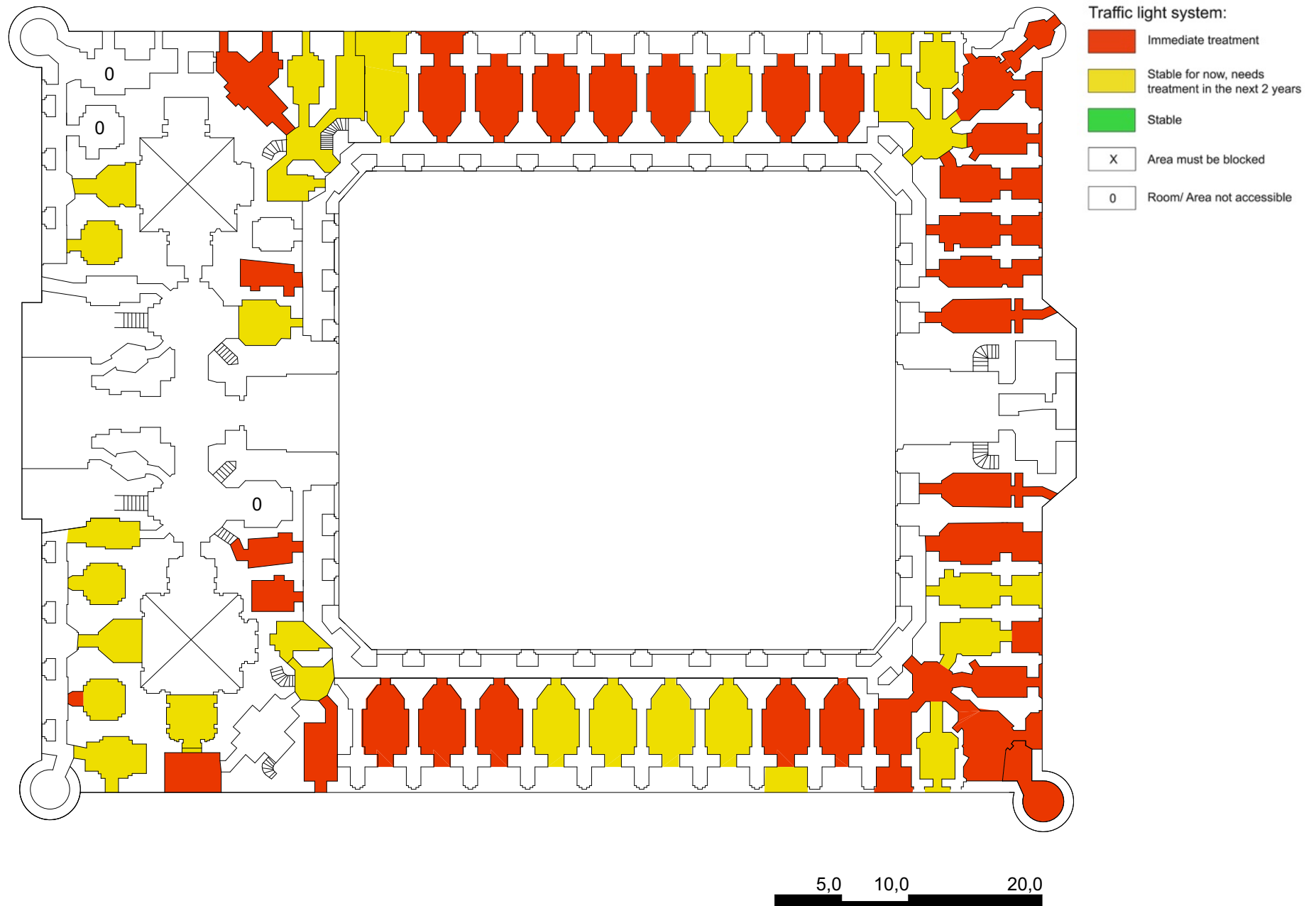
Yellow areas also need work (within two years), but are currently stable.

Green areas should only be inspected within the next 5 years. If deterioration has occurred, the area should be assigned to another color. In our mapping for the whole madrasa, all areas not marked red or yellow are considered green.

On the floor plan of the 2nd floor, individual rooms are marked with a „0“. These areas were not accessible to us at the time of the survey.

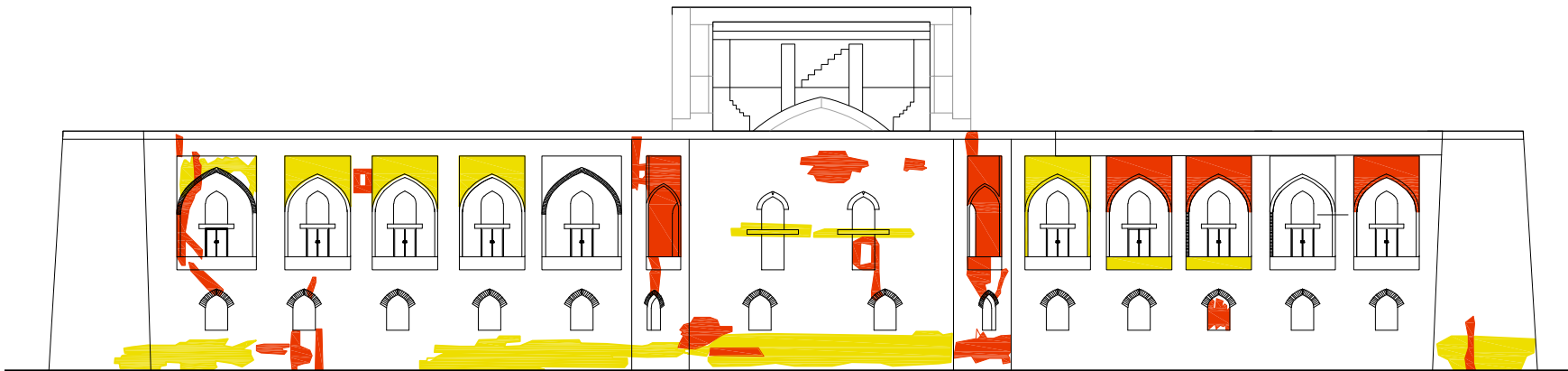
Apart from the measures to ensure stability, cleaning should generally be carried out on the roof and the overgrowth removed. To prevent further damage, a functioning roof drainage system must be ensured.





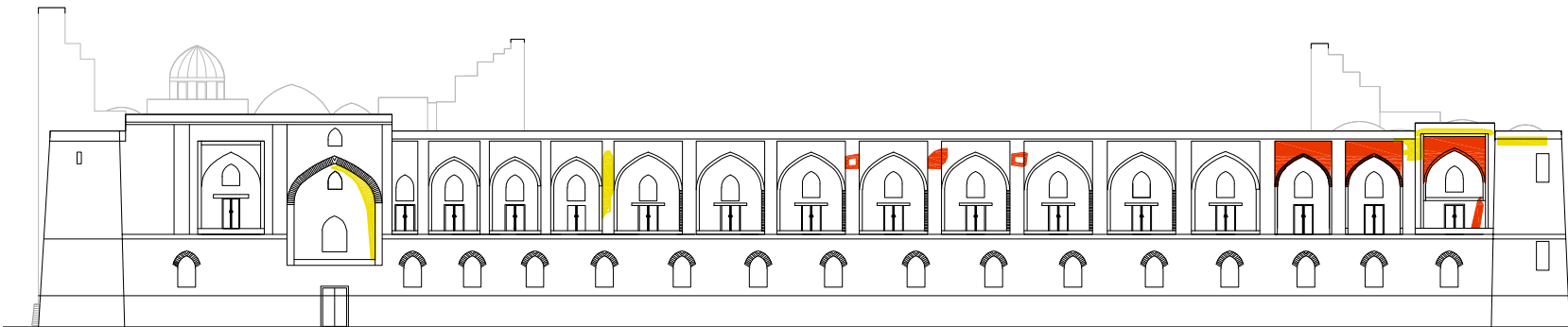
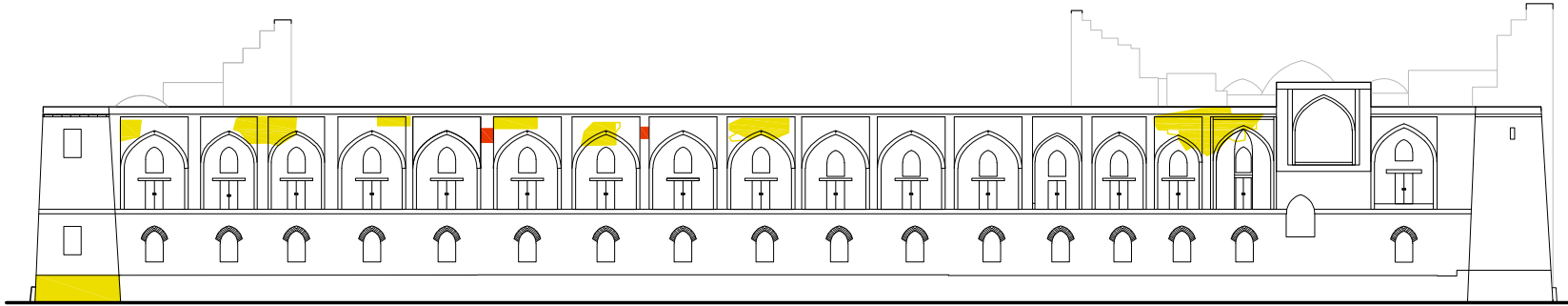
Traffic light system:

- Immediate treatment
- Stable for now, needs treatment in the next 2 years
- Stable
- X Area must be blocked
- 0 Room/ Area not accessible



Traffic light system:

- Immediate treatment
- Stable for now, needs treatment in the next 2 years
- Stable
- X Area must be blocked
- 0 Room/ Area not accessible



Team 1



Students

Sharofat Asrorova
Buchara State University
Folk Applied Decorative Art and Restauration

Anke Kaßler-Völker
University of Applied Science Potsdam
Building Preservation

Firuz Kurbanov
Buchara State University
Fine Arts and Engeneering Grafics

Julia Reinhardt
University of Applied Science Potsdam
Conservation and Preservation (Wallpainting)

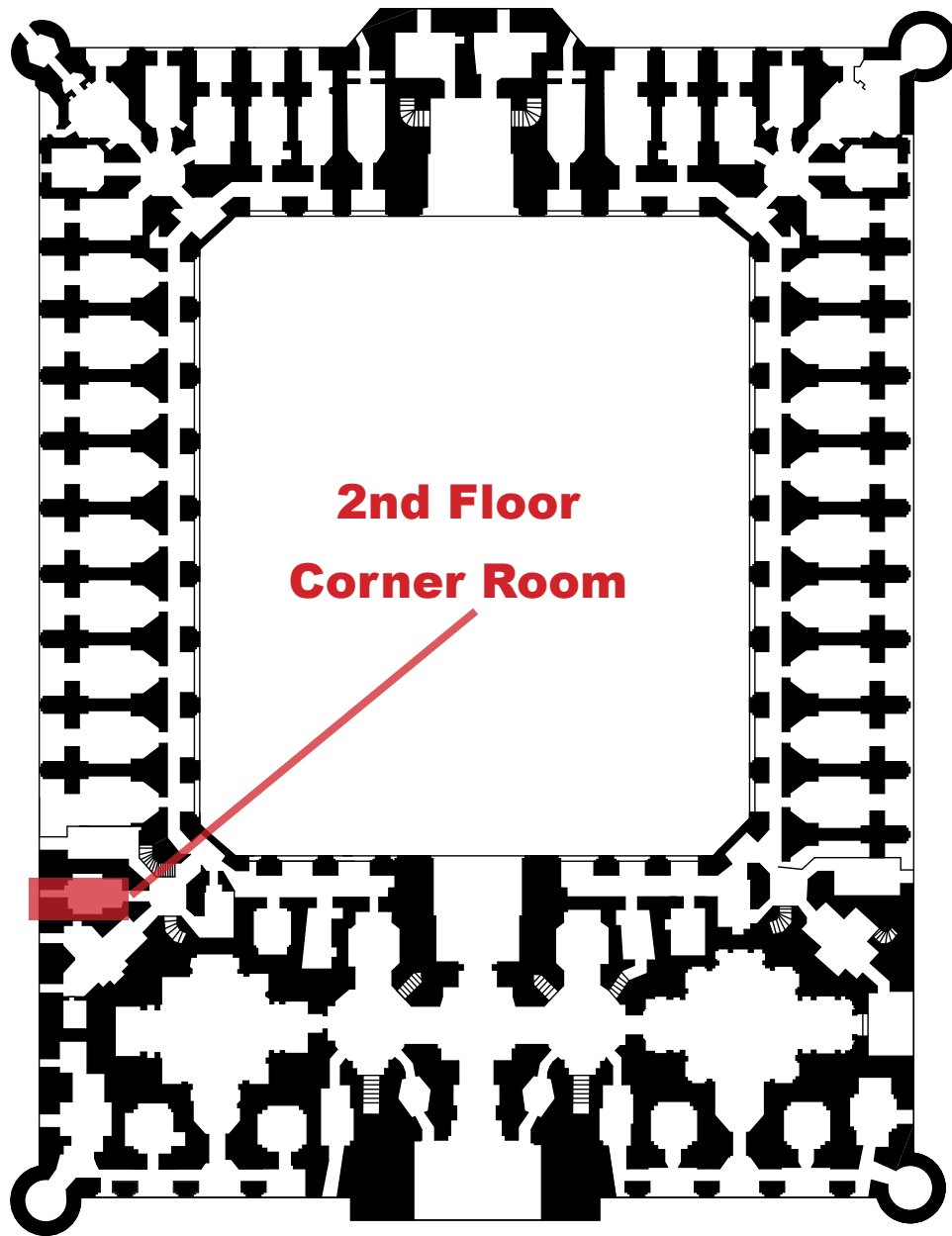
Deniz Yildirim
University of Applied Science Potsdam
Building Preservation

Mentors

Prof. Dr. Jan Raue
University of Applied Science Potsdam
Professor of Conservation and Preservation
Wallpaintings

Dinara Nazarova
Tashkent University of Arch. and Civil Eng.
Head of Department of Urban Planning and
Landscape Architecture

Corner Room



Corner Room

Introduction of the room

The room worked on by group 1 is on the second floor of the Madrassa. A small staircase leads from the inner courtyard to an arcade that provides access to most of the rooms on the upper floor of the western half of the madrassa. In the southwest corner, several rooms and a staircase are accessed via an anteroom, including the room being worked on.

The rich decorations in different techniques are to be emphasised as a special feature. The existing tokchas, niche compartments, on the north and south walls give an idea of how a student might have lived here. Perhaps it was a wealthy student, because all wall and ceiling surfaces are decorated with stucco or wall paintings.

In addition, a wall opening with an open flue up to the roof has been preserved on the north wall. On the wall surface above the opening is a kyrma, an ornament worked like a sgrafitto.

On the floor rises a rectangular work surface that was used, among other things, to make panjaras, window grilles. This surface is called tachmon. There is also such a plate in the room above.

Documentation

This documentation consists of floor plans and sectional drawings, photographs of the interior views, the facades and individual damages, as well as mapping of damages and materials. Also included are hand drawings that reproduce some of the existing decorations.

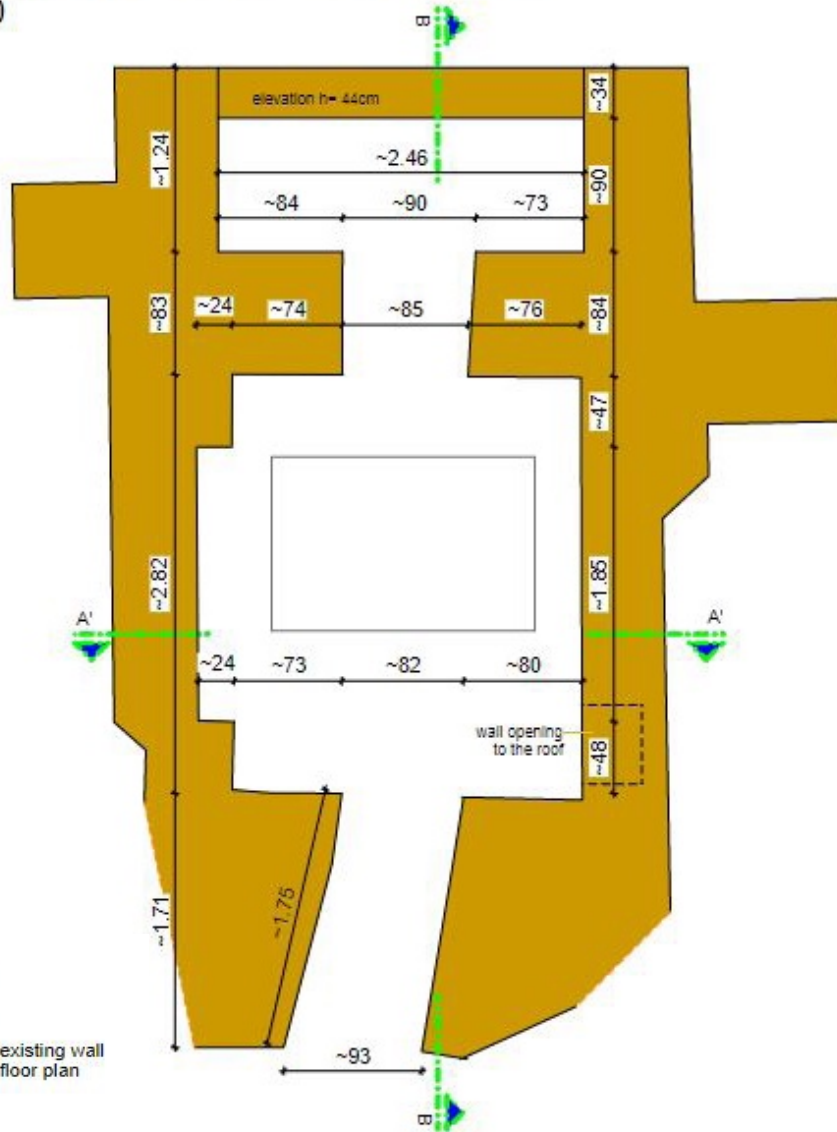
CAD Drawing

The floor plans show the main room that was worked on and the room above. The main room has a square floor plan, while the room above has a rectangular floor plan. A rectangular loggia adjoins the main room to the west.

Both the main room and the room above are closed off by a dome. This is shown in the sectional drawings as well as the position of the rooms in relation to each other.

Floor plan 1st floor - lower floor

M 1:50

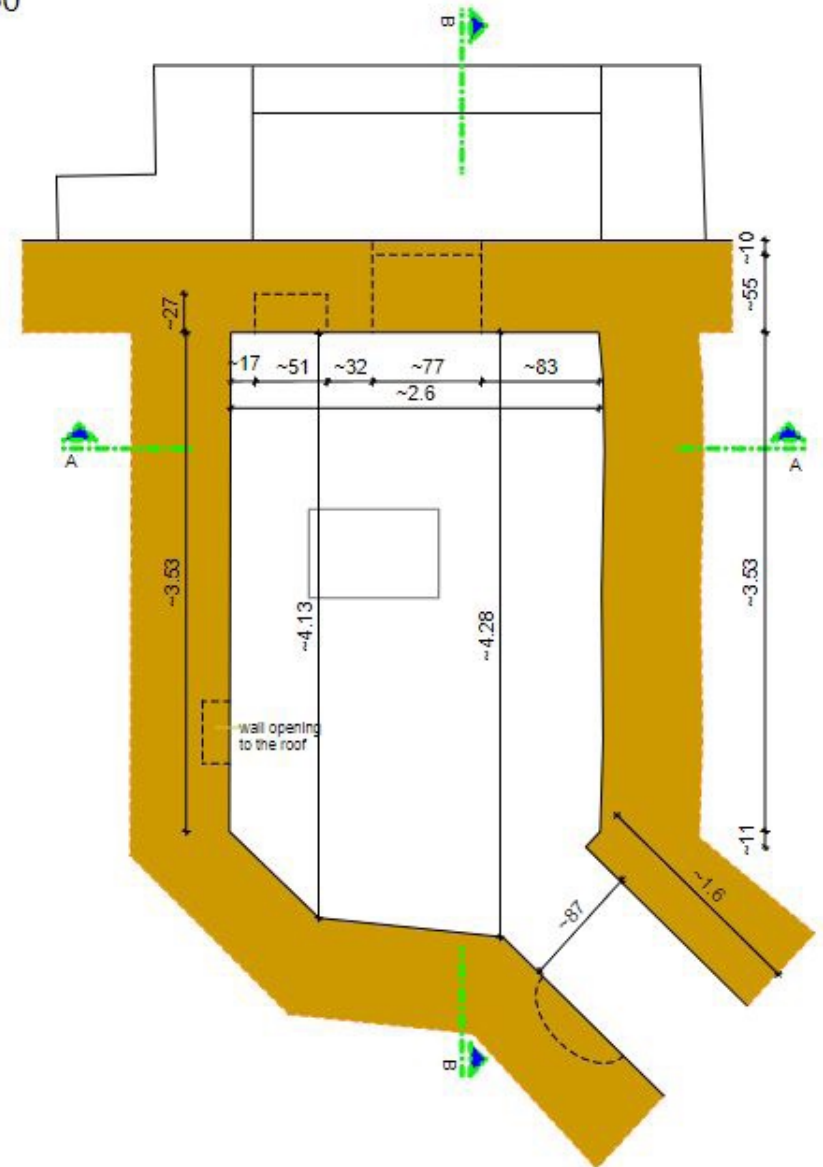


Legend

- existing wall floor plan
- existing wall section

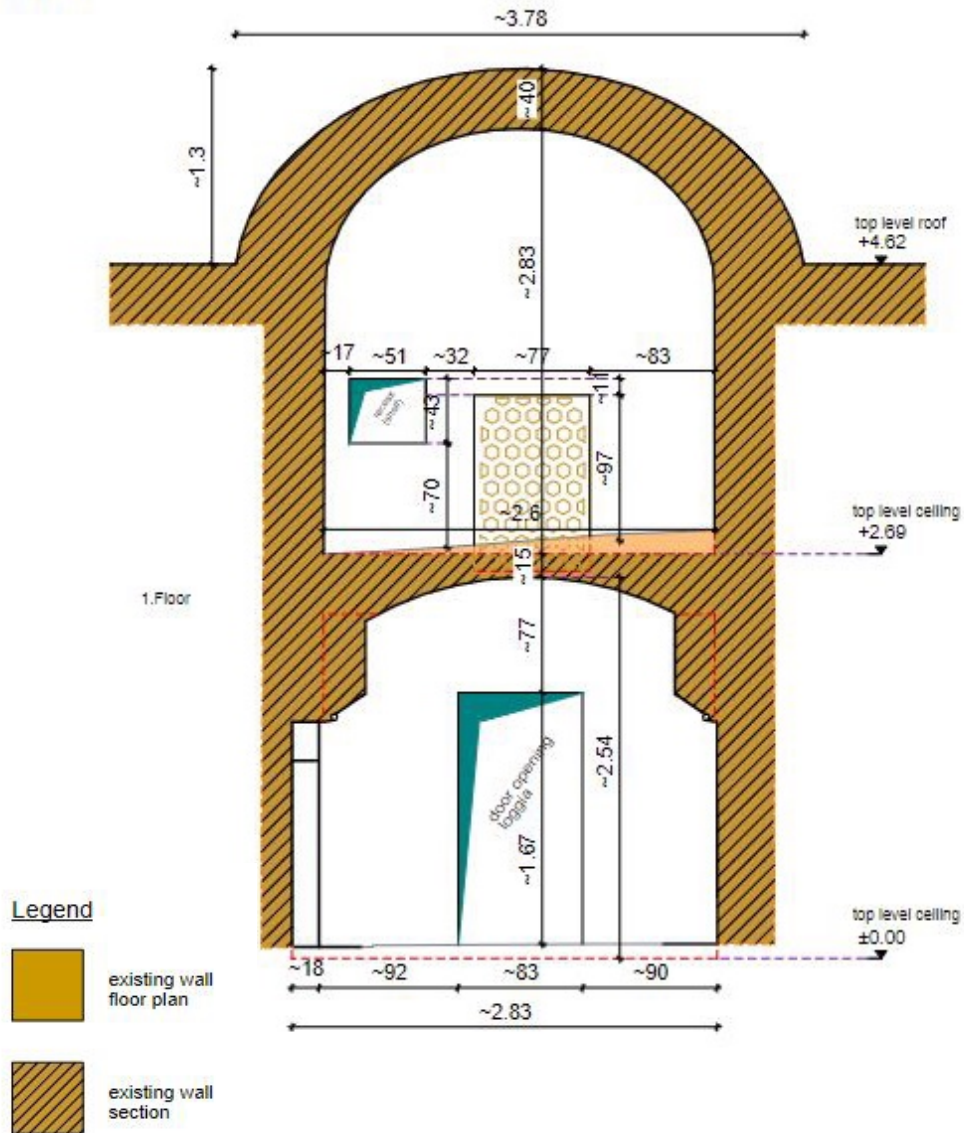
Floor plan 1st floor - upper floor

M 1:50



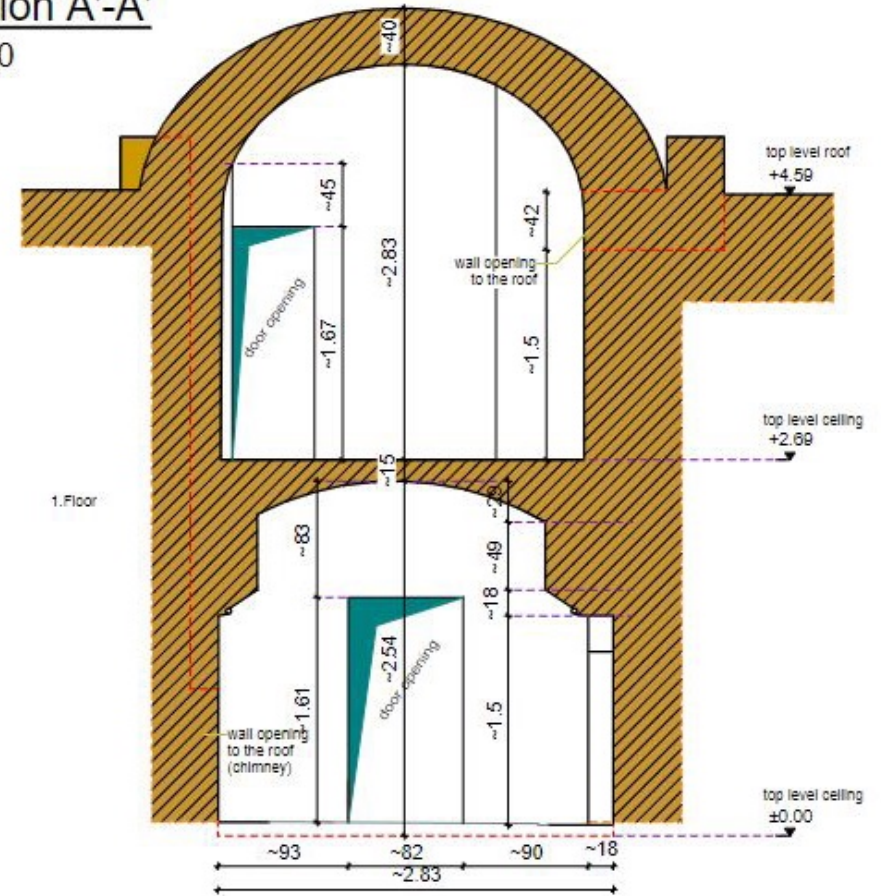
Section A-A

S 1:50



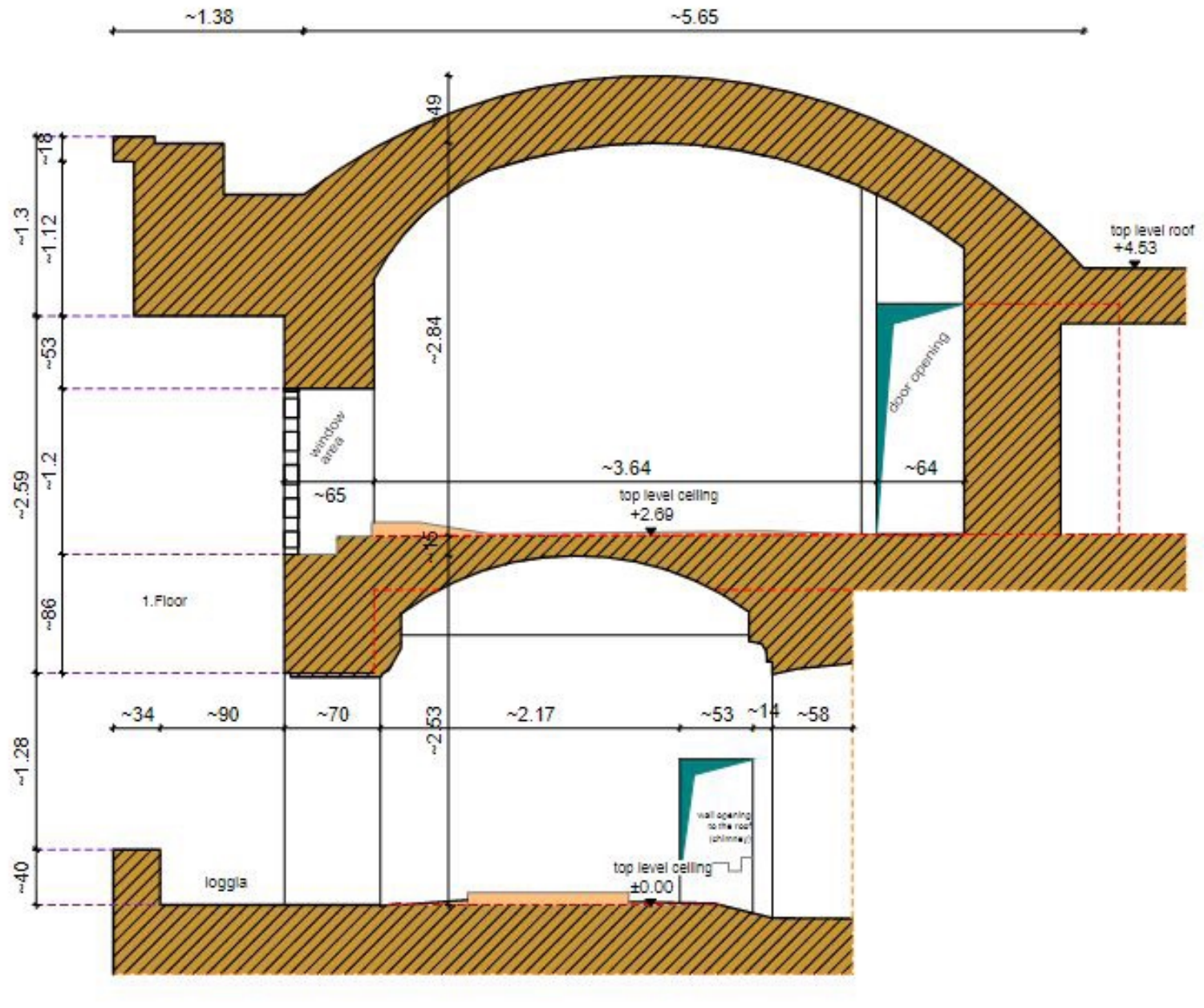
Section A'-A'

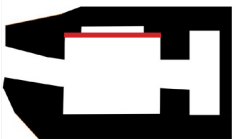
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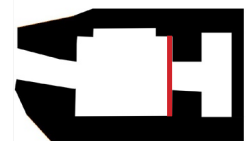


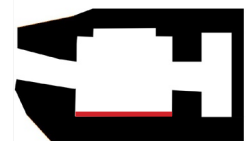
Section B-B

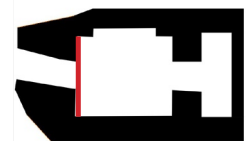
S 1:50















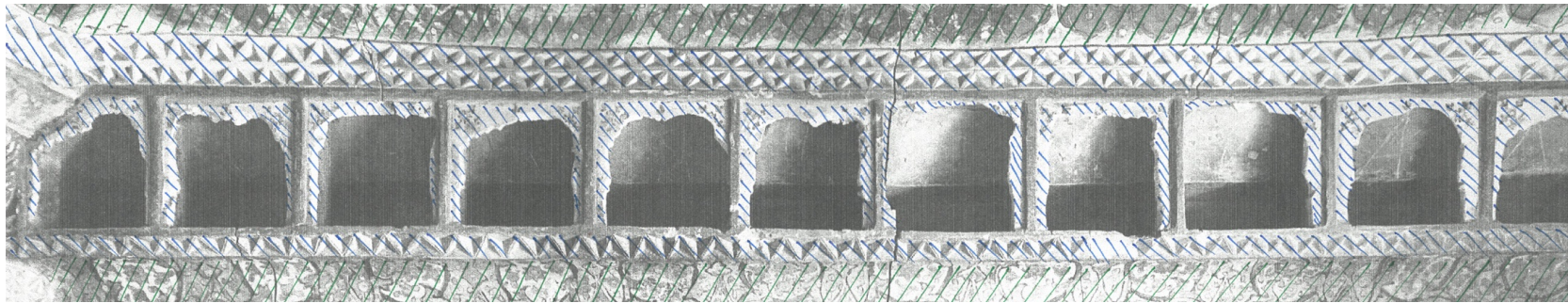




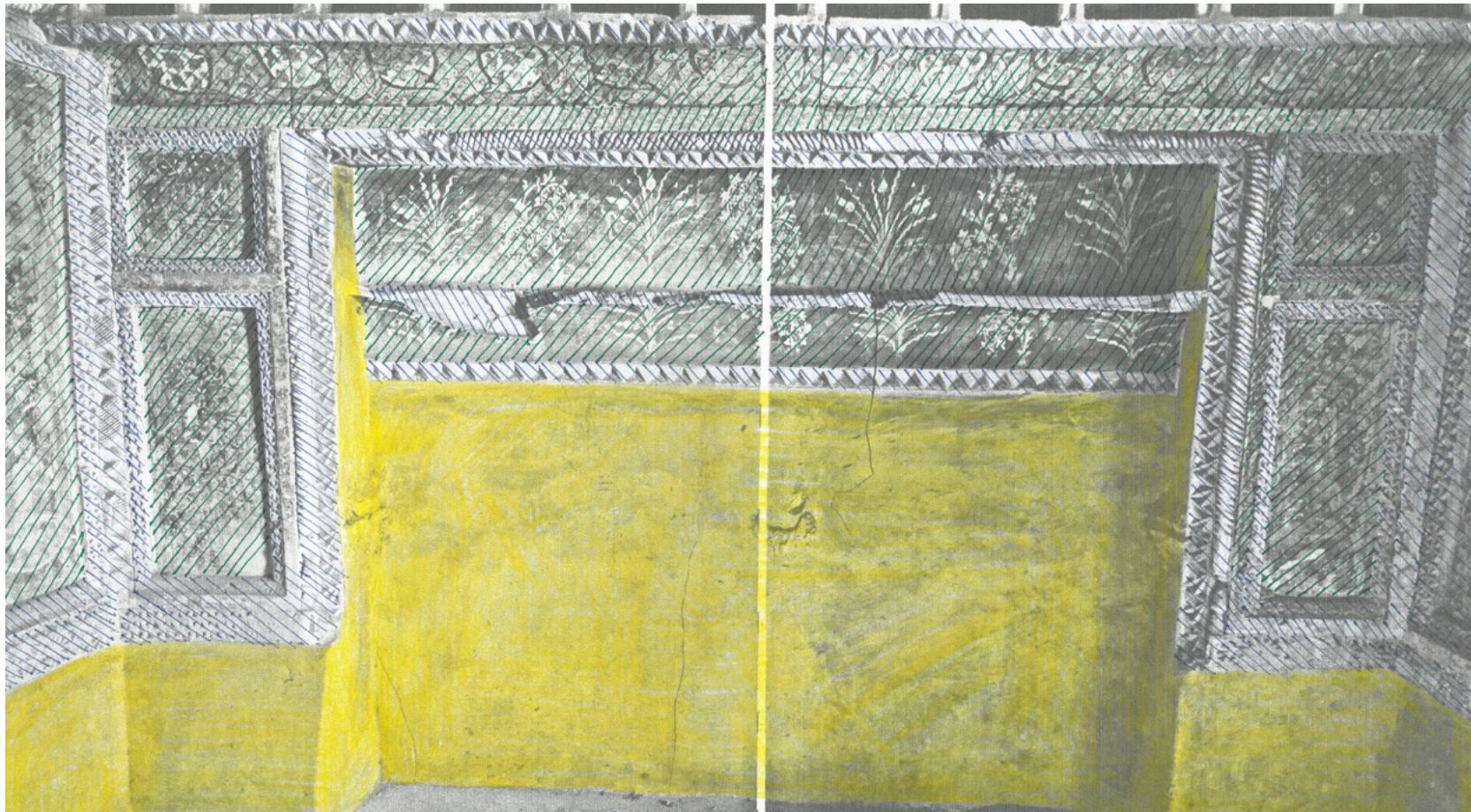


Mapping Materials

The mapping of the materials regarding this room is based on the predefined legend of materials and the corresponding glossary.
















- Legend of materials:
- Brick masonry
 - Natural stone
 - Plaster
 - Stucco
 - Wall painting
 - Paint layer
 - Sgraffito
 - Overlay
 - Majolika tile
 - Terracotta
 - Glazed terracotta
 - Artificial stone
 - Wood
 - + Metal
 - Glas
 - Cable/Wire
 - Reet

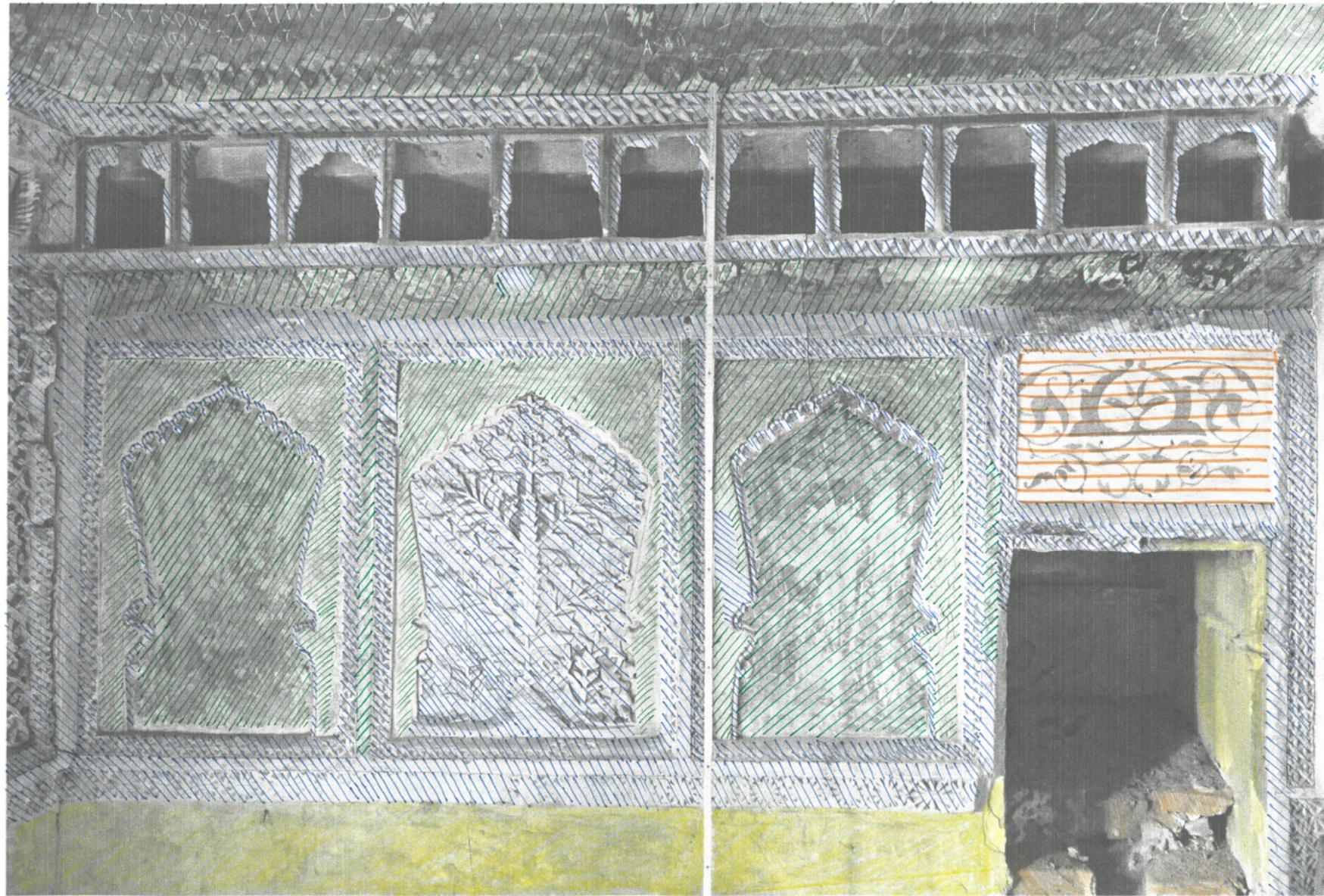




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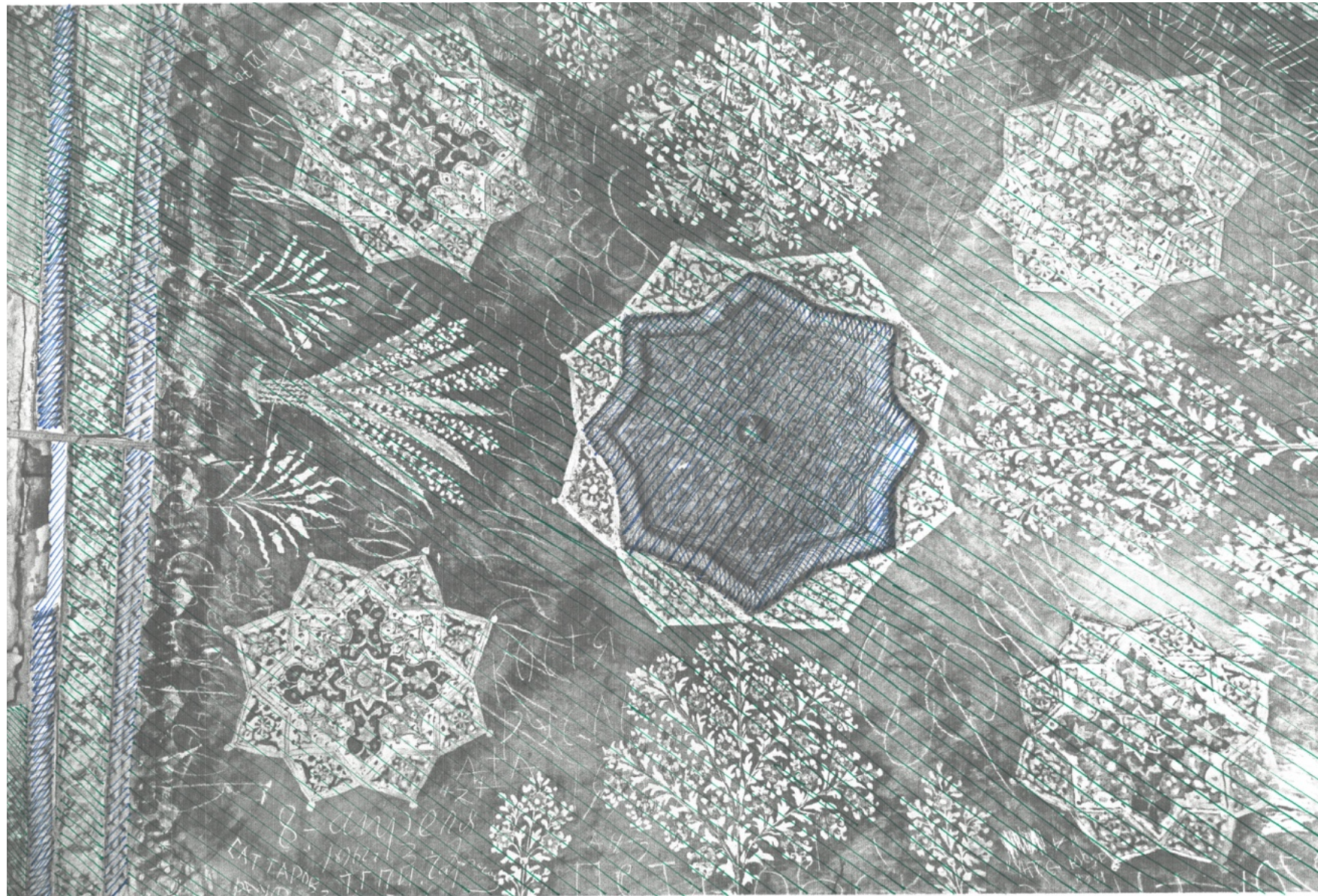
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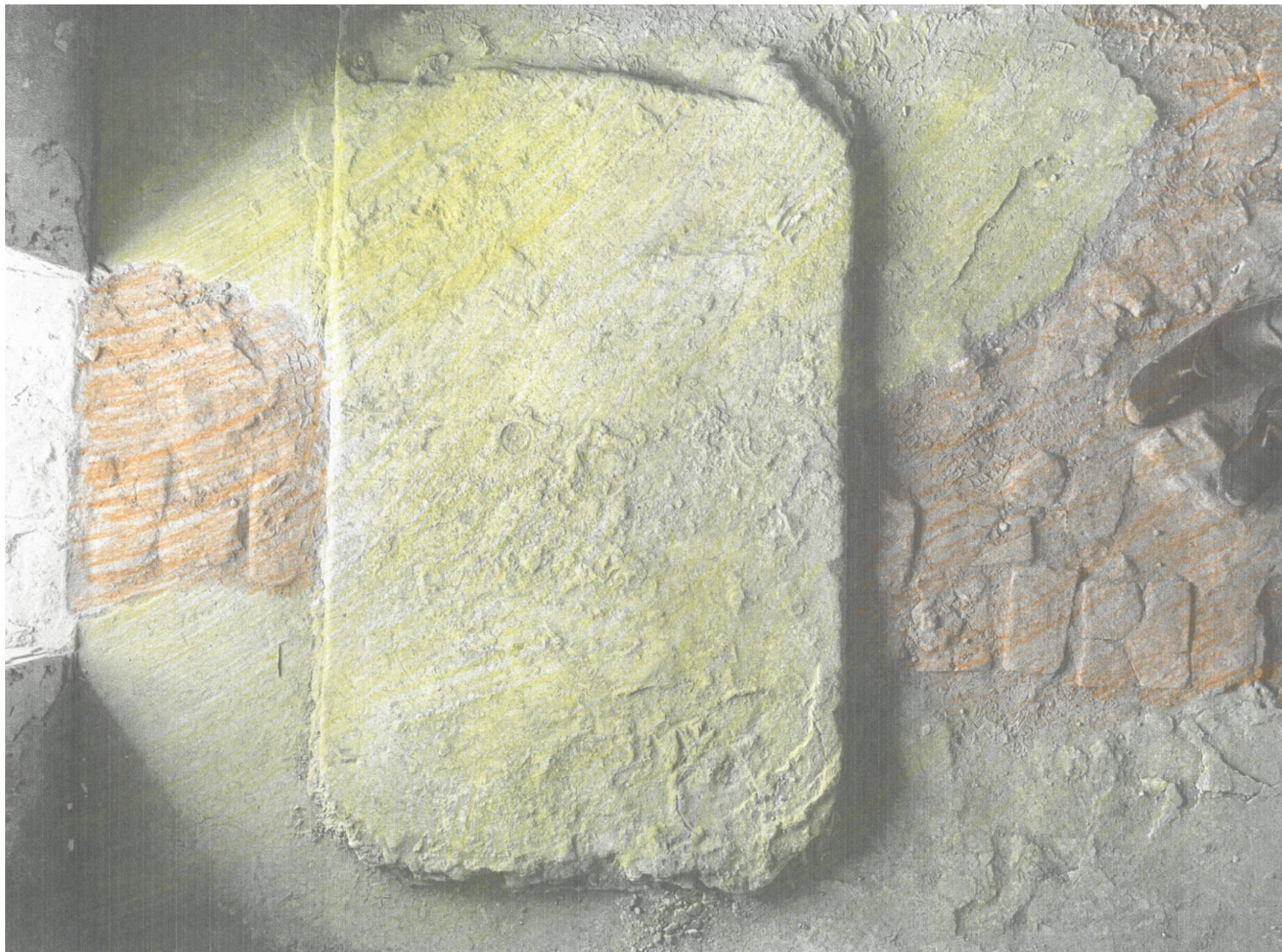
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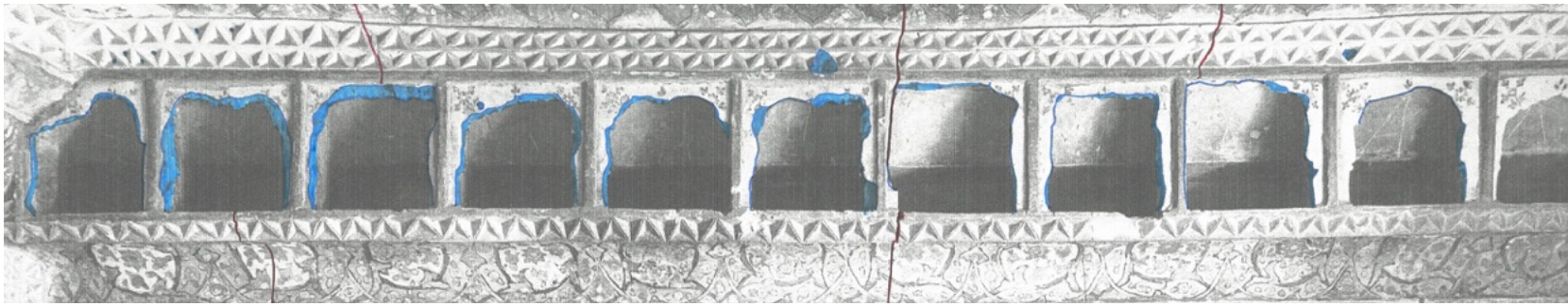


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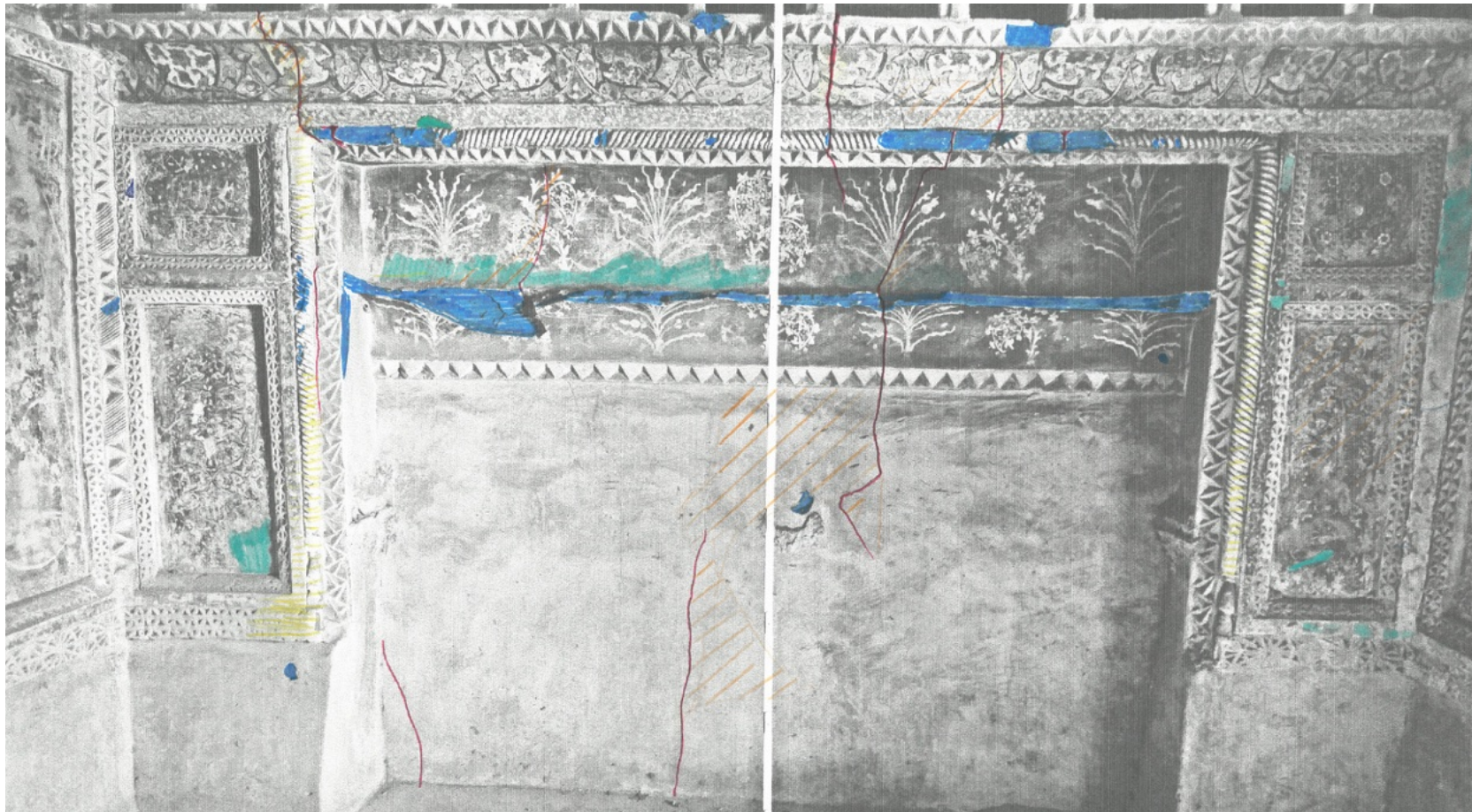
Mapping Damages

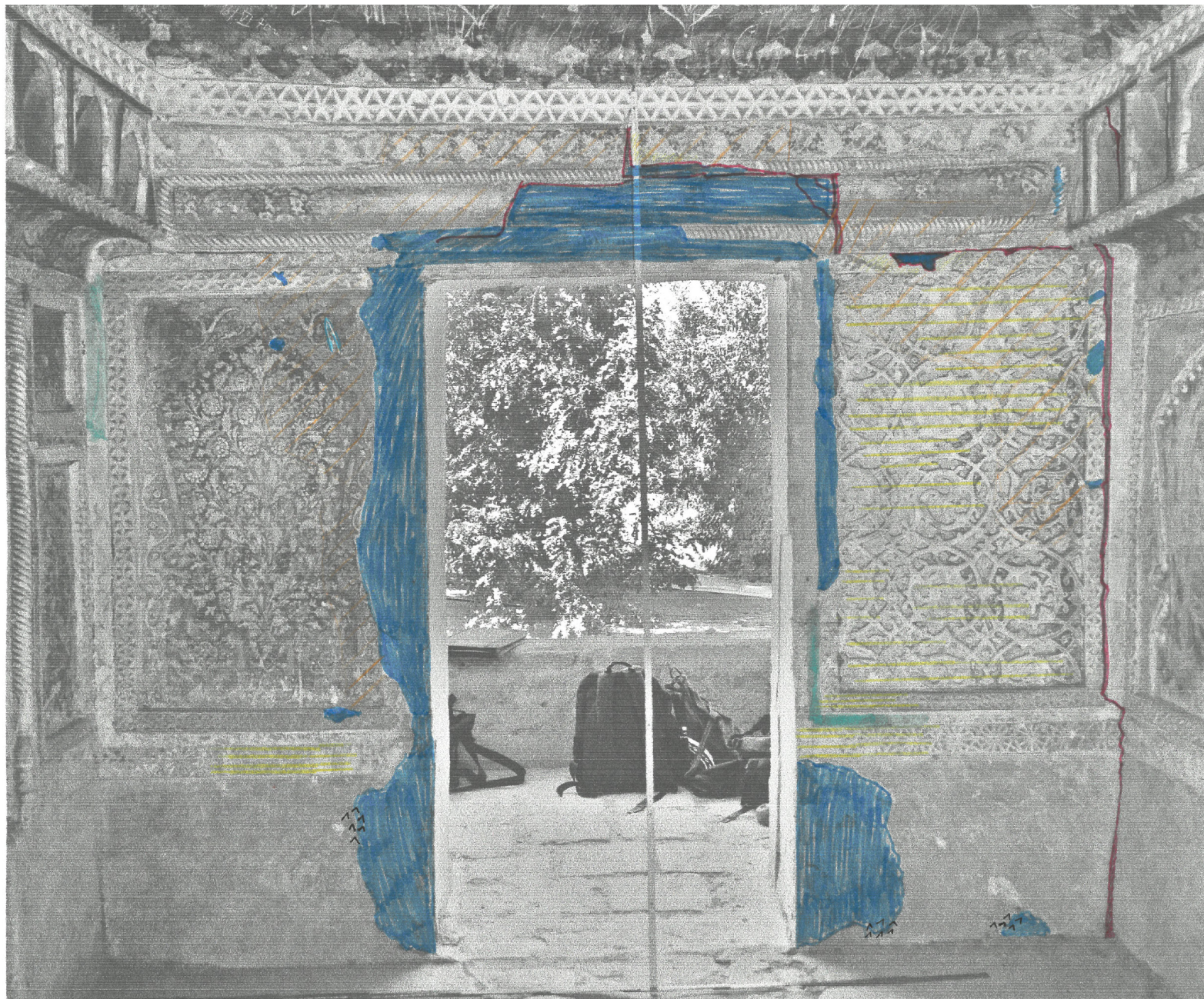
In some areas of the walls, losses of the paint layers can be seen. Abrasion on the stucco elements is also visible in some places. Another damage, probably one of the most visible, is missing spots/laccunae, on the stucco elements with broken edges. Overall, the lower main room is in good condition.



Legend of damages:

- Lacuna/ Missing parts
- Loss of paint layer
- Crumbling
- Peeling
- Crack
- Scaling
- Salt
- Biological growth
- Corrosion
- Burrow
- Water traces





Legend of damages:

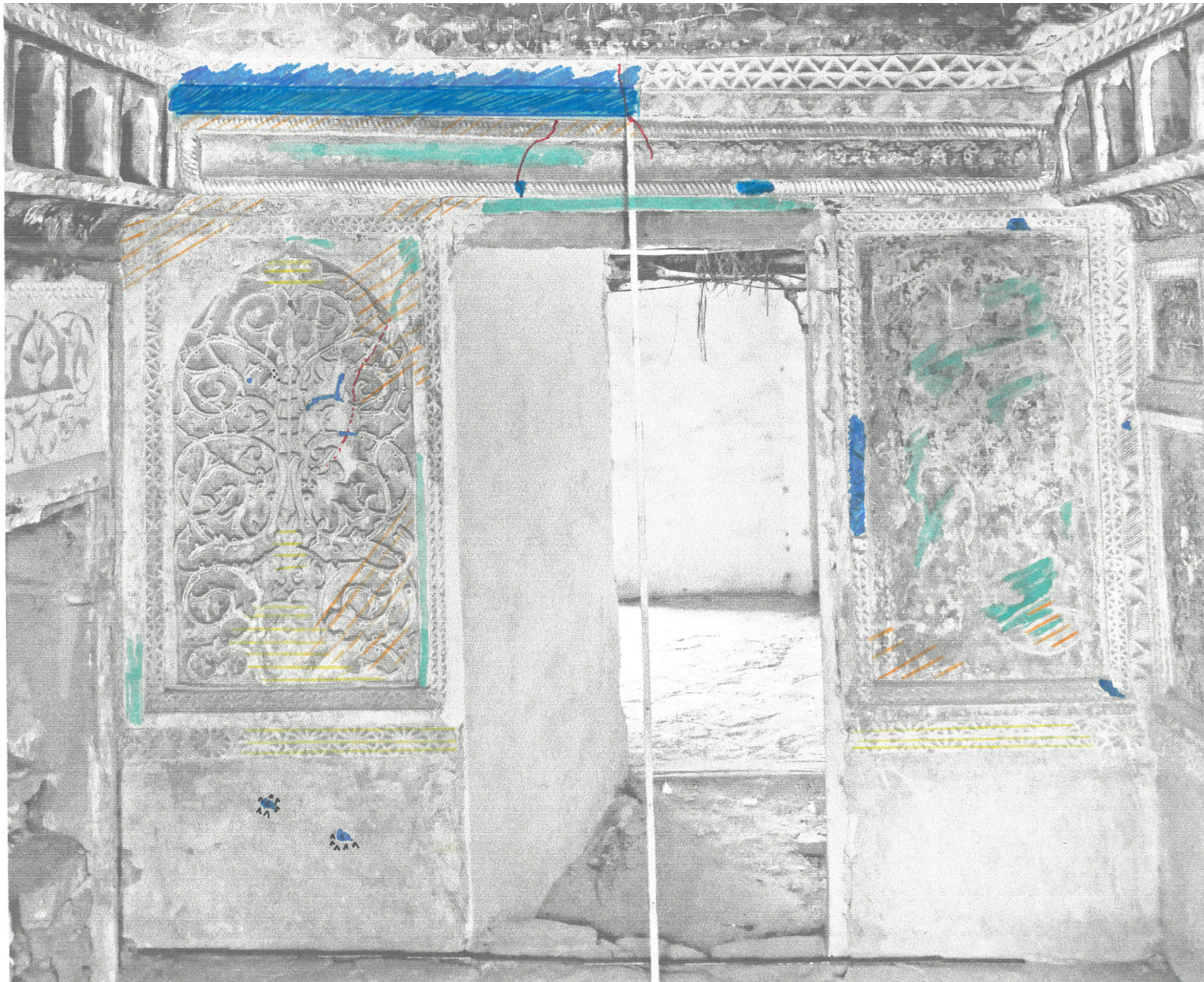
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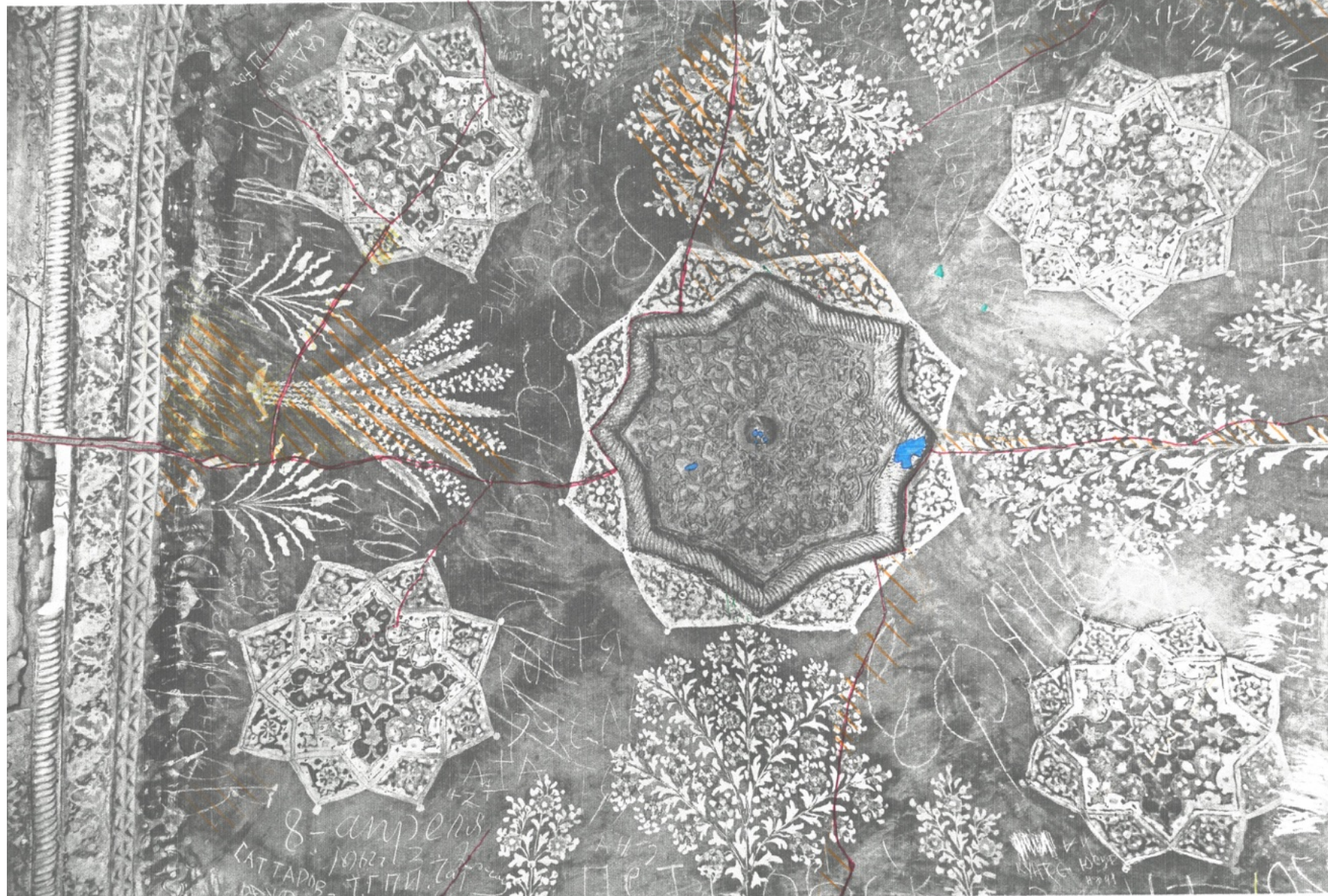
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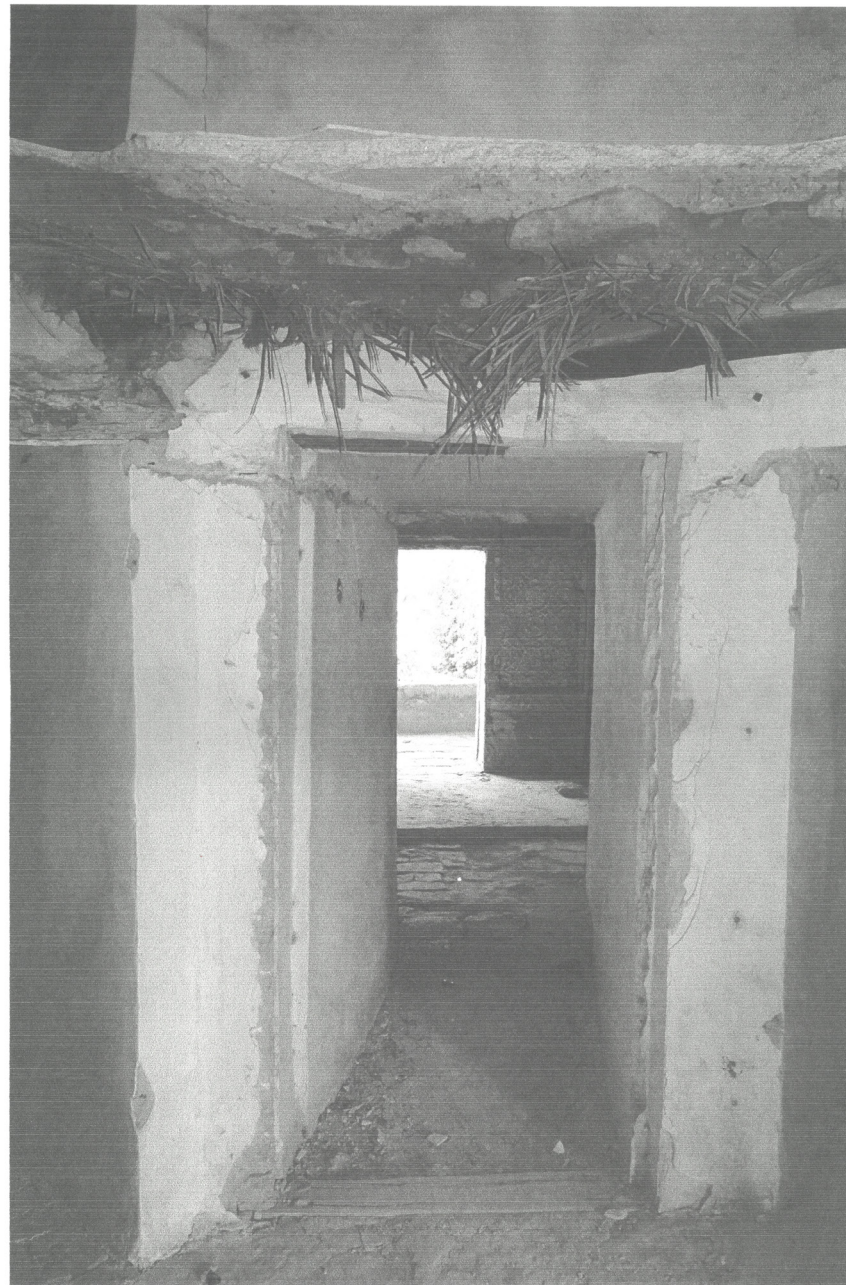
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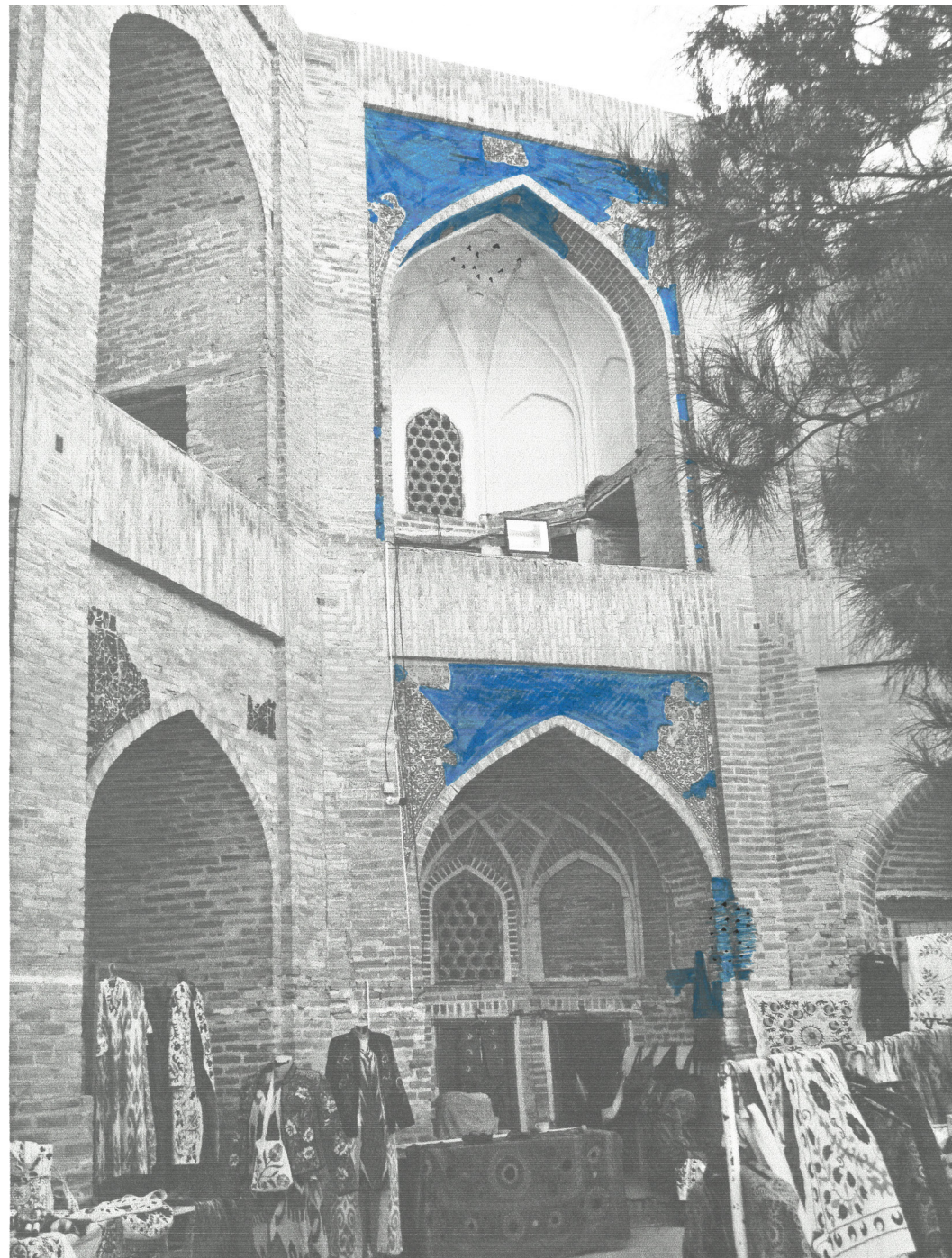
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-  Water traces



Legend of damages:

-  Lacuna/ Missing parts
-  Loss of paint layer
-  Crumbling
-  Peeling
-  Crack
-  Scaling
-  Salt
-  Biological growth
-  Corrosion
-  Burrow
-  Water traces





Legend of damages:

- Lacuna/ Missing parts
- Loss of paint layer
- Crumbling
- Peeling
- Crack
- Scaling
- Salt
- Biological growth
- Corrosion
- Burrow
- Water traces



Legend of damages:

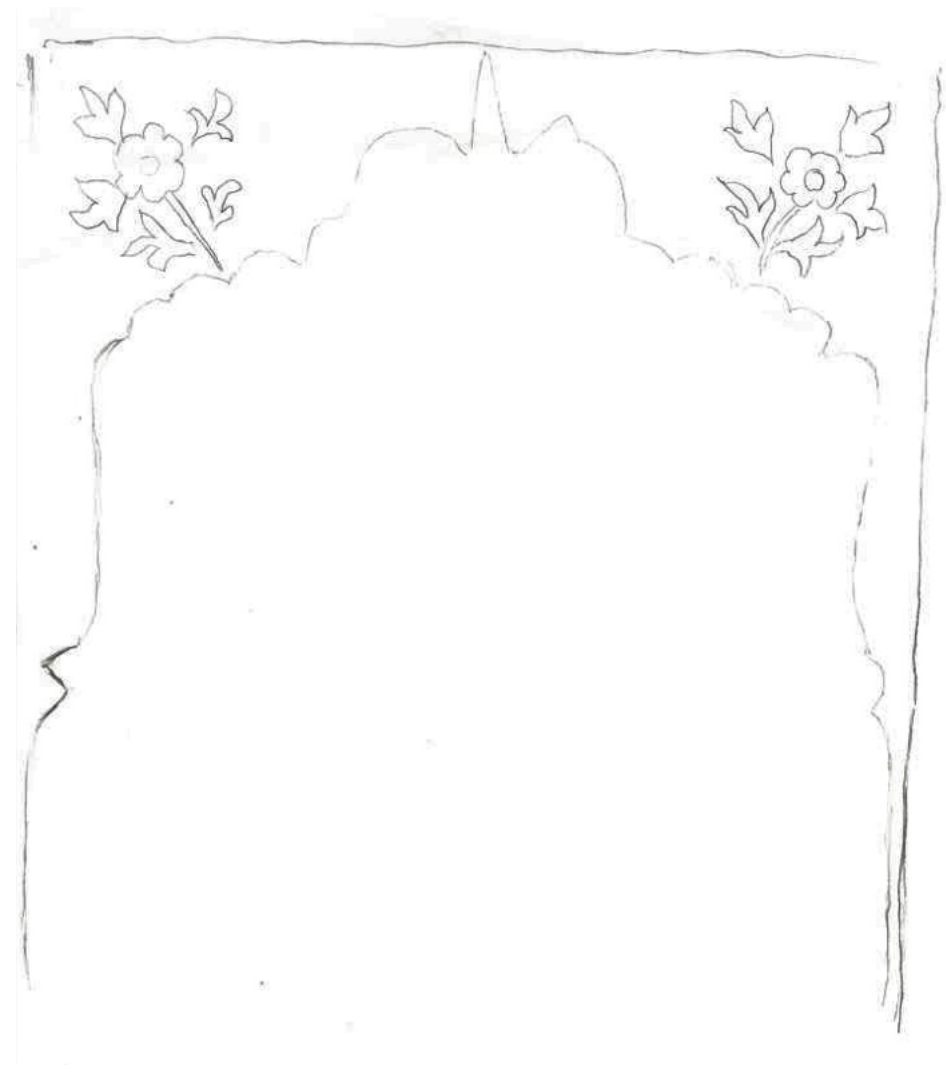
- Lacuna/ Missing parts
- Loss of paint layer
- Crumbling
- Peeling
- Crack
- Scaling
- Salt
- Biological growth
- Corrosion
- Burrow
- Water traces

Painting

As part of the interdisciplinary work process, Sharofa Asrorova, a fine arts student at the University of Bukhara, made hand drawings of individual parts of the murals.







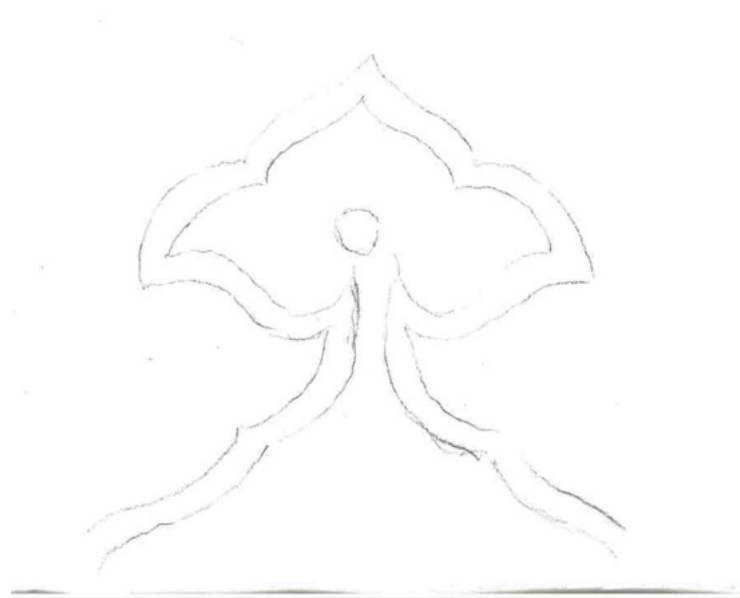


Photo- documen- tation

The photo documentation shows detail shots of the wall and ceiling surfaces, wall paintings, stucco and other forms of design. The close-ups document damage such as cracks or missing parts.



kyrma above the hearth, mural with lettering and ceiling painting with stucco mouldings in the wall transition and centre



Wall painting on a concealed layer and various stucco patterns



Close-up of individual damage patterns

Team 2



Students

Hanna Radt

*University of Applied Science Potsdam
Conservation and Preservation (Wood)*

Johanna Schwab

*University of Applied Science Potsdam
Building Preservation*

Yusuf Erkinov

*Tashkent University of Arch. and Civil Eng
Civil Engineering*

Komila Tolipova

*Tashkent University of Arch. and Civil Eng
Architecture*

Markus Ober

*University of Applied Science Potsdam
Architecture*

Mentors

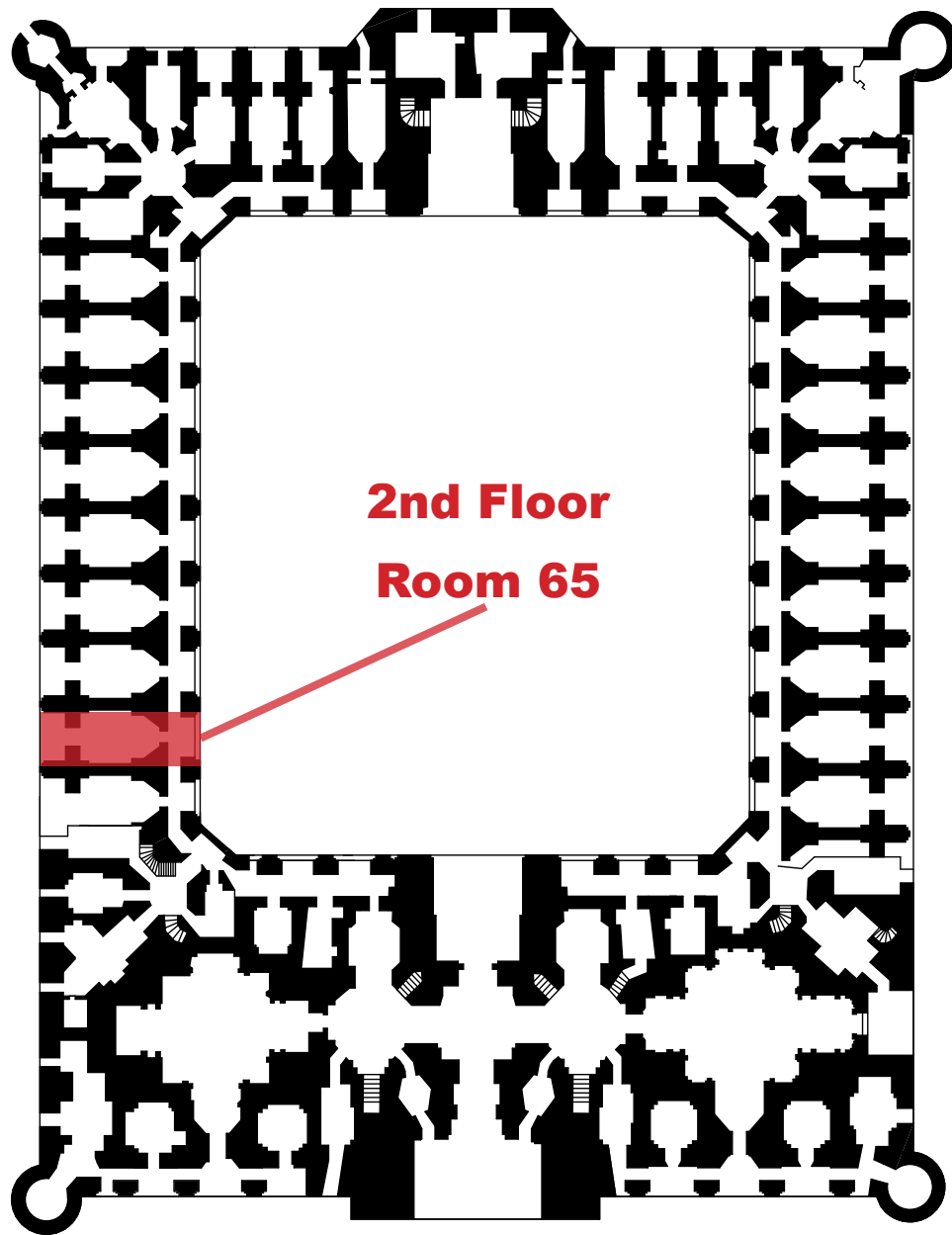
Prof. Dr. Steffen Laue

*University of Applied Science Potsdam
Professor of Natural Sciences for Preservation
and Restoration*

Dr. Dilshoda Sultanova

*Samarkand State University of Arch. & Constr.
Head of Fine Arts*

Room 65



2nd Floor
Room 65

Room 65

Documentation

Elevation drawings, photographic images of the facades and internal elevations, paintings, detailed mappings of materials and damages as well as a photo documentation of the room's condition are part of the documentation. Also, a valuation of the surfaces of the room based on a traffic light system is included.

Introduction to the room

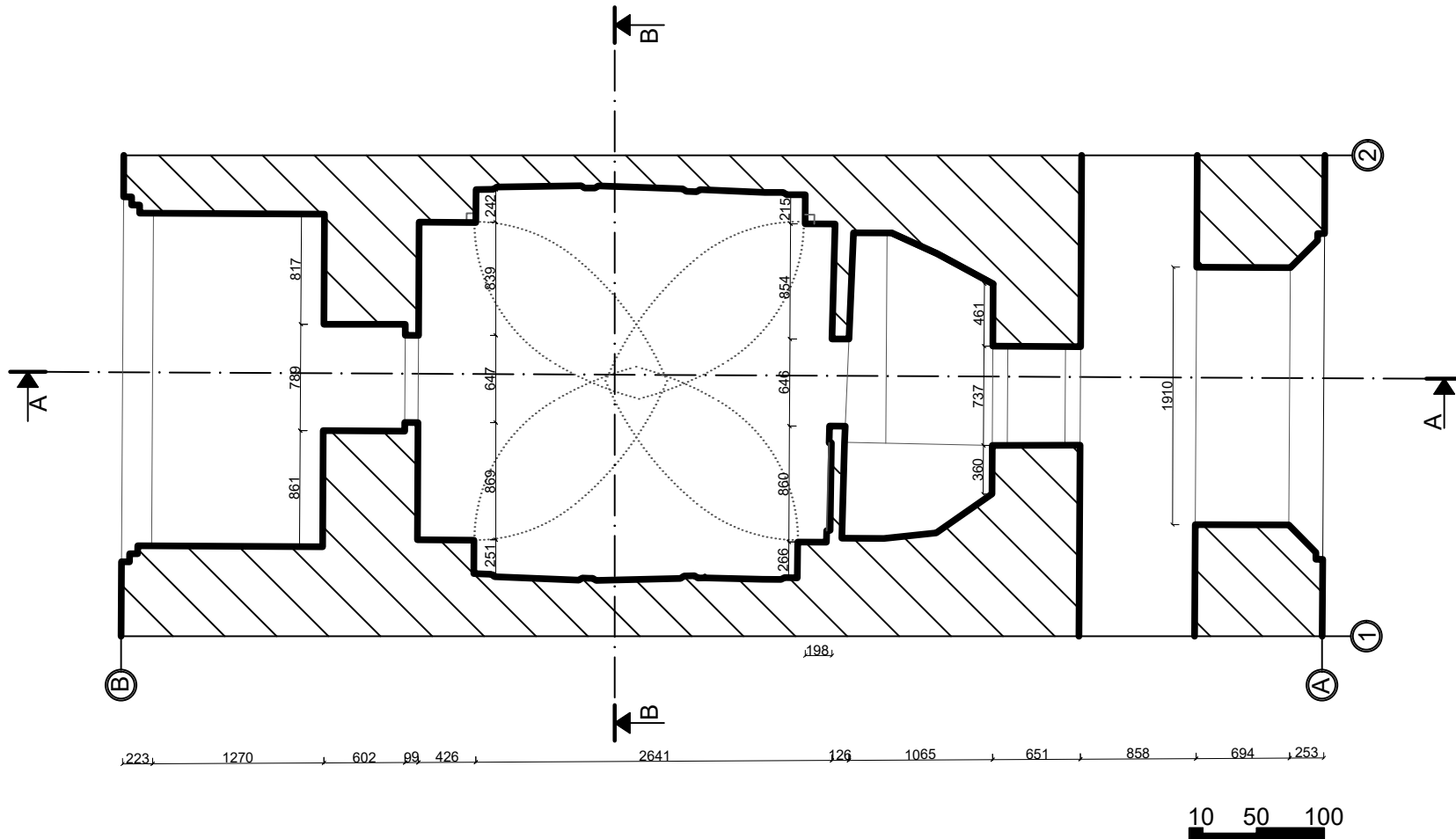
Room number 65 is located on the second floor of the madrasah. A small, winding staircase on the south-west side of the inner court yard leads up to a hallway on the second floor. Room number 65 is located through the second set of wooden doors on the left side of the pergola walk running the full length of the madrasah wing. These rooms, so called khujras, used to be study rooms, each decorated individually.

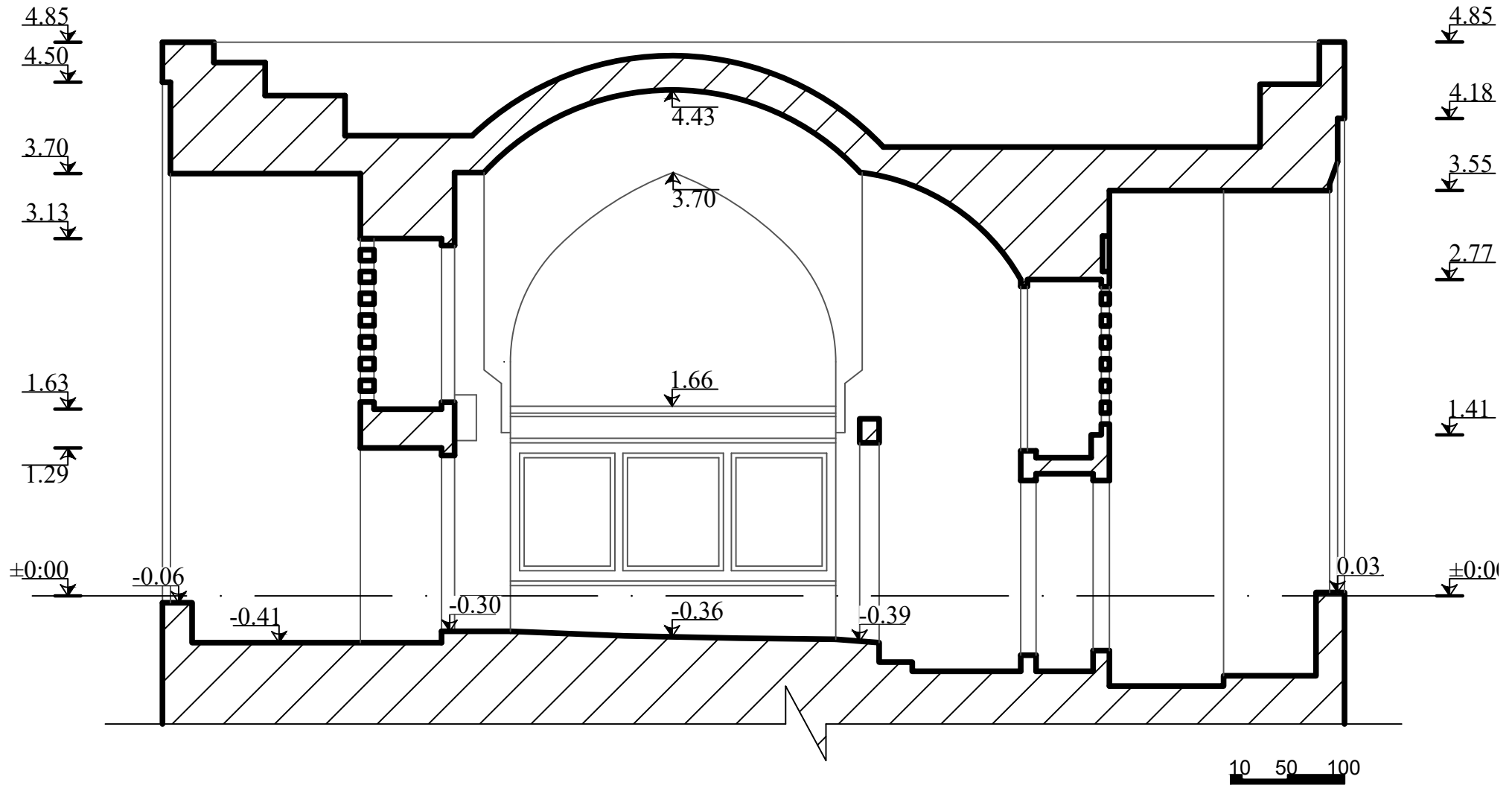
The main interest of room 65 is the decoration on lower part of the north and south walls with its stuccoed elements and wall paintings with three panels on each side. Beneath the upper layer of wall paintings further wall paintings are visible which depict a version of namoya. All of these layers are of historical value and should therefore be conserved.

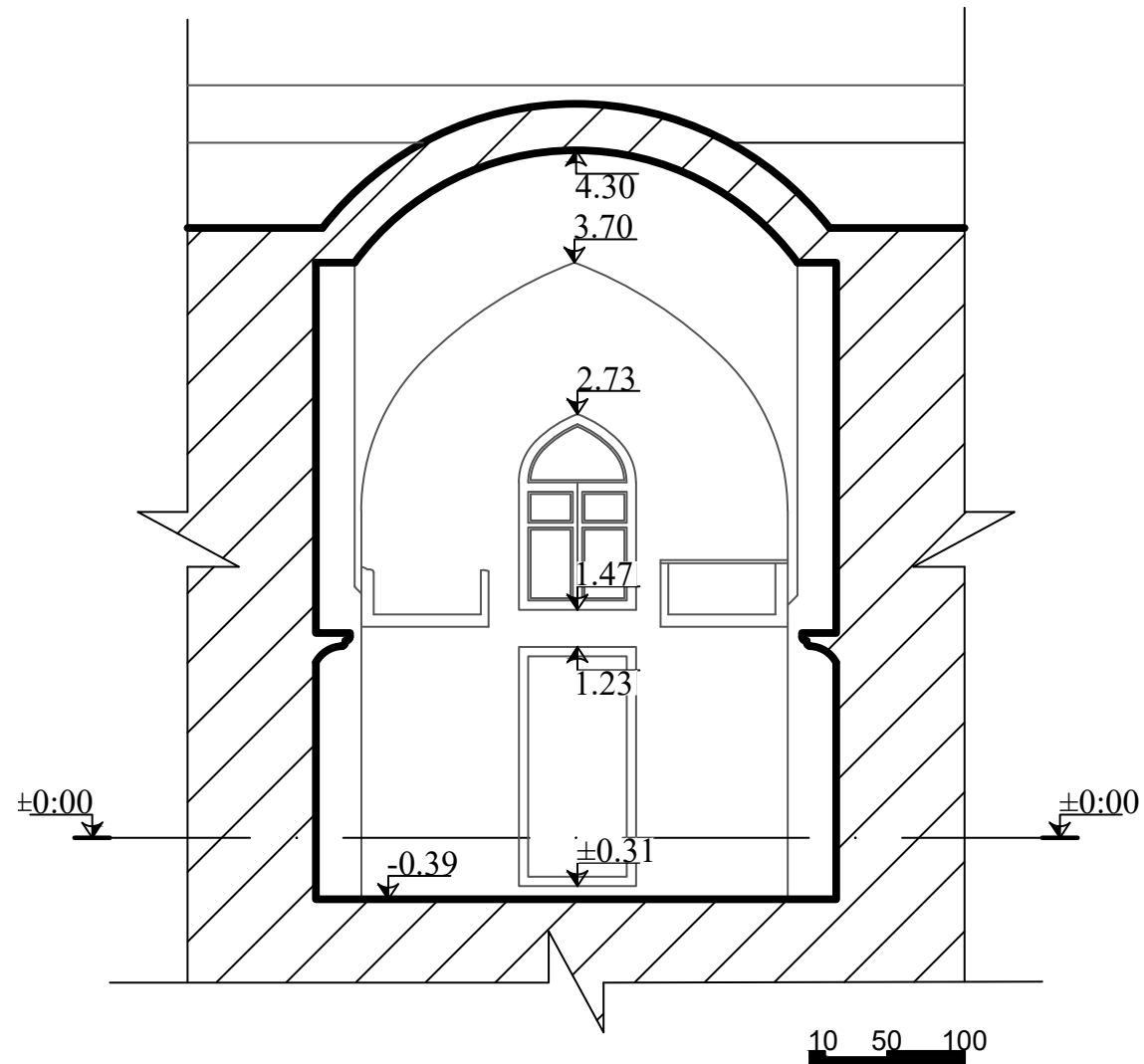
CAD Drawing

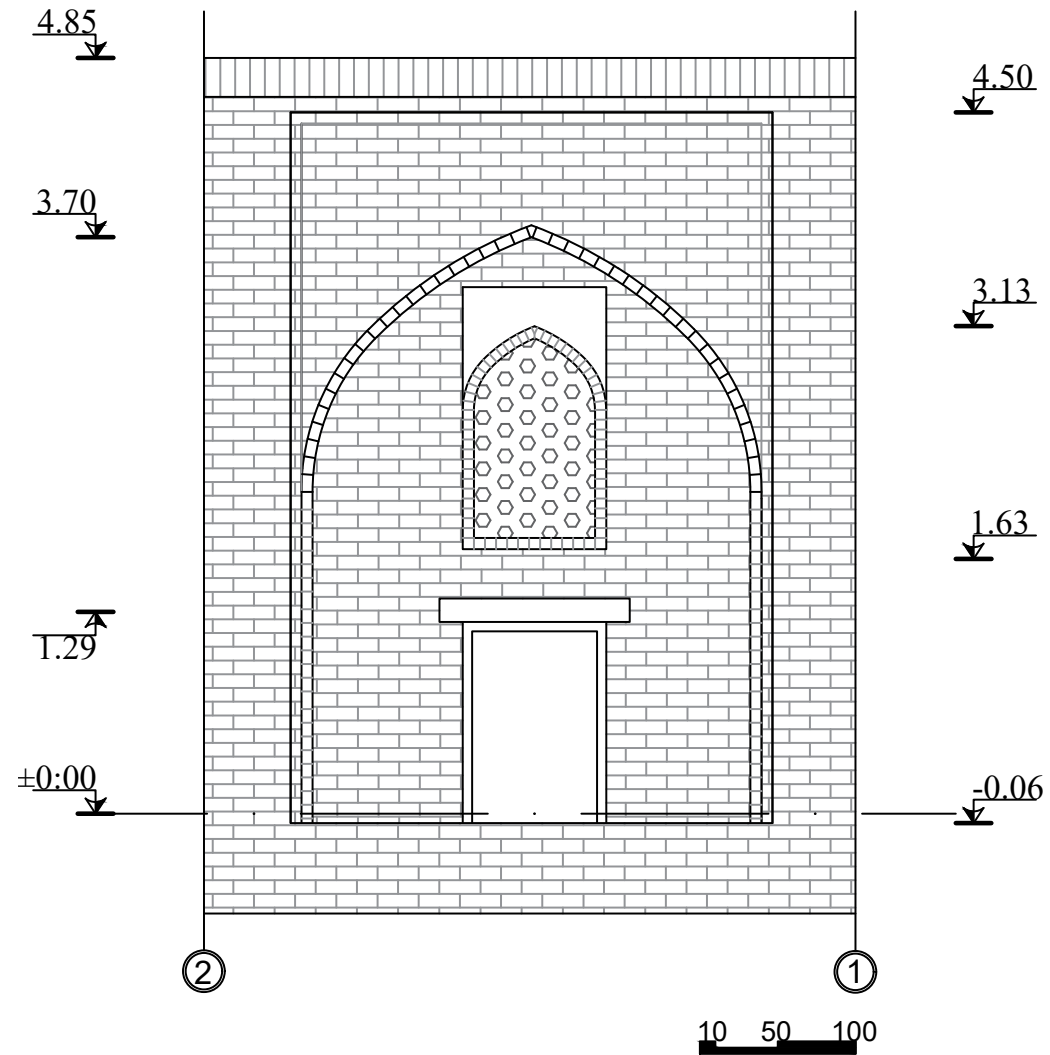
As shown on the floor plan the room is divided into two sections. The first one is a semi-circular entrance room with a big step on the left side, where remains of stairs can be found. These probably once lead up to the second level of the room, which is missing. Another small stone step leads up to the main room with a square base with measurements close to 3,0 m x 3,0 m. Through a little transition a small rectangular balcony can be reached.

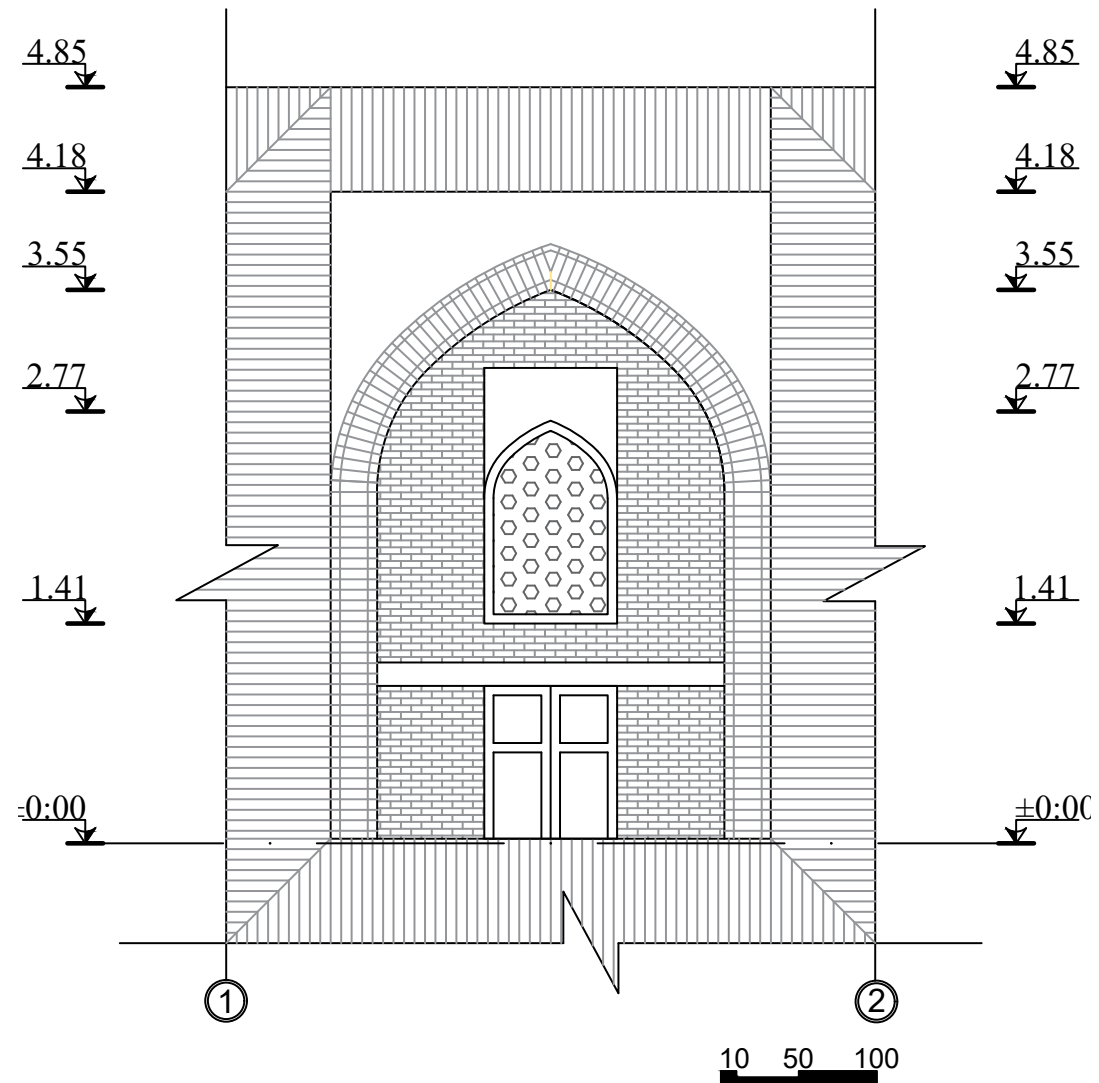
Aside of the floor plan, the documentation includes two sections which give an impression of the shape of the ceiling of the room. The main room is covered by a cupola on pendentives and is visible due to the loss of the intermediated level which once was located at a height of 3,00 m. The entrance room is topped by a semi cupola, which connects to the cupola of the main room.



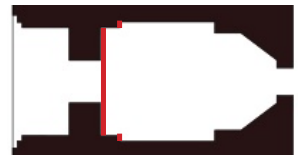




























Mapping Materials

The mapping of the materials is based on the predefined legend of materials and the corresponding glossary.

The external walls are made out of brick masonry, which is opened to form a door. Therefore a wooden door lintel is added. The windows on both facades are covered by a grid made out of artificial stone and partially ornamented with terracotta. Above the windows parts of the masonry are covered by plaster. Furthermore a cable over the door of the eastern facade exists. While the floor in the entrance room is natural stone, the main room has got a wooden floor made out of floorboards. The whole ceiling and the upper part of the walls are covered by plaster. At some spots the brick masonry beneath is visible. The lower range of the northern, southern and western walls are covered with panels. The panels are surrounded by geometrical (giri) and floral (islimi) stucco elements and decorated with wall paintings. On some parts and over the stucco elements there is a overlay/whitewash as an upper layer. As already mentioned, in the eastern and western wall there are windows with a wooden frame and glass.



Legend of materials:

- Brick masonry
- Natural stone
- Plaster
- Stucco
- Wall painting
- Paint layer
- Sgraffito
- Overlay
- Majolika tile
- Terracotta
- Glazed terracotta
- Artificial stone
- Wood
- + Metal
- Glas
- Cable/Wire
- Reet





Legend of materials:

	Brick masonry
	Natural stone
	Plaster
	Stucco
	Wall painting
	Paint layer
	Sgraffito
	Overlay
	Majolika tile
	Terracotta
	Glazed terracotta
	Artificial stone
	Wood
	Metal
	Glas
	Cable/Wire
	Reet





Legend of materials:

- Brick masonry
- Natural stone
- Plaster
- Stucco
- Wall painting
- Paint layer
- Sgraffito
- Overlay
- Majolika tile
- Terracotta
- Glazed terracotta
- Artificial stone
- Wood
- + Metal
- Glas
- Cable/Wire
- Reet

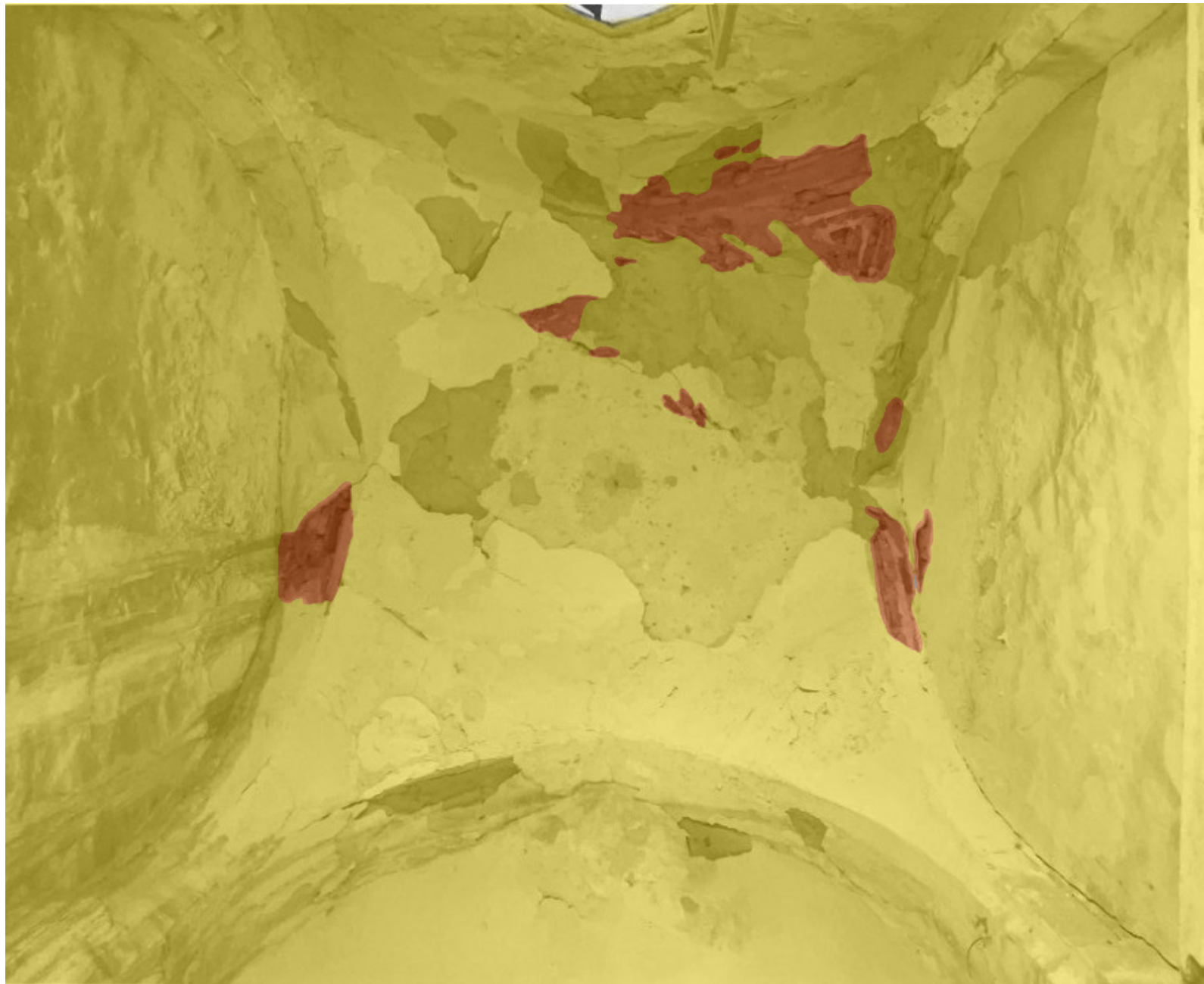




Legend of materials:


















- Brick masonry
- Natural stone
- Plaster
- Stucco
- Wall painting
- Paint layer
- Sgraffito
- Overlay
- Majolika tile
- Terracotta
- Glazed terracotta
- Artificial stone
- Wood
- Metal
- Glas
- Cable/Wire
- Reet

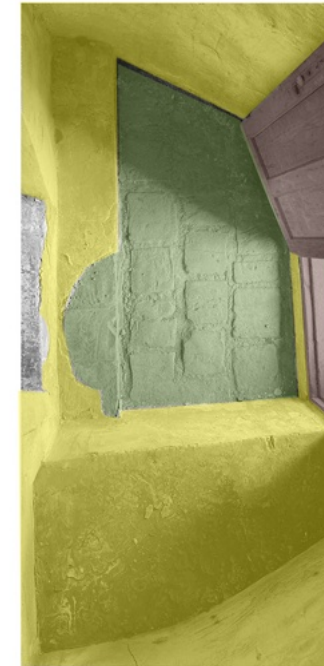
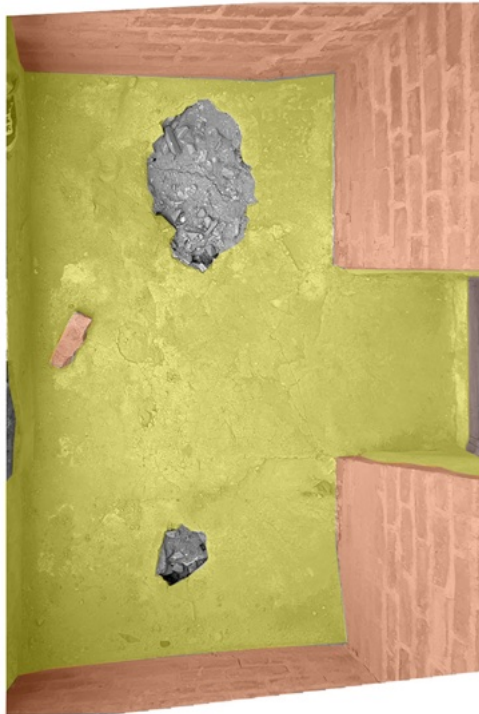




- Legend of materials:
- Brick masonry
 - Natural stone
 - Plaster
 - Stucco
 - Wall painting
 - Paint layer
 - Sgraffito
 - Overlay
 - Majolika tile
 - Terracotta
 - Glazed terracotta
 - Artificial stone
 - Wood
 - + Metal
 - Glas
 - Cable/Wire
 - Reet

Legend of materials:

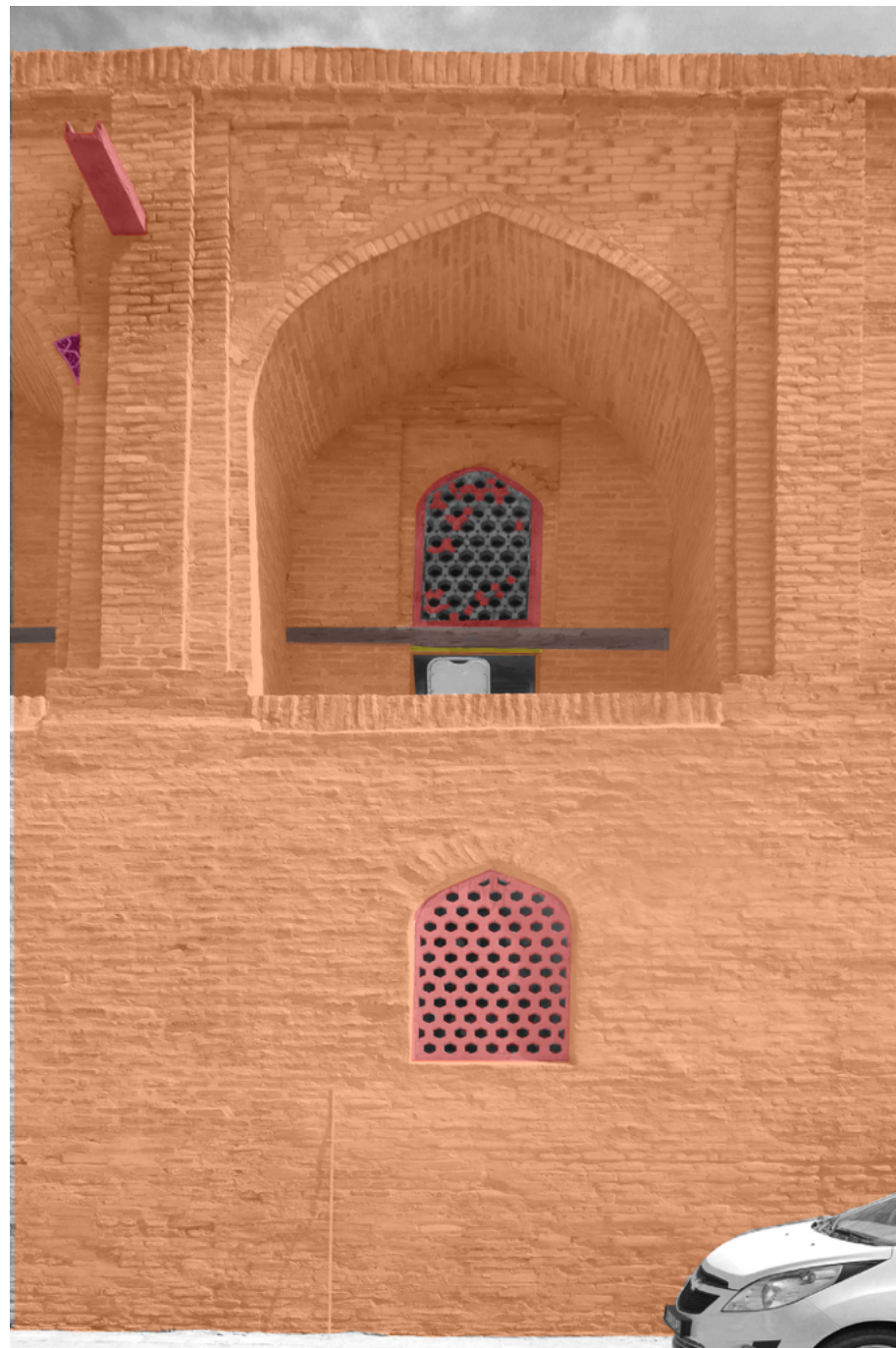
-  Brick masonry
-  Natural stone
-  Plaster
-  Stucco
-  Wall painting
-  Paint layer
-  Sgraffito
-  Overlay
-  Majolika tile
-  Terracotta
-  Glazed terracotta
-  Artificial stone
-  Wood
-  Metal
-  Glas
-  Cable/Wire
-  Reet





Legend of materials:

- Brick masonry
- Natural stone
- Plaster
- Stucco
- Wall painting
- Paint layer
- Sgraffito
- Overlay
- Majolika tile
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Legend of materials:

- Brick masonry
- Natural stone
- Plaster
- Stucco
- Wall painting
- Paint layer
- Sgraffito
- Overlay
- Majolika tile
- Terracotta
- Glazed terracotta
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- Glas
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- Reet

Mapping Damages

The greatest source of damage of the room is the water intrusion in the ceiling. Due to that, disintegration of the plaster layers (crumbling and scaling) followed and the wall paintings and stuccoed elements are in a bad condition. Cracks and scaled plaster layers as well as crumbling of the material are the most prominent damages in the upper part of the room. Salt efflorescence is also visible in the cupola of the entrance room in the east.

On the lower part with the stucco elements and wall paintings the most prominent damages are lacunas, loss of the paint layers and graffiti made by scratching and/or writing on the surface. Prominent cracks are visible in the corners and also through the stuccoed panels.

Missing parts/lacunas, cracks, scaling as well as crumbling can be found on both external and inner facade. The outer facade additionally shows some salt damages on the base. Notable is also the disintegration of the floor of the balcony, which poses a danger to both the integrity of the building as well as the people living and walking through there.

Altogether the room is in a bad condition and deterioration and damages are found in every part of the room with an exception of the floor which is mostly intact.



Legend of damages:

- Lacuna/ Missing parts
- Loss of paint layer
- Crumbling
- Peeling
- Crack
- Scaling
- Salt
- Biological growth
- Corrosion
- Burrow
- Water traces

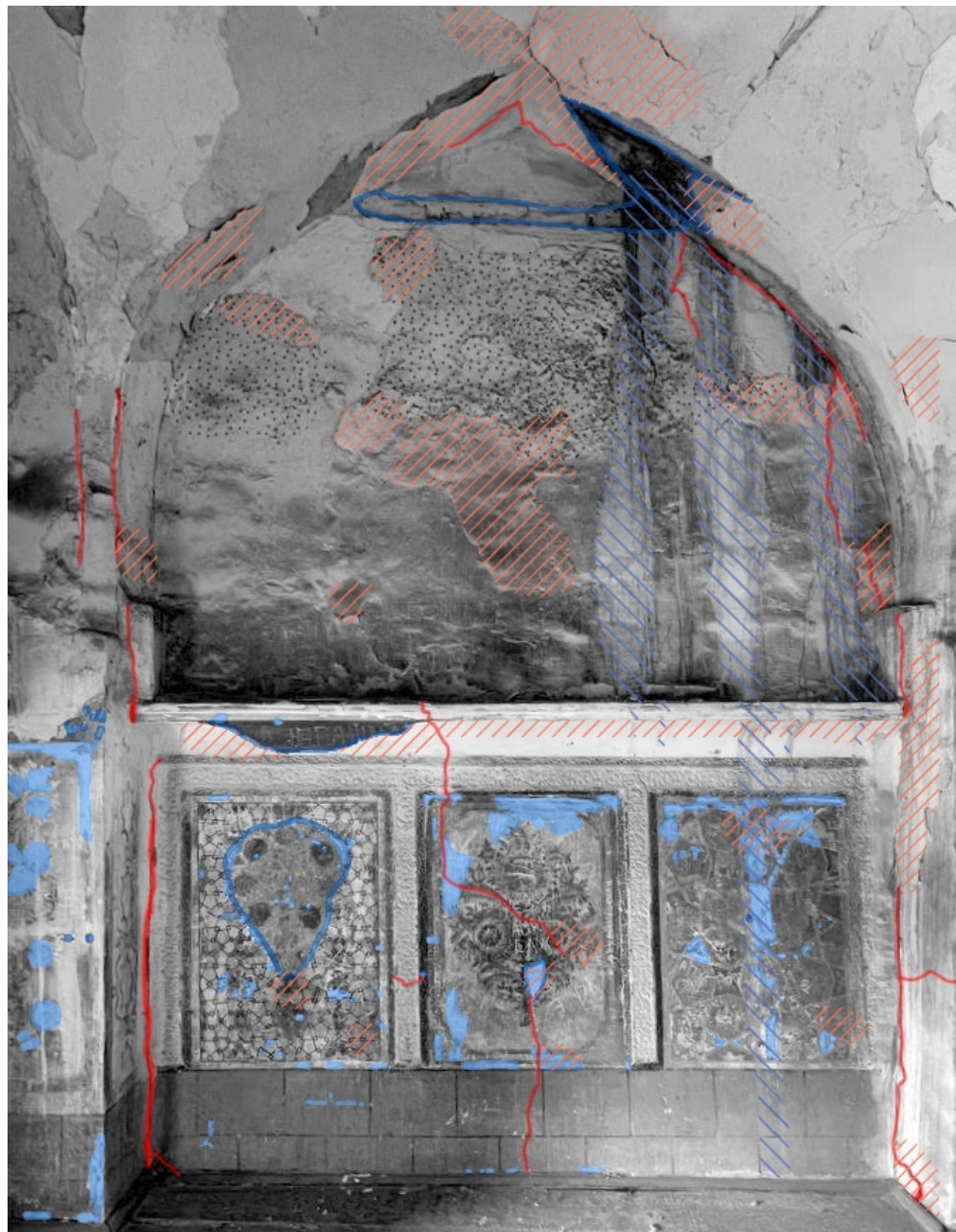




Legend of damages:

- Lacuna/ Missing parts
- Loss of paint layer
- Crumbling
- Peeling
- Crack
- Scaling
- Salt
- Biological growth
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- Burrow
- Water traces

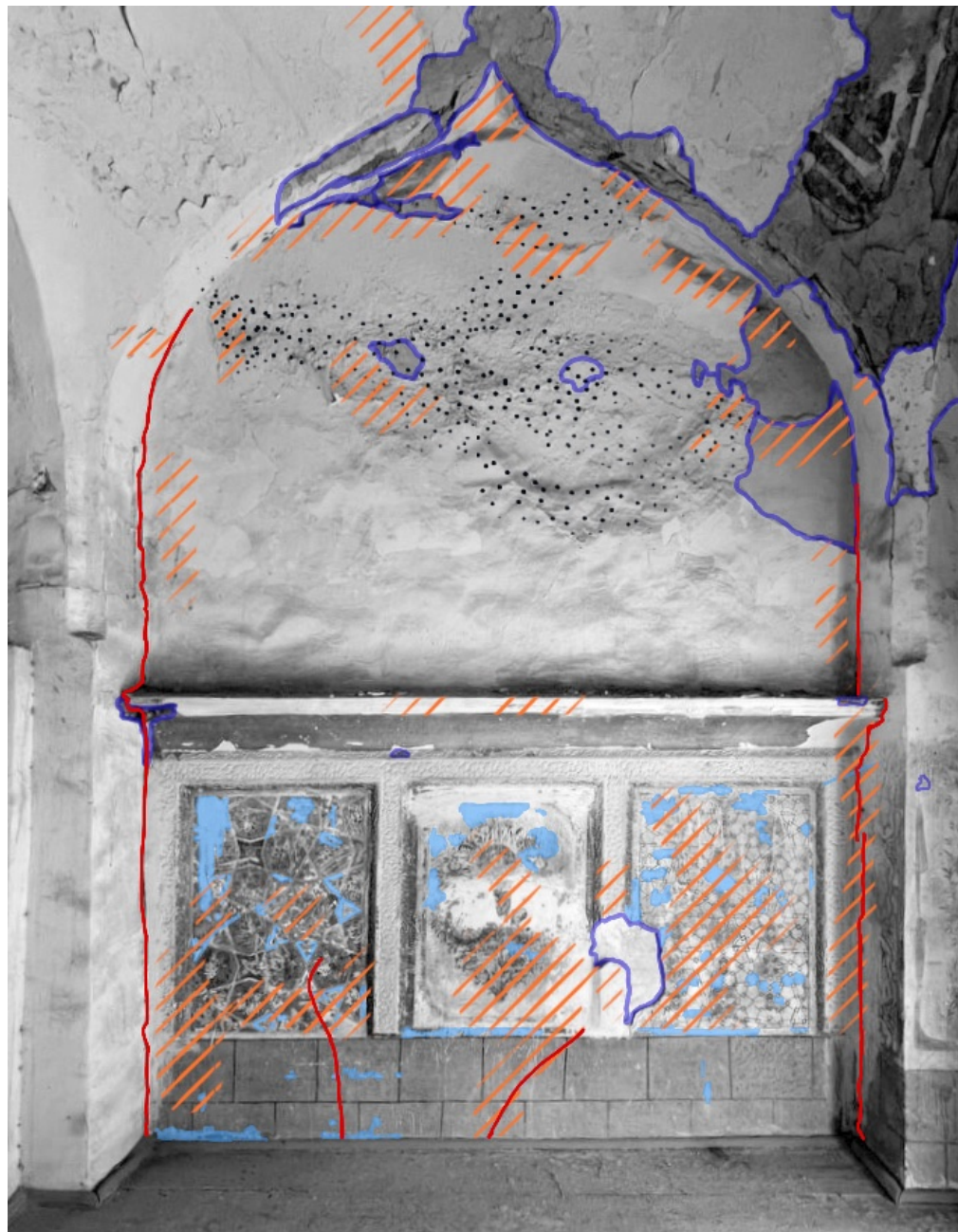




Legend of damages:

- Lacuna/ Missing parts
- Loss of paint layer
- Crumbling
- Peeling
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- Water traces

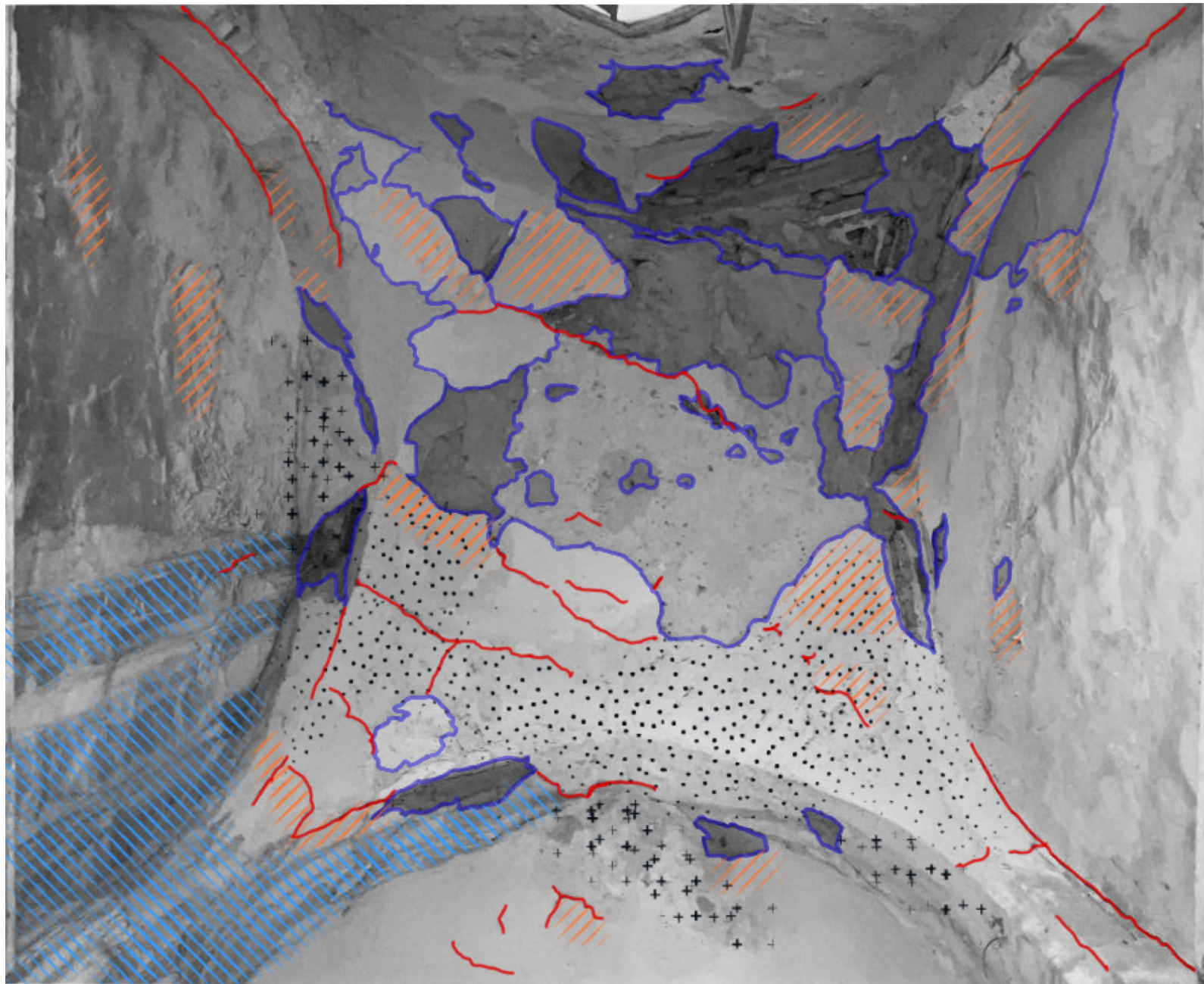




Legend of damages:












- Lacuna/ Missing parts
- Loss of paint layer
- Crumbling
- Peeling
- Crack
- Scaling
- Salt
- Biological growth
- Corrosion
- Burrow
- Water traces

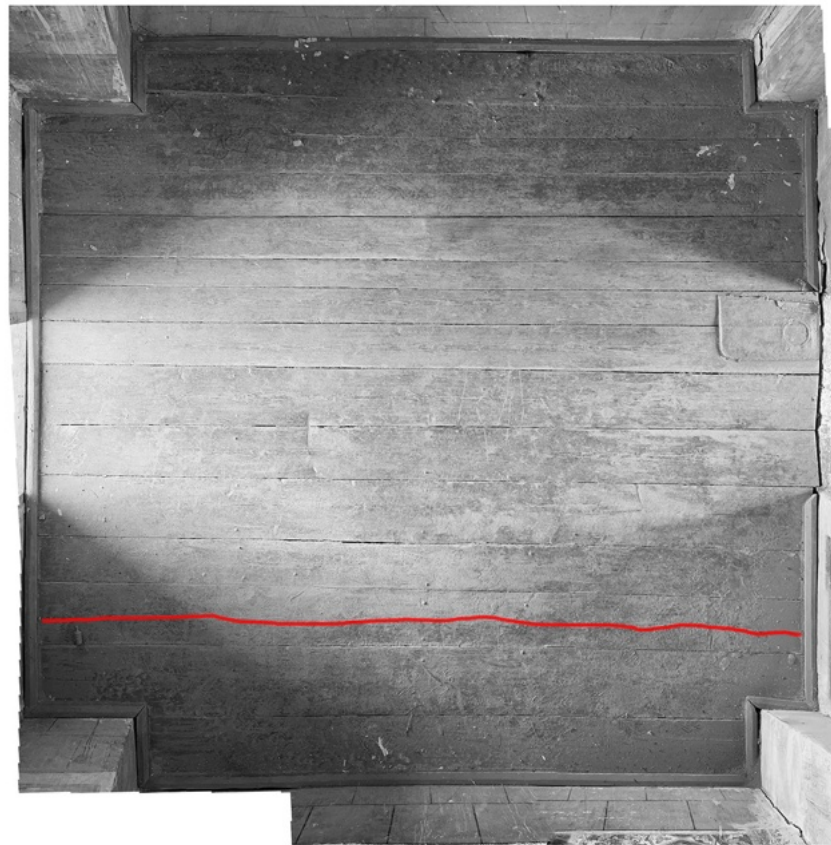


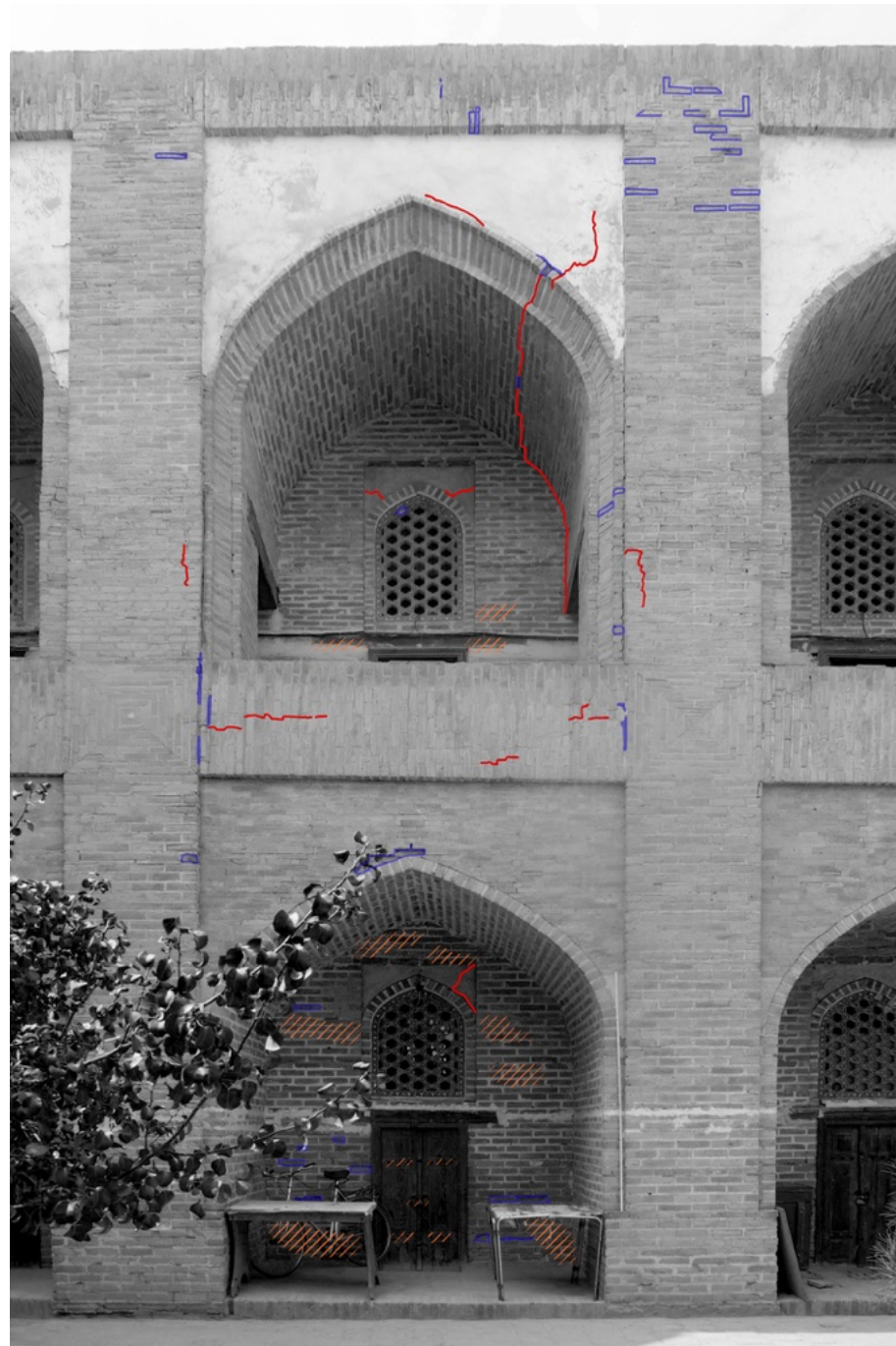


- Legend of damages:
- Lacuna/ Missing parts
 - Loss of paint layer
 - Crumbling
 - Peeling
 - Crack
 - Scaling
 - Salt
 - Biological growth
 - Corrosion
 - Burrow
 - Water traces

Legend of damages:

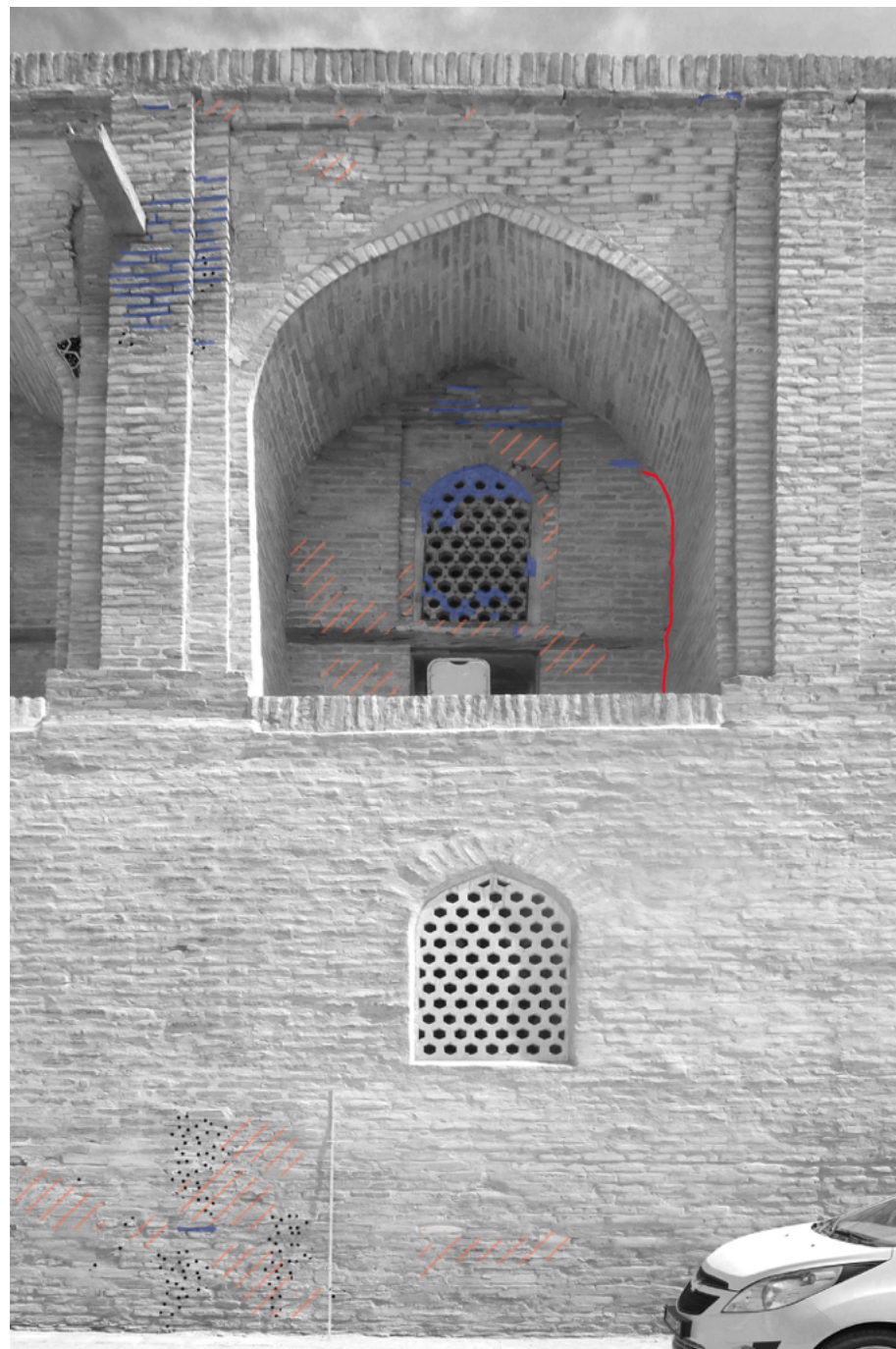
-  Lacuna/ Missing parts
-  Loss of paint layer
-  Crumbling
-  Peeling
-  Crack
-  Scaling
-  Salt
-  Biological growth
-  Corrosion
-  Burrow
-  Water traces





Legend of damages:

- Lacuna/ Missing parts
- Loss of paint layer
- Crumbling
- Peeling
- Crack
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- Biological growth
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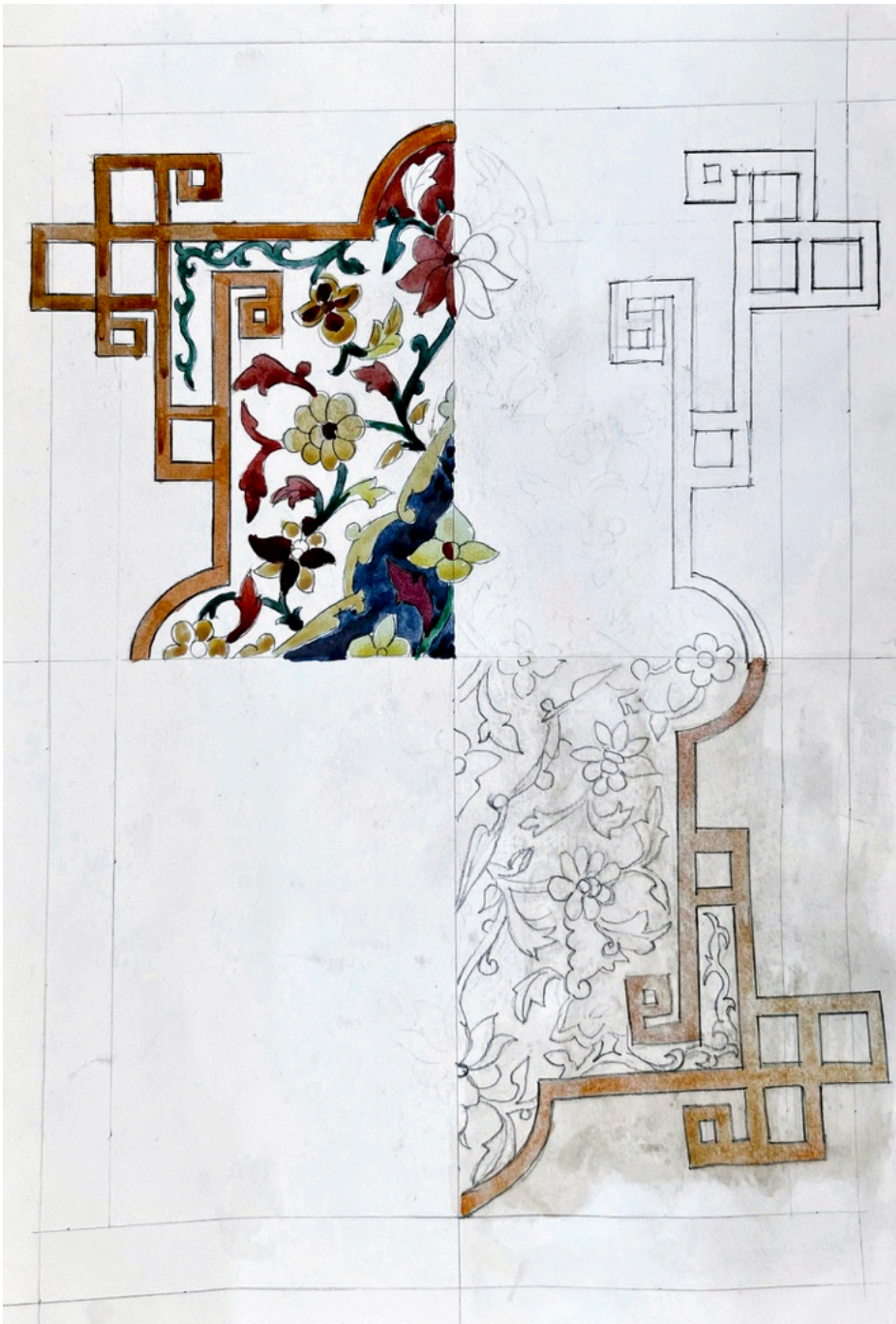


- Legend of damages:
- Lacuna/ Missing parts
 - Loss of paint layer
 - Crumbling
 - Peeling
 - Crack
 - Scaling
 - Salt
 - Biological growth
 - Corrosion
 - Burrow
 - Water traces

Painting

As part of the interdisciplinary work process Dilshoda Sultanova and Malika Beknazarova, a student of Fine Arts at the University in Bukhara, produced a number of paintings from some of the decorative elements that were found on the walls in the main room. To do this, they analysed the paintings and reconstructed selected parts but also gave an artistic impression for the potential color of its design to give a glimpse of a possible display in the future.





Traffic Light System

The areas of the rooms most affected by degregation and in need of intervention rated according to a traffic light system of urgency:

Red - under peril, urgent attention

Yellow - currently stable, monitoring for change within next two years

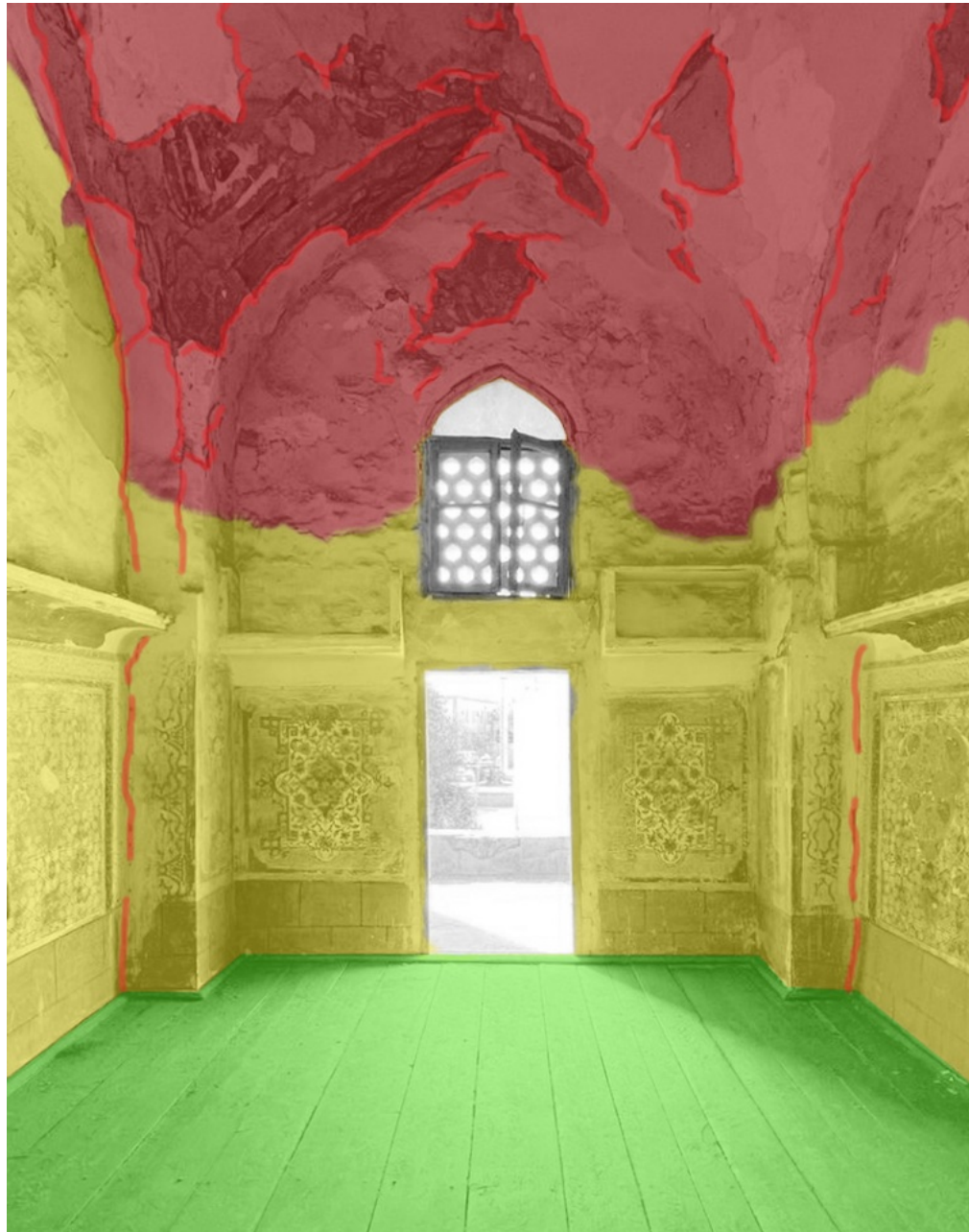
Green - stable, no immediate intervention necessary, monitor for change



Traffic light system:

- Immediate treatment
- Stable for now, needs treatment in the next 2 years
- Stable

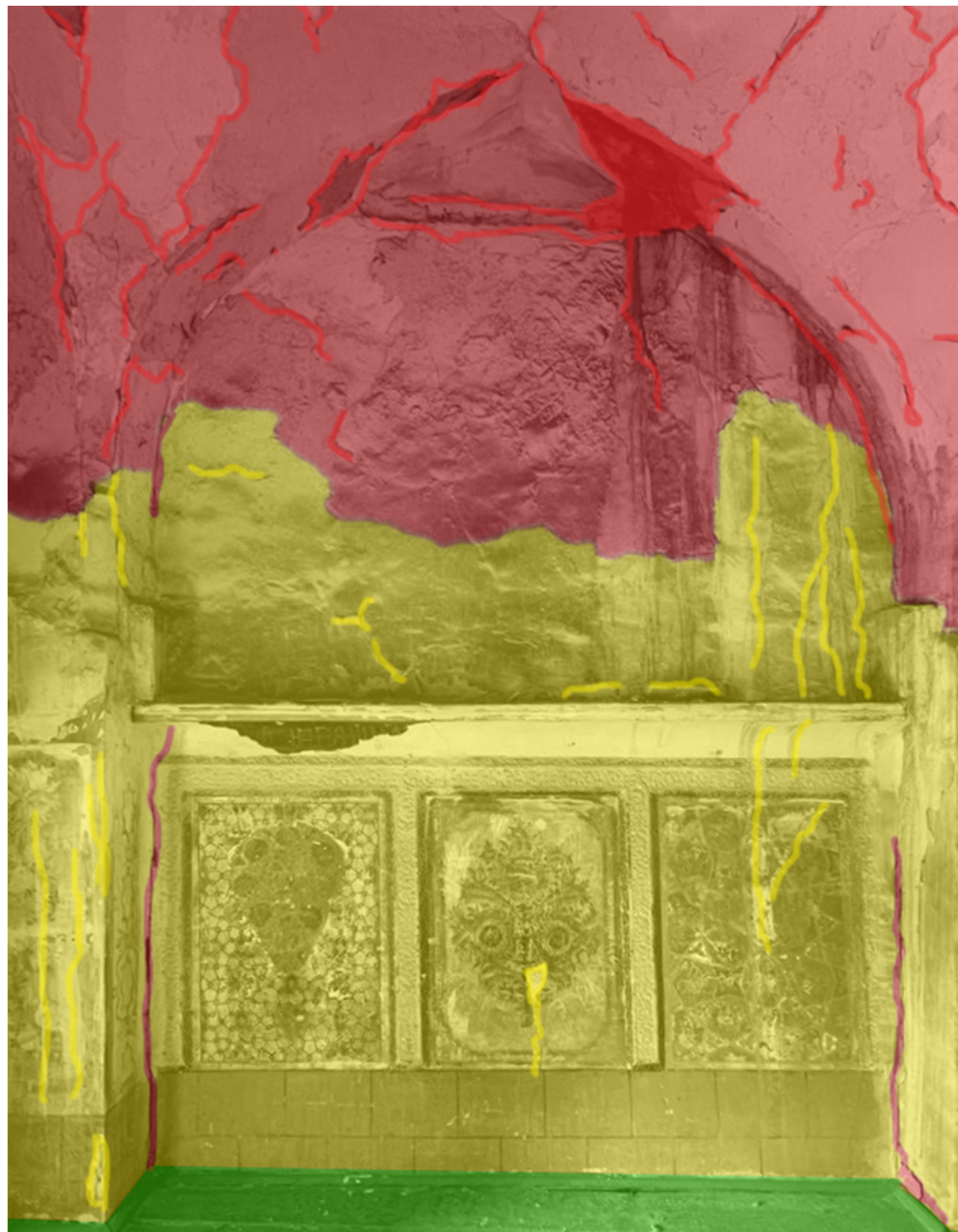




Traffic light system:

- Immediate treatment
- Stable for now, needs treatment in the next 2 years
- Stable





Traffic light system:

- Immediate treatment
- Stable for now, needs treatment in the next 2 years
- Stable

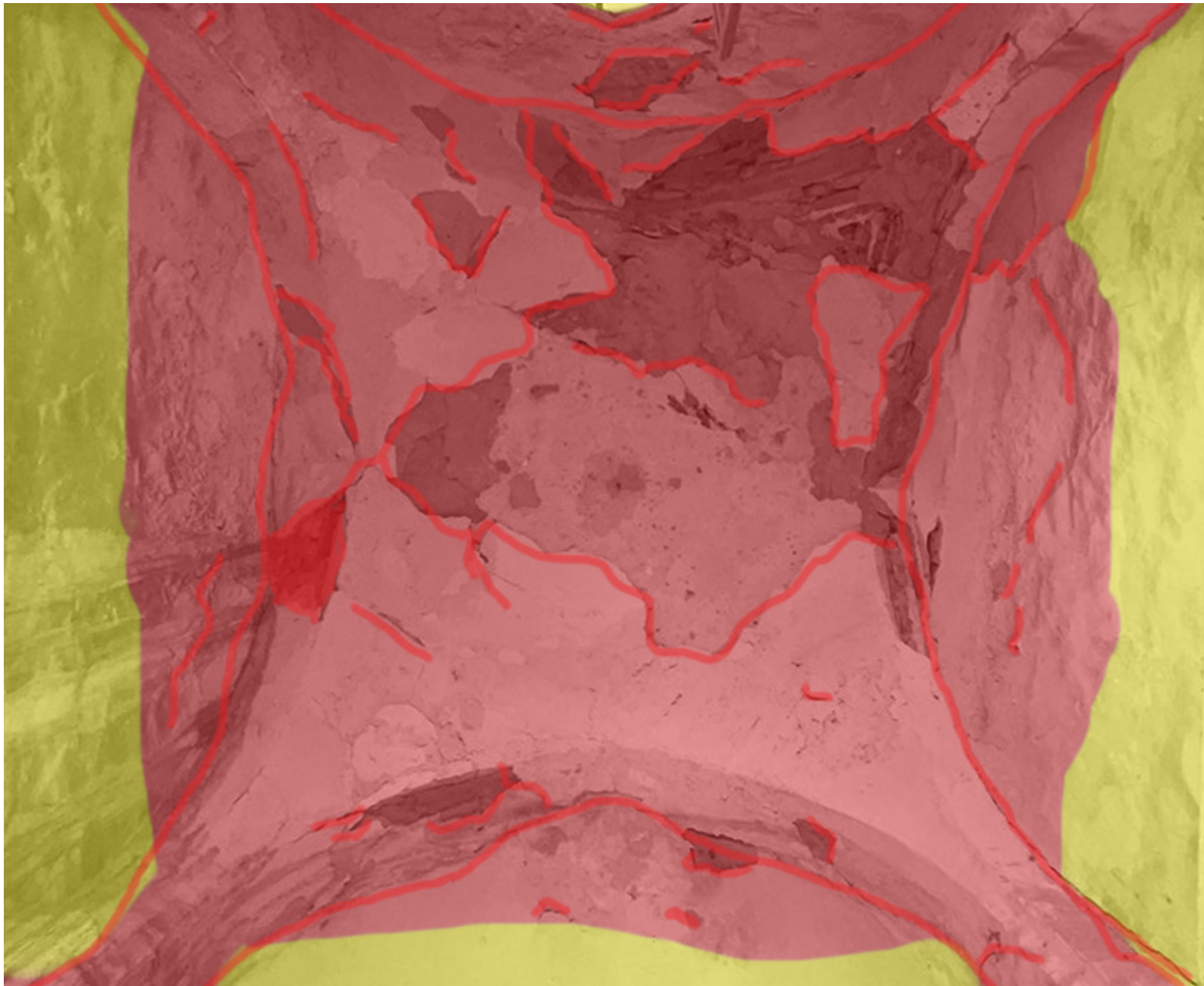




Traffic light system:

- Immediate treatment
- Stable for now, needs treatment in the next 2 years
- Stable



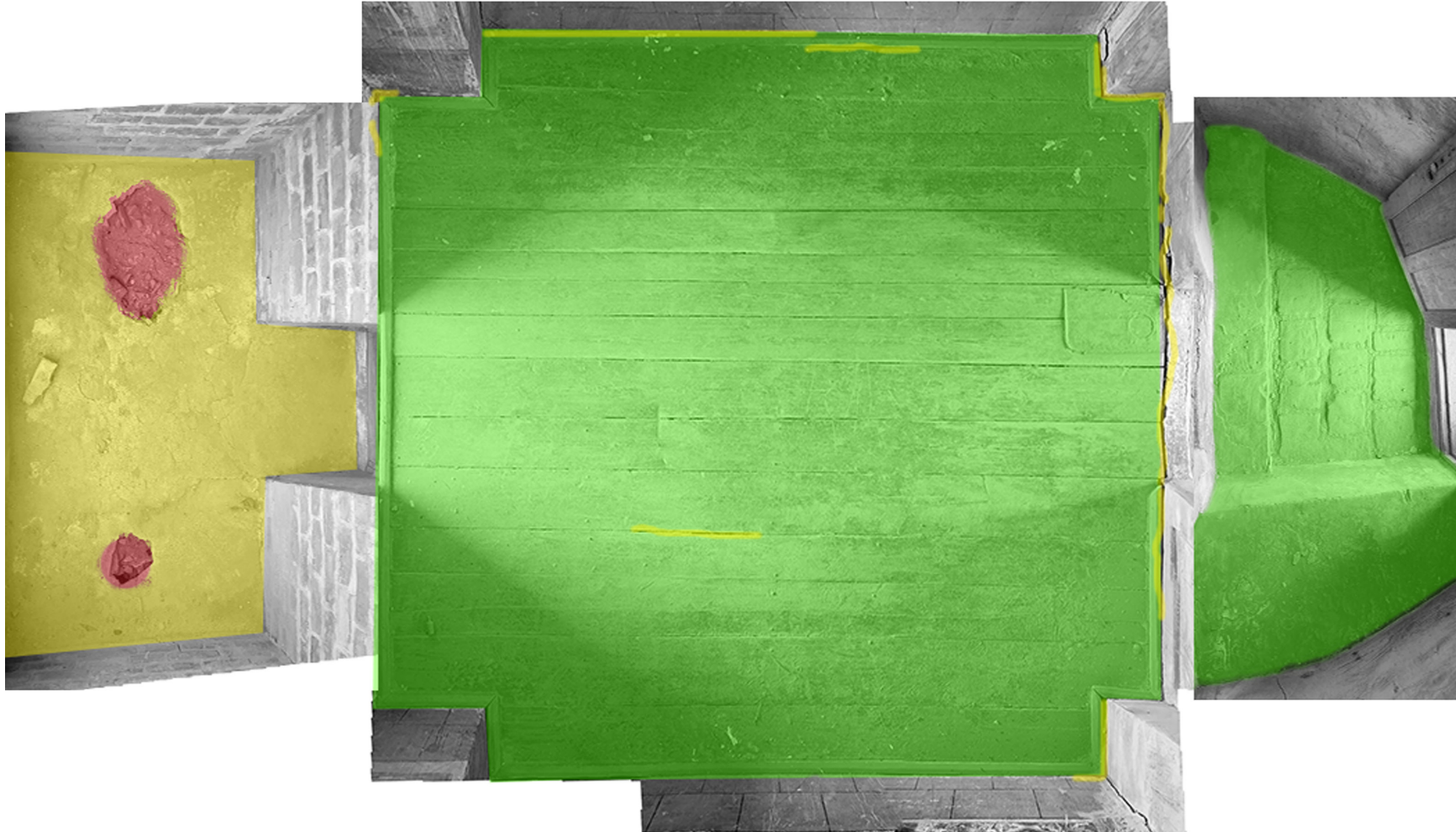


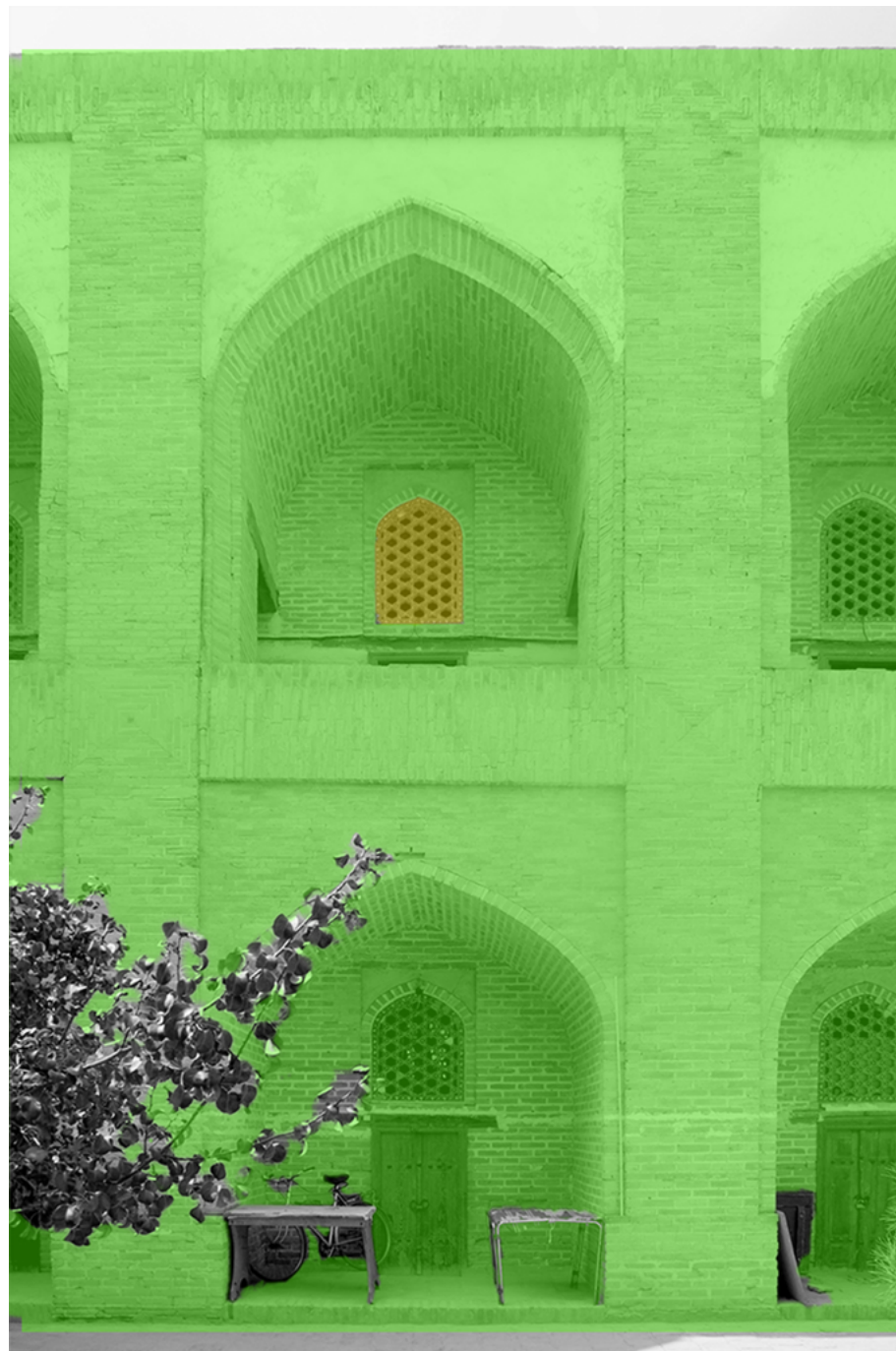
Traffic light system:

- Immediate treatment
- Stable for now, needs treatment in the next 2 years
- Stable

Traffic light system:

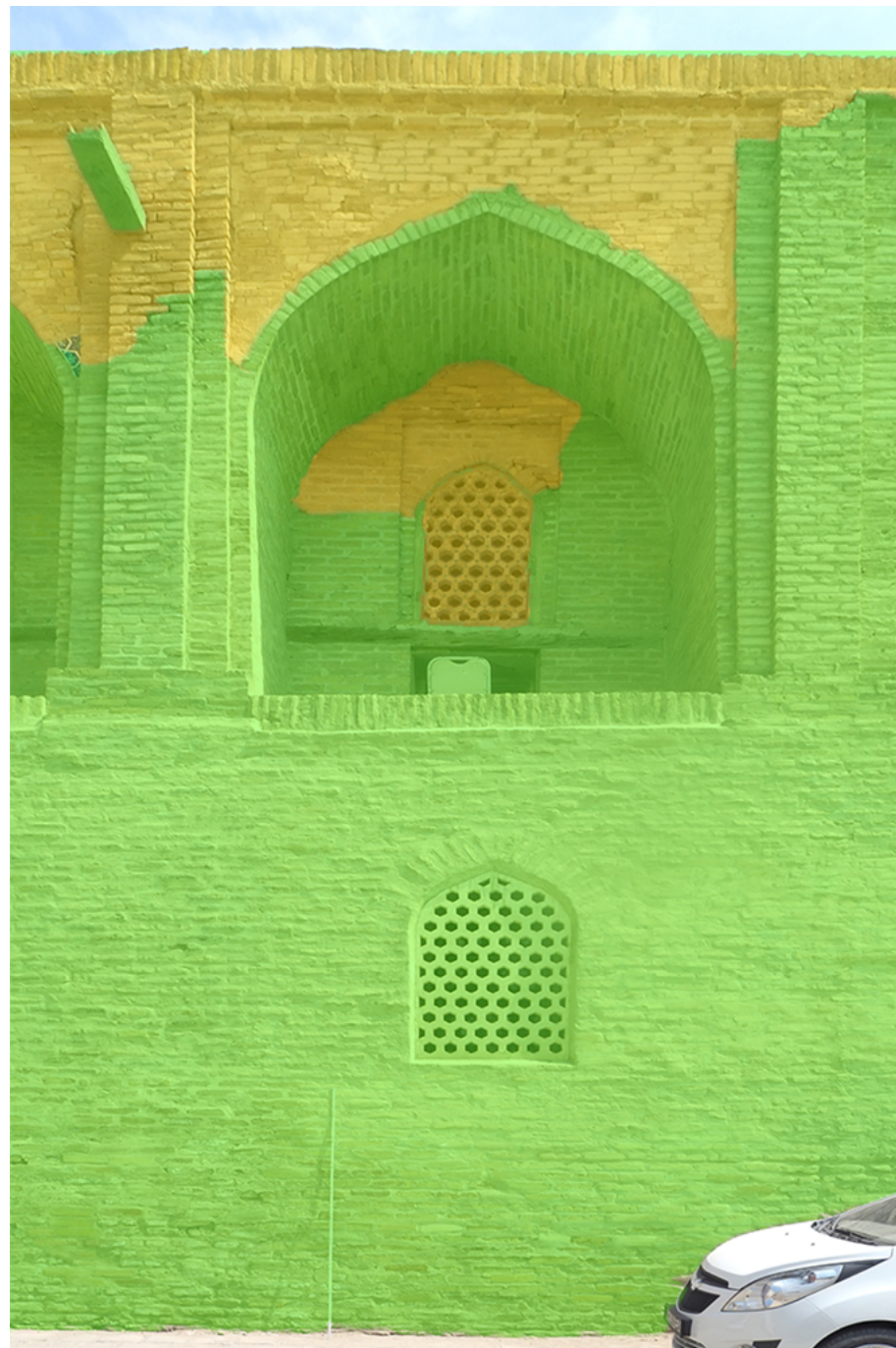
- Immediate treatment
- Stable for now, needs treatment in the next 2 years
- Stable





Traffic light system:

- Immediate treatment
- Stable for now, needs treatment in the next 2 years
- Stable



Traffic light system:

- Immediate treatment
- Stable for now, needs treatment in the next 2 years
- Stable

Photo- documen- tation

The photographic documentation shows detailed images of the room, its materials such as wall paintings and stucco, damages such as cracks or missing parts and the overall condition of the room and outer facade. It also gives additional visual feedback on the condition on site and a more in depth view of selected parts in need of urgent conservation.



Water intrusion source in in northern corner of the cupola



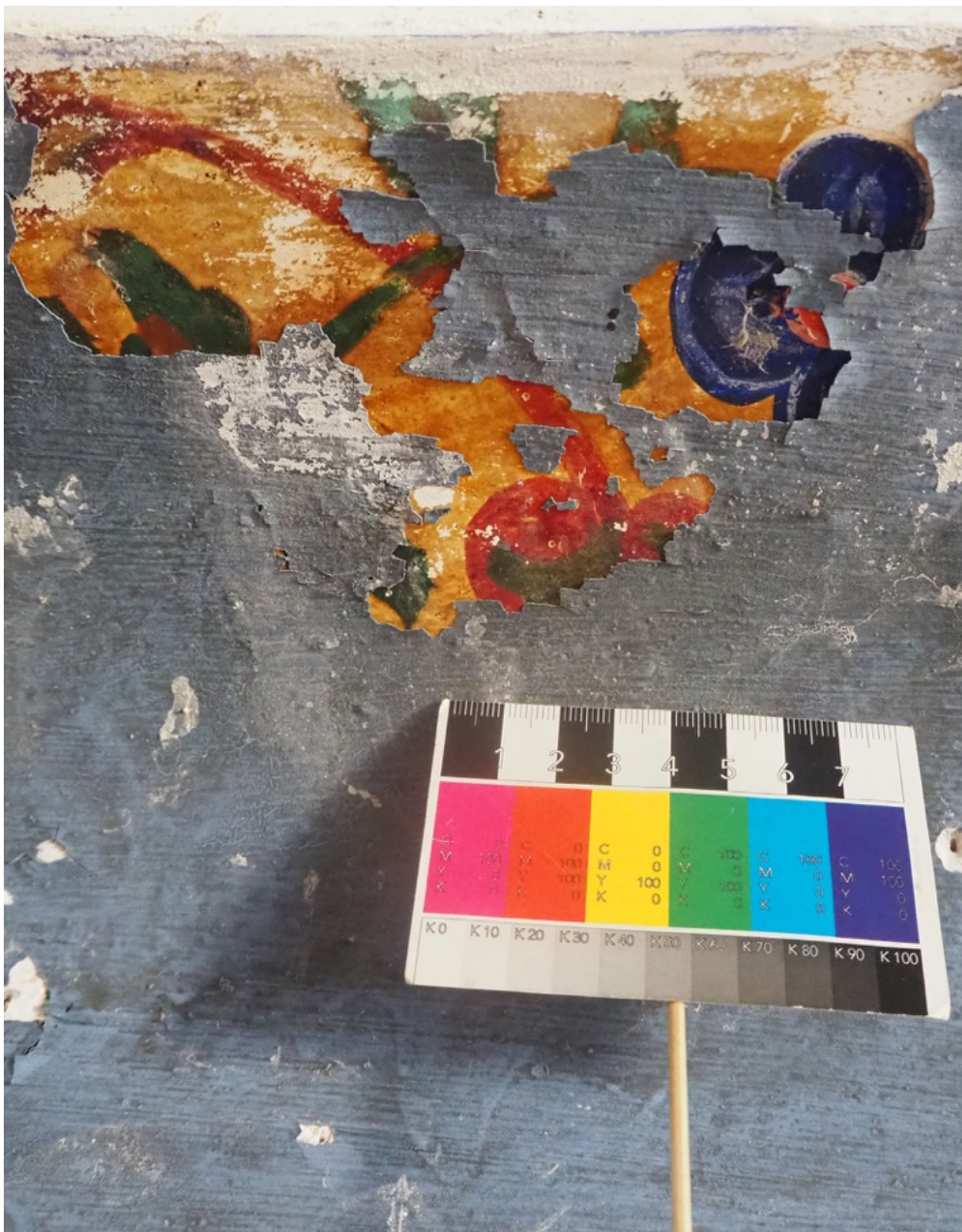
Loss of fragile wall paintings and stucco, south wall



Scaling of different plaster layers in different stages, south-west corner



Crumbling of the upper plaster layer, north wall



Detail of paint layer loss on the stuccoed corbel with another paint layer visible underneath



Detail of the corner of the two visible layers of wall paintings



Detail of the stucco frame around the wall painting with a thick layer of overlay on top

Team 3



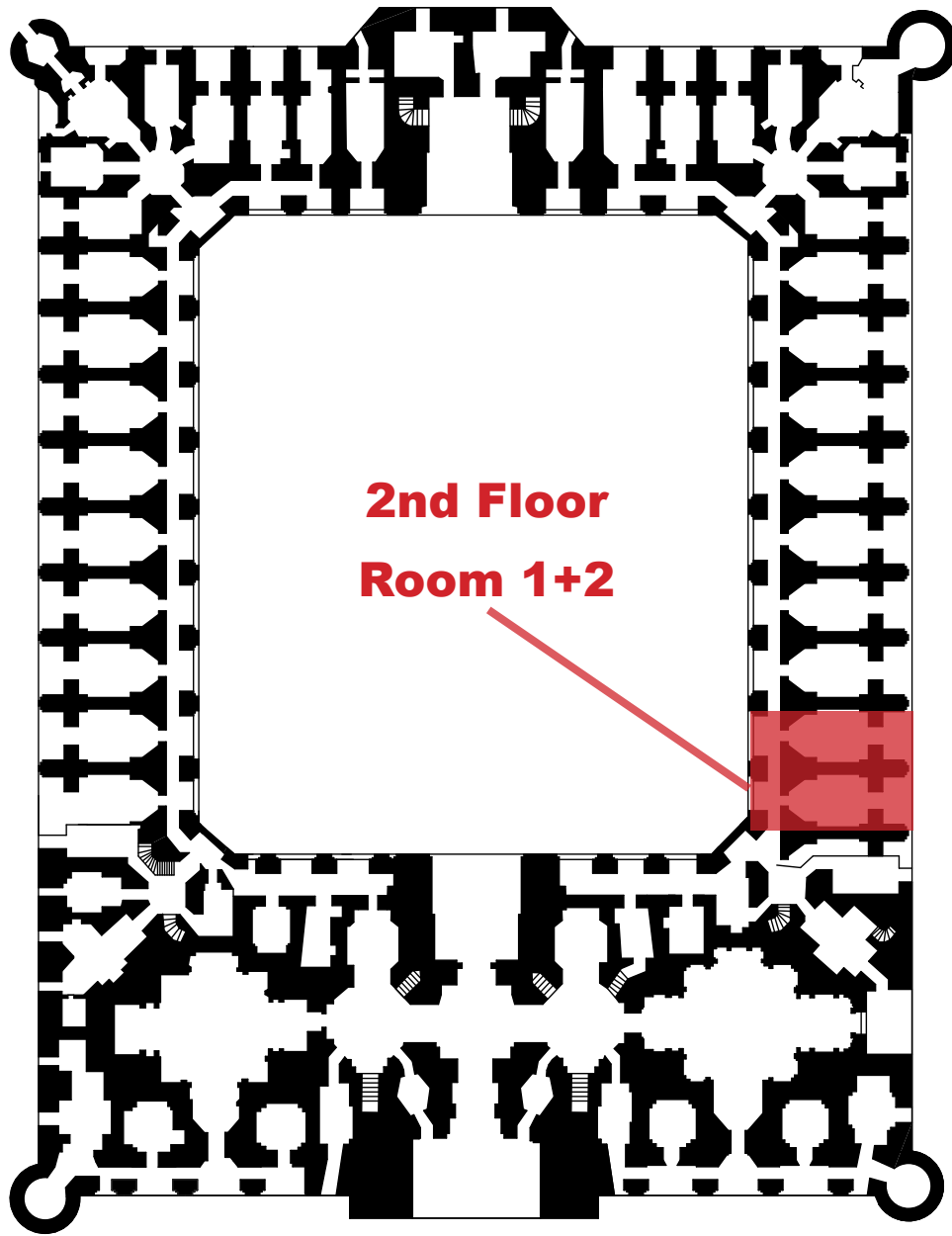
Students

- Sarah-Theresa Becker**
*University of Applied Sciences Potsdam
Conservation and Preservation (Wall)*
- Seija Bräuchle**
*University of Applied Sciences Potsdam
Building Preservation*
- Avazbek Jamolov**
*Samarkand State University of Arch. & Constr.
Architecture*
- Immanuel Kasper**
*University of Applied Sciences Potsdam
Architecture and Urban Design*
- Asadbek Kuliev**
*Tashkent University of Arch. and Civil Eng.
Civil Engineering*

Mentors

- Prof. Dr. Jörg Röder**
*University of Applied Sciences Potsdam
Professor of Civil Engineering and Preservation*
- Bozor Maxamov**
*Samarkand State University of Arch. & Constr.
Teacher for Architecture*

Room 1+2



2nd Floor
Room 1+2

Room 1+2

Introduction to the room

The following documentation focusses on the analysis and investigations of room number 1 and 2, on the second floor of the Madrasah. They are located next to each other on the eastern wing at the corner to the southern wing. The access staircase is located in the north-eastern corner of the courtyard, since the staircase nearby is closed. The rooms are of particular interest showcasing a severe crack in between the connecting wall. Room 2 stands out in form of its wall paintings and stucco panelling.

Documentation

The documentation includes elevation drawings, photographic images of the facades and internal elevations, detailed mappings of materials and damages as well as a photo documentation of the room's condition. It furthermore contains a treatment concept based on the prior mentioned and explained traffic light system.

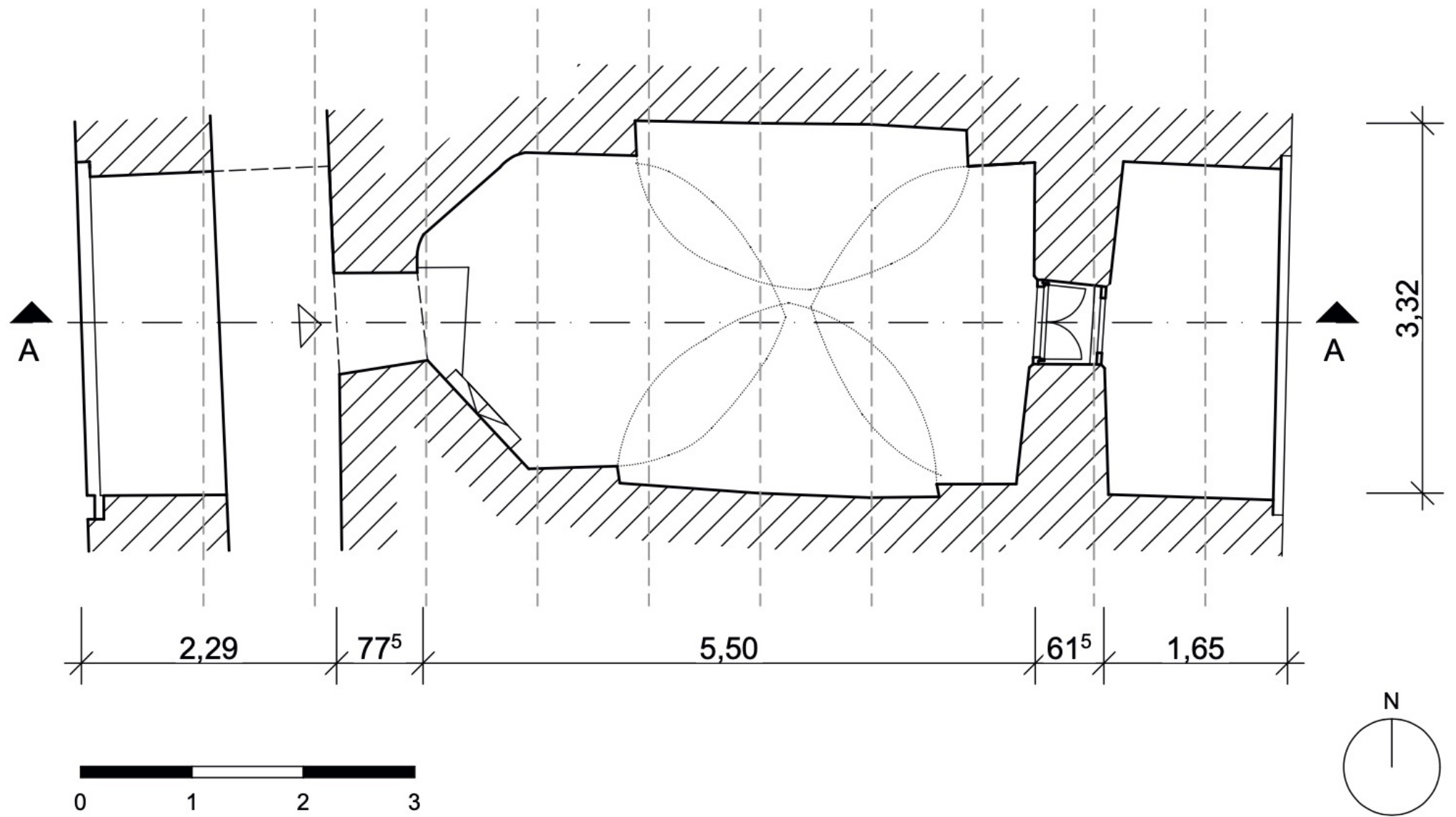
CAD Drawing

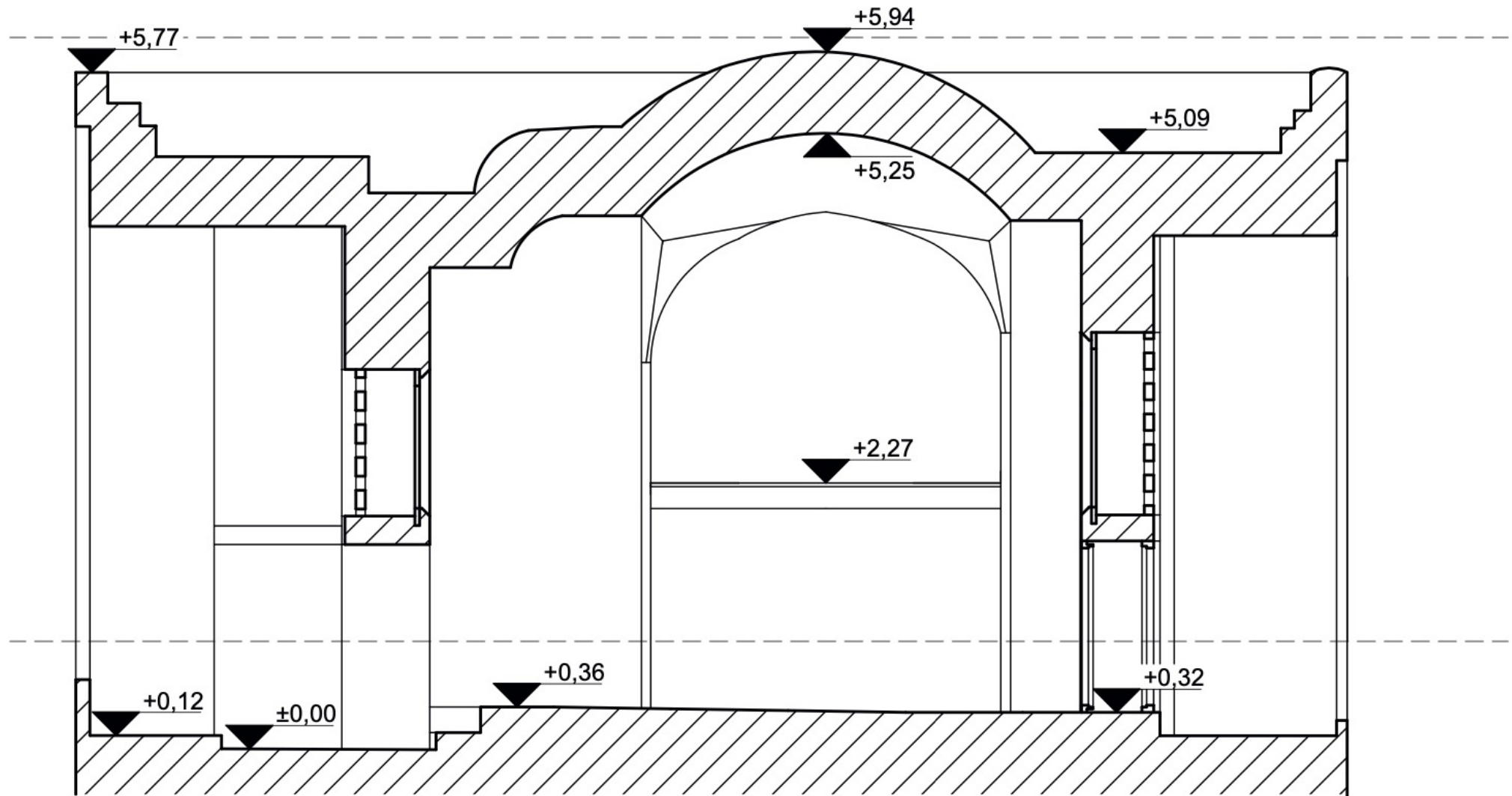
Only room 1 was measured and drawn. Room 2 was only considered from the point of view of materials, damages and measures, especially with regard to the large crack between the two rooms, the wall paintings and stucco.

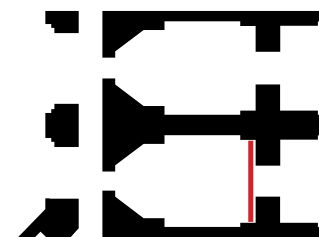
Both rooms basically consist of the arcade on the courtyard side, which is used for accessing the room, the main room and the loggia on the street side.

Room 1 is particularly characterised by its irregularities. There are no right angles, which is further reinforced by the massive damage in the plaster; in addition, the floor has a slope towards the street side.

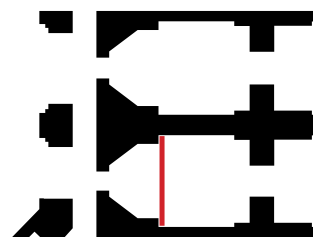
In the following chapter you can find a floor plan and section of room 1 as well as a photographic documentation of the interior and exterior condition of the rooms.

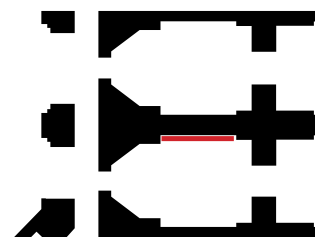




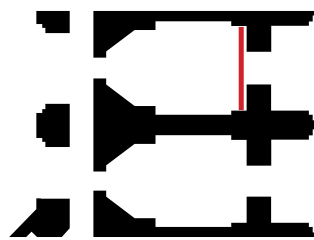


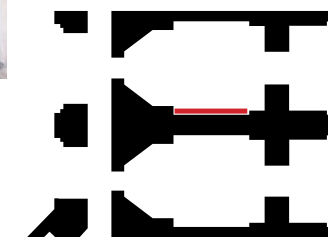


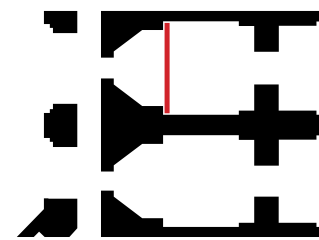


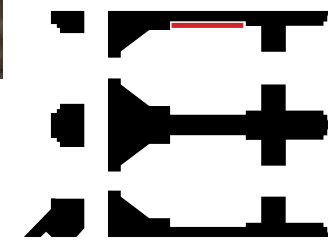


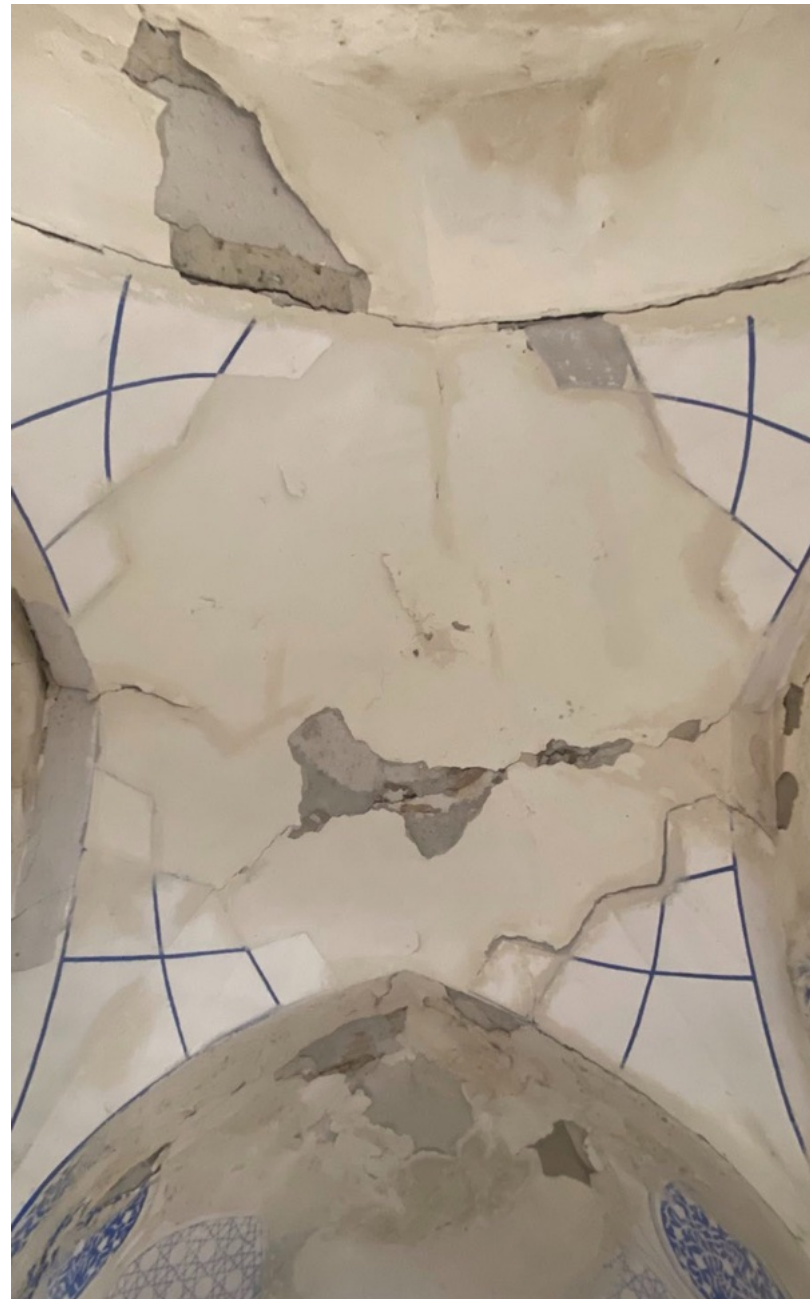
















Mapping Materials

The walls and ceiling of room 1 are finished with a grey base coat and a white finishing coat. No ornaments are present. There is a cornice half-way up the wall on each of the two side walls. This is built up over a core of grey mortar (probably cementitious) and covered with the same white fine plaster as the rest of the wall surfaces. Next to the entrance door is a small wall recess with a shelf (tockcha). Its surface is also covered with the same white fine plaster as the wall surfaces. Windows are still present, although some of the glass panes are missing. The two doors are missing, although the door facing the courtyard were in front of the room at the time of the inventory.


















The floor is covered with rectangular tiles (mostly approx. 25 cm x 25 cm). The spaces between them are roughly closed with grout.

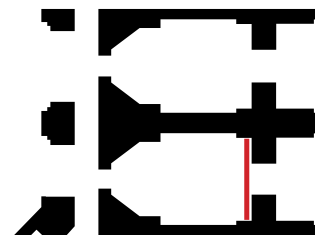
The side walls of room 2 are divided into fields decorated with ornaments. Some of the ornaments are painted on, others are vividly set off by profiled stucco surfaces. The fields are partly decorated with floral, partly with geometric ornaments. The three upper fields are separated from the four lower fields by a moulding decorated with muqarnas. Large areas of the paintings are covered with a thin white coating.

The mapping of the materials regarding this room is based on the predefined legend of materials and the corresponding glossary.

Since room 1 does not have any ornamentation in the form of stucco or wall paintings, the two side walls of the adjacent room (room 2) were also included in the considerations with regard to the existing condition and necessary measures. The floor of room 1 will only be briefly discussed here.



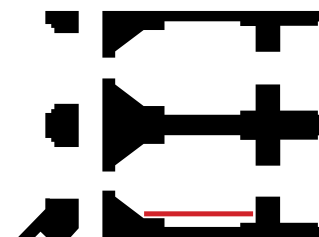
- Legend of materials:
-  Brick masonry
 -  Natural stone
 -  Plaster
 -  Stucco
 -  Wall painting
 -  Paint layer
 -  Sgraffito
 -  Overlay
 -  Majolika tile
 -  Terracotta
 -  Glazed terracotta
 -  Artificial stone
 -  Wood
 -  Metal
 -  Glas
 -  Cable/Wire
 -  Reet






















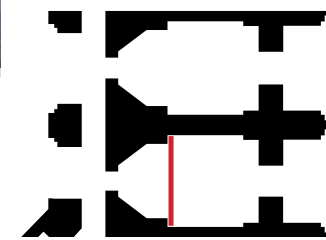
Legend of materials:

	Brick masonry
	Natural stone
	Plaster
	Stucco
	Wall painting
	Paint layer
	Sgraffito
	Overlay
	Majolika tile
	Terracotta
	Glazed terracotta
	Artificial stone
	Wood
	Metal
	Glas
	Cable/Wire
	Reet



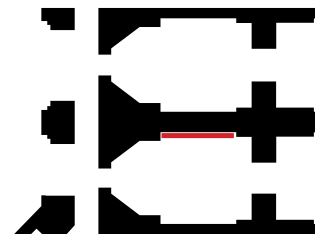


- Legend of materials:
-  Brick masonry
 -  Natural stone
 -  Plaster
 -  Stucco
 -  Wall painting
 -  Paint layer
 -  Sgraffito
 -  Overlay
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- Legend of materials:
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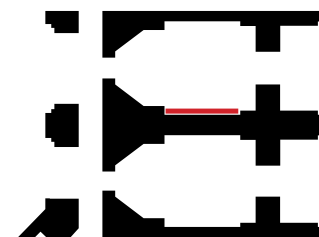


Legend of materials:

	Brick masonry
	Natural stone
	Plaster
	Stucco
	Wall painting
	Paint layer
	Sgraffito
	Overlay
	Majolika tile
	Terracotta
	Glazed terracotta
	Artificial stone
	Wood
	Metal
	Glas
	Cable/Wire
	Reet

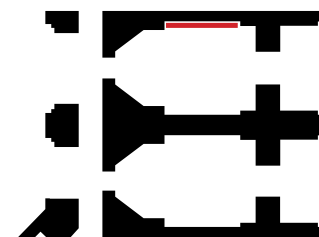


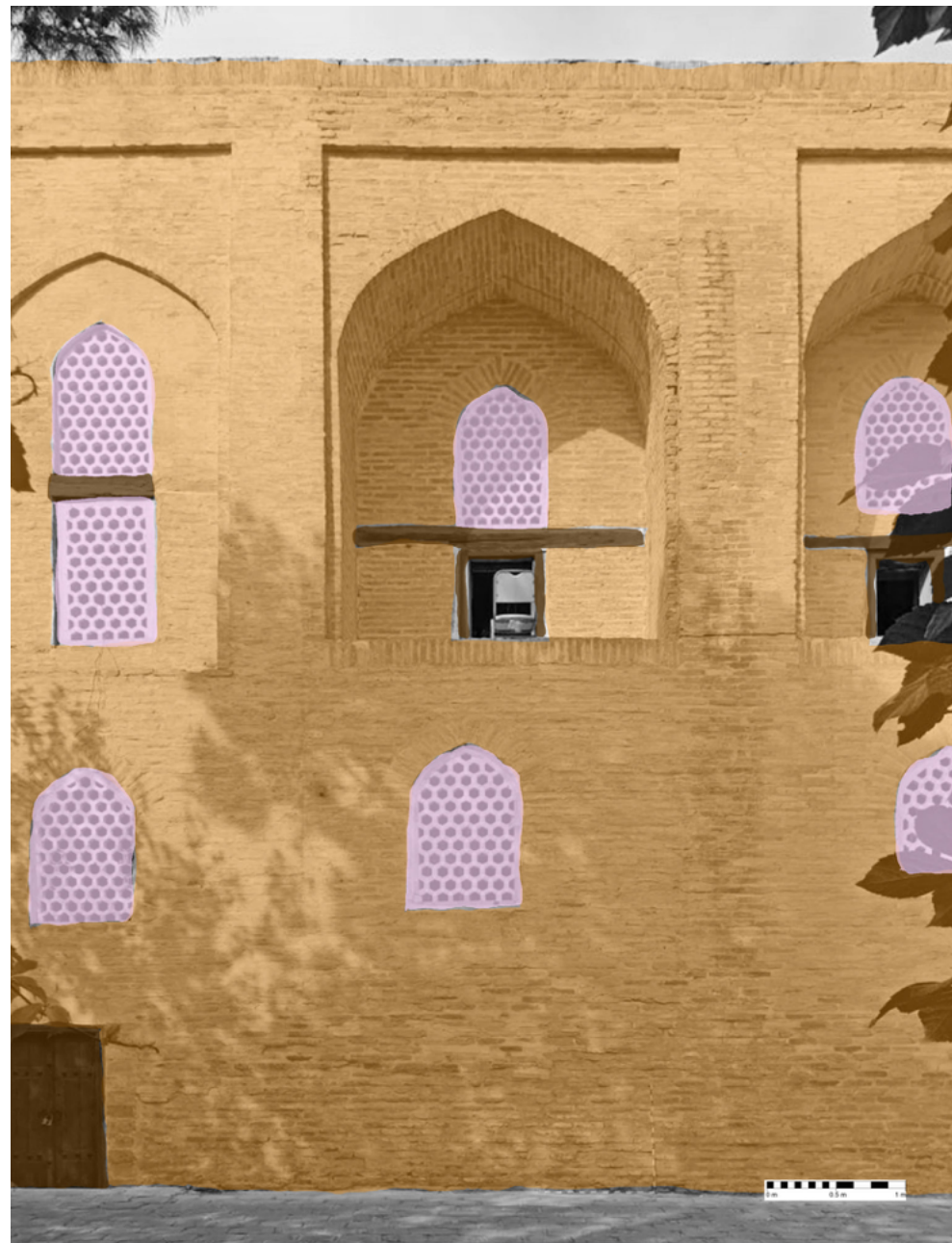
- Legend of materials:
- Brick masonry
 - Natural stone
 - Plaster
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Legend of materials:

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Mapping Damages

Overview

The most significant damage of both rooms is a severe crack between room 1 and 2. It is up to 25 cm wide in room 2 and even continues on the wall between room 2 and 3. There you can find a gap of about 10 cm width between ornaments and wall, that has been filled retroactively. Based on this observation one can assume that the exterior wall disconnected from the interior wall and leaned outward at some point.

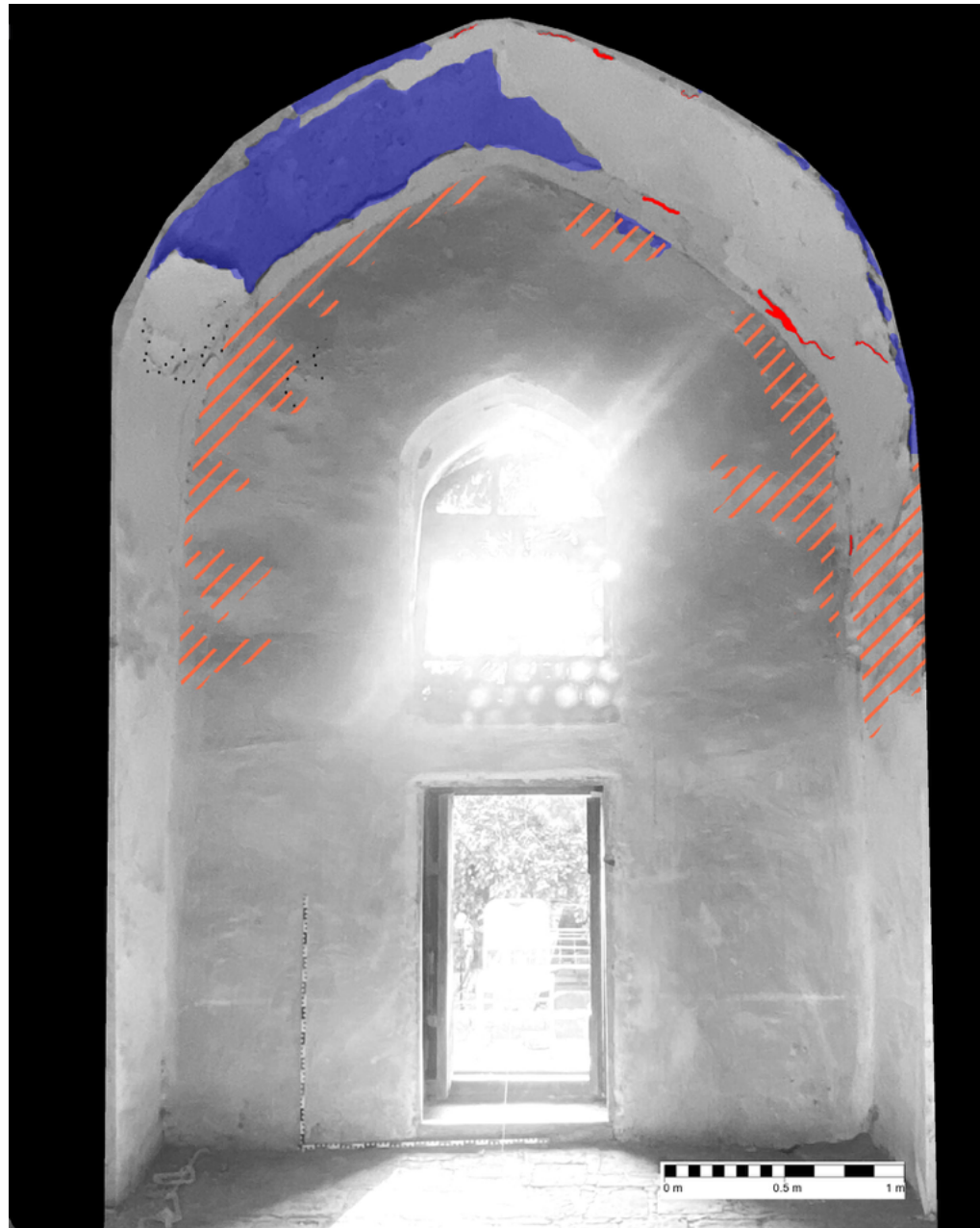
The further condition of room 1 is characterised by water ingress through the ceiling. Heavy scaling, crumbling and plaster loss are found mainly on the ceiling and in the upper area of the walls. Scaling also occurs further down in the area around the cracks.

Room 2 is less damaged. Less severe peeling also occurs here in the upper area, rather than where the paintings and stucco are located. The condition of the paintings cannot entirely be judged, as they are largely covered with a white paint glaze. Defects in the stucco and paintings occur only to a slight extent in the exposed areas. Active peeling that will lead to further loss of the painting layer can be observed in the area of the muqarnas.

Necessary measures / Traffic Light System

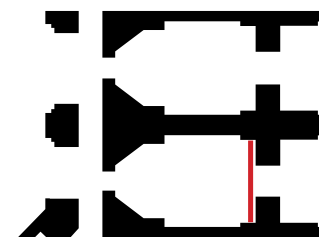
First of all, the cause of the crack between room 1 and room 2 must be found and more information about the possible continuation in the floor and the storey below has to be collected. Then first, a force-locking connection should be restored, taking into account the earthquake situation and eliminating the cause. Likewise, the restoration of the functionality of the roof should have a high priority and a corresponding maintenance plan has to be drawn up. Only then the wall paintings and stucco can be restored. The aim here should be to restore a cohesive overall aesthetic appearance. Further investigations into the chronology of the individual parts of the building would also be desirable.

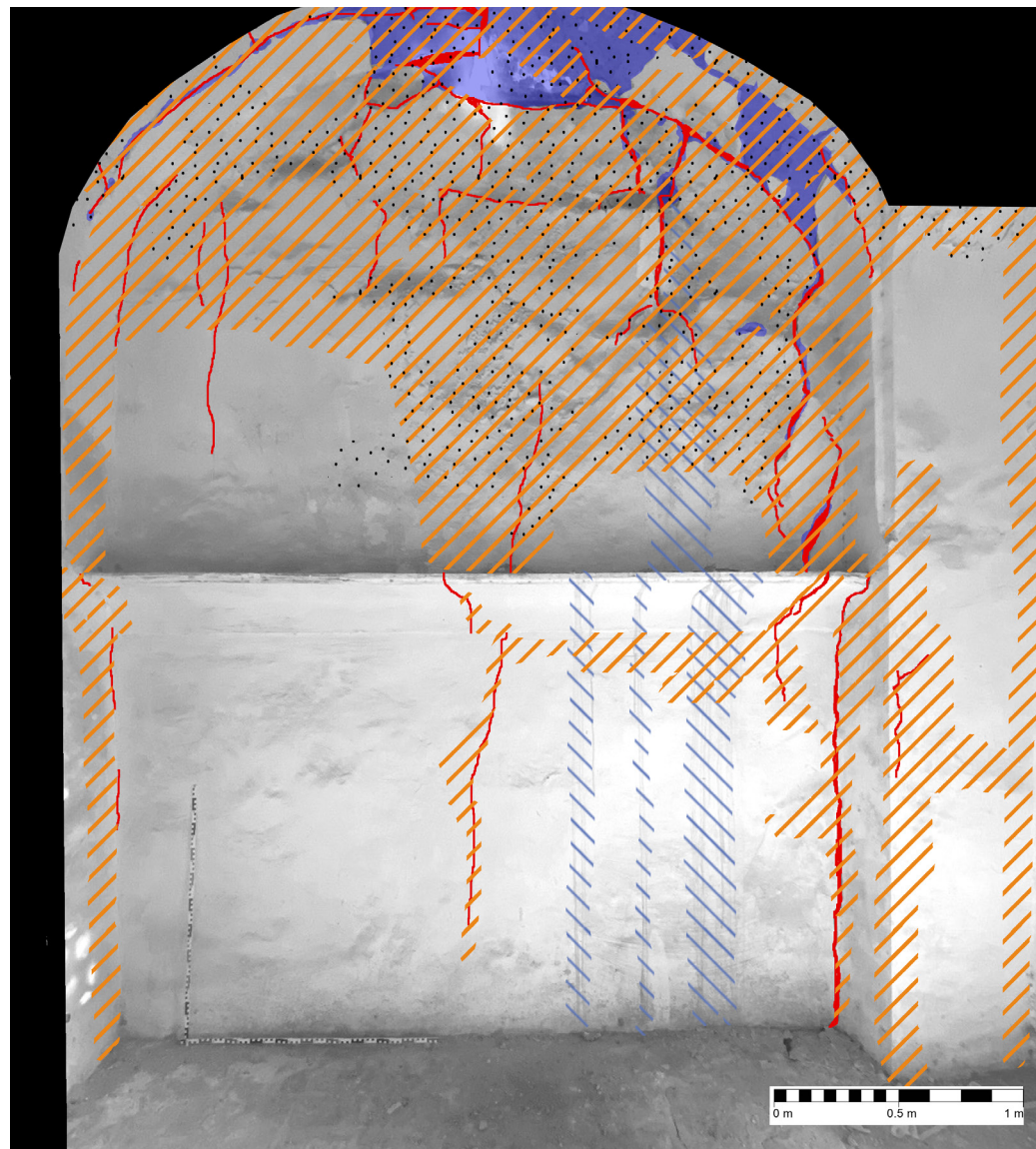
The necessary measures and their prioritisation can be seen in the table and mapping of the traffic light system in the second part of this chapter.



Legend of damages:

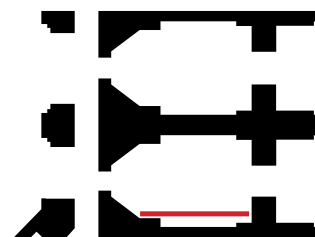
- Lacuna/ Missing parts
- Loss of paint layer
- Crumbling
- Peeling
- Crack
- Scaling
- Salt
- Biological growth
- Corrosion
- Burrow
- Water traces

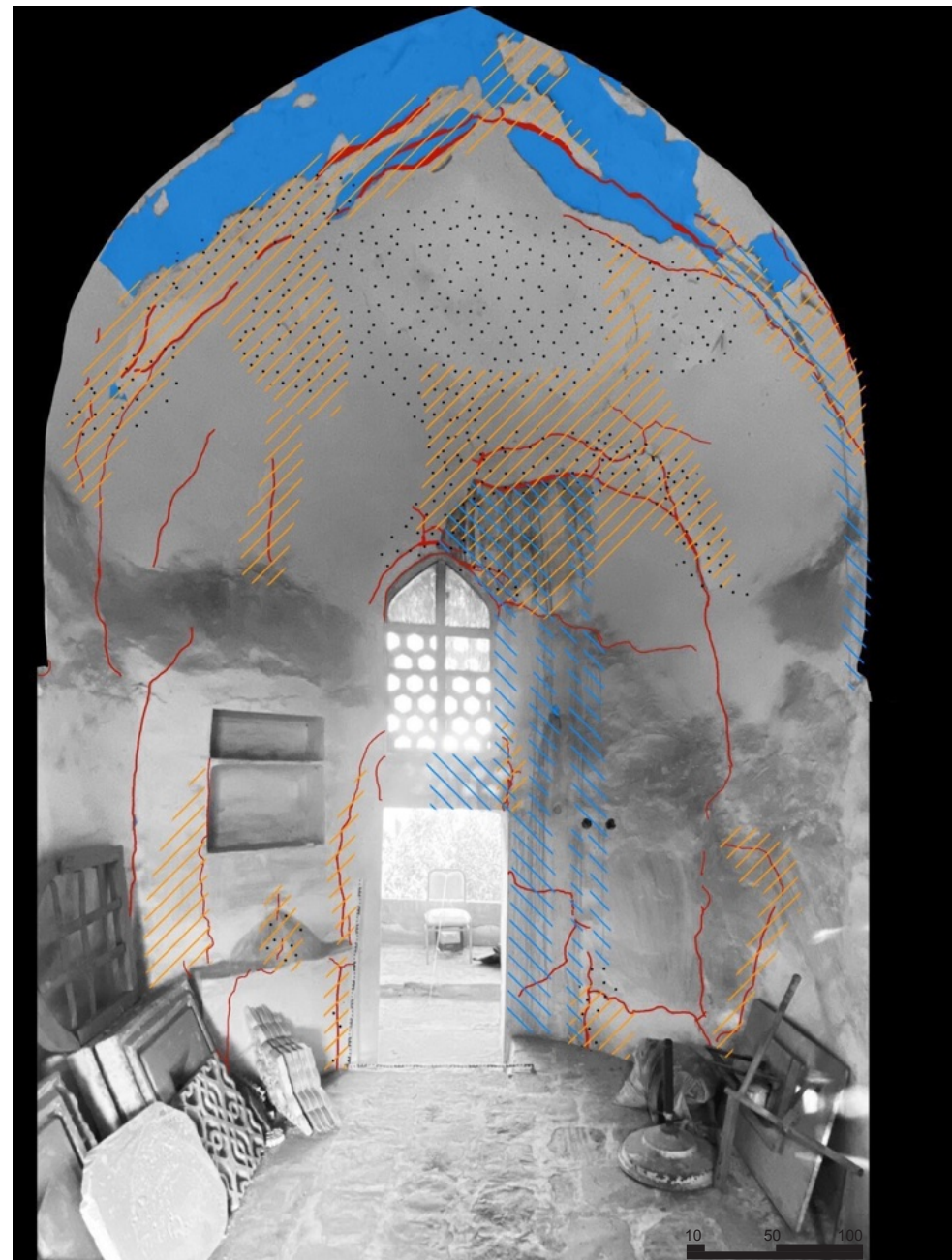




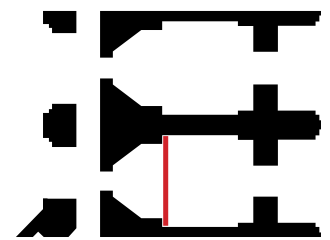
Legend of damages:

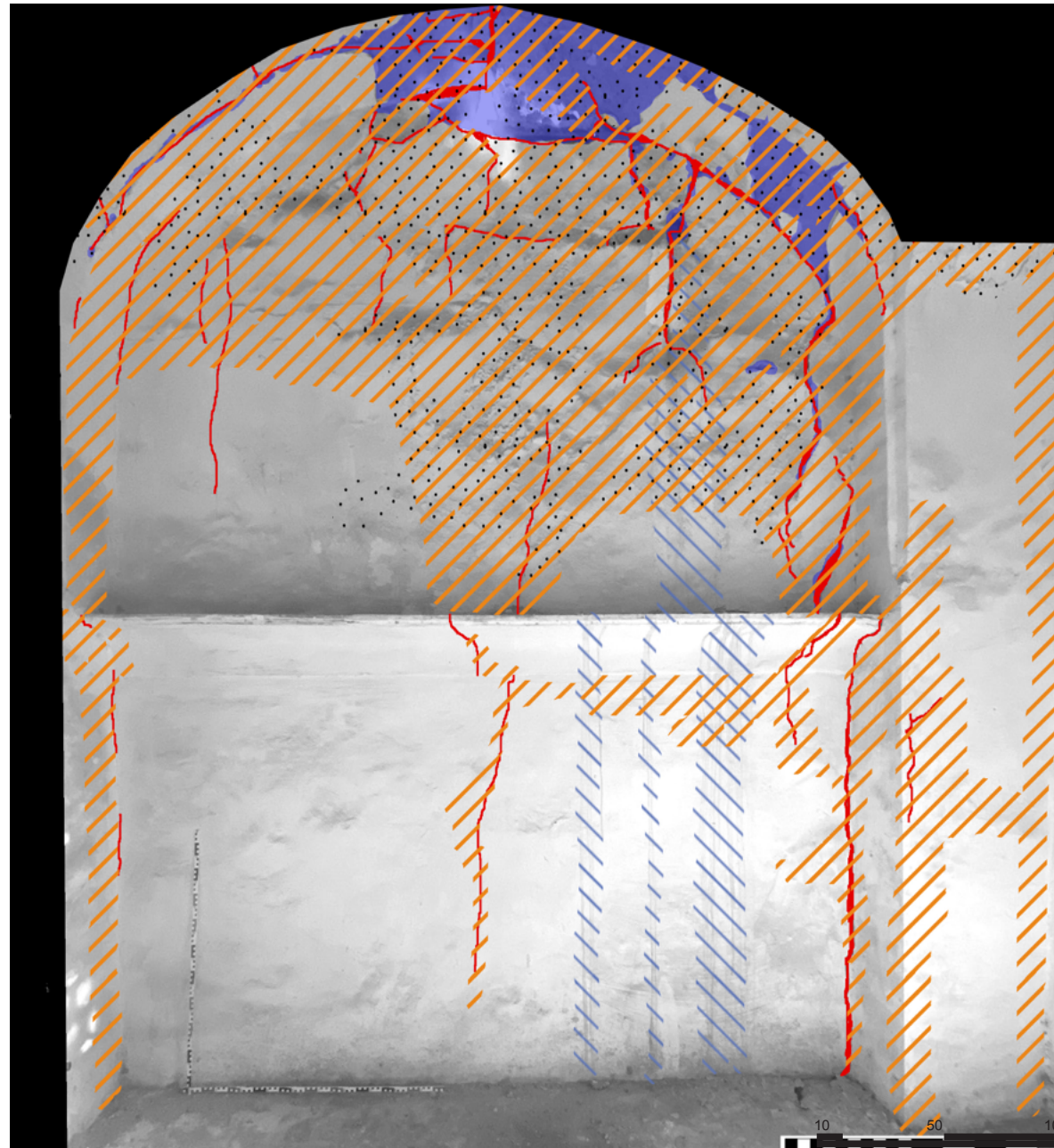
- Lacuna/ Missing parts
- Loss of paint layer
- Crumbling
- Peeling
- Crack
- Scaling
- Salt
- Biological growth
- Corrosion
- Burrow
- Water traces



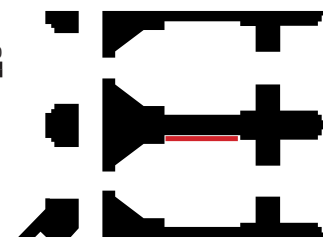


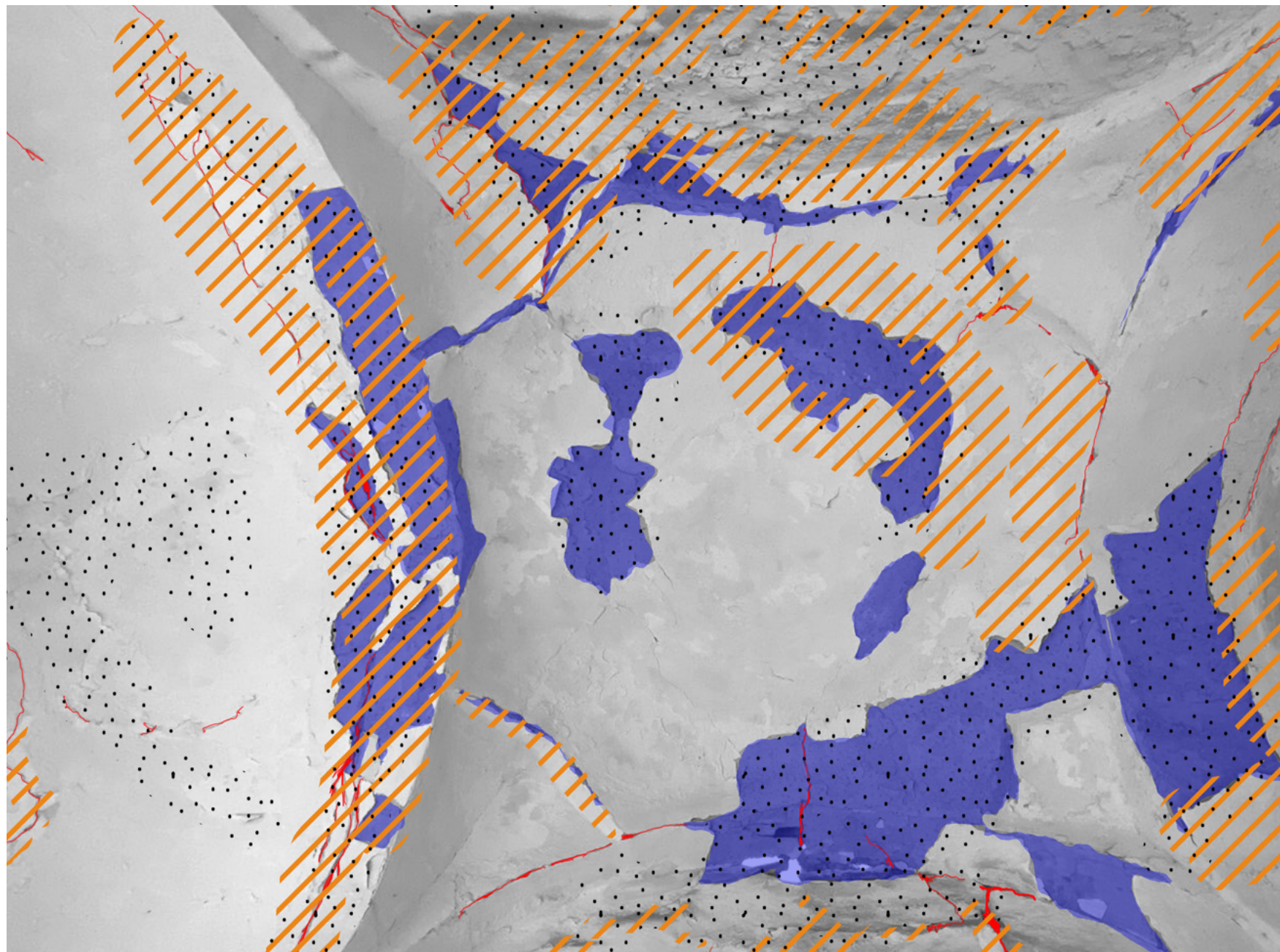
- Legend of damages:
- Lacuna/ Missing parts
 - Loss of paint layer
 - Crumbling
 - Peeling
 - Crack
 - Scaling
 - Salt
 - Biological growth
 - Corrosion
 - Burrow
 - Water traces



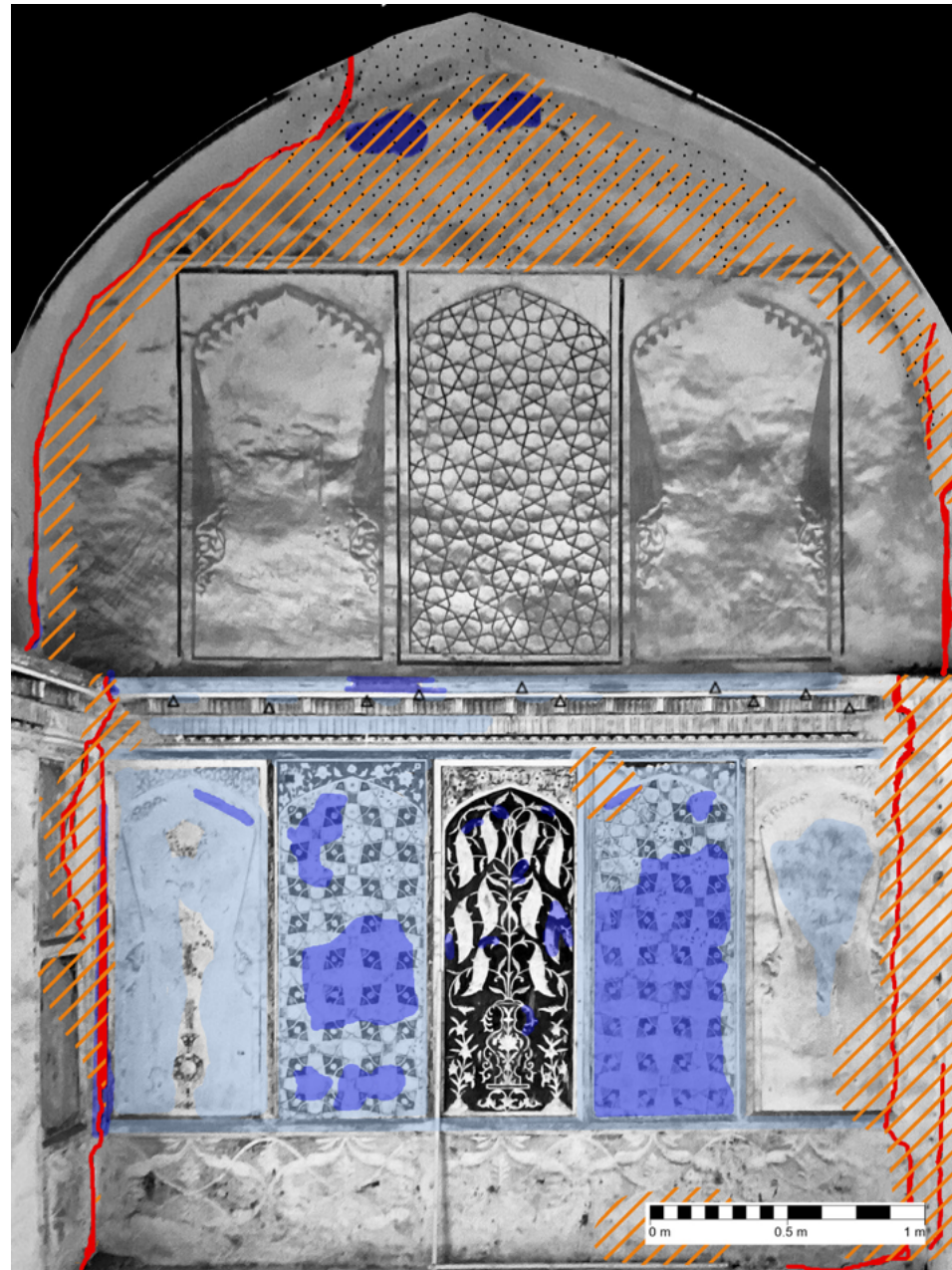


- Legend of damages:
- Lacuna/ Missing parts
 - Loss of paint layer
 - Crumbling
 - Peeling
 - Crack
 - Scaling
 - Salt
 - Biological growth
 - Corrosion
 - Burrow
 - Water traces

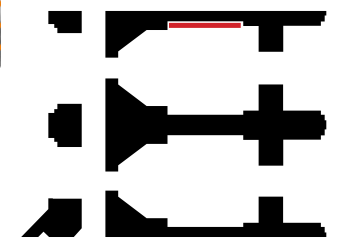


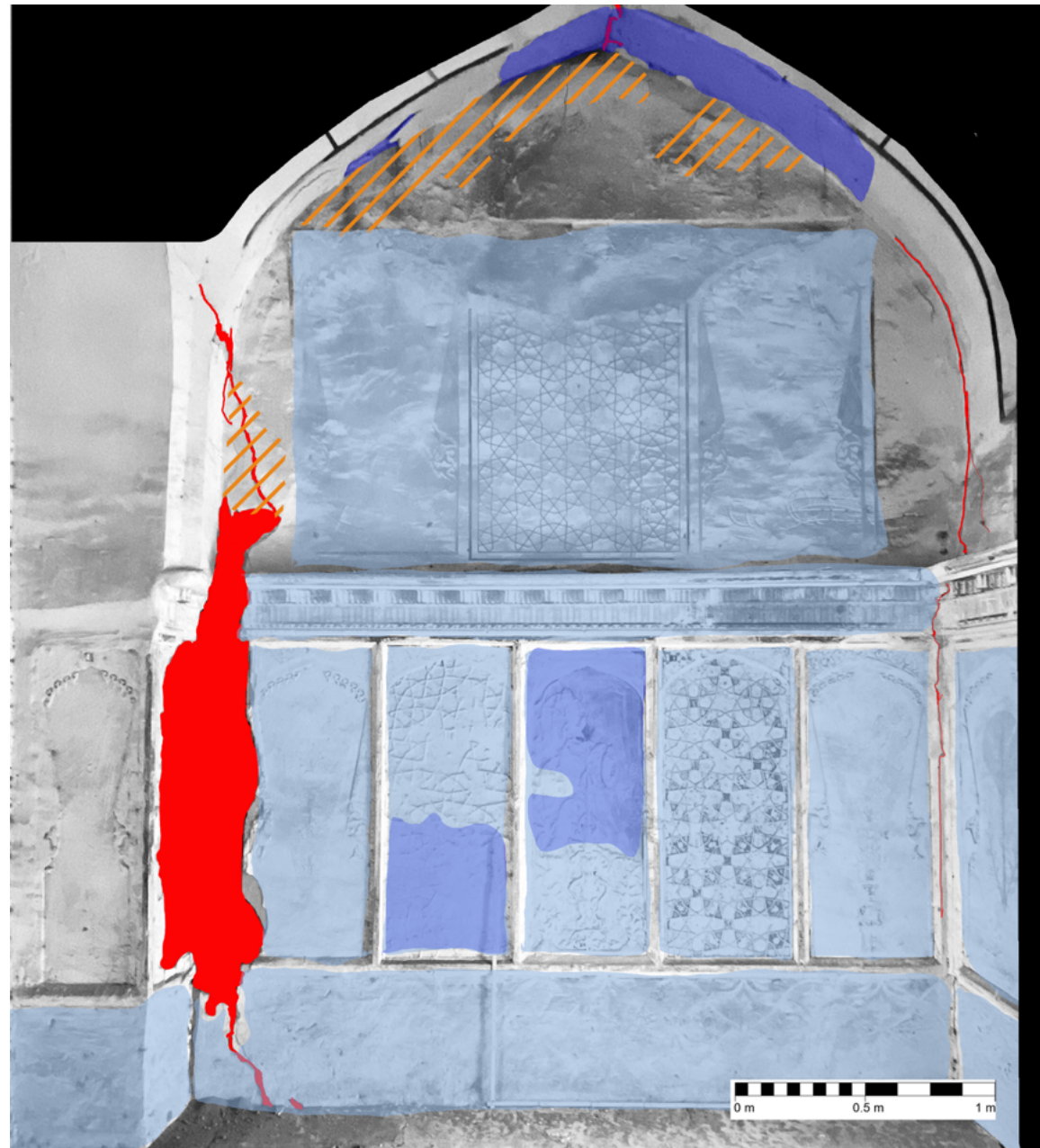


- Legend of damages:
- Lacuna/ Missing parts
 - Loss of paint layer
 - Crumbling
 - Peeling
 - Crack
 - Scaling
 - Salt
 - Biological growth
 - Corrosion
 - Burrow
 - Water traces

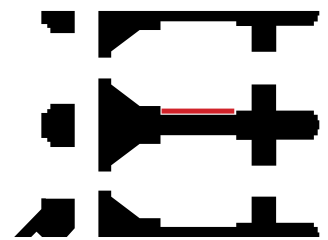


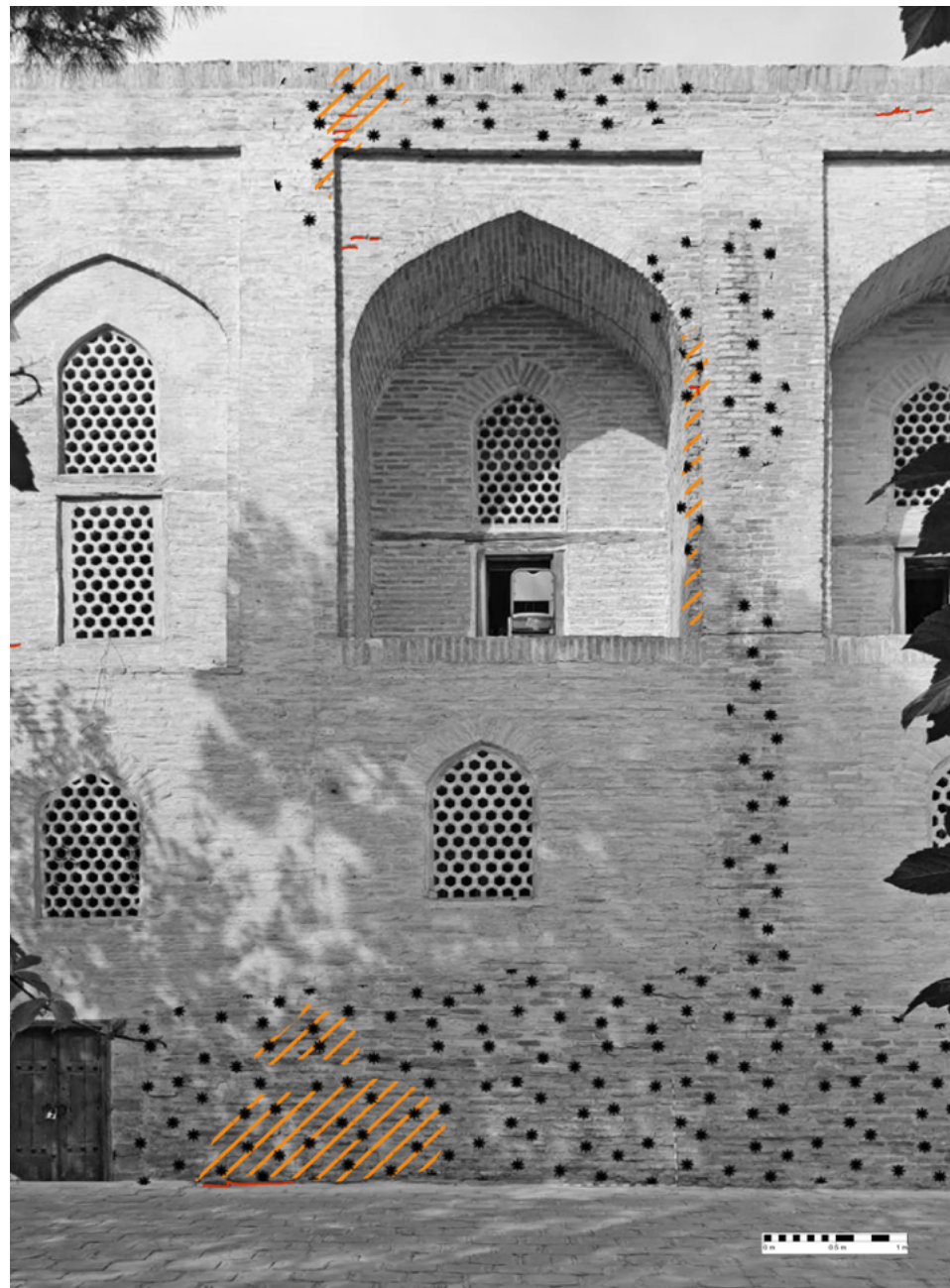
- Legend of damages:
- Lacuna/ Missing parts
 - Loss of paint layer
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- Loss of paint layer
- Crumbling
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- Crack
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Legend of damages:

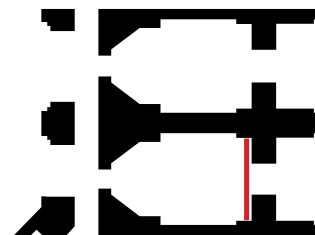
- Lacuna/ Missing parts
- Loss of paint layer
- Crumbling
- Peeling
- Crack
- Scaling
- Salt
- Biological growth
- Corrosion
- Burrow
- Water traces

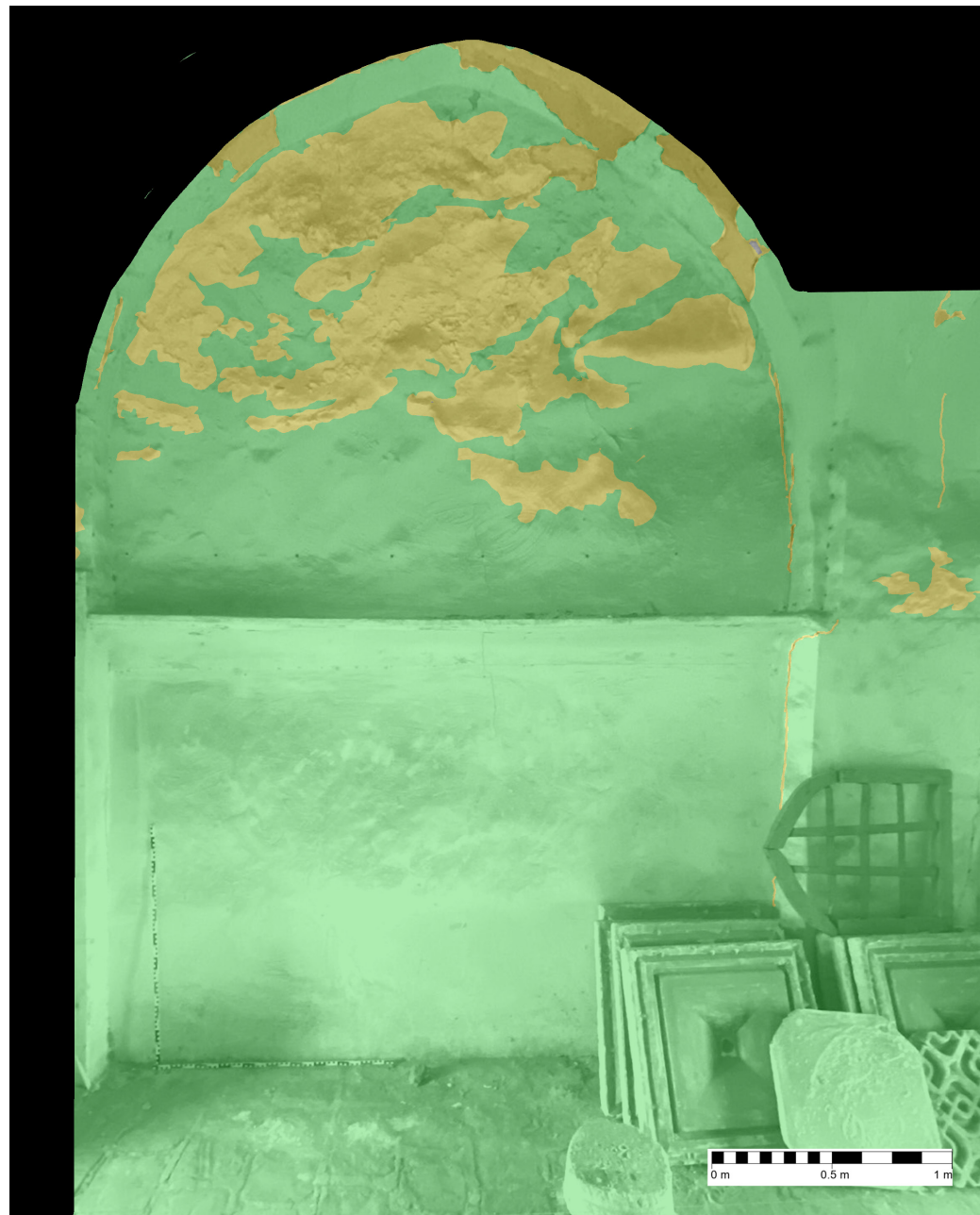
Traffic Light System






Traffic light system:

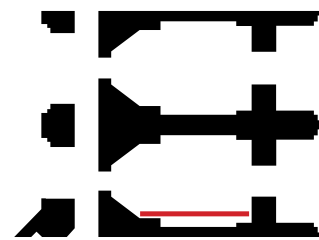
- Immediate treatment
- Stable for now, needs treatment in the next 2 years
- Stable

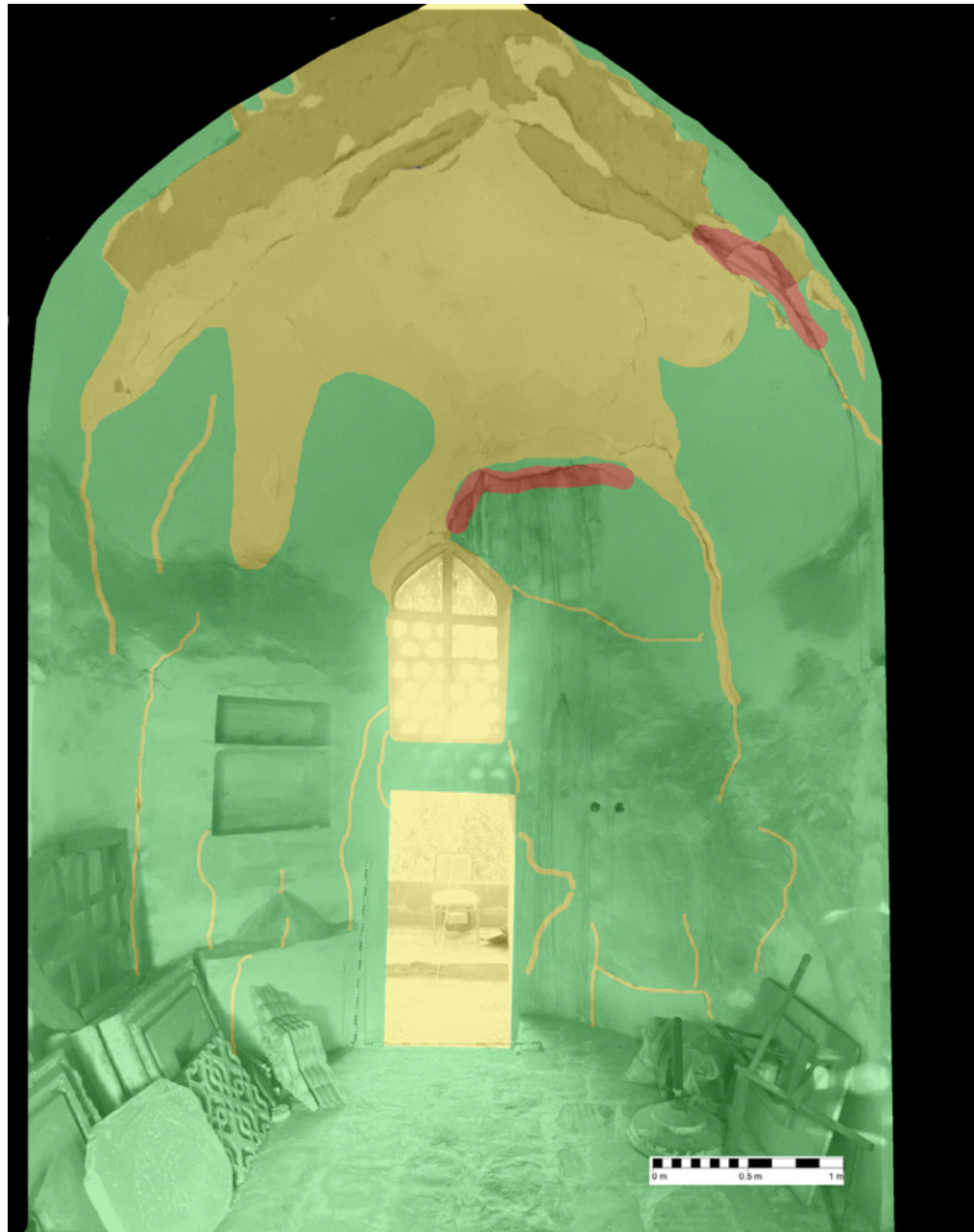




Traffic light system:

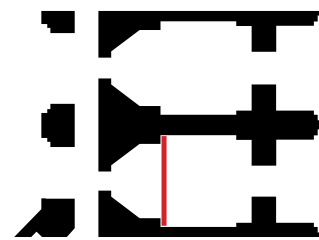
-  Immediate treatment
-  Stable for now, needs treatment in the next 2 years
-  Stable

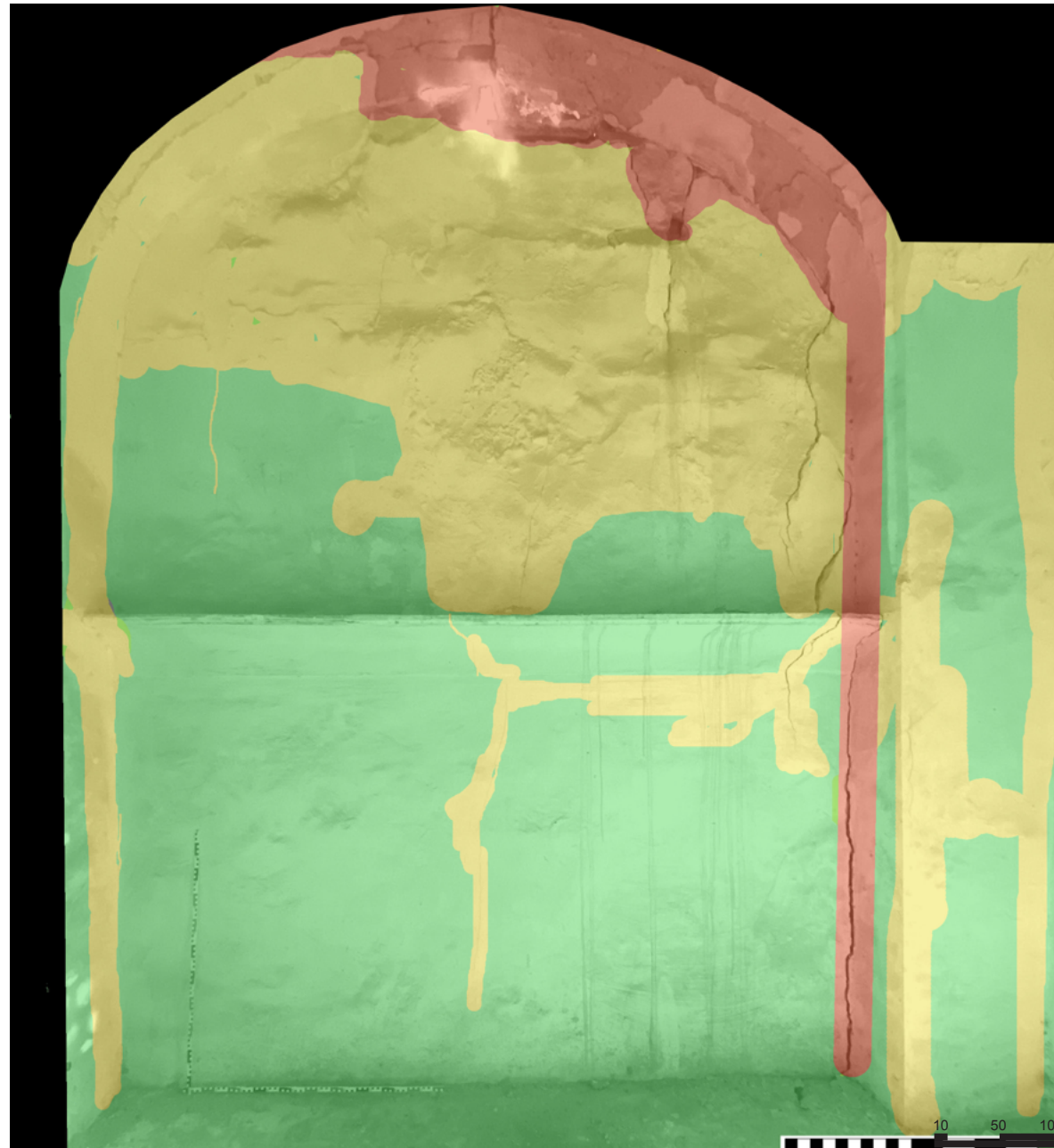




Traffic light system:

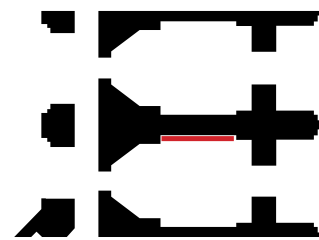
- Immediate treatment
- Stable for now, needs treatment in the next 2 years
- Stable

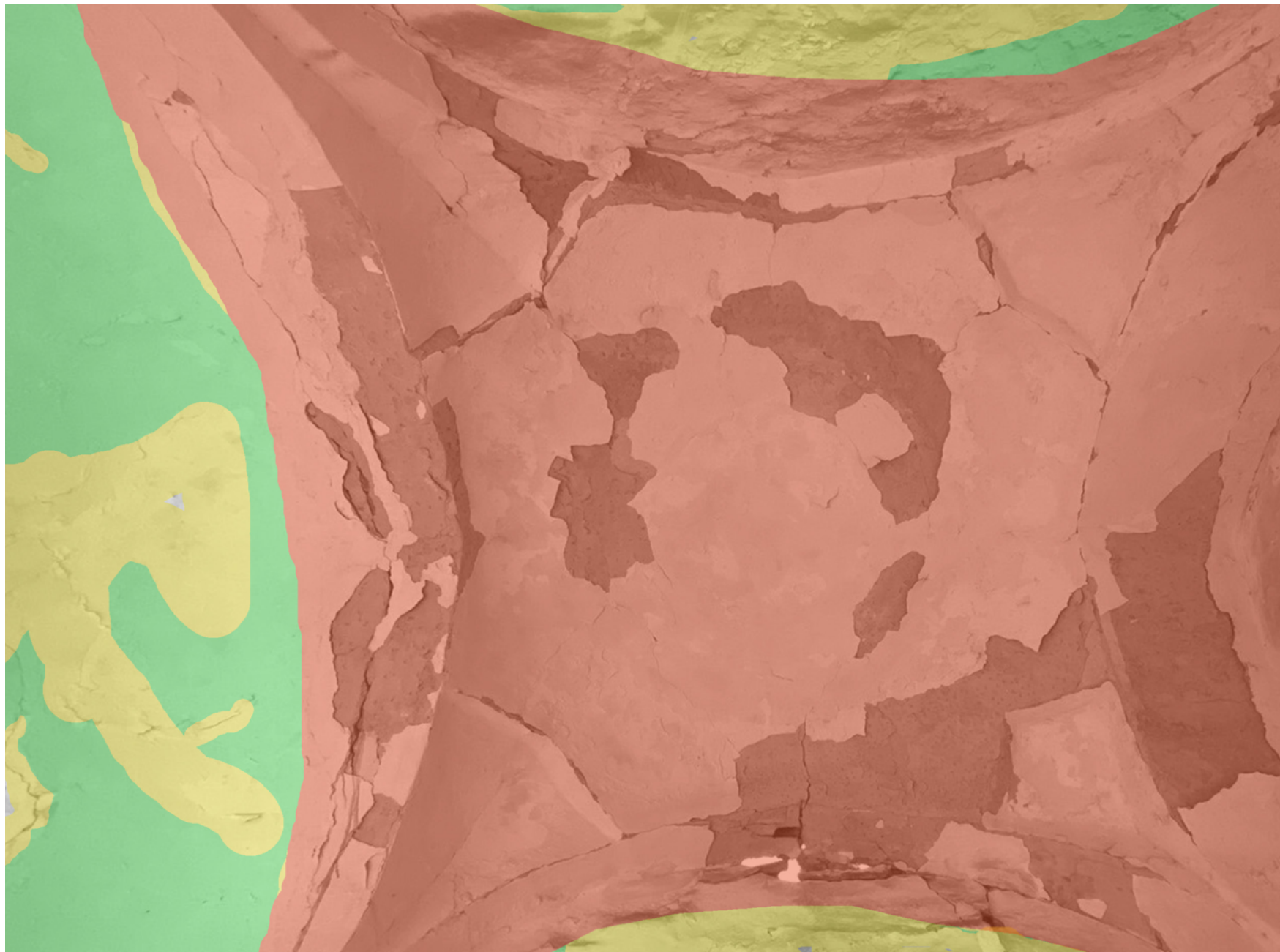




Traffic light system:

- Immediate treatment
- Stable for now, needs treatment in the next 2 years
- Stable





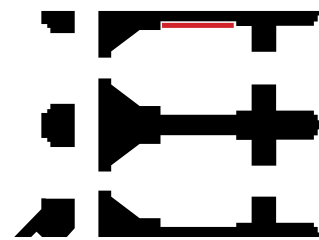
Traffic light system:

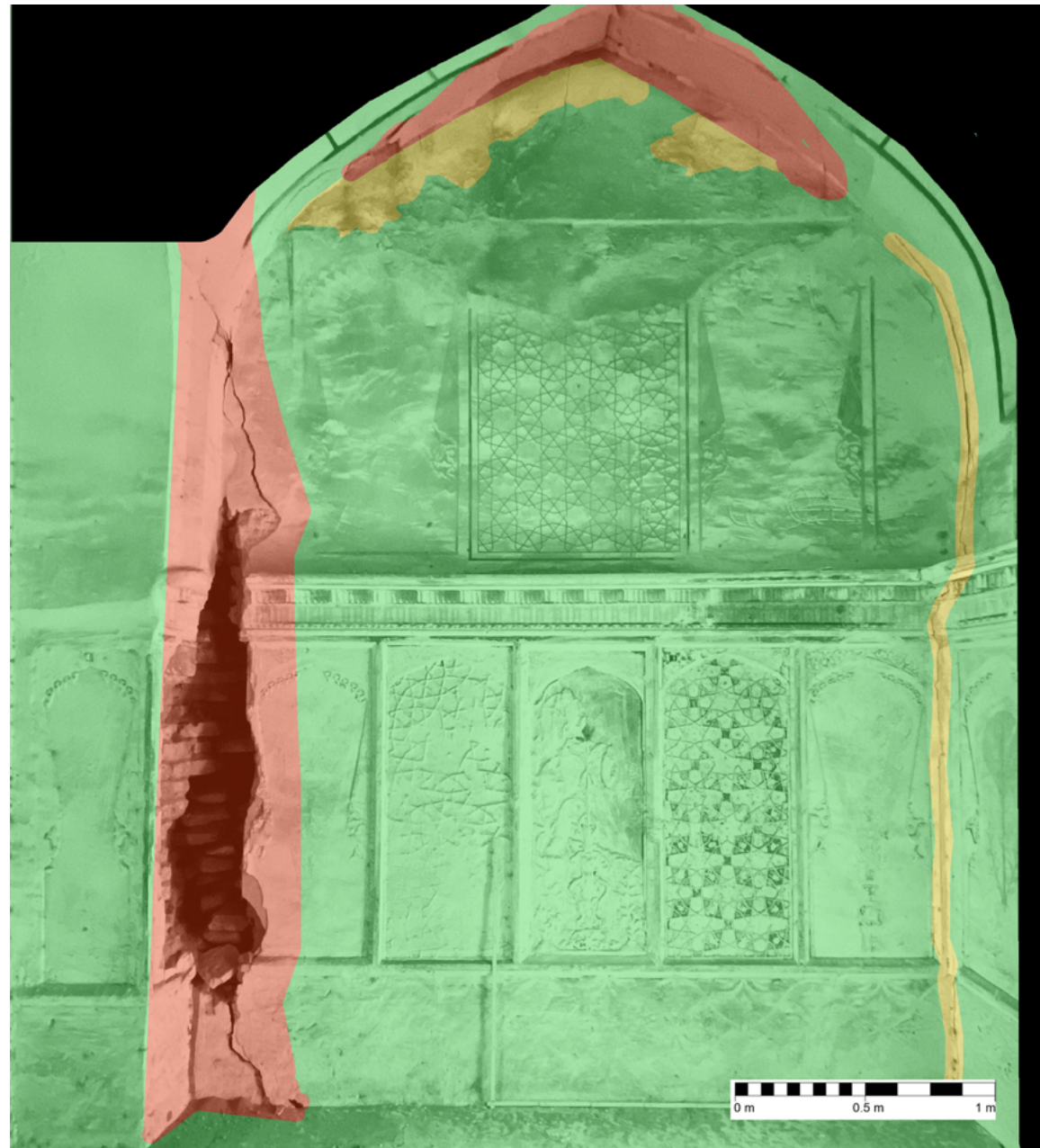
- Immediate treatment
- Stable for now, needs treatment in the next 2 years
- Stable



Traffic light system:

- Immediate treatment
- Stable for now, needs treatment in the next 2 years
- Stable





Traffic light system:

- Immediate treatment
- Stable for now, needs treatment in the next 2 years
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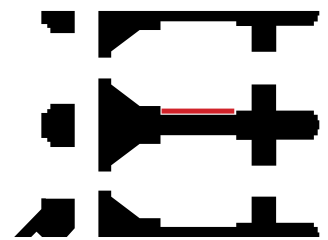


Photo- documen- tation



The severe crack between room 1/2/3.

From left to right: Fig. 01: Room 1, north view (wall between R1&2). | Fig. 02: Room 2, south view (wall between R1&2). | Fig. 03: Room 2, north view (wall between R2&3).

Team 4



Students

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*University of Applied Science Potsdam
Conservation and Preservation (Wood)*

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*University of Applied Science Potsdam
Building Preservation*

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*Samarkand State University of Arch. & Constr.
Architecture*

Mokhinur Abdullaeva

*Tashkent University of Arch. and Civil Eng.
Architecture*

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*Bukhara State University
Faculty of Art History*

Mentors

Prof. Dr. Tubbesing

*University of Applied Science Potsdam
Professor of Design Monument Preservation*

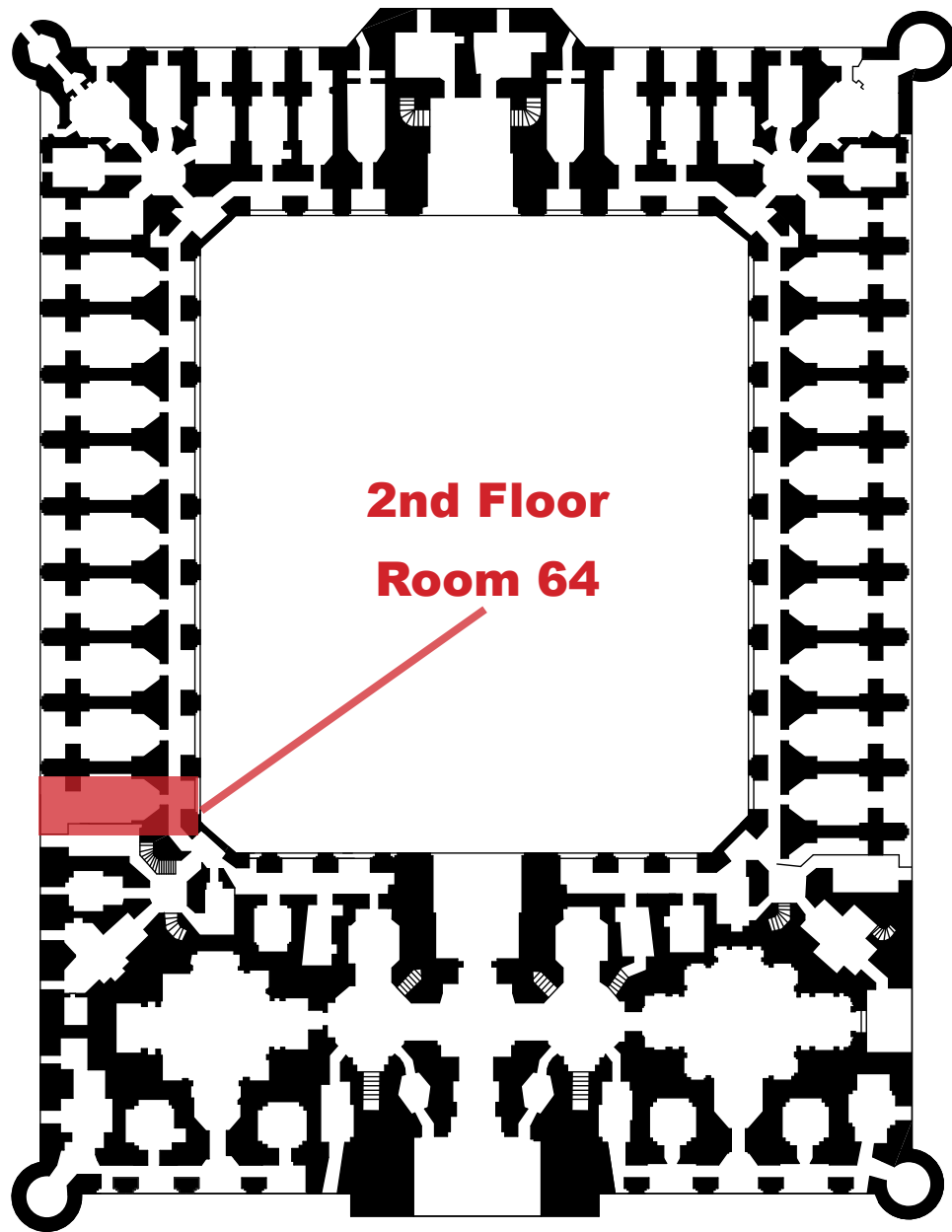
Dr. Nilufar Tuxhboeva

*Tashkent University of Arch. and Civil Eng.
Dr. Ass. Prof. Architecture*

Mr. Ravshan Tuxtaev

*Tashkent University of Arch. and Civil Eng.
Architect*

Room 64



Room 64

Documentation

The documentation includes elevation drawings, photographic images of the facades and internal elevations, paintings, detailed mappings of materials and damages as well as a photo documentation of the room's condition. It furthermore contains a treatment concept based on the prior mentioned and explained traffic light system.

Introduction of the room

The following documentation focuses on the analysis and investigations of room number 64. The room is located on the upper level of the western wing of the Kukaldosh Madrasah. It can be reached by a winding staircase in the corner of the western inlying facade. After reaching the upper level, it is the first room on the left-hand side. As the internal upper level of the room was poorly accessible and highly dangerous, the group directed its focus on the lower main room.

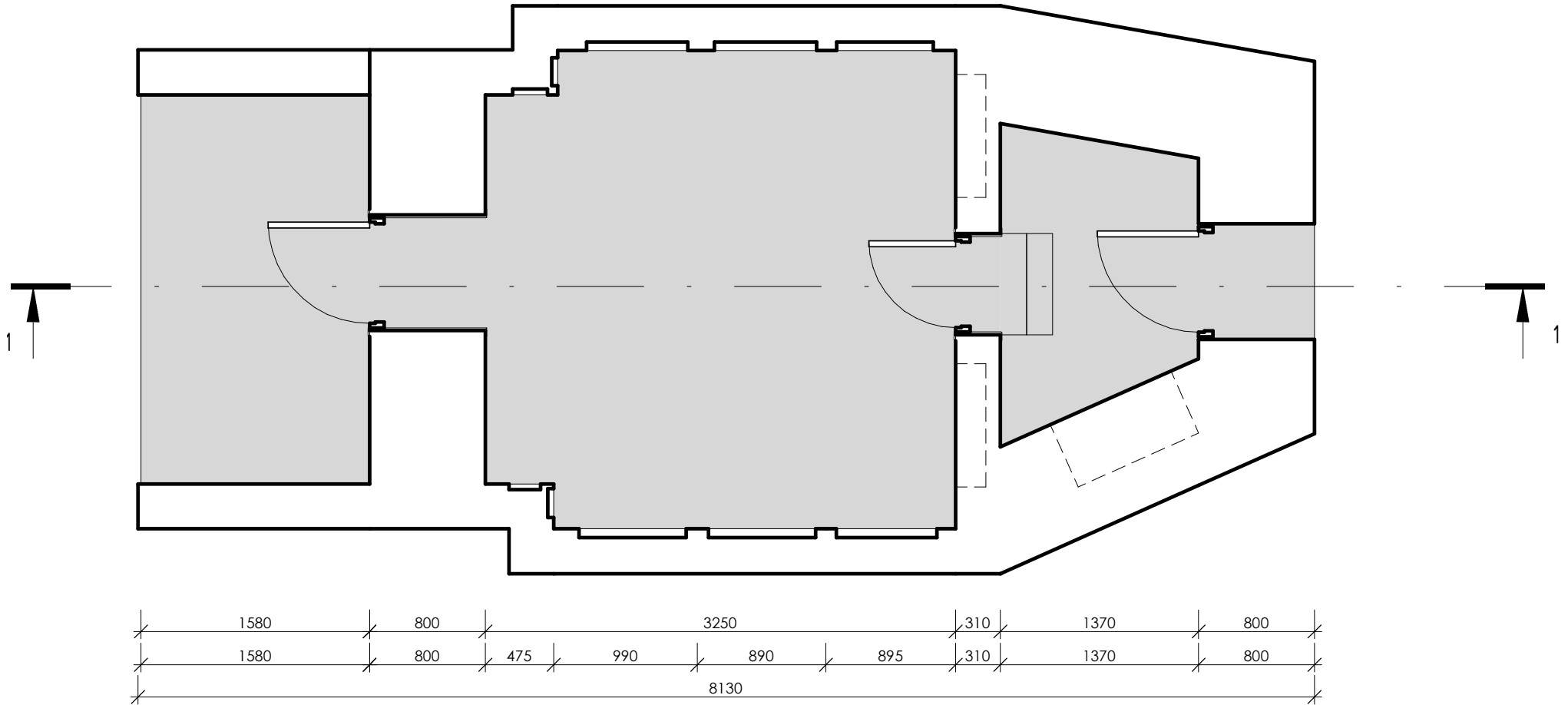
The wooden ceiling in particular is of utmost interest, as it shows the original construction and historical layout of the rooms on the upper level and makes this room unique. Though it is not the original ceiling from the 16th century, it gives a glimpse into what all the rooms might have looked like. Thus, it is of historical and constructional value and therefore should be conserved. We assume that every room on the upper floor had a wooden ceiling like this one. Presumably, the upper area under the dome was used as a sleeping area.

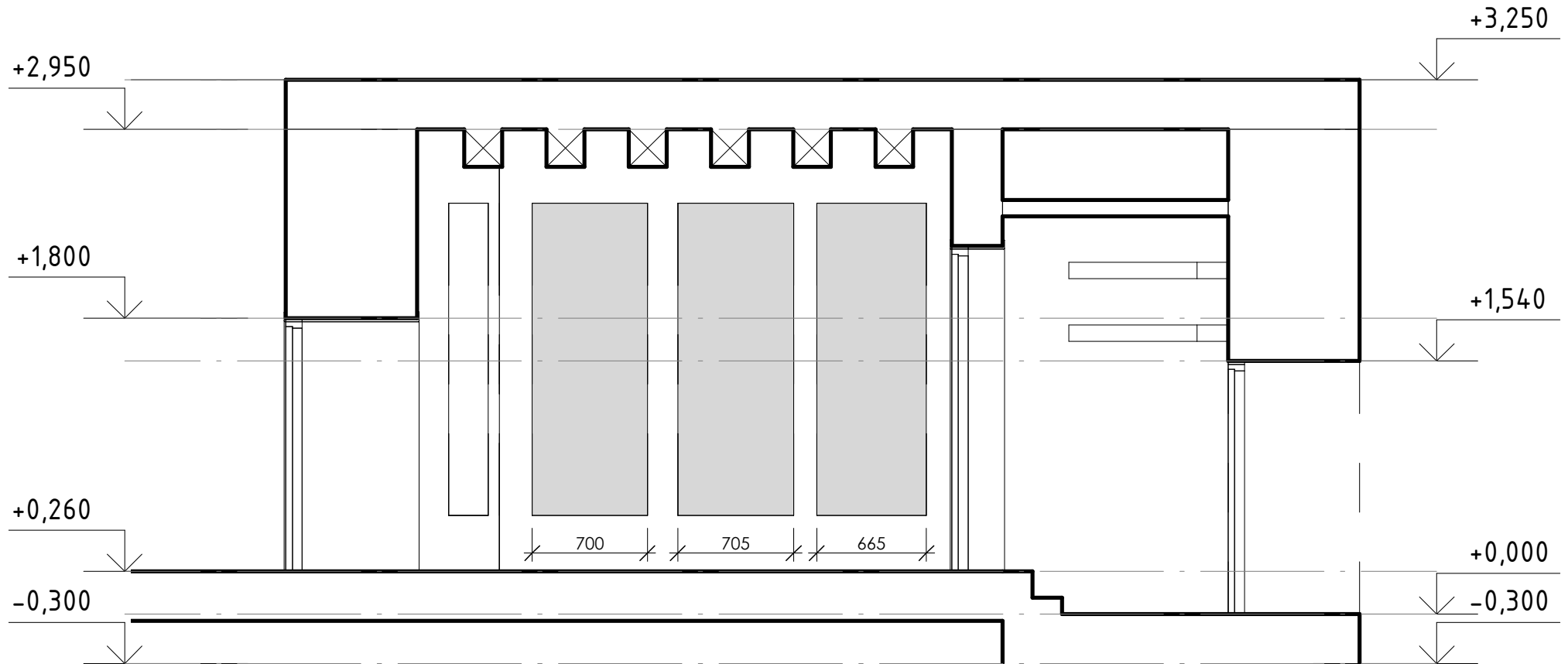
CAD Drawing

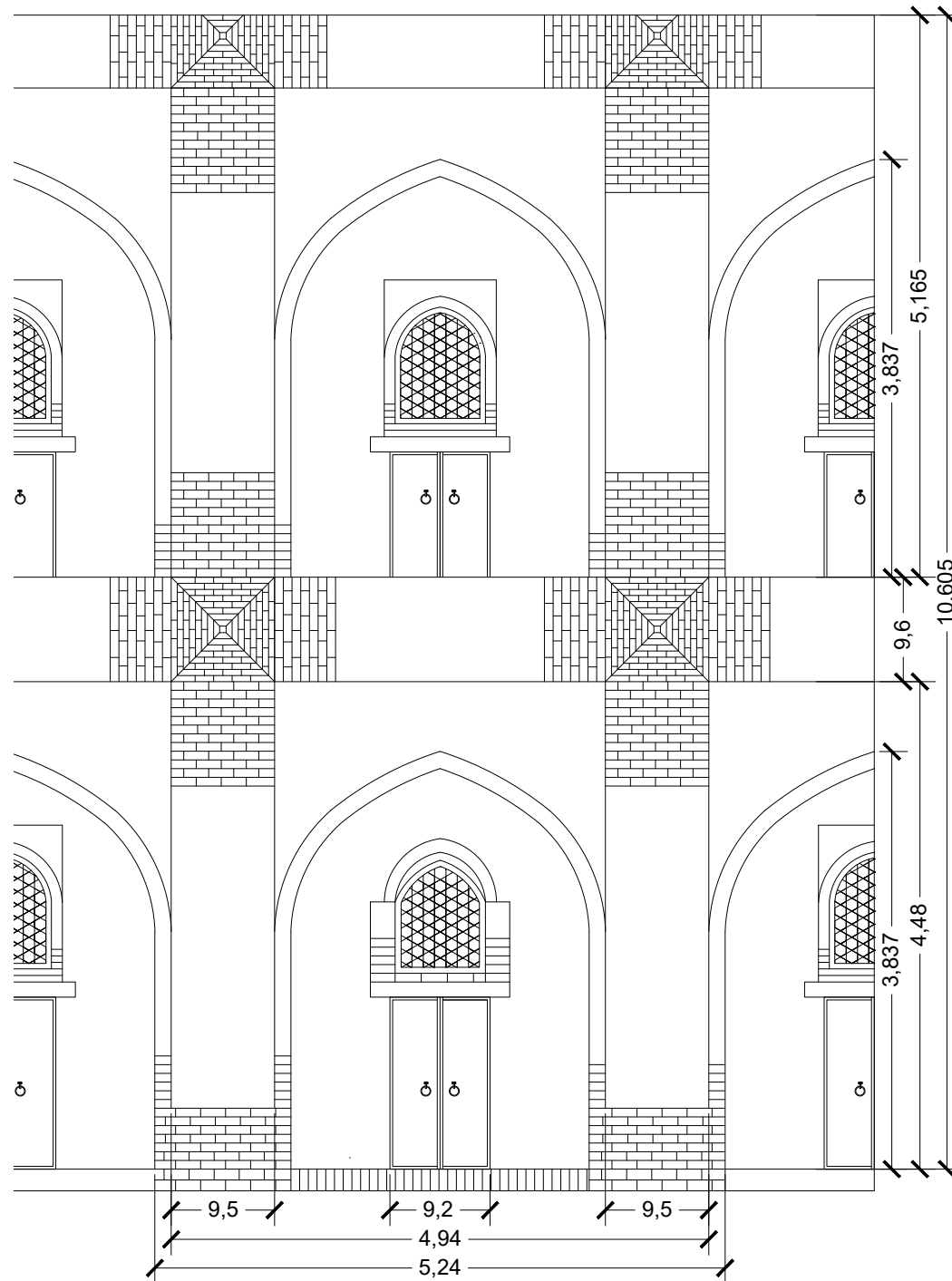
As shown in the floor plan, the internal room is divided into two parts. The antechamber, which needs to be crossed to reach the main room, is of a maximum of 2 square meter. It has roughly the shape of a semicircle, with the open part pointing into the main room's direction. On the left side, it contains a small platform that might have been the access point to the upper level of the room. Originally, there most certainly was some kind of staircase or ladder connecting the two levels. On the antechambers right side, shelving is attached to the walls. The main room can be entered through a wooden door frame located in the middle of the eastern wall. The main room has a square layout of approximately 3 x 3 meters. The wooden ceiling rounds up the room at a level of about 3 meters. Subsequently attached to the main room and separated by a wooden door that is located on the western wall opposite to the entrance is a loggia that finishes off the axis towards the outer facade. The rectangular shaped loggia faces the west. The railing only has a height of a maximum of 40 centimeters.

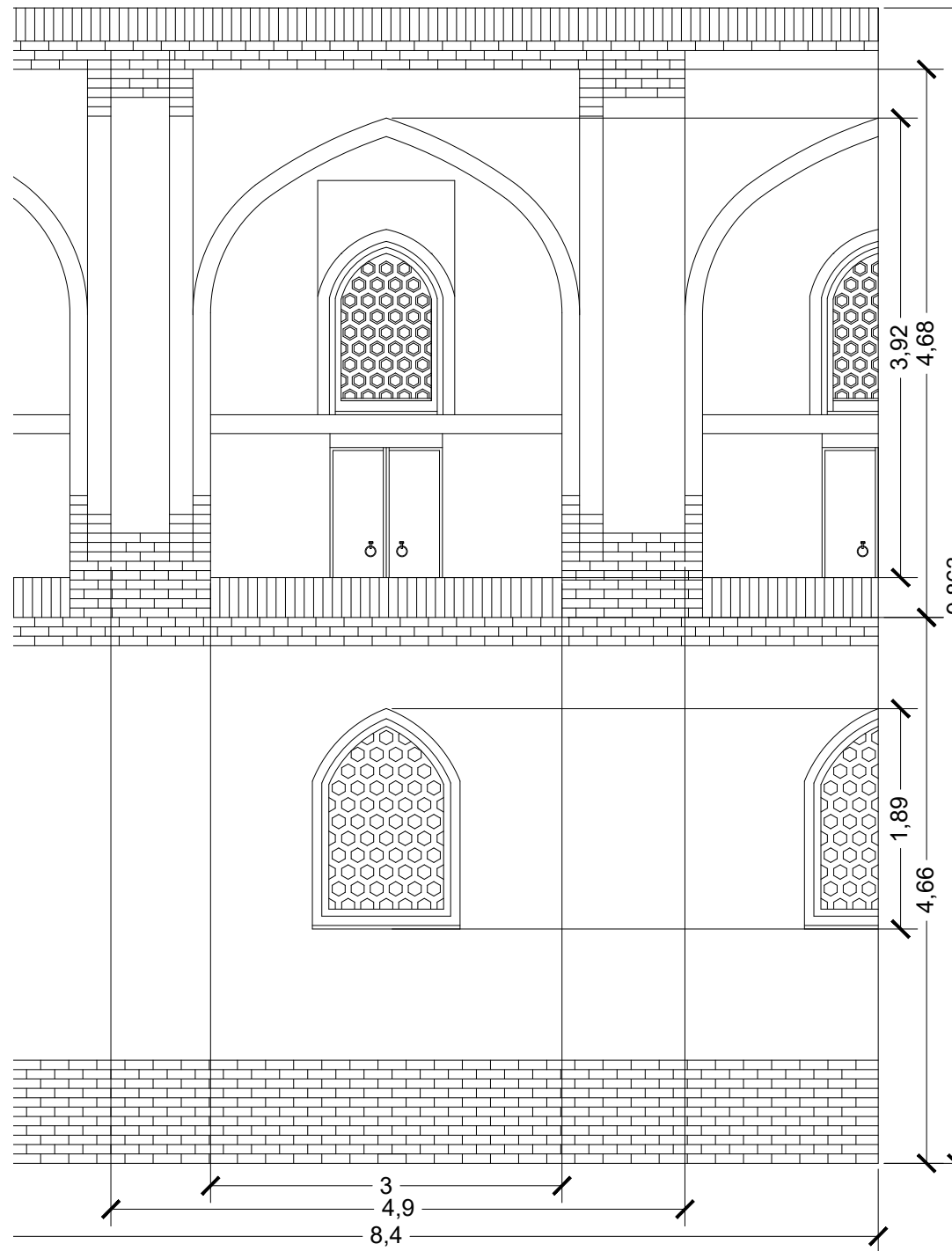
The drawing of the section shows a cut through the vertical middle axis of the upper level. The unique feature of the room, its wooden beam ceiling, is depicted together with the panels which contain wall paintings and stucco elements.

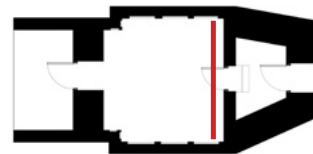
Inner and external facade have a similar layout. Both levels of the inlaying facade contain a pointed barrel vault. Crossing a small paved square on the ground level, one can reach the winding staircase through a wooden door on the left side that leads to the upper level of the Madrasah. Straight ahead, a wooden door is crowned by an ornamented open window. This layout can also be found on the upper level. The entrance to room number 64 opens off to the inner hallway that winds around the inner courtyard and interconnects the rooms on the upper level of the western wing, as well as parts of the southern and northern wing. The lower level of the external facade only contains an ornamented window. On the upper level, a similar layout to the inner upper level can be found. Instead of the hallway, the outer facade shows the loggia with its low railing.



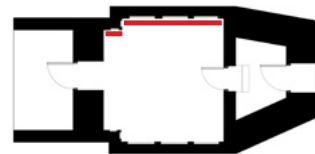


























Mapping Materials

The mapping of the materials regarding this room is based on the predefined legend of materials and the corresponding glossary.

As you can see in the following pictures, most of the areas of the northern, southern and western walls of the main room are covered with stucco. The stucco elements are geometrical as well as floral. Additionally, nearly everywhere small or bigger areas of wall paintings are surfacing. On top of that, the whole base is decorated with a wall painting. There is an additional overlay/whitewash on top of all the walls and stucco elements except for the parts where the wall paintings are appearing. The eastern internal wall of the main room is mostly covered with plaster and some wall paintings. Furthermore, as mentioned before, the room contains a painted wooden ceiling as well as a wooden floor made of floorboards. The ceiling's beams are decorated with carved ornaments.


The external walls are made of brick masonry. The ornamented open windows are partially made out of terracotta, glazed terracotta and plaster elements. Wood has been used for doors and beams. You can still find some remains of majolica on the upper level of the inner facade.



- Legend of materials:
-  Brick masonry
 -  Natural stone
 -  Plaster
 -  Stucco
 -  Wall painting
 -  Paint layer
 -  Sgraffito
 -  Overlay
 -  Majolika tile
 -  Terracotta
 -  Glazed terracotta
 -  Artificial stone
 -  Wood
 -  Metal
 -  Glas
 -  Cable/Wire
 -  Reet



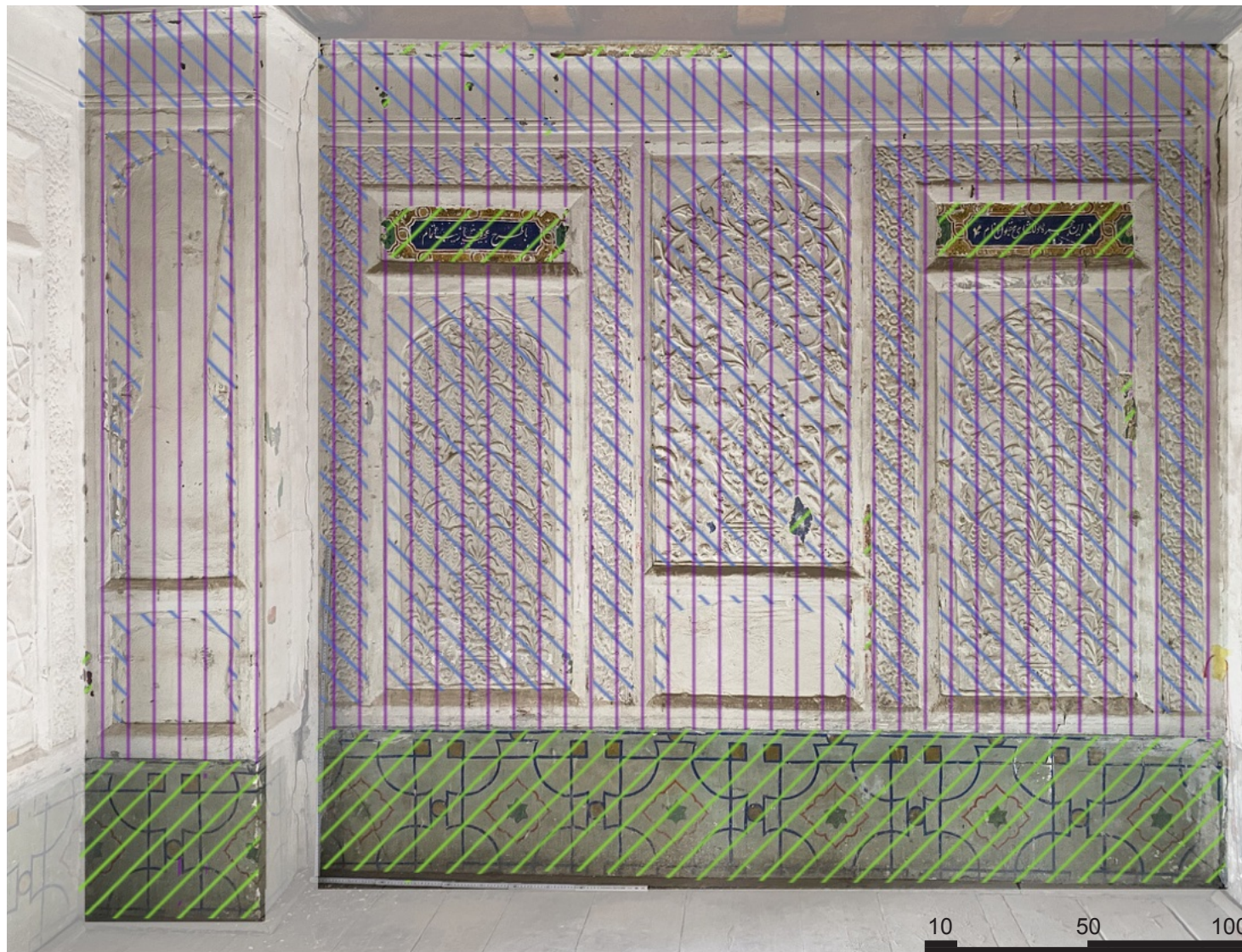


- Legend of materials:
-  Brick masonry
 -  Natural stone
 -  Plaster
 -  Stucco
 -  Wall painting
 -  Paint layer
 -  Sgraffito
 -  Overlay
 -  Majolica tile
 -  Terracotta
 -  Glazed terracotta
 -  Artificial stone
 -  Wood
 -  Metal
 -  Glas
 -  Cable/Wire
 -  Reet



Legend of materials:

- Brick masonry
- Natural stone
- Plaster
- Stucco
- Wall painting
- Paint layer
- Sgraffito
- Overlay
- Majolika tile
- Terracotta
- Glazed terracotta
- Artificial stone
- Wood
- + Metal
- Glas
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- Legend of materials:
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 - Plaster
 - Stucco
 - Wall painting
 - Paint layer
 - Sgraffito
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 - Terracotta
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Legend of materials:

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- Natural stone
- Plaster
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Legend of materials:

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Mapping Damages

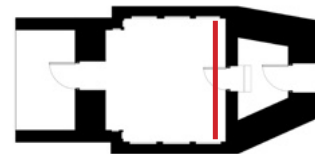
Partial areas especially of the northern, southern and western walls show loss of paint layers, but they are not that many altogether. This regards the areas where wall paintings resurfaced. Another damage, probably one of the most visible ones, are missing parts/lacuna, regarding the stucco elements in particular. The eastern inside wall also shows areas of scaling and peeling. Some cracks were discovered primarily in the corners of the room. The most notable one is located in the corner of the western and northern wall. Overall the lower main room is in a good condition.

Missing parts, cracks, scaling as well as crumbling can be found on both external and inner facade. The outer facade additionally shows some salt damages on the base.



Legend of damages:

- Lacuna/ Missing parts
- Loss of paint layer
- Crumbling
- Peeling
- Crack
- Scaling
- Salt
- Biological growth
- Corrosion
- Burrow
- Water traces





- Legend of damages:
- Lacuna/ Missing parts
 - Loss of paint layer
 - Crumbling
 - Peeling
 - Crack
 - Scaling
 - Salt
 - Biological growth
 - Corrosion
 - Burrow
 - Water traces

10 50 100



Legend of damages:

- Lacuna/ Missing parts
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Legend of damages:

	Lacuna/ Missing parts
	Loss of paint layer
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50 100 200



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Painting

As part of the interdisciplinary work process, Gohzal Jabborova, student of Fine Arts at the University in Bukhara, produced a painting of one of the floral stucco elements that were found on the northern wall of the main room. For this, she reconstructed missing stucco parts as well as a potential color of its background to give a glimpse of an eventual display.






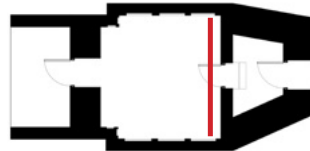
Traffic Light System

The already described and mentioned traffic light system was being applied on all four internal elevations. The results can be seen on the next pages of this documentation. However, as these images do not include roof, cupola, entrance or loggia, a short description especially concerning the safety of visitors and the art itself is added.

Firstly, to prevent further damages to the room from above, the roof needs to be reinstated and made waterproof again. Secondly, the cupola and its plastered inside walls need emergency consolidation. A lot of crumbling and scaling was found on the inside of the cupola. Furthermore, due to ongoing damages to the roof and cupola, accumulated material can be found on top of the wooden ceiling and therefore adds load to it. Thus, this should therefore be cleaned and taken off the inner ceiling. In a next step for security reasons primarily for visitors, the loggia could be closed as for corroded protruding nails, holes in the ground and the low railing itself. The cracks should also be monitored, but are stable for now. And finally, for better protection of the art, mainly the wall paintings and the stucco itself, one could close the room off at the second door frame, prohibiting visitors from entering the room.

Traffic light system:

-  Immediate treatment
-  Stable for now, needs treatment in the next 2 years
-  Stable





Traffic light system:

- Immediate treatment
- Stable for now, needs treatment in the next 2 years
- Stable

10 50 100



Traffic light system:

- Immediate treatment
- Stable for now, needs treatment in the next 2 years
- Stable



Traffic light system:




-  Immediate treatment
-  Stable for now, needs treatment in the next 2 years
-  Stable



Photo- documen- tation

The photographic documentation shows detailed images of the layout of the room, materials such as wall paintings and stucco, details of the carved ornaments on the wooden beams, damages such as cracks or missing parts and the overall condition of the room and outer facade. It also shows the cupola and roof, which have not yet been covered, but will be essential for the treatment concept and traffic light system of the room.



The antechamber, with a shelf and a small platform that might have been the access point to the upper level of the room



The unique wooden ceiling



Loggia at the west facade



Damages at the inside of the cupola



The roof above the Room 64

Team 5



Students

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Conservation and Preservation (Wood)*

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Shakhriyor Sharipov

*Bukhara State University
Faculty of History*

Zukhro Rakhmatova

*Bukhara State University
Faculty of History*

Mentors

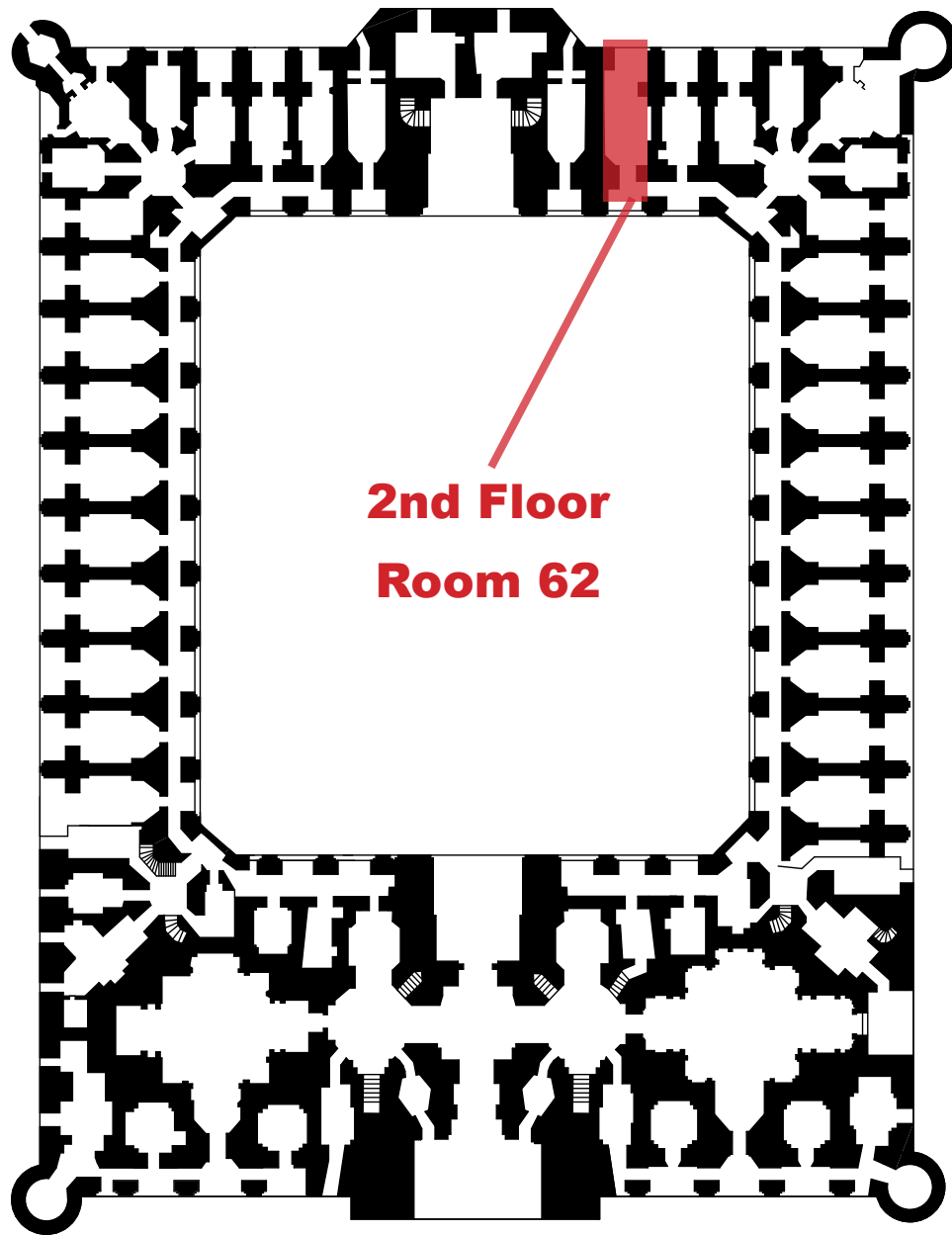
Lisa Hock, M.A.

*University of Applied Science Potsdam
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Ph.D Said Manoev

*Samarkand State Architectural and
Civil Engineering University
Ass. Prof. for Building Design*

Room 62



2nd Floor
Room 62

Room 62

Introduction of the room

The following documentation deals with the investigations of Room 62 on the 1st floor of the north wing. Regarding from the courtyard, the room is located in the second axis to the right of the high portal. It is reached by a spiral staircase between the north and west wings and an adjoining portico facing the inner courtyard.

Particularly striking in this room is an immense crack that spreads along the east and west walls, as well as the ceiling and the floor. In some parts it is 5 cm thick and runs through the whole northern part of the building and it appears as if the entire western part of the north wing is sinking outward.

Documentation

This documentation includes plans of the room, drawn on the basis of a conducted measurement, as well as a development of the four walls, ceiling and floor in the form of photos. These photos served as a basis for the material and damage mapping, which, in addition to photo documentation, are another component of this documentation. This analysis is followed by the evaluation of the condition, the traffic light system.

CAD Drawing

The room documented in the following is with its about 5,20 x 2,40 m rectangular and oriented to the north and south. It is entered via an arcade from the south, through an old wooden door, above which there is also a window with a curtained panjara.

The elongated inner room is divided into three areas - the entrance area in the south, the main room and an area connecting the main room with the bordering loggia. In the floor plan, the main room only differs subtly from the other two areas, gaining width through two small niches on the east and west walls. The difference between the two areas stands out more clearly in the section and in the interior elevations. While the entrance area has a simple 3,90 m high barrel vault, the ceiling of the main room forms a 4,77 m high cupola with four pointed barrel vaults connecting on every side.

North of the main room, the space again narrows, forming a transitional area to the adjacent loggia to the north. This is entered through a low door, above which is the same window opening as already on the south wall, decorated with a panjara to protect the room from too much sunlight. The loggia is 2,76 x 1,40 m and, like the arcade, has a simple barrel vault, which is approx. 3,90 m high.

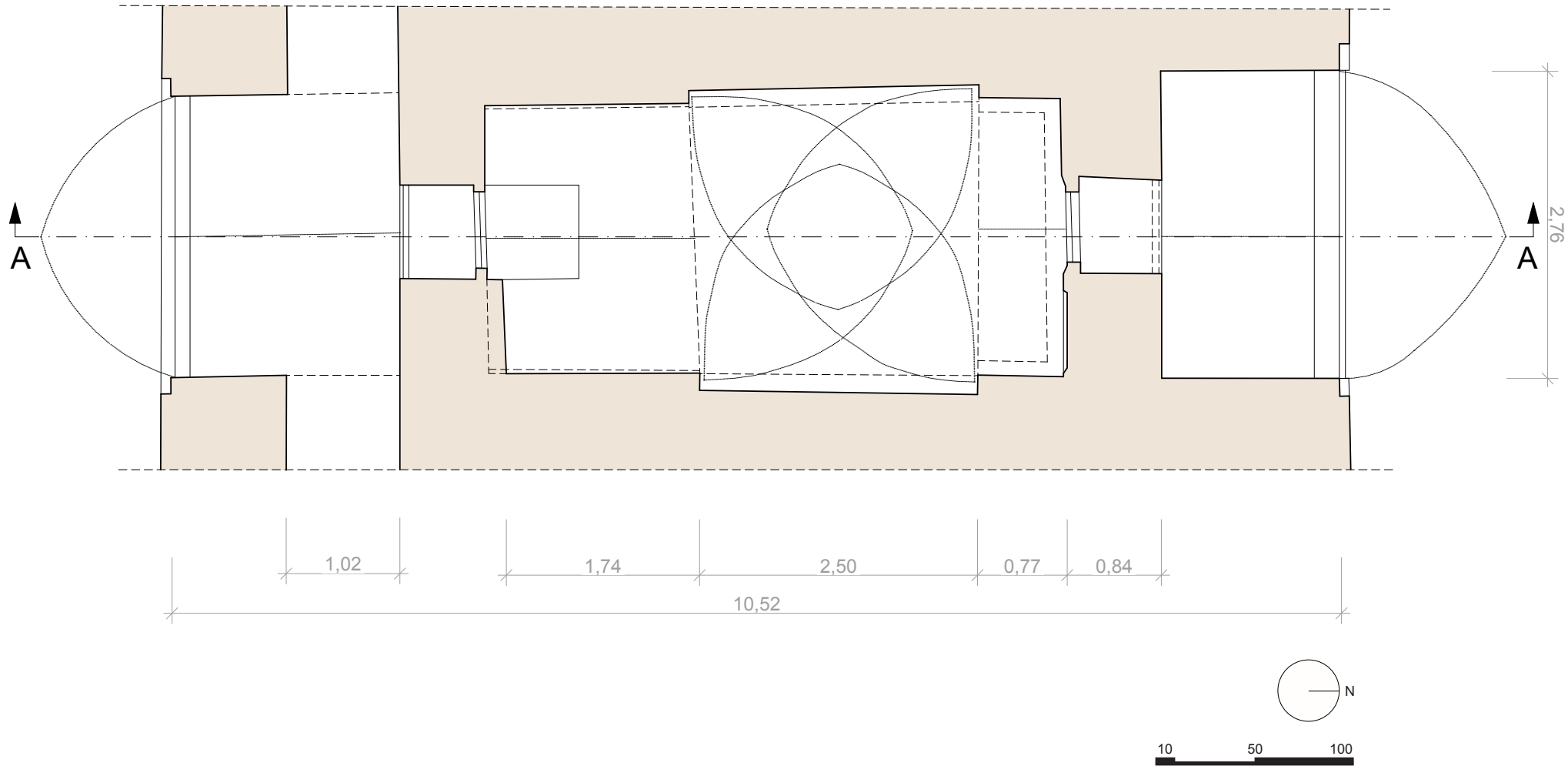
The north and south facades of the treated space are similar in layout, but have significant differences in appearance. Both are two-storied and end with a flat roof.

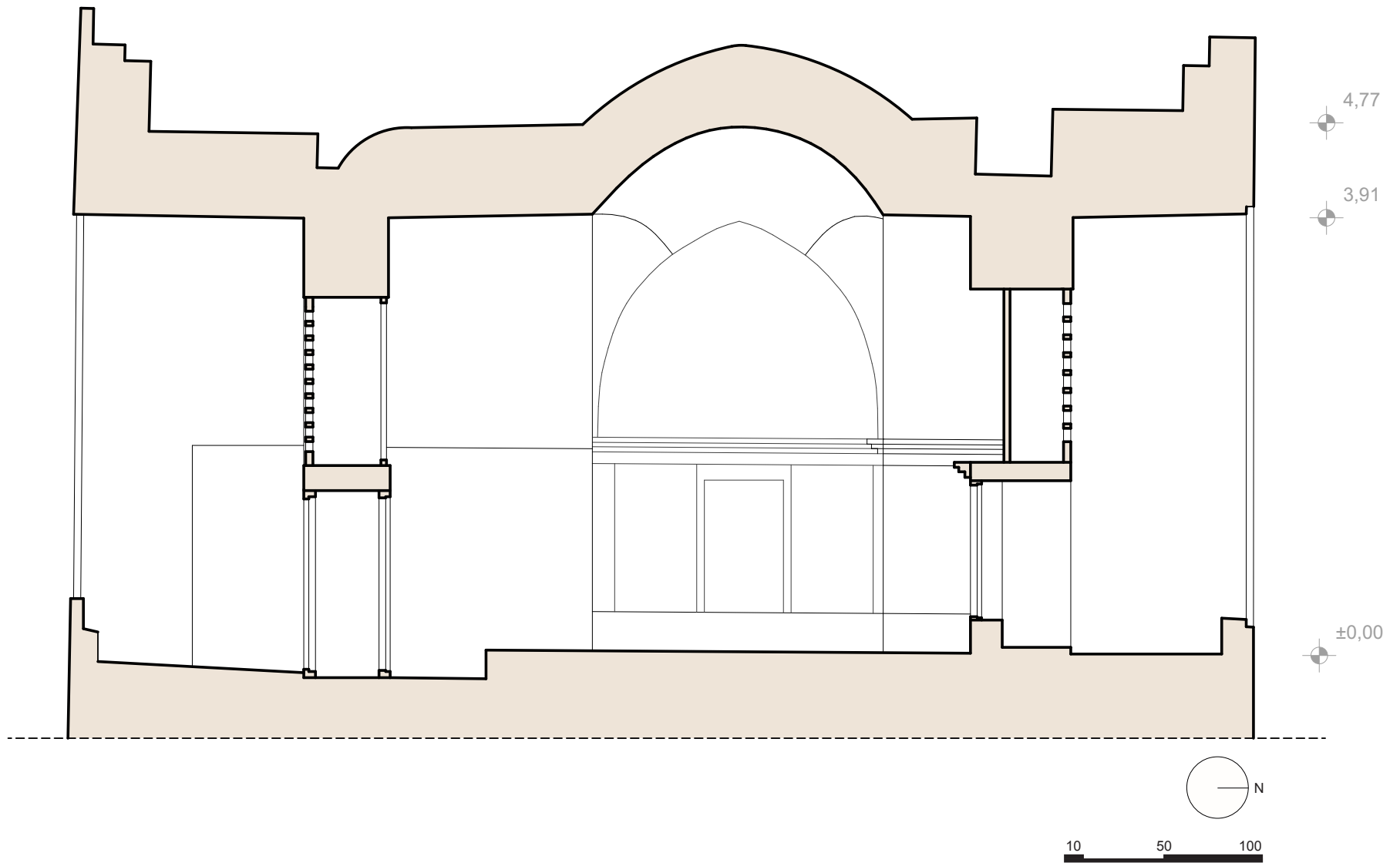
The south facade faces the courtyard and appears slightly more open than the north facade.

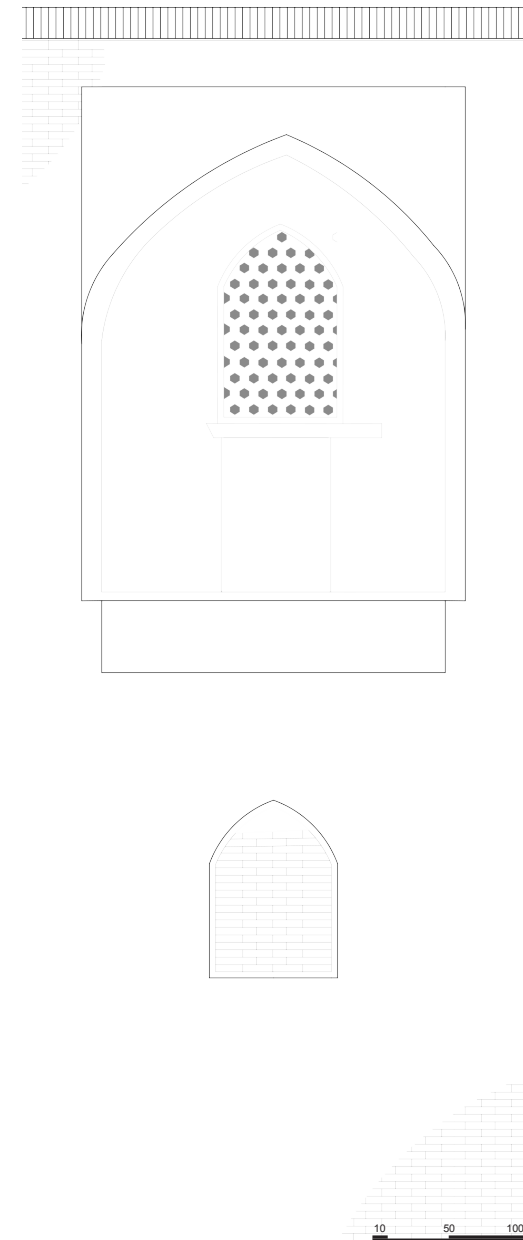
The first level of the facade is vertically articulated by massive two-story brick piers. These pillars mark the width of the cells of the madrasah behind them. In contrast, the brick parapet on the upper level and the attic provide a horizontal balance.

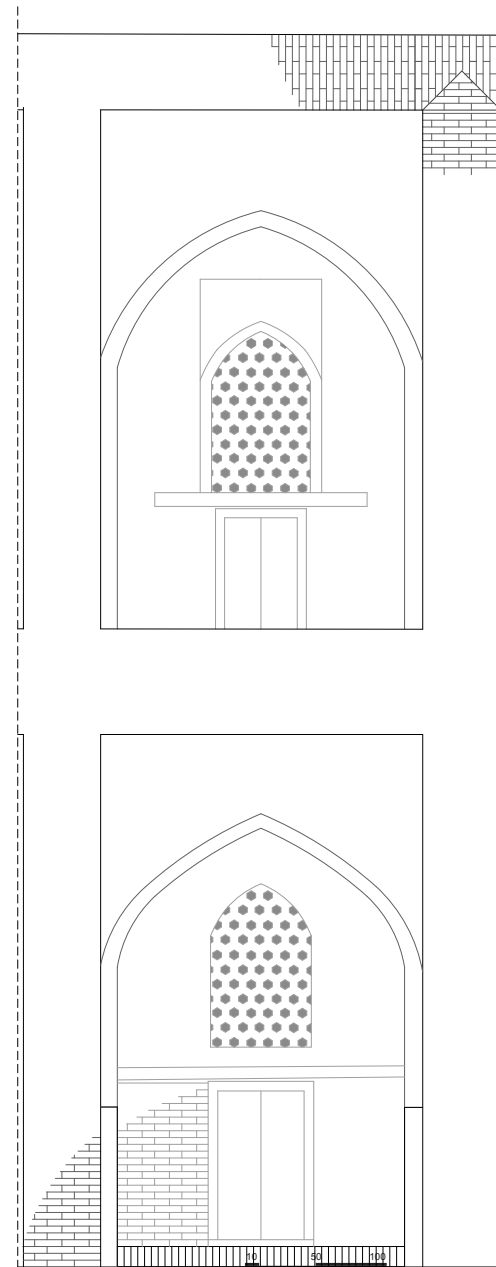
Between each of the pillars are niches, which thus form the second, rear level of the facade. These niches are equipped with a central wooden door on both floors and a window with panjara above it. The niche ends at the top with a pointed barrel vault.

The north facade is not vertically and horizontally articulated in a balanced way like the south facade, but gives a much more massive and closed impression. The difference lies in the first floor: here there is no niche framed by vertical pillars, but only an unarticulated wall with a small window bricked up afterwards.























10 50 100



Mapping Materials

The mapping of the materials regarding this room is based on the predefined legend of materials and the corresponding glossary.


















The upper part of the room and the cupola is covered with white plaster, also the complete inner south wall and the ground. We guess that the used material is “gansch” a plaster like mixture with gypsum as binder. On the eastern, northern and western wall you have in two meters height one the walls dividing cornice, which is designed as a sharafat, made out of stalactites (called muqarnas here in Uzbekistan). The used material here is gypsum and underneath there might be an artificial stone which is formed out of concrete.

Underneath the sharafat, the eastern and western walls both are divided in different rectangular frames made from stucco. Every frame is filled with different white floral ornaments, which are mirrored vertically, while the fond is alternately from section to section coloured in blue or green. The only exception from this pattern is on the right side from the door to the balcony, a just with plaster covered small niche, in the same shape as the other stucco frames. Between these repetitive stucco ornaments and the ground is a simple wall painting, shaped as a great checked pattern in red and blue.

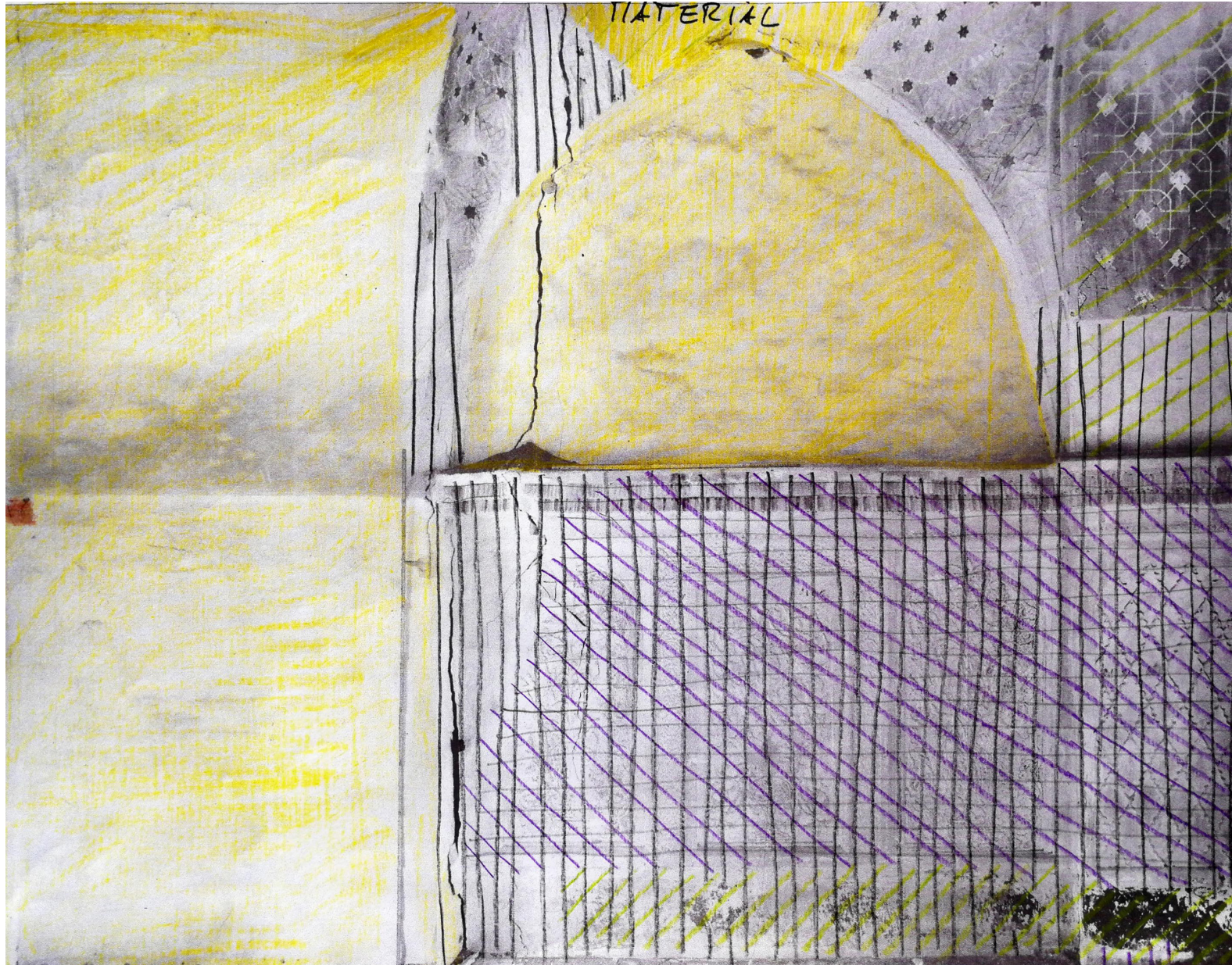
On the peak of the cupola is a circular, red coloured floral ornament. The design of the pendentives needs a greater attention, as the other elements of our room: The dark grey stars with seven flames are here the focus point. They are all connected with a white sgraffito line scratched in the bright grey fond. Also, the pendentives were horizontal subdivided by zig-zag sgraffito lines, which are also connected to the stars. Next to every scratch is laying close by a yellow painted line on top, only fragments of this layer are left. The triangles, which are constructed by the sgraffito lines have a three-dimensional flat shape and must have been constructed before the carving. Also, the stars had for sure a three-dimensional shape and there base was cut in the stucco and then filled with the grey plaster, but the leftovers are just witnessing the former design. In younger days some of them were painted blue.



Legend of materials:

-  Brick masonry
-  Natural stone
-  Plaster
-  Stucco
-  Wall painting
-  Paint layer
-  Sgraffito
-  Overlay
-  Majolika tile
-  Terracotta
-  Glazed terracotta
-  Artificial stone
-  Wood
-  Metal
-  Glas
-  Cable/Wire
-  Reet





- Legend of materials:
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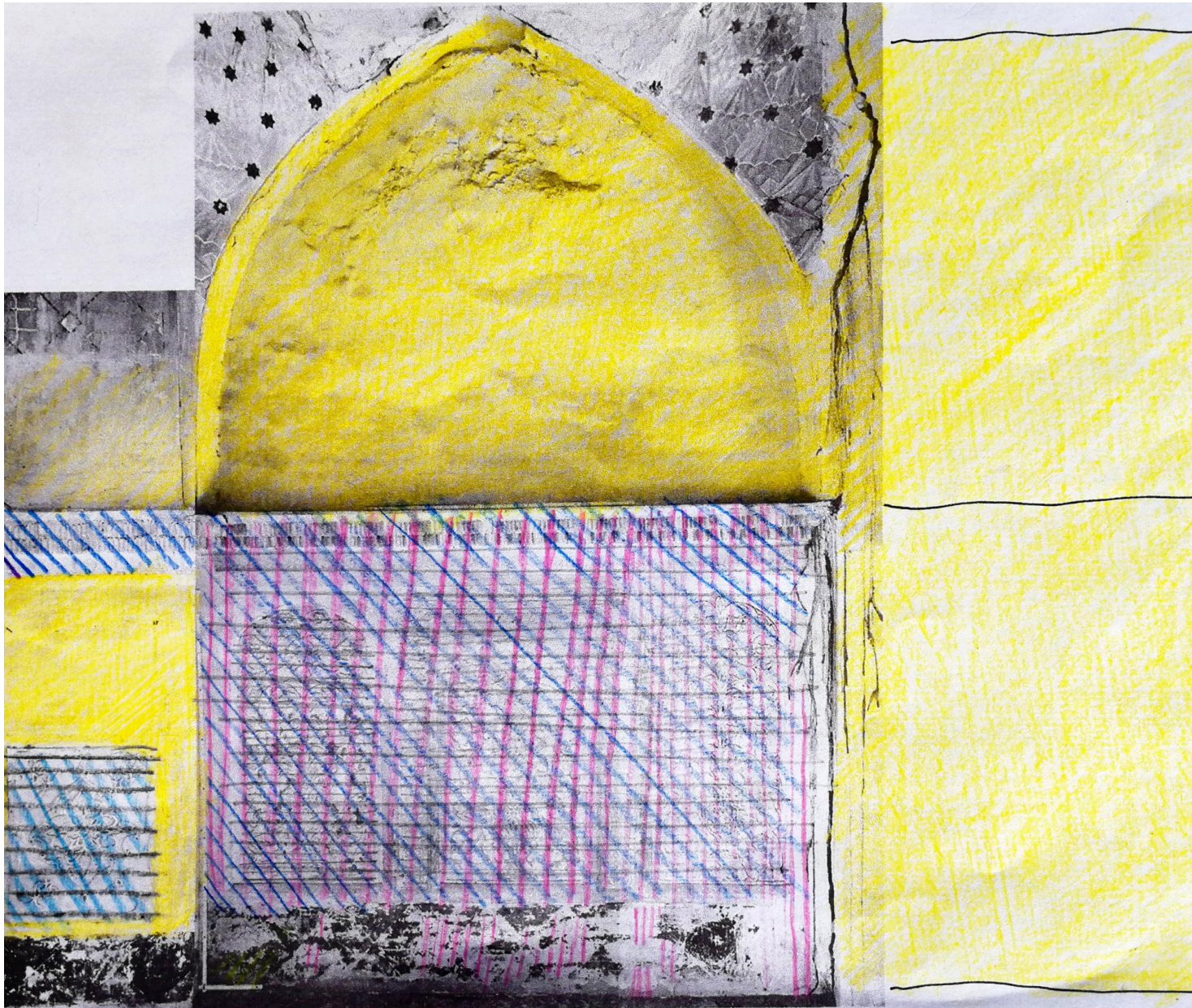




Legend of materials:

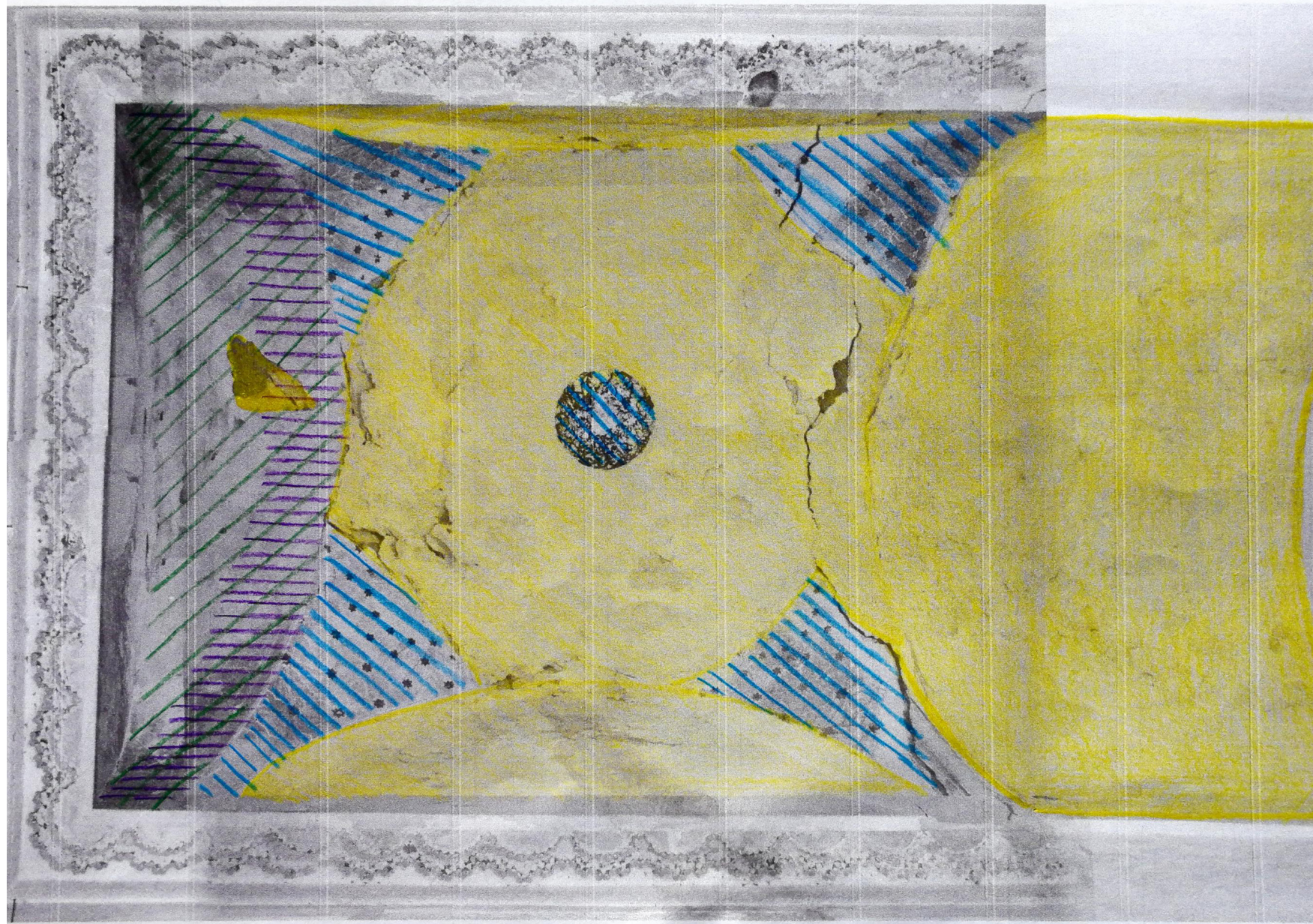
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- Wall painting
- Paint layer
- Sgraffito
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- Terracotta
- Glazed terracotta
- Artificial stone
- Wood
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- Glas
- Cable/Wire
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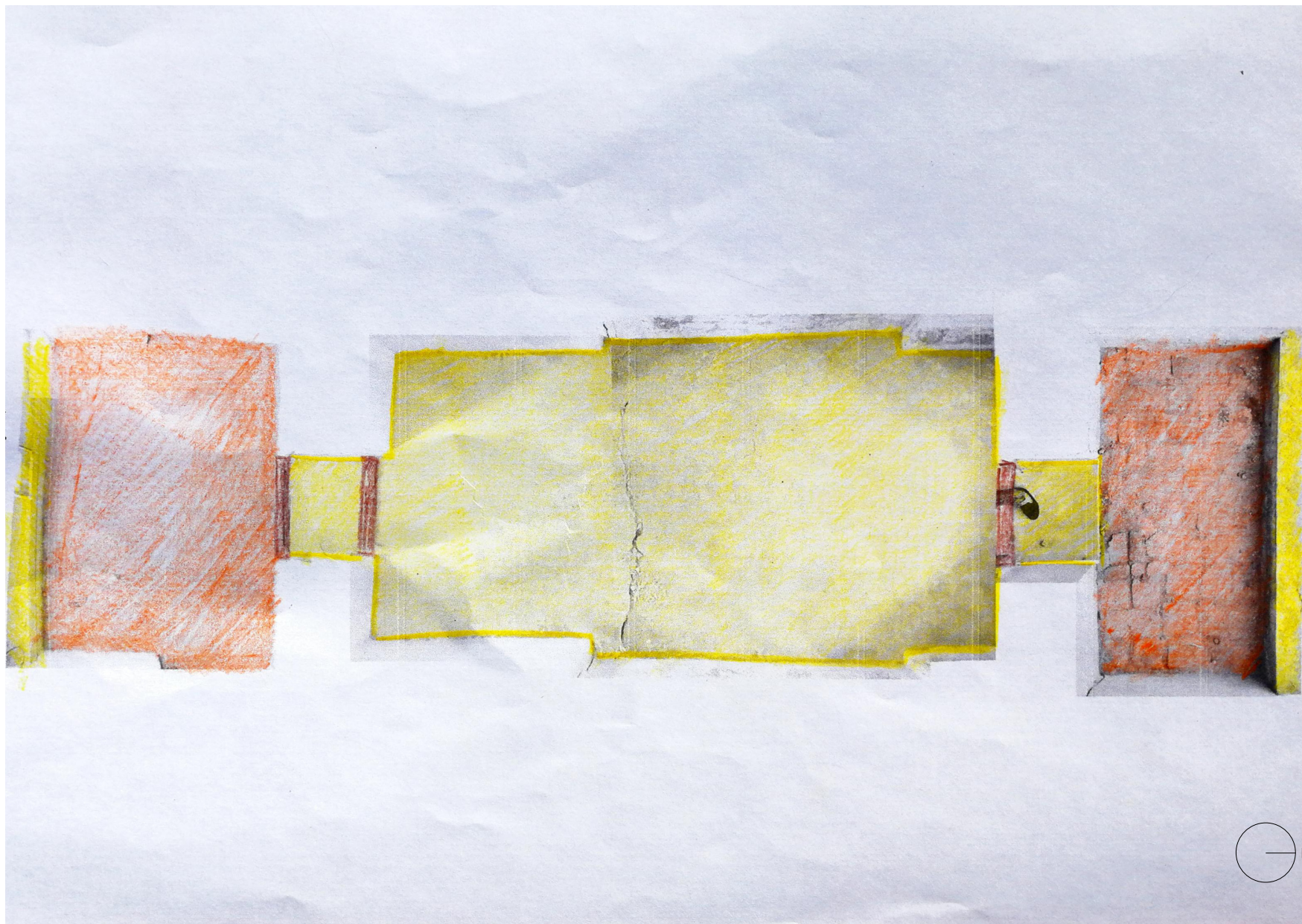
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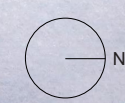


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Mapping Damages

In the Room 62 are two damages, which are that heavy, that we have marked them in our trafficlightsystem as red – this means that both of the damages need immediately treatment. The first “red” damage is the huge crack through the whole room (cracks that are thinner than 5 mm aren’t meant). It seems that the whole fundament on the northside of the madrassa is collapsing or is collapsed and set the northern wing under intense tension, which leads to this crack. You can also see it on the roof and in the rooms close by. To see, if it’s an “active” damage or not, a test subject should be glued on the left and on the right side of the crack. If the subject starts to show cracks itself after a while, or the glue is not able to hold it in place the crack is still active, if not, the danger is not that intense, and we would classify it as “yellow”.

The second dramatic damage is the condition of the ceiling. At the Arcade we see at the peak of the pointed barrel vault salt evaporation and on the balcony ceiling some parts of the plaster at a similar point are still missing, while the surrounding plaster is scaling heavily. Inside it’s even worse. – Generally, all the plaster and stucco three meters above is crumbling and on the crossings you can see softer peeling of the first layers. The peak of the cupola, is in quite good condition instead. On the connection points between cupola and walls or vaults the plaster is scaling heavy and even more next to the big crack. This damage is caused by incoming water from the roof and still ongoing. If the roof would be in better condition this damage would not have happened like this.

The other damages, that still need treatment but are less or not active we marked “yellow”. So outside on the southside of the examined area the masonry has huge cracks and is partially broken. Cause we haven’t found something similar on the other walls, we think that the sun is doing her work here and the bricks and the mortar are not made for this extreme weather conditions. By time this damage will escalate heavily. Also the plaster that is replacing the missing majolicas on this side is start to scale, cause of the same reason, we think. Inside we have also some less dangerous damages, like the scaling close by the smaller cracks and corrosion on the peak of the cupola caused by a single piece of metal.












The damages, that don’t need any direct treatment and just monitoring, with our conservative perspective, we have marked “green”. On the north facade we have, caused by the wetness and the shadows, some biological disintegration, by name: moss. It doesn’t set any building part in danger, but it should get monitored all five years or so. The scratched and partially painted graffiti that covers parts of the northern, the western and the eastern inner walls in the height of eyes, is a damage that really interrupts the view on the most decorative elements of the room 62.

Mapping Damages

So, it should get documented and at least monitored so you notice if there appears new graffiti in the room or we should start a discussion about to close the rooms and make them just accessible with a proper guide to secure the cultural heritage here. Some pieces of the room are missing, if by demolition or by use, we can't say precisely: Half of the glasses from the windows, the inner door on the southside (there were two doors), some stucco elements from the central ceiling decoration and the sharafat are also missing, like from the floral ornaments beneath also and pieces from the panjara on the northside.












The heaviest interruption of the picture from a former high decorated student cell in the Kukeldash Madrassa is the whitewash, that covers roughly everything in the room to the height of roundabout 2,20 m. And this really is a pity, cause the amount of work that is needed to remove it without hurting the surface underneath is huge. But at least it doesn't look like that it's going to hurt the layers underneath. At last we want to mention the small cracks next to every window and door frame. They have happened cause the wooden elements were shrinking by time and they need to get filled with plaster.

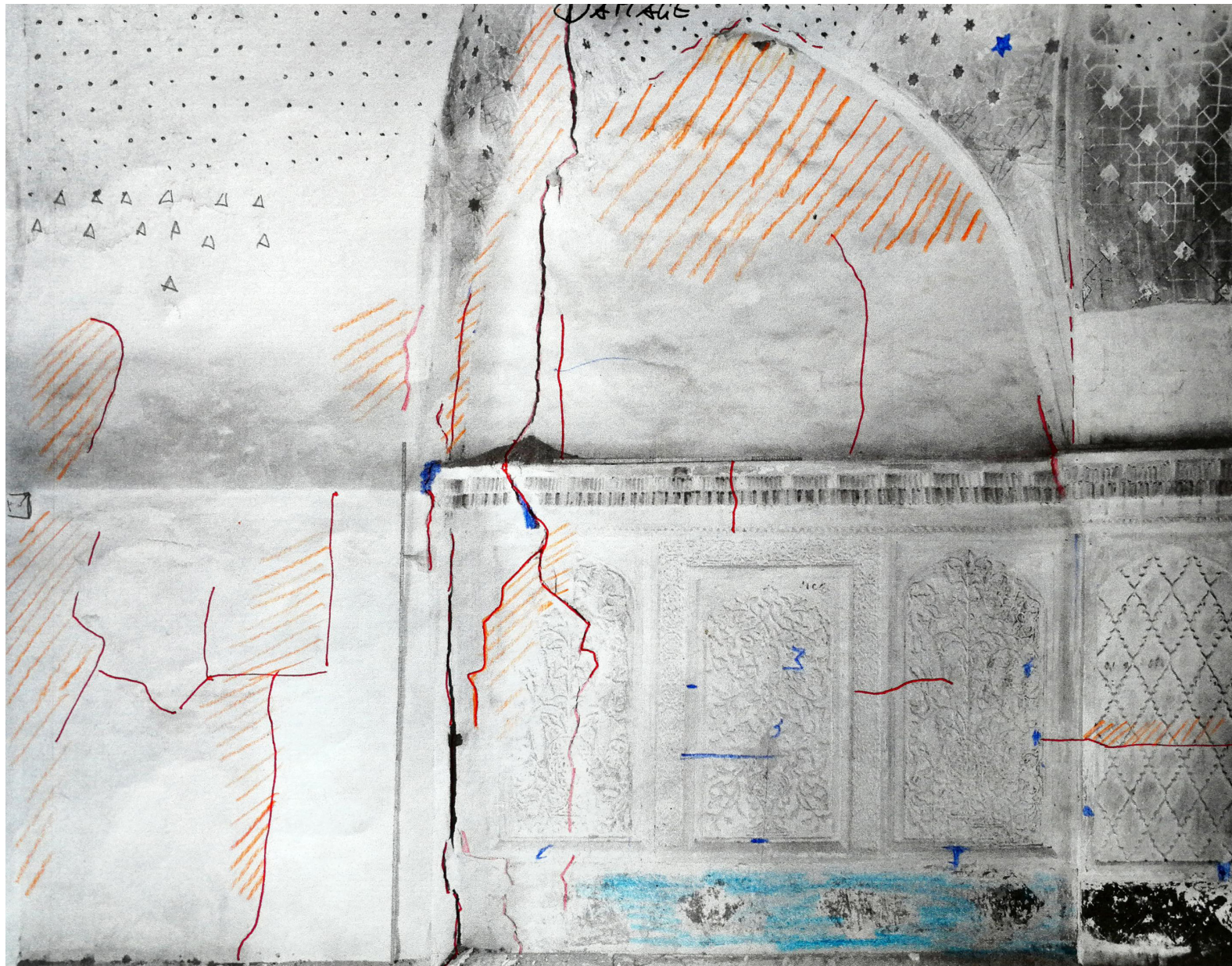
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-  Peeling
-  Crack
-  Scaling
-  Salt
-  Biological growth
-  Corrosion
-  Burrow
-  Water traces



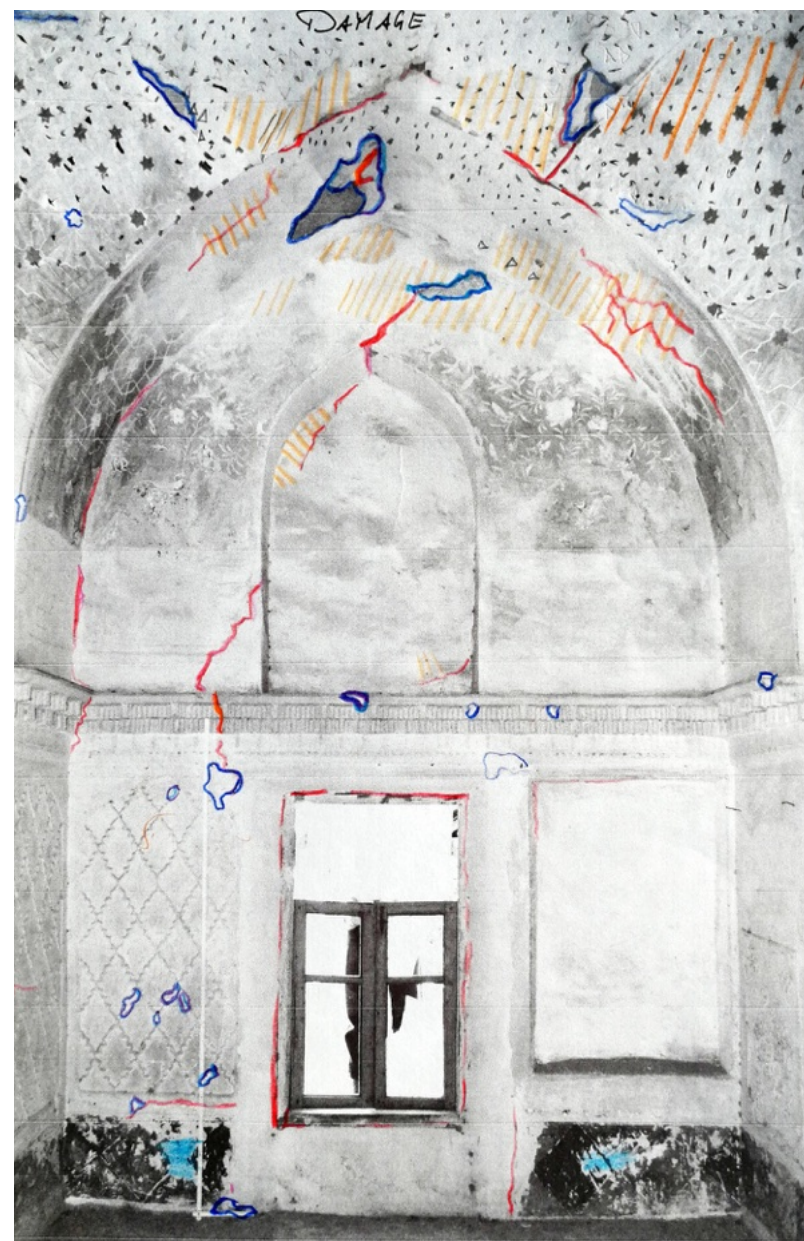
Legend of damages:

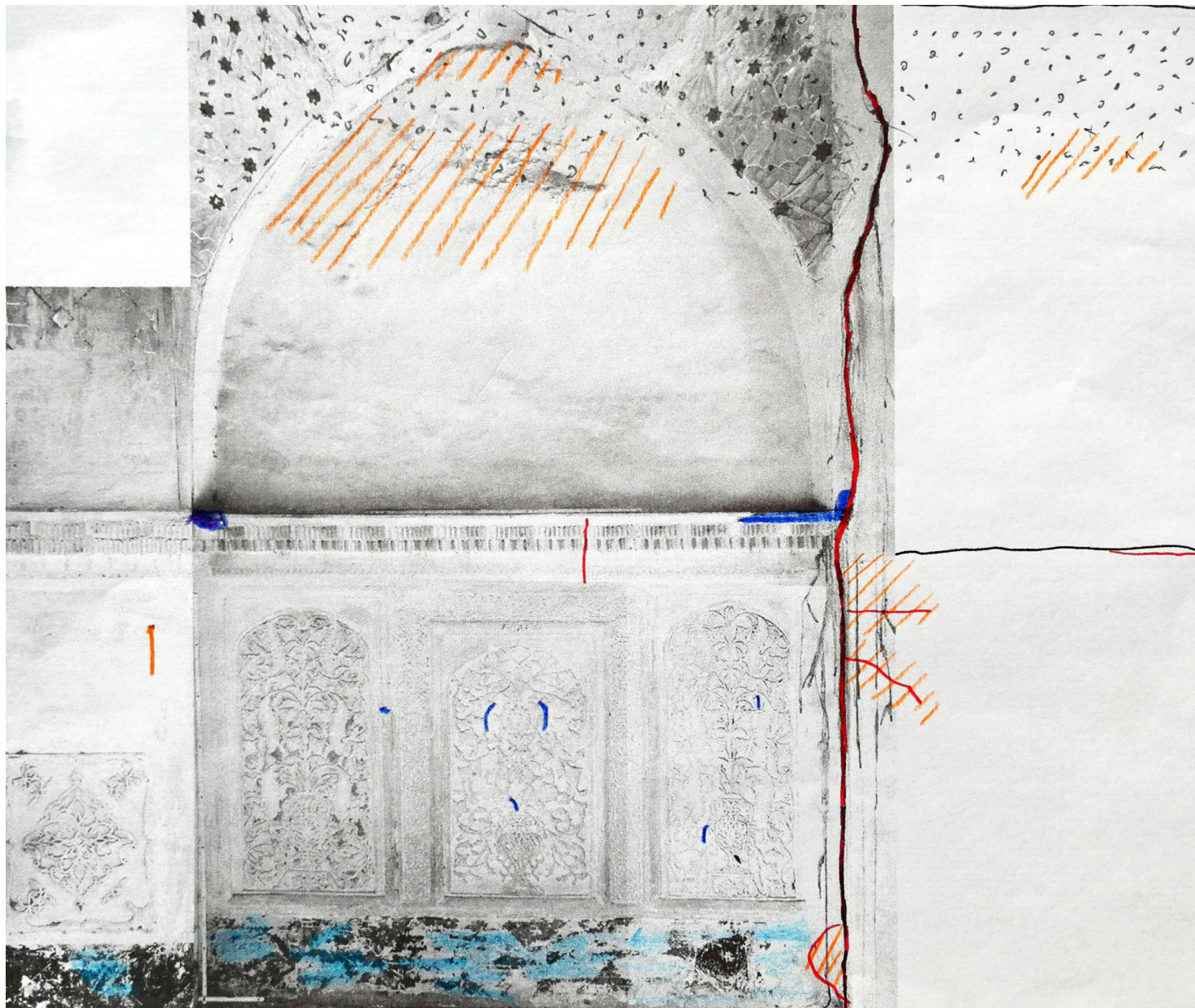
-  Lacuna/ Missing parts
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Legend of damages:

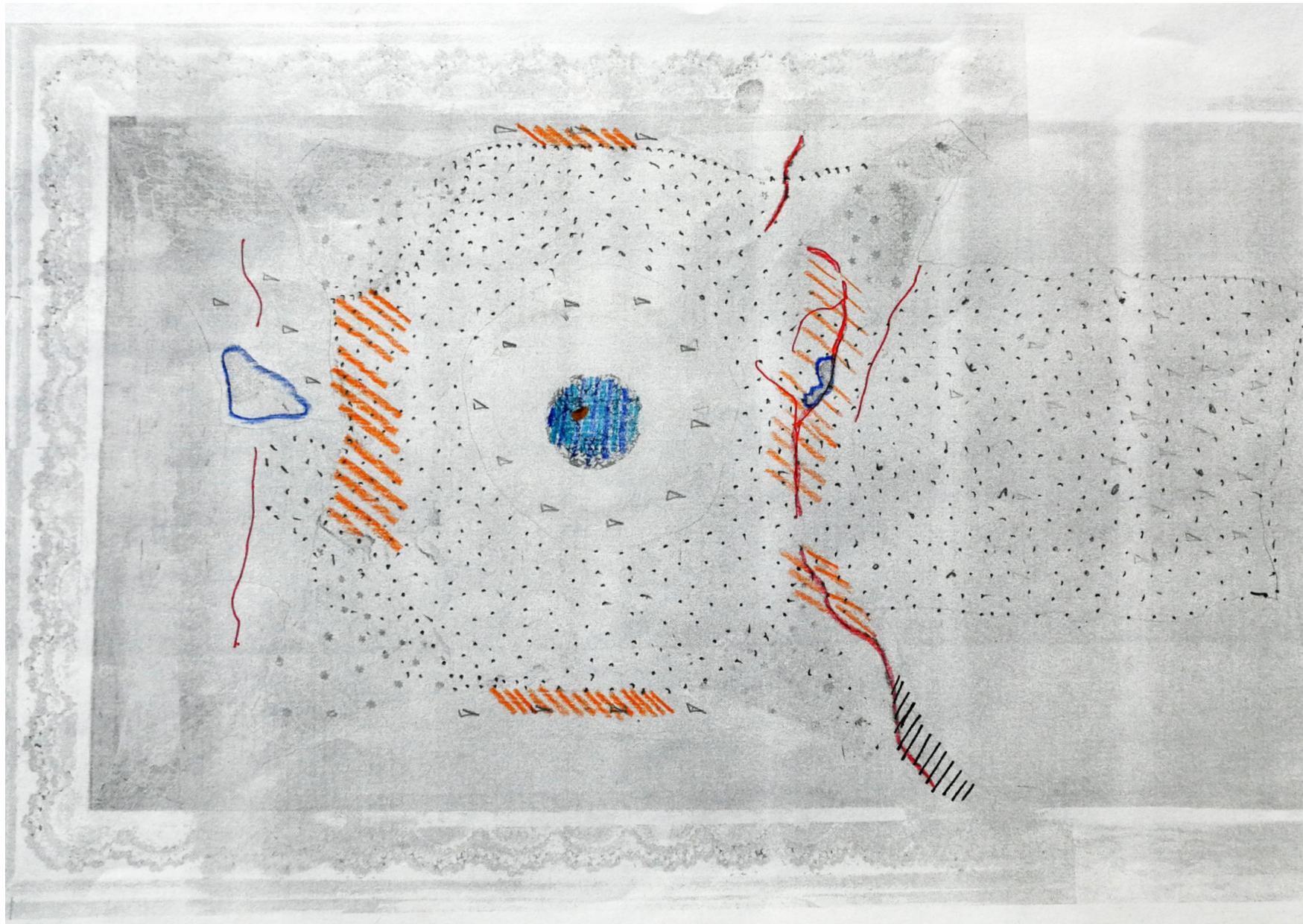
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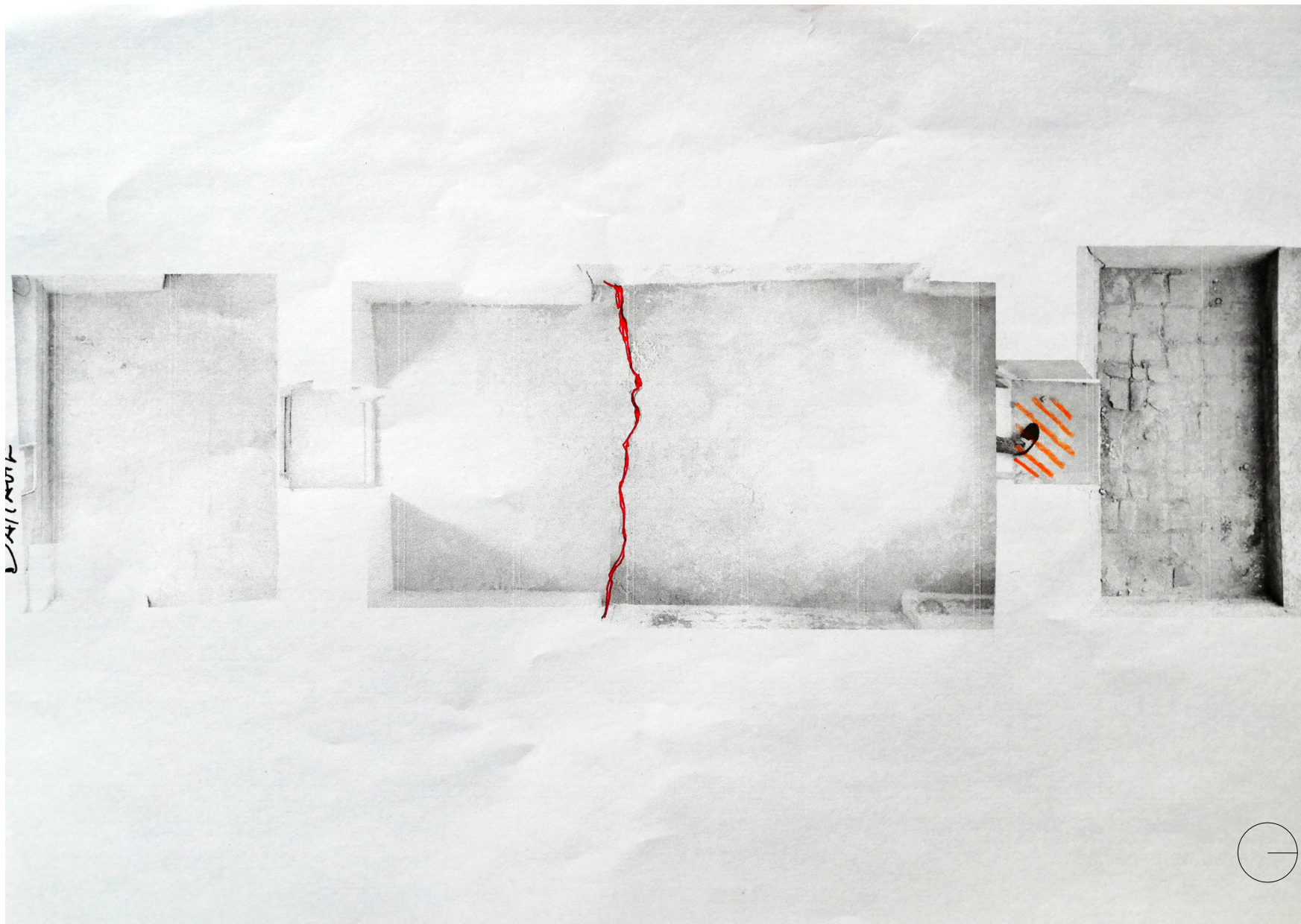




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Traffic Light System

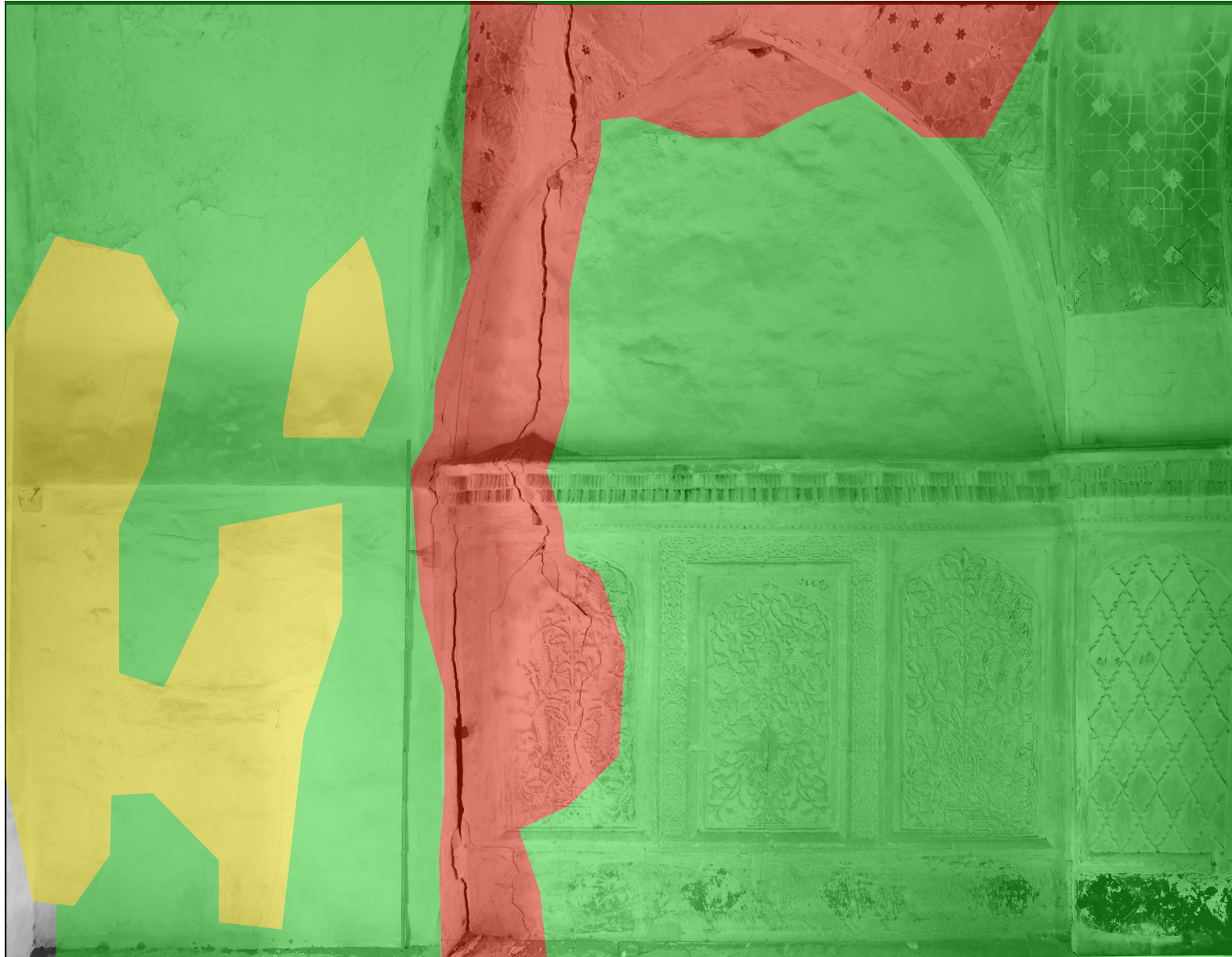
Traffic light system:

-  Immediate treatment
-  Stable for now, needs treatment in the next 2 years
-  Stable






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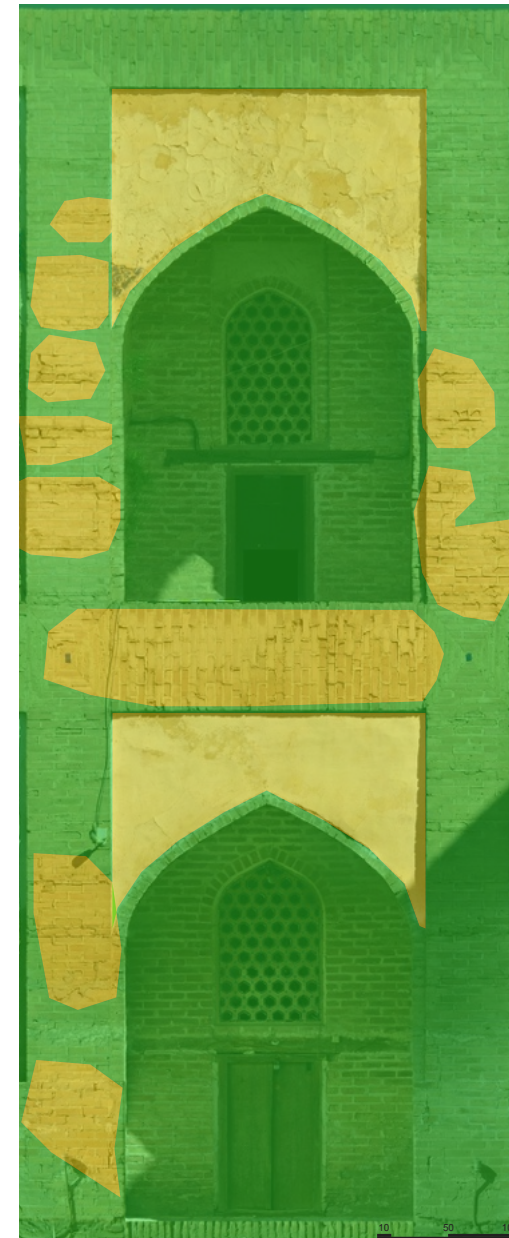
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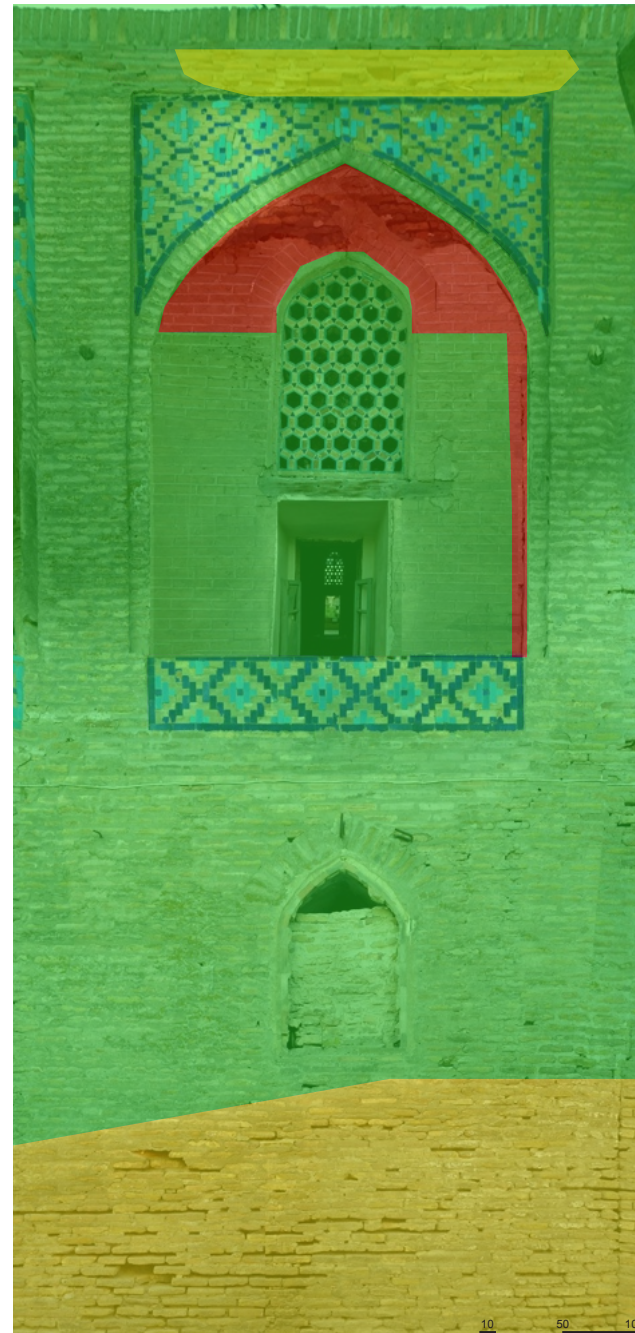
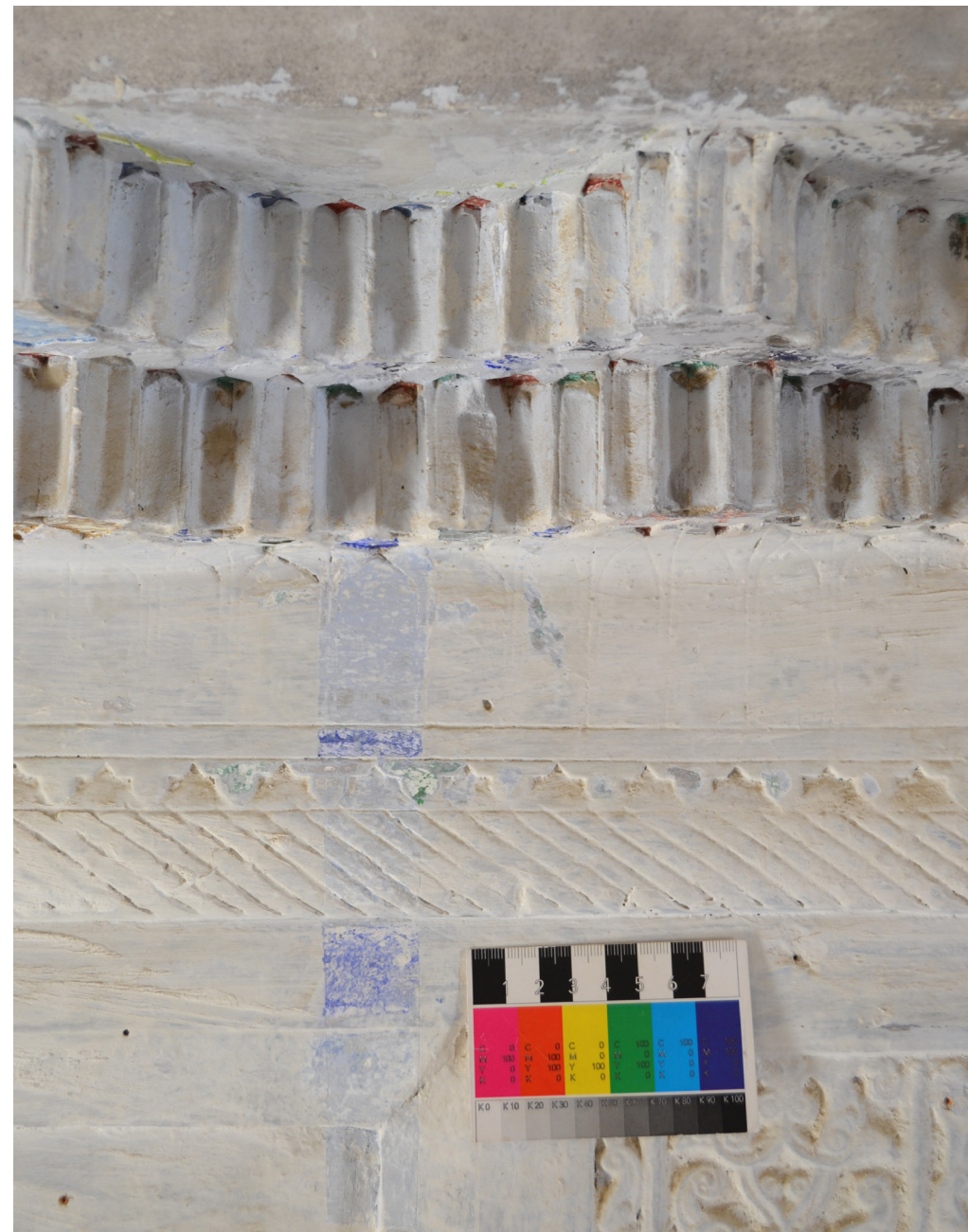


Photo- documen- tation

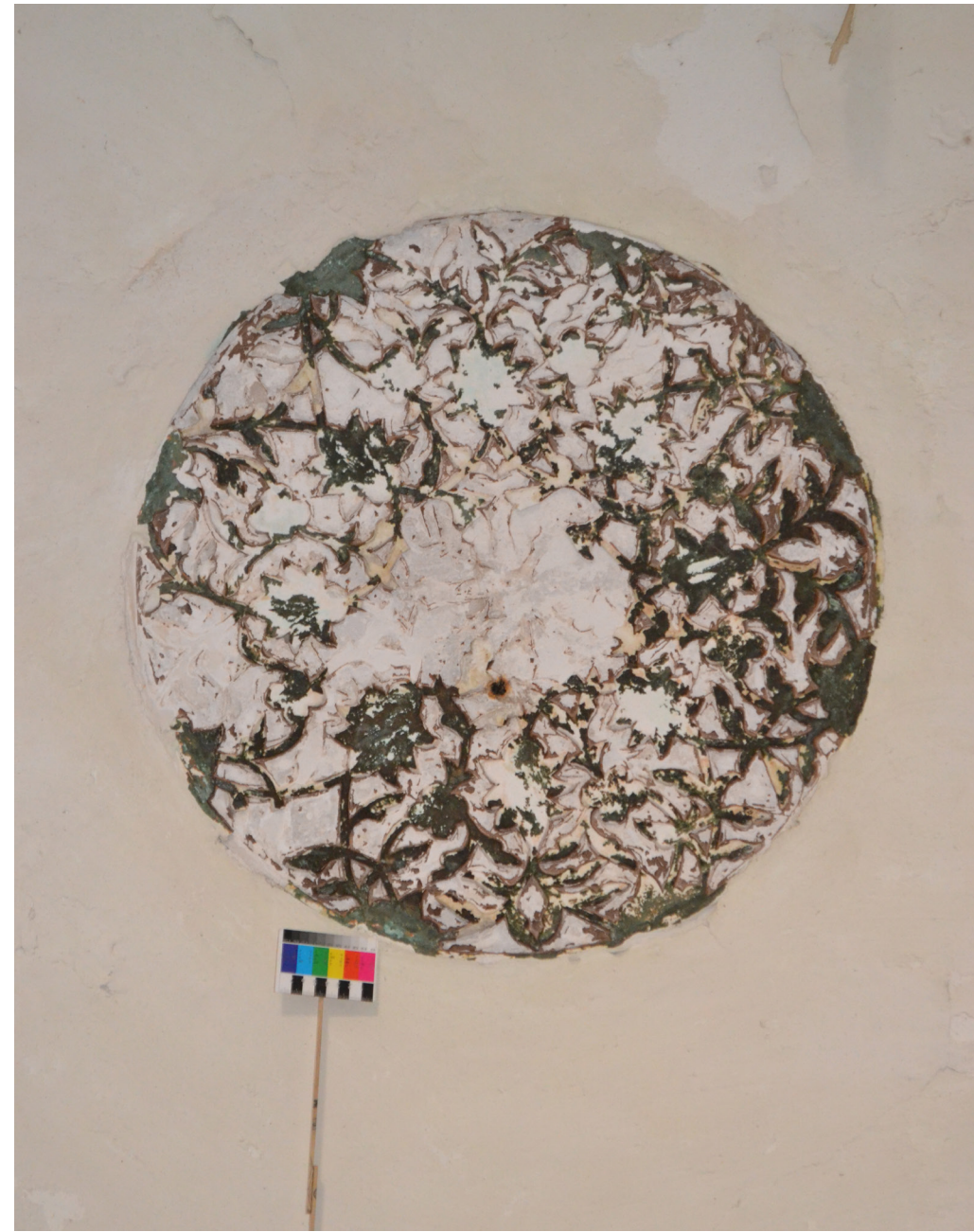
The photographic documentation shows detailed images of the layout of the room, materials such as wall paintings and stucco, damages such as cracks or missing parts and the overall condition of the room and outer facade. It also shows the cupola and roof, which have not yet been covered, but will be essential for the treatment concept and traffic light system of the room.



Rectangular frames on the west wall (fig. on the left) and the east wall (fig. on the right) made out of stucco, with different white floral ornaments



West wall: Analysis of the former colours on the elements of stucco (fig. on the right) and the sharafat with the crossing crack (fig. on the left)



The figures show the circular floral Ornament in the peak of the cupola



Looking south, to the pendants in the south-east corner and (fig. on the left) and the south-west corner (fig. on the right) with the immense crack



Roof of the cupola: Huge parts of the grouting mortar is missing, allowing the water to enter unhindered, which causes the crumbling plaster and stucco at the ceiling



Arcade in the south: salt evaporation at the peak of the pointed barrel vault (fig. in the left), caused by a bad water supply system on the roof (fig. on the right)



Loggia in the north (left): Parts of the plaster at the ceiling are missing, while the surrounding plaster is scaling heavily

Roof of the Loggia (right): Bad water supply system on the roof, missing mortar. The water can enter, which leads to the fact that the plaster in the loggia comes loose

Technical Terms Glossar

A common (technical) language was necessary for communication on site. In addition, there were constructions, building materials and terminology that were or still are in use in the immediate or wider surroundings of Bukhara.

Firuz Kurbanov and Dinara Nazarova did the essential work for this. Some terms could be verified with the help of internet search results, others are based exclusively on the listing of our Uzbek colleagues.

The glossary is intended to summarise the most common terms of the Summer School, but does not claim to be complete.

No.	technical term	short description	description	reference
1	aivan	floor elevation	<i>(tajik) is a summer place that opens from one, two or three sides. The floor of Ivan is usually raised</i>	Dinara Nazarova
2	ark	citadel	<i>(persian) is a citadel of a central asian feudal city</i>	Dinara Nazarova
3	bad-gir	wind catcher	<i>occur in Iran, cold and warm streams in separate channels</i>	
4	balkhi	vault construction	<i>(persian) vaulted construction with a rectangular base; named after the province of Balkh in northern Afghanistan</i>	Dinara Nazarova
5	chartak, chortok	vault construction	<i>(persian) square pavilion with arches on four pillars; originates from Sasanian Iran, served as a fire temple with a lighthouse for caravans in the desert and mountains</i>	Dinara Nazarova
6	chaspak	type of manufacture	<i>(tajik) way of making mosaics in Central Asia</i>	Dinara Nazarova
7	clay	building material	<i>is a plastic sedimentary rock consisting mainly of clay minerals</i>	Dinara Nazarova
8	ganch	building material	<i>plaster with gypsum as a binder and a wide variety of additives, such as hair, ash, brick dust, chalk, etc....</i>	
9	grich	geometrical Ornament	<i>decorative Islamic geometric patterns</i>	
10	guldasta	mural or stucco motif	<i>bouquet of flowers</i>	Firuz

No.	technical term	short description	description	reference
11	hona		<i>(tajik) a room, premise</i>	Dinara Nazarova
12	honako, khanaka		<i>mosque with dormitories for dervishes in Central Asia, winter room of the mosque</i>	Dinara Nazarova
13	islimiy	ornaments from plants and flowers	<i>based on floral, leafy or biomorphic patterns; usually a spiral from which stylised buds, leaves and flowers emerge; compositions are reflected, repeated and arranged in a mosaic-like manner</i>	https://www.jeeamirza.com/islimi-1
14	kalla (kala)		<i>(persian) city fortress in the feudal period</i>	Dinara Nazarova
15	karavan-sarai		<i>(turkic) is an inn, a resting place for travellers and merchants in the cities and on the trade routes of the Middle and Near East</i>	Dinara Nazarova
16	karbandi	vault construction	<i>multi-limb vault</i>	
17	khataba	ducts in buildings	<i>channels in building structures for moisture regulation and ventilation</i>	Dinara Nazarova
18	khudjra, hurja	cell	<i>"(arabic) is a residential building für students and teachers of madras; small private rooms in the medrese"</i>	Dinara Nazarova
19	kundal	[farsi] flowered paradise	<i>(tajik) Relief painting, done by repeatedly applying a specially prepared ganch solution with glue to the mould with a brush. On top of the ganch there is colouring and gilding by honey</i>	Dinara Nazarova
20	kurgon		<i>(turkic) is a suburban rural estate in central asia.</i>	Dinara Nazarova

No.	technical term	short description	description	reference
21	kyrma	sgraffitto	<i>(turkic) technique of making an ornament on plaster, similar to sgraffito, widespread in Central Asia</i>	Dinara Nazarova
22	maghrab-iga		<i>arabic fontaines</i>	
23	mahalla		<i>term for guzar in some parts of tajikistan</i>	Dinara Nazarova
24	majolica		<i>glazed tiles, with arabic characters on them; mainly in blue, turquoise and white</i>	
25	malquaf	wind towers	<i>occur in Iran, use of air movement for air conditioning of buildings (circulation).</i>	
26	minaret		<i>(arabic) a tower like structure at a mosque or madrasah</i>	Dinara Nazarova
27	minbar		<i>(arabic) elevation in a mosque from which a sermon is preached, a pulpit</i>	Dinara Nazarova
28	mirhab		<i>(arabic) niche with an arrow-shaped end in the wall of the mosque, indicates the direktion of mecca</i>	Dinara Nazarova
29	morpatch	stucco element		
30	muqarnas	stalactite cornice	<i>usually consisting of a large number of pointed-arched elements arranged one inside the other and one above the other; transition between niche and wall or wall and dome</i>	https://de.wikipedia.org/wiki/Muqarnas

No.	technical term	short description	description	reference
31	namoyon		<i>symetrically arranged bouquets of flowers</i>	
32	naqsh	pattern		
33	nimkar-bandi		<i>half a many-limbed vault</i>	
34	pa-barik	part of karbandi		
35	pakhsa		<i>mud brick wall, consist of several (up to 10) horizontal layers</i>	Dinara Nazarova
36	panjara	window cage		
37	portal		<i>(latin) architecturally processed entrance to a puplic building, palace, church, madras, etc</i>	Dinara Nazarova
38	qirma	look at kyrma		
39	rabad		<i>(arabic) suburb, handicraft settlement of a medieval city in Central Asia</i>	Dinara Nazarova
40	rabat		<i>(arabic) fortified points on the borders of states and on the caravan routes of Central Asia</i>	Dinara Nazarova

No.	technical term	short description	description	reference
41	salsabil		<i>arabic fontaines</i>	
42	samana		<i>(turkic) straw; raw brick made of clay with the addition of cut straw, chaff etc.</i>	Dinara Nazarova
43	sardoba		<i>(tajik) semi-subterranean circular room with a dome, for water storage</i>	Dinara Nazarova
44	shahris-tan		<i>(persian) residential part of a medieval city</i>	Dinara Nazarova
45	shamseh	part of karbandi	<i>cell on top</i>	
46	sharafa	stucco element	<i>stalactites/muqarnas arranged into a cornice</i>	
47	soosan	part of karbandi		
48	sufa	stone plinth	<i>(tajik) platform made of clay for sitting or lying down, indispensable element of a courtyard or room</i>	Dinara Nazarova
49	tachmon	work surface	<i>area on the floor for the production of various components</i>	
50	tahorat-hona		<i>(arabic) room in the mosque for performing ritual ablutions</i>	Dinara Nazarova

No.	technical term	short description	description	reference
51	tanagul	stucco work		
52	tim		<i>(arabic) covered market</i>	Dinara Nazarova
53	tockcha	niche	<i>designation for small wall recesses e.g. for books</i>	
54	toki, tok		<i>(persian) commercial building at the intersection of the main streets of the cities of Central Asia in the Middle Ages</i>	Dinara Nazarova
55	toranj	part of karbandi	<i>naming by number, for example "16 sided karbandi"</i>	
56	usto		<i>(tajik) master</i>	Dinara Nazarova
57	vassa		<i>(tajik) semi-circular blocks for filling between the ceiling beams</i>	Dinara Nazarova
58	waqf	donation	<i>sponsorship for the madresa</i>	
59	zanjira	stucco elemet		

Materials Glossar

The legend of the materials and damages was a cooperative production of the restorers of each group. It builds the foundation of the mapping of the materials and damages and is used throughout the groups. Visualized as colors and pictograms, the different materials and damages are summarized in these legends.

In addition to that, the restorers also created glossaries of all the materials and damages which include descriptions in English, German and Russian, color or pictogram of the material or damage as well as a picture as an example. These were used as a manual for the inner and outer facades.

Brick masonry
Ziegelmauerwerk
Кирпичная кладка



Masonry made of bricks and joints filled with mortar.

Mauerwerk bestehend aus Ziegel und Mörtelfugen.

Natural stone
Naturstein
натурального камня



Stones of a natural source (field-collected or quarried)

Steine natürlichen Ursprungs (gesammelt oder abgebaut)



Plaster
Putz
Штукатурка



Protective and/or decorative coat which is applied to architectural surfaces. Plaster consists of a mixture of binders, aggregates, water and often fillers, additives and admixtures.

Schützende und/oder dekorative Beschichtung von Architekturoberfläche. Putze bestehen aus Bindemittel, Zuschlag, Wasser und oft Füllstoffen, Zusatzmitteln und Zusatzstoffen.

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Stucco
Stuck
Стукко



The plastic moulding of all kinds of mortars on architectural surfaces for decorative purposes

Plastische Ausformung von Mörteln aller Art auf Architekturoberflächen



Wall painting
Wandmalerei
Монументальная живопись



Painting executed on an architectural surface

Malerei auf Architekturoberfläche



Majolica tiles
Majolicafliese
майолика плитки



Tiles made of earthenware covered with tin decorated glaze

Keramische Fliesen mit dekorativ verzierter Glasur



Terracotta
Terracotta
терракота

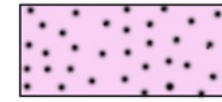


molded stone made of pottery

Keramische Formsteine

267

Glazed terracotta
Glasierte Terracotta
глазурованная терракота



molded stone made of pottery covered with glaze

Keramische glasierte Formsteine



Artificial stone Kunststein



molded stone made of mortar

Formsteine hergestellt aus Mörtel

Overlay Überlagerung



An additional Layer covering the paint layer that should be taken off

Schicht, die Malschicht überdeckt und abgenommen werden sollte



Wood
Holz
древесины



Metal
Metall
металл

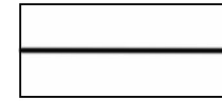


**Glas
Glas**



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**Wire
Kabel
кабель**



Reet
Stroh
солома



Damages Glossar

Lacuna, Missing parts
Fehlstelle
Отсутствующие части



Loss of three-dimensional parts (Stucco, plaster, bricks,...).

Verlust von plastischen Elementen (Stuck, Putz, Ziegel, ...).

Отсутствие целых объёмов каких-либо элементов (Штукатурка, гипс, кирпичи, ...).

Ausschließlich die Bruchkanten dick markieren und nicht den fehlenden Teile/ Only mark the broken edges, not the missing part itself./ Отметить жирной линией края отломанных частей, если действие затруднительно, просто указать что конкретно отсутствует и степень повреждений.



Loss of paint layer
Fehlende Malschicht
Отсутствует слой краски



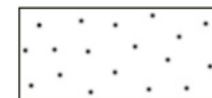
Loss of paint layer.

Verlust von Malschicht.

Утрата слоя краски.



Crumbling
Abbröckeln
Крошение



The disintegration of a material into small pieces as a result of chemical or physical deterioration. Loss of cohesion between component materials. Phenomenon needs consolidation.

Zerfall eines Materials in kleine Partikel in Folge von chemischer oder physikalischer Verwitterung. Kohäsionsverlust zwischen den Komponenten eines Materials. Phänomen erfordert Festigung.

Раздробление материала на маленькие частицы вследствие химического или физического воздействия. Потеря сцепление между компонентами материала. Данное явление требует укрепления.

Auf Putzschicht bezogen! Referring to plaster! Относится только к штукатурке!



Peeling
Ablösung von Malschicht
Отслоение



Loss of adhesion between paint layer and underground.

Verlust der Anbindung (Adhäsion) der Malschicht an den Untergrund.

Потеря связи между слоем краски и нижнего слоя.

Auf Malschicht bezogen! Referring to paint layers! Относится только к слоям краски!



Crack
Risse
Трещина



A discontinuity in an architectural surface or wall painting, resulting in a visible separation of one part from another, that extends through one or more layers.

Eine Unterbrechung in einer Architekturoberfläche oder Wandmalerei, die sich in einer optischen Trennung von zwei Bereichen zeigt und eine oder mehrere Schichten durchziehen kann.

Разрыв на архитектурной поверхности или настенной живописи, приводящая к явному разделению одной части от другой, которая распространяется на один или более слоёв.

Rissweite wird durch Liniendicke erfasst; kartiert werden nur geöffnete Risse, die im Falle von Maßnahmen gefüllt werden können! Width of cracks will be shown by the thickness of the line. Only open cracks, that need injecting, will be mapped! No mapping of hairline cracks! Глубина трещин определяется толщиной линии. Только открытые трещины, нуждающиеся в заполнении, должны быть зафиксированы.



Scaling
Schalenbildung, Hohlstellen
Осыпание



The detachment of layers (stone, bricks, plaster) parallel to the surface.

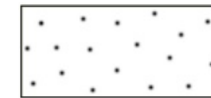
Ablösen von Schichten (Stein, Ziegel, Putz) parallel zur Oberfläche, Adhäsionsverlust, Ablösung vom Putzträger.

Расслаивание, параллельное поверхности (камень, кирпич, штукатурка).

*Durch vorsichtiges Abklopfen entlang der Risse können Hohlstellen gefunden werden! Scaling can be discovered by carefully knocking on the surface along the cracks!
Будьте осторожны при обращении с поверхностью, возможно осыпание!*

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Efflorescence
Salzausblühung
Высолы



An accumulation of a white powder or crystals, made up of soluble salts, on an architectural surface.

Häufung von weißem Pulver oder Kristallen aus löslichen Salzen auf einer Oberfläche.

Образование белого порошка или кристаллов, состоящего из растворимой соли на поверхности.



Biological growth
Bewuchs
Биологическое обрастание



Colonization by plants/living organisms on an object.

Besiedelung eines Objekts oder anderen Kunstwerks mit pflanzlichen/lebenden Organismen.

Обрастание объекта растениями/живыми организмами.

277

Corrosion
Korrosion
Коррозия



Metal corrosion.

Korrosion von Metall.

Коррозия металла.



Graffiti
Graffiti
графические рисунки



Engraved/carved or applied words/signs.

Eingeritzte oder aufgetragene Schrift/ Muster.

Вычерченные или нанесенные слова/знаки.

Wird nicht kartiert, nur erwähnt. Will not be mapped, only mentioned. Не будет зафиксировано, только упомянуто.

278

Burrow
Fraßgänge
Червоточина



Damage/burrows done by insects.

Löcher verursacht durch Insekten.

Повреждения/углубления, оставленные насекомыми.

Die ganze Fläche wird kartiert, nicht jedes einzelne Loch. Single burrows will not be mapped. The hatching will be applied to the whole area. Поверхность полностью будет зафиксирована, не каждая дырка в отдельности. Штриховка применяется ко всей поверхности.



Note of Thanks

Finally, all lecturers and students from Potsdam University of Applied Sciences would like to express their gratitude to all the professors, lecturers and students from the involved Bukhara, Samarkand und Tashkent universities. To all of us it was a very pleasant and intense experience, both in a scientific, and in a social way. It was a great pleasure to work with our Uzbek colleagues and students, to learn from them, and to celebrate together! The summer school got outstanding input from Uzbek colleagues to a large number of topics.

Potsdam participants profited a lot from the explanation and naming of all the madrasa's architectural details and functions, learning about historical und religious backgrounds, having sharpened their eyes for beauty and meaning of all the ornament and decoration on that highly valuable monument, to mention only a few.

It was a great pleasure to see Uzbek and German students from different faculties work efficiently and confidently together from the very first day. In difficult political times on a global scale, this is a source of hope and confidence to all of us, indeed. Thus, each of the participants would deserve to be mentioned with their own specific contribution. Because there are so many it seems almost not possible. But one single person has to be recognized especially at the end of that documentation:

Dr. Sukhrob Abdulayev from Bukhara State University. He was the one to keep the 2022 Kukeldosh Madrasa Summer School running from the first to the last hour. Thank you very much!

We hope for a long lasting and fruitful scientific Uzbek-German cooperation for the benefit of our mutual architectural cultural heritage!

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