

REPORT
of the Joint World Heritage Centre/ICOMOS/ICCROM
Advisory mission
to the World Heritage property “Gelati Monastery” (Georgia)
28 November – 2 December 2022



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The mission team would like to express its profound gratitude to the Georgian authorities for their kind hospitality and for the excellent arrangements put in place to ensure the smooth running of the mission. The programme of the mission, combining meetings with various stakeholders with on-site visits and discussions, allowed the mission team to receive first-hand information on the issues and challenges that the national cultural heritage authorities are facing in the preservation of the World Heritage property 'Gelati Monastery'.

The mission team would like to convey its special thanks to Mr Kaha (Karlo) Sikharulidze, First Deputy Minister, Ministry of Culture, Sport, and Youth of Georgia, and to Mr Nikoloz Aznaurashvili, Director-General, National Agency for Cultural Heritage Preservation of Georgia, and their respective teams for their efforts in ensuring the success of the mission.

The mission team was privileged to be accompanied through much of its visits and meetings by Mr Aznaurashvili and by Ms Tamar Ketiladze, Acting Head of the UNESCO and International Relations Unit at the National Agency for Cultural Heritage Preservation of Georgia, and by many representatives of the State Party and other stakeholders, all of which contributed valuable comments and support. Our thanks go to all stakeholders for their sincere engagement and determination to safeguard the property.

Executive Summary and List of Recommendations

The main purpose of the Joint WHC/ICOMOS/ICRROM Advisory mission to the World Heritage property “Gelati Monastery” was to assess the emergency actions carried out by the National Agency for Cultural Heritage Preservation of Georgia, with its expert consultants, from June 2021 to September 2022, following the water infiltration due to deficiencies of the roofs installed in 2015-2018 and subsequent damage to the interior murals. In particular, evidence of serious water infiltration in the Church of the Nativity of the Virgin (the Main Church) was detected in the winter of 2019-2020, with visible water stains in the upper part of the southern wall of the west wing. The water ingress has led to a mobilisation of soluble and hygroscopic salts and their crystallisation, which in turn led to the detachment of paint layers and to the decay of part of the plaster and paint layers, most visible in the west and north arms of the Main Church. The emergency actions carried out by the National Agency for Cultural Heritage Preservation therefore focused mostly on the west arm, but also on the north arm of the church.

Upon suggestion from the World Heritage Centre, the State Party engaged Ugo Tonietti, architect and President of ReStruere, a Florence University spin-off, to lead investigations on the reasons of the water infiltration and to contribute to decision-making towards appropriate mitigation measures. Further Italian specialists were hired by the State Party upon his recommendation, in particular from the Giovanni Secco Suardo Association and Studio Massari, to undertake investigations, monitoring and emergency interventions on the roofs of the Main Church and the Church of Saint George, and on the wall paintings of the west arm of the Main Church. This work has been undertaken by the Italian teams together with Georgian specialists led by Merab Buchukuri, Wall Paintings Chief Conservator-Restorer at the National Agency for Cultural Heritage Preservation of Georgia.

The executive summary accompanied by specific recommendations follows the Terms of Reference of the mission (refer to Annex 1).

Assess the overall state of conservation of the Gelati Monastery World Heritage property, including its setting.

There is a general need for interior and exterior conservation work on the monuments of the property. The immediate needs are linked to addressing deficiencies with regard to the roofs installed in 2015-2018, which led to moisture ingress and associated decay of the historic murals inside the Main Church. The necessary emergency interventions should be undertaken in parallel with developing a holistic conservation programme for the property as a whole, which will entail updating the existing Conservation Master Plan. A closer dialogue is desirable between different stakeholders involved in the conservation of the property.

Recommendations:

1. Immediate actions should focus on emergency stabilisation works. Further conservation work should be undertaken only once the structures, wall paintings and mosaics should be guided by a thoroughly designed and holistic conservation programme for the entire property and should be underpinned by systematic monitoring, research, and documentation. The existing Conservation Master Plan should be updated accordingly.
2. It is recommended that the State Party continue with the programme to redress the conservation challenges at the property following the recommendations contained in this report, and submit to the World Heritage Centre for review by the Advisory Bodies

documentation on further emergency interventions and longer-term conservation strategy and measures, as well as relevant technical material, before implementation.

3. The management plan for the property should be updated to guide continuing conservation efforts.

Provide advice on measures to address challenges with regard to the state of conservation of the property, including a course of action with technical advice to address deficiencies discovered, if any, with regards:

a. The intervention on the roof of the Nativity of the Virgin Church (the Main Church)

The roofs installed in 2015-2018 had several shortcomings in terms of design, installation technique and the quality of the materials used. These shortcomings resulted in a critical moisture ingress and moreover, in humidity being trapped between the stone vault intrados and the glazed roof tiling layer. The subsequent removal of the glazed roof tiles and fill layers over the west arm, combined with a temporary raised cover, has enabled the process of progressive evaporation of the moisture towards the exterior to begin, with positive results for the wall paintings. Now there is a need to allow such process of evaporation to happen in the other arms of the church. To this end, the optimal temporary solution would be to construct an overall protective coverage of the entire monument.

Recommendation:

4. Immediately carry out a project for the placement of an overall protective coverage of the monument, including the cupola, following the mission's remarks.

b. The methods and materials applied to the conservation work undertaken on the conservation-restoration of the wall paintings in the Nativity of the Virgin Church (the Main Church)

A thorough assessment of the conservation treatments undertaken on the mural paintings in the Main Church are hampered by the apparent lack of documentation related to their condition assessment and the past interventions, as well as by the lack of analysis of the plaster and painting techniques. Nevertheless, concerns can be confidently expressed regarding the approach and selection of some of the materials and techniques for emergency interventions on the wall paintings in the upper part of the west wing. Recommendations below are aimed at addressing these concerns.

Recommendations:

5. Ensure thorough and detailed documentation is continuously produced (both to monitor the condition of the wall paintings and to record all the treatments undertaken). This information must always be available to be used during the emergency conservation works, and for the constant monitoring of the mural paintings, which will be required over an extended period of time.
6. Extend and maintain secure scaffolding in all areas of the church, to be able to assess and monitor all the upper parts of the mural paintings as well as the mosaics in the apse.

7. Extend the condition assessment and monitoring to the mural paintings of the Church of Saint George where infiltrations may also have occurred when the roof was changed.
8. Develop a project and road map for the property, with clear responsibilities and processes to be undertaken. Detailed actions for the emergency treatments of the mural paintings in the upper parts of the vaults (and possibly the dome) should be kept to the minimum necessary, using compatible materials with the original ones, and limiting the addition of water as much as possible. The road map should also include the necessary monitoring of the condition of the paintings, of the environmental conditions inside the church, and of water levels inside the walls. There should also be a plan for the longer-term conservation of the mural paintings at the site, including more extensive conservation treatments, which may need to be reviewed over time, as the building and the mural paintings slowly dry and reach a stable condition.

Engage with local and national stakeholders to understand and report to their views on the state of conservation of the property.

The State Party made efforts to consult and inform various stakeholders about the state of conservation of the property, in 2021. Regrettably, these efforts have not been systematic in 2022, which led to some stakeholders feeling less informed and somewhat excluded.

Recommendations:

9. The State Party is encouraged to pursue a closer dialogue with different stakeholders about the protection measures taken at the property, including through the World Heritage Protection Council.
10. Given the long-term conservation and monitoring actions that will be required at Gelati, it is strongly recommended to involve more Georgian conservators (and plan capacity building if this is required), to ensure the long-term sustainability of the actions.

Assist the State Party in developing indicators for monitoring the state of conservation of the attributes that convey the Outstanding Universal Value of the property, as requested by Decision 44 COM 7B.47 of the World Heritage Committee.

The placement of an overall protective coverage of the monument mentioned in Recommendation 3 is a necessary precondition not only to further interventions on the site, but also for the different monitoring activities that would inform those interventions. Three types of monitoring are recommended: (i) monitoring the state of the wall paintings and mosaics, for which secure scaffolding is needed to be extended to the whole perimeter of the church's interior; (ii) monitoring the structural behaviour of the entire building, due to past and possible future modifications and challenges to its structural stability; (iii) microclimate monitoring, which is key for the future preservation of the fragile wall paintings.

Recommendations:

11. A detailed mapping of the existing state of conservation and the pathology of the wall paintings throughout the interior of the church is necessary before the elaboration of a detailed project for the emergency and medium-term preservation of the wall paintings and mosaics.

12. A thorough and accurate investigation with the help of devices of the long-term micro-movements on 3D that occurred in the cross arms building ashlar, with emergency emphasis on the west arm, is required.
13. It is recommended to undertake a holistic structural investigation and prepare an intervention project to restore the static adequacy of the monument, with emphasis on the upper parts of its structure. It is advisable that Georgian scientific institutes and university laboratories be involved in the preparation of the project.
14. No work shall be carried out to permanently fix the cracks in the western arm, before the final investigations and the necessary measures resulting from the above study are formulated.
15. Implement a project for thorough filling of joints and completion of broken/missing sections of structural ashlar on the church facades. It is advised to use a repair natural hydraulic lime mortar satisfying the issue of compatibility (ensuring breathability and avoiding percolation of salt solutions to the original building stones), and the issue of the restoration of the mortars' mechanical performance (strength and porosity) to achieve sustainability.
16. Installation of additional temporary double wooden doors (wind barriers) at the three entrances to the naos is recommended, as well as closing of some of the open windows to reduce wind-driven moisture ingress, depending on the monitoring process results.
17. The mission encourages the National Agency and local professionals involved to continue the monitoring project started in December 2020, taking under consideration the suggestions of the "Structural hygrometric and micro-environmental state investigations" (2021-2022), by Alessandro Massari, regarding the duration of monitoring, the number and locations of sensors for measuring the air parameters to be installed, a sensor to measure wind direction and intensity in the monastery area, the data recording intervals, and the conditions under which they are chronicled (depending on the condition of the doors, the presence of visitors, maintenance work, extraordinary openings, etc.).

Provide advice on any other relevant issue observed during the visit.

While it is understandable that efforts are focused on the emergency interventions necessary to reverse the negative impacts of the roof failures, an overall project for the conservation of the Main Church of the monastery and of the property as a whole is necessary to be developed in parallel. The design of the new roof is only one, albeit key element of such forward-looking strategy, in the development of which good coordination between different teams involved at the site and a more dynamic dialogue among the different stakeholders would be beneficial aspects. Moreover, immediate action is to be taken with regard to the Church of Saint George to prevent water infiltration from the outside.

Recommendations:

18. Ensure good coordination and communication between all teams working at the site, to make sure that the site is considered as a system, and decision-making is made jointly.

19. There is a need to address the water flows at the site and the impact of capillary rise on the stones and mural paintings (lower parts of the walls).
20. Regarding the Church of Saint George, there is an immediate need to work on external joints between stone blocks to ensure there is no water infiltration from the external walls, taking into consideration the suggestion in Recommendation 15 regarding the compatibility and sustainability of repair mortars.
21. Regarding the design of the new roof, the options for the “Design criteria determining the guidelines scenario” selected by the State Party during the remote meeting with ReStruere on 28 September 2022 are sound, with the following additional suggestions:
 - to take increased measures for the durability of the new permanent roof construction considering the local environmental conditions of the harsh winter climate [relevant measures can be found in the respective *Eurocodes*];
 - it is advisable to consider shaped copper for the final roofing layer similar in the form to that applied on the entrance to the Academy building in the Gelati Monastery.

The Property

The World Heritage property of “Gelati Monastery” was inscribed on the World Heritage List in 1994 under criterion (iv), as an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history.

Gelati Monastery is the masterpiece of the architecture of the “Golden Age” of Georgia and the best representative of its architectural style, characterized by the full facing of smoothly hewn large blocks, perfectly balanced proportions, and the exterior decoration of blind arches. The Main Church of the monastery is one of the most important examples of the cross-in-square architectural type that had a crucial role in the East Christian church architecture from the 7th century onwards. Gelati is one of the largest Medieval Orthodox monasteries, distinguished for its harmony with its natural setting and a well-thought-out overall planning concept (fig. 1-2).

The Main Church of the Gelati Monastery is the only Medieval monument in the larger historic region of Eastern Asia Minor and the Caucasus that still has well-preserved mosaic decoration, comparable with the best Byzantine mosaics, as well as having the largest ensemble of paintings of the middle Byzantine, late Byzantine, and post-Byzantine periods in Georgia, including more than 40 portraits of kings, queens, and high clerics and the earliest depiction of the seven Ecumenical Councils (fig. 3).

The whole monastic precinct is included in the property and contains all the main 12th century buildings as well as those added in the 13th century. All the attributes necessary to express the Outstanding Universal Value are present and included in the area. No important original feature of the monastery from the 12th and 13th centuries have been lost during the centuries, and its landscape setting remains largely intact. Not all buildings are in a good state of conservation.

The property has a large buffer zone of 1,246 ha. Some development pressures exist, in the buffer zone and the wider setting of the property, but the level of threats is low, and the processes are currently under control.

When inscribed on the World Heritage List in 1994, the property also included Bagrati Cathedral in Kutaisi and was titled “Bagrati Cathedral and Gelati Monastery”. Following rehabilitation works undertaken in Bagrati Cathedral that threatened the Outstanding Universal Value, integrity and authenticity of the property, the property was inscribed on the List of World Heritage in Danger in 2010 (Decision 34 COM 7B.88).

In 2017, the World Heritage Committee approved the significant boundary modification of the property to exclude Bagrati Cathedral (Decision 41 COM 8B.31) and decided to remove the property “Gelati Monastery” from the List of World Heritage in Danger (Decision 41 COM 7A.20). In the same year, the Committee adopted the Statement of Outstanding Universal Value of the property, which can be found in Annex VII.

The last Advisory mission to the property was the Joint ICOMOS/World Bank Advisory mission to “Bagrati Cathedral and Gelati Monastery”, which took place in January 2015. The last Reactive Monitoring mission to the property was the Joint World Heritage Centre/ICOMOS mission in April 2012.

Summary of the National Management System for Preservation and Management

Gelati Monastery has been a Listed Monument of National Significance since the Soviet period and was listed in the Georgian National Register of Monuments by presidential decree in 2006. The cultural protection area was enlarged beyond Gelati Monastery to encompass the buffer zone in a Decree of the Minister of Culture and Monument Protection in 2014. The buffer zone is protected for its monuments but also for visual attributes. The natural values of the surrounding landscape are regulated by the Forest Code of Georgia, the Law on Soil Protection, the Law on Environmental Protection and the Water Law that constitute the legal framework for the management of the forests and the rivers in the area. Applications for new constructions or reconstructions, including the infrastructure and earthworks within the buffer zone require the approval of the Cultural Heritage Protection Council, Section for Cultural Heritage Protected Zones, and the Agency of Urban Heritage.

Conservation work is guided by the Conservation Master Plan, produced by the Ministry of Culture, Monuments Protection and Sports of Georgia in collaboration with the Orthodox Church of Georgia. This plan covers conservation of the built structures as well as proposals to support the revival of monastic life that started in the 1990s and the needs of visitors. Adequate resources for long-term conservation programmes need to be sustained. A system of documentation for all conservation and restoration work and tri-dimensional measuring and monitoring of the overall stability of the various monastic buildings need to be put in place.

A Memorandum on Collaboration on Cultural Heritage Issues between the Georgian Apostolic Autocephaly Orthodox Church and the Ministry of Culture and Monument Protection of Georgia has been agreed for all properties of the church. Day to day management of the property is entrusted to the monastic community who live in the property. Longer term interventions are implemented by the National Agency for Cultural Heritage Preservation of Georgia. Its local representative agency is the Kutaisi Historical Architectural Museum-Reserve which is also responsible for visitor reception.

The Management Plan 2017-2021 reflects contributions of the Church, and relevant government bodies and community groups who were involved in the consultation process. It aims to set out a shared vision for the property. The Plan was developed in harmony with the Conservation Master Plan, with the Imereti Tourism development strategy, and with the 2014 management plan for the Imereti Protected Areas that includes the valley and canyon of the Tskaltsitela River in the buffer zone. It needs approval to become fully operational and enforceable by relevant authorities. A Management Committee for the property remains to be appointed and it is necessary for key roles and responsibilities to be established.

The Mission

The World Heritage Centre received a state of conservation report for the World Heritage property 'Gelati Monastery', on 28 February 2022 from the State Party, in accordance with Decision 44 COM 7B.47 (see Annex III). The state of conservation of the property will be reviewed by the World Heritage Committee at its 45th session.

Following the report, the State Party informed the World Heritage Centre, by a letter from Mr Kaha (Karlo) Sikharulidze, First Deputy Minister, Ministry of Culture, Sport, and Youth of Georgia, of 13 May 2022 of recent urgent interventions in the Main Church of Gelati and planned activities to be undertaken.

On 20 June 2022, the World Heritage Centre shared with the State Party information from ICOMOS International that multiple communications had been received outlining concerns on the methods and processes being implemented during the conservation works on the wall paintings in the Main Church. The World Heritage Centre expressed its and the Advisory Bodies' availability to assist the State Party in the restoration process, particularly in the framework of a dedicated joint World Heritage Centre/ICOMOS/ICCROM Advisory mission to the property.

The State Party reacted quickly, extending an invitation for a joint World Heritage Centre/ICOMOS/ICCROM Advisory mission to the property 'Gelati Monastery' on 22 July 2022.

The mission, organized from 28 November to 2 December 2022, followed the Terms of Reference agreed with the State Party (see Annex I). It combined on-site visits of the property with meetings with various stakeholders in Tbilisi.

The mission team consisted of Irena Caquet (World Heritage Centre), Alkiviadis Prepis (ICOMOS) and Valerie Magar (ICCROM).

Detailed Report on the Main Issues

Issue 1: Evaluation of the work carried out by the State Party in 2021 and 2022 for the improvement of the state of conservation of the Nativity of the Virgin Church (the Main Church) with respect to the intervention on its roofs

Studies conducted during 2021-2022 by ReStruere team and the Georgian experts team for the investigation of the state of conservation of the Main Church with respect to the intervention on its roofs revealed a number of issues, which are analysed hereunder as well as in the further sections.

Assessment of the missions and studies

A) Ugo Tonietti and Sara Stefanini missions on roofing (June 2021, June and July 2022)
Given the existence of the temporary metal protection roof, 5 surveys were carried out, which, in parallel with the information gained from the master mason who supervised the roof installation works, provided for a better understanding of the techniques employed during the replacement of the roof in the period from 2016 until 2019. Similar information was gained for the Church of Saint George's roof.

Samples were systematically collected from various building materials (stones, mortars, tiles), which were analyzed in a laboratory, providing very useful data on their quality and effectiveness ("Tests on material samples (mortars, stones and tiles) by CNR-ISPC, taken on-site. Scientific report explaining the results of the tests (December 2021)").

The urgent need for immediate evaporation of the wet vaulted masonry system of the west arm became evident in May 2022, which guided emergency interventions on the roof over the west arm in order to save the underlying paintings.

B) "Tariel Kiparoidze and Lasha Shartava technical report regarding the new surveys: under-roof stratigraphy of materials (January 2022)": 4 surveys were carried out, which revealed much needed and explanatory information on the building materials used, their technique of application and the negative results on the various pitches of the roof. The team provided a list of critical points to be modified.

C) The repetitive, systematic investigations made by Alessandro Massari (November 2021, January 2022, June 2022 and October 2022) gave specific data and a clear picture of the state of humidity both inside and outside the Main Church, as well as for the exterior of the Church of Saint George. Additionally, they resulted in concrete and detailed suggestions for the immediate treatment of the negative consequences of humidity, as well as for the medium- and long-term improvement of the hygrometric condition and microclimatic monitoring of the structures and the area of the monastic complex.

All the missions illustrated their findings with drawings and photos.

The group of teams prepared very informative material for the remote meeting with the Georgian authorities (September 2022), which was decisive for:

1. Results of the diagnostic process and key principles to be respected in the intervention strategy.
2. Identification and study of the qualifying elements of the drainage and waterproofing project.

3. Investigation on the ancient water drainage system present on the site and evaluation of the possibility to put it back into operation.
4. Comparison of possible technical solutions to be adopted for the roof.

In conclusion, the investigations, findings, and interventions carried out by the missions were crucial for the immediate treatment of the key problems of moisture inflow and were done in a complementary and cooperative manner. In addition, they resulted in specific proposals for the next stage of the process of restoring the roof and dealing with the general issues of moisture in the Main Church and in the area of the monastery.

Generalising results of the diagnostic process

- Roof typologies: Nine typologies, different or in combination, of new roofing with under-roofing filling have been implemented over time (fig. 4-6).
- Defective materials: Glazed tiles (both white and red type): the tests carried out at the *Consiglio Nazionale delle Ricerche - Istituto di Scienze del Patrimonio Culturale* showed that the tiles used could not guarantee effective protection from water infiltration due to their composition and inadequate baking. The new glazed tiles exhibit a porosity value greater than the average value for comparable medieval tiles (fig. 7).
- Incorrect installation technique: A thick layer of porous lime mortar, capable of absorbing a lot of water was installed as fill under the tiles. In some pitches no water/moisture insulation layer is installed. Even where some kind of water/moisture insulation is present, both the material (quantity and thickness) and the installation are defective. The large quantity of the filling material under the tiled roofs absorbed the water transferred from the tiles layer and constituted a reservoir of humidity (fig. 8-11). The nails used were rusty, while the thickness of the mortar between the insulating layer and the tiles was not sufficient to ensure that the nails fixing the tiles do not pierce the water insulating layer, making the latter ineffective (fig. 12-13). Special tiles, used for meeting the geometry of the curved shape on the domes covering the Churches of the Virgin and Saint George, are not present in the apses, where the tiles are simply doubled by juxtaposition (fig. 14-15).
- Un-functional design solution: The roofing of the pitches does not have sufficient overhangs to guarantee the protection of the cornices and other parts of the stonewall (fig. 16-17). There are no specific protection devices (such as flashings) on the intersection surfaces between the pitches and the vertical walls or in coincidence with the impluvium where the risk of infiltration is greater (fig. 18-19). The above is compounded by the absence of devices useful for the collection and channelling of rainwater (gutter and downpipes).

Interventions undertaken

Following the conclusions of the report of the Microclimate Team (December 2021), which underlined that the water penetrated was trapped between the stoned vault intrados and the glazed roof tiling layer which, in turn, preclude the evaporation toward the exterior, and after consultation with the Ministry of Culture, the National Agency for Cultural Heritage Preservation of Georgia undertook the following interventions in May 2022:

- The west arm covering was removed, including the glazed tile roofing and the temporary metal cover. The removal of the layer of the new filling (new intervention and the old – collapsed and incoherent) on the south side of the west arm revealed a longitudinal crack, affecting the top of the wall (fig. 20). Inspection of the external south facade of the west arm revealed findings of fractures in cornices and arches, evidence of the

activation of old local mechanisms/kinematics. On the north wall, problems similar to those found on the south wall were observed, albeit less extensive.

- Provisional consolidation of the crack by using “staples” and levelling of the anchorage surface, avoiding using cement, but using instead a special pozzolana mortar (MasterEmaco 285 Tix).
- Installation of a temporary emergency cover protecting the west arm from the ingress of rain. The new temporary roof is placed on an iron truss system, which is supported by reinforced truss piers, fixed along a concrete base, on the insulated substrate protecting the longitudinal cracks. It is raised at a high of approximately 1,20 m over the lower level, giving the possibility to work under it and allowing the movement of air (fig. 21-24).
- Removal of the under-roof filling: only the layer of the new filling (new intervention) and the layer of the old lime-based conglomerate, and only when it is already collapsed and incoherent; work done under the supervision of an archaeologist.

Guidelines for the new roof

The National Agency for Cultural Heritage Preservation, following a remote meeting with all teams involved (on 28 September 2022), made its choices regarding the new roof, after which ReStruere started working on a road map for the final guidelines. The options for the “Design criteria determining the guidelines scenario” for the new roof, selected by the State Party during the remote meeting are sound, with the following additional suggestions:

- a. Consideration should be given to the aesthetic consistency of the new roof with the architecture of the monument, avoiding negative impact on the property’s overall appearance.
- b. The choice of the roofing material: shaped copper (with the comparison of options). This choice is considered appropriate, as it enables:
 - suitable processing, closer to the traditional form of the stone slabs covering of the monuments of a similar construction method and date present in the wider region;
 - better workability on the intersection surfaces between the pitches and the vertical walls (making installing flashings easier);
 - easier intervention and repair in the event of a failure or disaster;
 - avoiding the use of filling material under the roofs.

Moreover, such roofing material has been tested in the past on the portico roof of the Academy building in the monastery complex.

- c. Adoption of a system of gutters and downspouts requires finding the best design solution. It is necessary to create a robust water runoff system on the roof able to remove the water and collect and direct it, by transferring devices, to the ground, where the integration with a drainage system will allow the water to drain away from the buildings. The intervention is considered necessary even if it is different from the most traditional solutions for similar churches, and even if it will alter to a small extent the traditional appearance of the roofs. Water percolation over the past centuries has determined a serious weakening of the masonry of the monastery buildings and a high exposure to humidity of the interior wall paintings. Consequently, the buildings should be prevented from further exposure to this threat.
- d. Adoption of a double roof ventilation system without, however, removing the old mortar if it appears to be solid/rigid (fig. 25). The new roofing system should permit the evaporation of humidity to the outside through the ventilation capable of aeration the under roof/vault extrados. This space will be partially empty to facilitate transpiration and ventilation and, in addition, to reduce overhead load on the building. When choosing the materials to be used, preparing the design of the roof and its details, as well as their specifications/indicators, the meteoric factors affecting the durability of the

roof should be taken into account. The design of the new roof should also take into account the altitude (about 400 m) and the local environmental data of a harsh winter climate. The relevant measures are mentioned in the respective Eurocodes.

- e. Approval of the creation of roof overhangs above the cornices. It is advisable to restore the cornice shape according to the authentic cornice, which should prevent damage to the walls from precipitation and to the church structure from water infiltration.
- f. The roofing tiles should be changed over the dome of the Main Church and the other buildings of the monastery complex where the same glazed tiles have been used.

Issue 2: Assessment of the methods and the materials used from June 2021 to September 2022 for the conservation-restoration of the wall paintings in the west and north arms of the Main Church; key findings of the studies conducted from 2021 onwards by the State Party's expert teams

Preliminary considerations

The condition of the mural paintings at Gelati has been a matter of concern for several years, but the situation became dramatically more serious due to failures in the waterproofing of the new tiled roof. The first evidence of serious water infiltration in the Church of the Nativity of the Virgin was detected in the winter of 2019-2020, with visible water stains in the upper part of the southern wall of the west wing. Given the shortcomings of the roof detected in 2021-2022, it can be presumed that some level of water infiltration occurred in other areas of the vaults and upper parts of the walls in the church.

The installation of a temporary roof immediately above the tiles in July 2020 limited further rainwater infiltration, but it also did not permit any evaporation to take place in the upper parts of the roofs. Most evaporation has been happening (until the recent works undertaken in the west wing to place a new raised temporary roof (May-June 2022) and remove the tiles and loose material under the tiles) through the walls, creating a critical situation for the mural paintings.

The water ingress has led to a mobilisation of soluble and hygroscopic salts (mainly nitrates and sulphates), whose origin has not yet been fully analysed. Preliminary observations of their location seem to indicate that they may be coming from the original materials of the mural paintings (namely the organic materials contained in some of the plasters – straw, wool, and hemp), although this needs to be verified. The crystallisation of salts, both as superficial efflorescences and subflorescences (forming under the paint layers or inside the plaster) led to the detachment of paint layers and to the decay of part of the plaster and paint layers.

The severity of the damages occurring in the mural paintings required immediate emergency actions to be undertaken, but an extremely cautious approach is required, given that the problems affecting the mural paintings will take time to be resolved and a stable condition reached.

Some concerns

Prior and during the mission to Gelati, the State Party and the conservation professionals working at the site were extremely open to share information and exchange ideas. There are however a number of issues of concern. There does not seem to be an overall project for the conservation of the Church of the Nativity of the Virgin, with the necessary integration of the various aspects related with the alteration and decay processes affecting the site. Such a written plan is fundamental to assess the conservation proposals, both for emergency stabilisation for areas at risk, and the longer-term conservation plan, as the building slowly

dries. This plan can be flexible, depending on the evolution of the condition of the building and of the mural paintings, but it is required to allow clarity in the actions to be undertaken, facilitate communication and coordination, and ensure continuity in the actions.

Another matter of concern is the apparent lack of documentation regarding the condition assessment of the mural paintings. Monitoring through comparative photographs exists for some areas in the reports that were provided to the mission, as well as surveys of condition assessment for some areas of the mural paintings, but the mission team was not provided with systematic documentation. Detailed documentation of areas of losses of paint and plaster seems to be missing. Such documentation is fundamental as a baseline to continue monitoring the mural paintings over time.

Another issue of concern is the lack of analysis of the plaster and painting techniques, particularly of those in the upper parts of the vaults, but necessary for all mural paintings, in order to better assess and correlate painting techniques, phenomena of alteration and decay, and possible conservation treatments.

An additional matter of concern is the apparent lack of documentation related to past treatments undertaken at Gelati, which make any assessment much more complex.

A final serious concern is that during the mission, scaffolding only allowed the thorough and secure assessment and monitoring of the west wing. Additional scaffolding was recently erected in the north and south wings, but these require further security measures to allow safe work to be undertaken there. No scaffolding was available to assess the condition of the mural paintings and mosaics on the vaults of the apse, and on the dome.

Assessment of conservation issues

The information gathered so far is slowly bringing a clearer picture of the situation at Gelati. It is important to stress the direct link between the building, its walls, the roofs, and the decorative elements inside. They all work as a system, and different teams working at the site need to have good communication and coordination.

There is a clear understanding that the main problem was triggered by the inadequate roofing and waterproofing, which led to water infiltration. There also seems to be a clear agreement that the drying process must now start, favouring ventilation from the roof top (as already started in the west wing with the elevated temporary roof, and the removal of the tiles and loose material above the intrados). This will need to be extended to the other vaults and the dome (with an elevated roof covering all areas), to make sure the building dries slowly, with evaporation happening mostly towards the outside.

There is also a clear understanding that the stabilisation of the walls and mural paintings of the church will take time. It is therefore important to slow the speed of evaporation on the decorated walls, and to try to stabilise the microclimate inside the church, in order to avoid or reduce salt crystallisation, both on the surface and under the surface of the mural paintings. In order to achieve this, it would be important to explore, as suggested by Alessandro Massari, to try to reduce air flows in the church by keeping the doors closed, or at least closing one set of doors, particularly on the west side.

Assessment of conservation treatments of the mural paintings

The conservation treatments undertaken on the mural paintings decorating the upper part of the west wing were made as a response to a complex conservation problem, with areas presenting severe decay phenomena, both as paint exfoliation, paint disgregation, and plaster disgregation. Following a preliminary mission undertaken by the team of Italian conservation and restoration experts to assess the situation at Gelati in May-June 2021, a series of possible treatments and materials were proposed, and some were tested in situ at that time. In September 2021, the results from those tests were considered satisfactory, and more extensive treatments were undertaken over the following months, as well as in 2022.

There are however some concerns for the approach and selection of some of the materials and techniques, particularly considering that it is a site which is undergoing a slow drying process and where alteration and decay may still occur over some time. Conservation treatments should be limited to the minimum necessary to stabilise areas in danger, and the addition of any new materials, particularly water, should be kept to a minimum, to avoid the risk of further dissolving and moving soluble salts.

- Removal of salts: the mechanical removal of salts from the surface with soft brushes seems adequate (if salts are properly collected and disposed of, away from the wall surfaces). However, the treatment to remove salts from the plaster (desalinisation) seems dangerous, given that it requires adding water to the surface and the plaster. Before having a clear idea of the origin of the salts, and how they could potentially be stabilised again, a desalinisation seems too risky. Salt efflorescence and subflorescence were still visible in the treated areas of the west wing, both on the southern and northern mural paintings (fig. 27-30). The mission therefore advises not to undertake desalinisation treatments requiring the use of poultices.
- Fixing paint layer: the use of synthetic polymers (in this case a solution of Acrill 33/EA-MMA at 3% or 5% in water) can also be potentially problematic, as it is a material that may cause the formation of an impermeable layer on the surface or under the paint. As mentioned above, some subflorescences were visible in different parts of the treated mural paintings in the west wing (in all areas, including the southern and northern walls, and in the vault). The mission therefore recommends not to use synthetic polymers for the fixing of the paint layer.
- The report from June 2021 included the proposal to use nanolime for the fixing of the paint layer, which would seem much more appropriate, to ensure a continuity in the behaviour of the original materials and the conservation materials. The mission therefore encourages tests with nanolime to be undertaken as a possible treatment.
- Use of synthetic polymers (Paraloid B-72 at 10% in acetone) to temporarily fix loose areas of plaster: as mentioned above, the use of synthetic polymers can lead to remains staying on the surface, and creating an impermeable layer, which can lead to the future formation of subflorescences and new detachment of the paint layer, or decay of the plaster. The use of a more reversible material such as cyclododecane would be preferable for these temporary treatments.
- Treatment of biological decay: while quaternary ammonium salts (2% in deionised water) have been used for a long time, with good results, there are now fewer toxic materials which could also be considered for Gelati, such as essential oils. These materials have been tested on mural paintings and on stone with good results. The use

of these non-toxic materials may be useful, particularly if the relative humidity inside the church continues to have high levels over a prolonged time (fig. 31).

- Mechanical cleaning of the surface: the cleaning with sponges is a safe treatment, provided UV light is then used to verify no residues are left on the surface.
- Cleaning of carbonates from the surface: the cleaning of the surface with water and EDTA is a safe procedure in normal conditions, but in this case, the addition of too much water can again pose the risk of further solubilising salts from the plaster; the reports mentioned the repeated use of poultices with water, for periods of 15 minutes each. This treatment may not be necessary at an early emergency stage, since carbonates do not pose a threat to the stability of the paintings (they only obscure their visibility). This treatment should be postponed to a second phase of longer-term treatment of the mural paintings once they have been stabilised.
- Consolidation of decayed plaster: the use of ammonium oxalate could be an interesting possibility for salt-laden plaster. However, at an emergency stage, only severely decayed areas should be consolidated, and the results should be monitored over a more extended period of time, to verify its effectiveness with the continued presence of soluble salts (fig. 32-33).
- Removal of old repair fillings: this treatment is adequate when the fillings are no longer in adequate condition, or when they are obscuring parts of the original painting. However, at an early stage of emergency treatments, old repair fillings should only be removed when absolutely necessary, to avoid vibrations.
- Application of new repair fillings and edge repair: the use of lime-based materials for these treatments seems adequate, although the type, ratio and colour of the aggregates may need to be calibrated once more information on the original painting techniques is available. At the moment, only repairs that are absolutely necessary to stabilise fragments of plaster should be undertaken, to avoid unnecessary use of water.
- Grouting of loose areas of plaster: the use of lime-based materials is adequate, but again, this treatment should be limited to areas at high risk of detachment or falling, again with the aim to reduce the addition of water to the mural paintings.
- Test to remove a shiny layer on the surface, possibly due to an old treatment with an acrylic resin with acetone. It is good to see that the layer can be removed, but as the report by Mario Pulieri (23 November 2022, p. 8) rightly stated, this is not the moment to undertake this cleaning. Only a relatively small area (50 x 50 cm) was tested for this type of cleaning.
- Aesthetic presentation: colour integration with water colours on the north wall of the west wing. The conservation team at the site explained that this treatment had been undertaken as a sample, to better understand the possibilities for the future readability of the paintings. The treatment undertaken, with watercolours, is reversible. However, the timing for this type of treatment seems to be off, particularly considering that there is still ongoing alteration and decay on these mural paintings. This treatment should not be undertaken at the moment (fig. 34-35).

Issue 3: Understanding the views of local and national stakeholders on the state of conservation of the property

The World Heritage Centre enjoys a close cooperation with the State Party in general, and regarding the World Heritage property 'Gelati Monastery' in particular. From spring 2021, the First Deputy Minister at the Ministry of Culture, Sport and Youth of Georgia, Kaha (Karlo) Sikharulidze, has been ringing alarm bells regarding the alarming condition of the wall paintings of the Main Church of Gelati Monastery, which is considered in Georgia as not only a monument of a highest artistic and historic value, but also a manifestation of the most important and symbolic expression of the country's identity and Georgian statehood. Uncontestably, the Georgian authorities attach a great importance to the protection and preservation of Gelati Monastery and consider addressing the urgent needs in its state of conservation as a top priority. This was underlined in the correspondence the World Heritage Centre received from the First Deputy Minister since 2021 and further reaffirmed during the mission.

The investigations on the reasons of the water infiltration, monitoring of the buildings and emergency interventions on the roofs of the Main Church and the Church of Saint George, as well as on the wall paintings of the west and north arms of the Main Church have been undertaken by the Italian teams ReStruere, the Giovanni Secco Suardo Association and Studio Massari together with Georgian specialists led by Merab Buchukuri, Wall Paintings Chief Conservator-Restorer at the National Agency for Cultural Heritage Preservation of Georgia. There appears a true spirit of teamwork between the Georgian and foreign experts working on the mitigation measures at the monastery, with no apparent disagreements on the methodology and scope of the emergency interventions.

The mission team had an opportunity to exchange with the Georgian and Italian restorers and other specialists, including the Director of the Kutaisi Historical Architectural Museum-Reserve. The State Party's efforts in bringing these specialists to the site specifically to offer explanations on the work undertaken, are commendable.

The mission team met with the representatives of the Orthodox Church of Georgia, led by Locum Tenens of the Patriarchal Throne of the Orthodox Church of Georgia, His Eminence Shio (Mujiri) (fig. 57). They underlined their preoccupation with the state of conservation of the property and asked the mission team to provide explicit and concrete recommendations on the way forward. The representatives of the Patriarchate – the owner of the Gelati Monastery – underlined the existing disagreements among experts, both Georgian and foreign, on the conservation approaches and interventions in Gelati, referring in particular to the report of the International Advisory Board invited by the Patriarchate to visit the property in May 2022 and consisting of four experts from the UK, USA and Switzerland. The report concluded that the current emergency treatment plan be revised. Two representatives of the Patriarchate and members of ICOMOS Georgia present during the onsite visit of the property, underlined their concern with the methodology used for salt extraction from the affected wall paintings and voiced their opinion that the measures undertaken on the wall paintings of the west arm were not limited to emergency interventions, but consisted in full treatment and conservation.

Finally, the representatives of the Patriarchate underlined the need for emergency interventions to be undertaken in parallel with longer-term investigations and agreed that the restoration project will be a long-term process and should include a sound plan for water management at the property, among others.

During the mission team's meeting with the representatives of ICOMOS Georgia, the latter underlined not being fully informed of the state of conservation of the property and the interventions carried out since October 2021. Between April and August 2021, the Ministry of

Culture, Sport, and Youth of Georgia convened four meetings of the World Heritage Protection Council, bringing together a variety of stakeholders, including representatives of ICOMOS Georgia. The meetings allowed for the civil society stakeholders to be informed and consulted on the impact of previous interventions carried out at Gelati and the state of conservation of the property. However, this modality of information sharing was discontinued after summer 2021.

While regretting the lack of up-to-date information regarding ongoing emergency interventions in the Main Church, the representatives of ICOMOS Georgia reiterated their concerns, already expressed during the on-site visit, with the methodology used to address the emergency situation of the wall paintings of the west arm, especially after having read the report of the International Advisory Board whose representatives visited the property in May 2022 upon invitation from the Patriarchate. The representatives of ICOMOS Georgia consider that the interventions undertaken went too far, without a proper risk assessment.

Overall, a more systematic and inclusive information sharing about the conservation approaches and activities at the property among different stakeholders should be encouraged. It will facilitate an effective dialogue between the State Party and the public and contribute to awareness-raising about the property and its management.

Issue 4: Developing indicators for monitoring the state of conservation of the attributes that convey the Outstanding Universal Value of the property

This part aims at addressing the types of monitoring required to ensure the conservation of the key attributes, tangible and intangible, that convey the Outstanding Universal Value of the property and that include, amongst others, the architectural forms of the Main Church and the Church of Saint George and the other buildings within the monastery, their spatial arrangement, their religious and other functions, and the interior decoration of the churches.

4.1. Precondition to monitoring activities in the Main Church

The State Party is advised to immediately carry out a project for the placement of an overall protective coverage of the monument. The following criteria for the design of the new protective roofing are suggested:

- The overall coverage of the monument, including the dome, so that every possible area on its exterior and interior is accessible (in conjunction with the completion of the metal scaffolding in the interior of the building).
- Ensuring the strength of the construction under difficult weather conditions (snow, rain and wind). Preferably, it should be reinforced by iron beams-elements capable of lifting heavy loads (snow), inclined for removing rainwater quickly, connected to each other by wind-resistance cross links (X), and anchored to point bases of concrete.
- The protection of the facades of the monument from the weather conditions.
- The protection of the workers on the monument under different climatic conditions, and ensuring access for the repair of the open joints of the structural stones of the building (e.g. vertical banners – metallic elements be placed on the sides, protecting the monument and the workers from side winds and rainwater).
- Ensuring lighting for the workers, by placing transparent sections. The solution of strong plastic sheets to cover side luminaires, fixed on a suitable metal frame, should be examined.
- The protection of any archaeological finds (underground channels, etc.) in the areas where the roof supports are placed.
- The long-term maintenance of the protection roof in situ.

4.1.1. Monitoring wall paintings and mosaics

As a first step in this monitoring process, a complete installation of the same durable scaffolding covering the full interior of the Church of the Nativity of the Virgin is necessary. This will – as part of the first phase of emergency interventions – allow the assessment of the state of conservation of the wall paintings, as well as the structural behaviour of all interior surfaces and spaces, including the eastern part and the dome (fig. 36-37).

The second necessary step will be undertaking a detailed mapping of the existing state of conservation and the pathology of the wall paintings throughout the interior of the church and of the eastern arm mosaics.

The east slope of the main apsis roof has shown strong evidence of dampness in the brick partitions between the extrados of the quadrant and the mortar covering and glazed tiles. On the lateral sides and on the frontal part of the “triumphal arch” of the sanctuary, recent dampness is evident on parts of the mosaic and the wall paintings (such as on the face of the Holy Virgin, but also on wall painting completion parts) (fig. 38-43). Further in-depth investigation is not possible without an on-site observation and thorough inspection with appropriate instruments.

It is necessary to make a precise control and assessment of the state of conservation of the mosaics and the wall-paintings in the eastern part of the sanctuary apsis. The information from archive material (documentation, photographs, laboratory analyses, etc.) from the National Agency for Cultural Heritage Preservation of Georgia or the Patriarchate regarding previous maintenance - fixing - presentation operations on the sanctuary apsis, could contribute to the assessment.

4.1.2. Monitoring the structural behaviour of the building as a whole

The discovery of a through meridian crack on the church dome in 2015 (see Joint ICOMOS / World Bank Advisory mission to the World Heritage property “Bagrati Cathedral and Gelati Monastery” (Georgia), 21-25 January 2015) was a first indication that the building has undergone dangerous alterations on its structural stability during the centuries, as well as local destructions, which are usually not visible under the wall painting layer but require constant monitoring to make them evident. To address these problems of the dome, the interventions by the National Agency were lifesaving for the monument, by placing the reinforced concrete ring at the base of the hemisphere (2015), and the metal supporting ring at the base of the dome drum (2016).

However, the discovery of two long cracks on the top of the longwalls of the west arm in May 2022, is an alarm call that is of great concern.

The provisional consolidation by the Italian and Georgian groups of experts of the cracks by using “staples” and the levelling of the anchorage surface, avoiding using cement, but using instead a special pozzolana added mortar, was a correct approach. In addition, this intervention helped to create a base for the placement of the supports of the new temporary protective roof, in order to facilitate the evaporation of trapped moisture – a measure recommended by the hygroscopic study – correctly – as absolutely necessary and of first priority to avoid further damage to the interior wall paintings in this part of the church.

The assessment carried out by this mission revealed micro-movements of the upper part of the building ashlar to the vertical (shifting), but also to the horizontal / radical direction outwards, as proved by fractures on stone edges or stone decorative elements, and the open

joints. Permanent dampness was detected in joints, maintained even after the installation of the protective roof, and salts coming from joints, after filling them with mortar, which are long-term processes, as evidenced by the comparison of the 2015 photos. The continuing pressures from the movements of the overlying old roof structure, as well as the long-term moisture arising from the interior of the fabric seem to be decisive causes for the appearance of these results (fig. 44-47). Similar phenomena were detected on the north side, as well, albeit to a lesser extent.

Additionally, the mission noted chronic micro-displacements / shifting of some ashlar – constructive stones on the internal part of the arch of the north arm vault of the church. Some joints under the substrate of the wall-paintings are open, and the “hollow” fresco is full of moisture (fig. 48-50). This preliminary visual finding needs more accurate investigation and measurements with the help of devices.

Such investigation and measurements should take into consideration that the engineering-geological survey in the underground of the building has shown that the territory of the monastery, including its surroundings, is in a satisfactory condition: *“All the buildings of the monastery are based on the limestone rock. [...] The foundations are built with the processed limestone and lime mortar. The depth of the foundation varies from 40 to 150 cm. (...) The overall strength of the masonry varies from 30 to 40 kg/cm². Such an indicator makes it impossible for unexpected deformations to occur. On top of the foundation is a stereobate built with the basalt blocks.”* (Report on the technical condition of the Main Church of the Gelati Monastery, National Agency for Cultural Heritage Preservation – submitted for the Joint WHC/ICOMOS/ICCROM Reactive Monitoring and Advisory mission to “Bagrati Cathedral and Gelati Monastery” (Georgia), 11-17 March 2010).

Based on the above observations, the cracks that occurred on the meridian of the cupola and on the upper part walls of the west arm, and micro-displacements / shifting of some ashlar should be attributed to seismic action, taking into account the great height of the building (the total height to the top of the cupola is 35.26 m). Additional factors which should be considered, are: the fact that the connections of the secondary volumes with the main structure of the church are weakened (due to the weathering of the facing masonry), the self-load of the cupola and the wind-loading. Consequently, possible future movements of the upper part of the west arm longitudinal walls should be taken into serious consideration, and it is likely that more stringent measures will need to be taken to shield the church against a strong future seismic stress or other physical phenomena (fig. 26).

In conclusion, a thorough investigation of the condition and the structural behaviour of the monument as a whole, with a special emphasis on its upper parts, is of absolute necessity, taking into account the interventions on the cupola – the earlier (walling of a considerable number of windows) and the later ones (reinforced concrete ring and metallic ring in 2015 and 2016). To this direction, the involvement and collaboration of the Georgian scientific institutes and university laboratories is considered necessary, given their long-term experience concerning the structural behaviour of the country’s monuments.

Following the recommendation of the Joint World Bank / ICOMOS mission to the property in 2015, a system of electronic monitoring (gauge) had been installed on the dome, to record any potential movement of the existing crack and allow for the problem to be addressed in a timely manner. It should be checked whether the system is in operation and continue the monitoring.

The 2017-2019 work carried out a very important task of restoring the building stones and filling the joints. However, it is a fact that there are still problematic situations on this matter, as evidenced on the north side of the church façade, which certainly continue resulting in salt

crystallisation outside and humidity problems inside. The implementation of a project for thorough filling of joints and completion of broken/missing sections of the ashlar on the church façade is needed, which will increase ashlar's adhesion, while strengthen the building mechanical resistance and shield it against external moisture (fig. 51-54). It is advised to use a repair natural hydraulic lime mortar satisfying the issue of compatibility (ensuring breathability and avoiding percolation of salt solutions to the original building stones), and the issue of the restoration of the mortars' mechanical performance (strength and porosity) to achieve sustainability.

4.1.3. Microclimate monitoring

The mission takes note of the 2021-2022 investigations by Alessandro Massari regarding the prioritizing need of monitoring the microclimatic situation in the Main Church, to understand the ongoing phenomena of the widespread presence of soluble and hygroscopic salts, with local high concentrations – particularly in the west arm, but also in the north and south arms – and, consequently, to design improvement measures.

The mission team agrees on the importance to control and stabilize the microclimate parameters in the church interior, in order to limit the relative humidity (RH) and the RH fluctuations inside the church, as much as possible, as they cause the crystallization and solubilization processes of the soluble salts to be activated. The main causes for the above are the infiltration of external air through the west door and the narthex, as well as through the side parecclesia, where there are open doors, windows, and openings.

To this end, the mission encourages the National Agency and local professionals involved to continue the monitoring project started in December 2020, taking under consideration the suggestions of the “Structural hygrometric and micro-environmental state investigations” (2021-2022) by Alessandro Massari regarding the duration of monitoring, the number and locations of sensors for measuring the air parameters to be installed, a sensor to measure wind direction and intensity in the monastery area, the data recording interval, and the conditions under which they are chronicled (depending on the condition of the doors, the presence of visitors, maintenance work, extraordinary openings, etc.).

Additionally, the mission approves the “Initial indications towards hygrometric improvements of structures”, proposed by Alessandro Massari in the mission report “Investigations on the structural hygrometric and micro-environmental state aimed at safeguarding the internal wall paintings (6-12 November 2021)”. The mission notes that the sufficient overhanging of the temporary protective roof, installing gutters and reusing the rainwater drainage system did the most to prevent water from collecting at the base and from flowing on the facades of the building (fig. 55-56).

4.2. Saint George Church

Saint George Church presents humidity problems similar to those of the Main Church, although less serious. However, its wall paintings (16th c.) are overall in a worse condition and therefore, the need for intervention is high (fig. 58, 60). Pumice irregular blocks were used to fill the uneven surface, which was covered with a dense mortar layer. Externally, the church faces an evident problem related to the rising damp: the north side is the most affected (fig. 61), followed by the east and south-west sides. A sewage network outward with sewer manholes is absent, and the water floods the pavements. This situation on the outside of the church affects its internal conditions, with the walls exhibiting moisture from the ground up to 1.5-2 m, with consequent damage to the wall paintings (fig. 62). In the roof of Saint George Church, red clay tiles coexist with white clay tiles. The roof tiles are installed in the least suitable way, juxtaposed

with the mortar joint instead of having a wide overlapping, with the exception of the dome, covered by overlapping tiles and where special tiles were used (fig. 14).

There is an immediate need to work on external joints and cracks between stone blocks to ensure there is no water infiltration from the external walls (fig. 59), following the recommendations above for a similar issue in the Main Church.

On the issue of the ground moisture, the mission recommends the State Party to follow the suggestions “Assessment-for-design Actions” and “Short-term Actions in St. George and Recommendations”, made by ReStruere during the remote meeting of 28 September 2022 (Deliverable 2 – Findings of the analysis: keynotes based on the results of the studies conducted by RS and GET).

4.3. Completing and monitoring the water drainage system on the site

While the roofing project is finalised, it is necessary to carry out periodic monitoring and documentation of the water drainage process on the roofs, the gutters and the downspouts, and the whole roof structure.

During archaeological excavations, ancient drainage channels were found around the churches of the monastery. The ancient water drainage system has been out of order for a long time and, moreover, is no longer visible as it is covered by the ground.

For the collection and passage of water, there is a more recent system (2019-2020) in the Main Church consisting of downpipes, sewer manholes and a sewage network directed outwards. In Saint George Church there is no sewage network outward with sewer manholes. Works for the protection of the foundation walls of the church are necessary to avoid water ingress into the building.

In addition, it should be considered whether it is necessary to extend the system to other areas of the monastery yard, covering e.g., the needs of the neighbouring building of the Academy and the adjacent areas of the archaeological remains (which are at an even lower level than that of the churches).

The entire water drainage system within the monastery area should be under constant monitoring.

4.4. Remarks regarding the setting of Gelati Monastery

The hill above Gelati Monastery on the eastern side brings large quantities of groundwater, inflowing into the monastic ensemble grounds.¹ Especially due to the sloping ground, the inflow comes from the east gate direction. This phenomenon causes permanent moisture in the foundations of the two main monuments of the monastery – the Main Church and the Church of Saint George. The mission suggests, in addition to the measure of completing the water drainage system for the churches inside the complex:

- a) Conducting a geotechnical investigation to identify the phenomenon and collect specific data (for example: stratigraphy identification with the help of electric tomography, which could provide a profile for the whole area).

¹ Currently, the water supply system to Gelati Monastery, as well as to the visitors' centre and to families living in the village Gelati is arranged via the Sokhasteri source, located 2,400 m away from the monastery.

- b) Based on the results of the research, to consider the possibility of constructing a system to collect and remove (the main quantity of) underground water outside of the east enclosure wall of the complex and on the opposite side of the road, either through a drainage system or through a collecting well.

4.5. Managing tourism

Gelati Monastery is an important tourist destination and a spiritual centre that attracts around 200,000 tourists each year. This figure is likely to increase in the future, with implications for the management of the tourist flows. The level of tourist services should be enhanced, and the safety and security should be assured for both the monument and its visitors. Managing the visitor flow is an important aspect of the overall management of the property. Making the information centre operational is instrumental in this respect, and a plan should be developed for its operational use (since its construction, the centre has remained out of use to this day).

4.6. Facilitating the religious function

The monastery has a religious function. This implies not only the performance of religious services, but also the provision of adequate facilities that are required to accommodate the monks and religious visitors. Plans for addressing these issues following the ongoing restoration works should be reviewed and where needed, adapted to include the possibility of increased visitor flow.

4.7. Risk preparedness

In line with the commitment of the State Party to avoid emergency situations in the future, the necessity and scope of a risk preparedness program should be assessed, especially in light of the recent negative experience of water ingress through the roofs and its impact on the interior wall paintings.

4.8. Summary of the suggestions for developing indicators for monitoring the state of conservation

The table below intends to summarise the analysis above into an indicative and more practical guide to facilitate the development by the State Party of indicators for monitoring the state of conservation of the attributes that convey the Outstanding Universal Value of the property. It is not intended as a sequence of actions, many of which could and should be undertaken simultaneously. Moreover, it could be used to facilitate the preparation by the State Party of a conservation programme for the property.

1. Church of the Nativity of the Virgin	
1.1. Overall plan	Develop an overall plan for the conservation of the church, with immediate and longer-term actions, with clear responsibilities, to be shared with stakeholders
1.2. Protective roof	Immediately carry out a project for the placement of an overall protective coverage of the monument
1.3. Remove tiles on the roof and loose material under it	Remove loose under-roof conglomerate fill to promote evaporation from the roof following the installation of an overall protective coverage and removal of the remaining tiles

1.4. Analyses of mural paintings	Finalise analyses to identify painting techniques of the mural paintings
1.5. Accessibility and security	Extend and maintain secure scaffolding covering the full interior of the church, allowing access to all the upper areas
1.6. Documentation and condition assessment	Undertake a thorough and detailed mapping of the existing state of conservation and the pathology of the wall paintings throughout the interior of the church and of the eastern arm mosaics
1.7. Periodic monitoring of mural paintings	Continue with the periodic monitoring of the mural paintings, to identify areas requiring emergency stabilisation treatments
	Periodically assess the evolution of the humidity content in the walls and on the surface of the wall paintings
1.8. Undertake emergency conservation treatments for the areas where the mural paintings are at risk	Follow recommendations contained in the report, to eliminate superficial salts, fix detached areas of paint layer, and consolidate areas of decayed plaster; produce a thorough and detailed documentation of the intervention treatments undertaken
1.9. Monitoring the structural behaviour of the building as a whole	Undertake investigation of the condition and structural behaviour of the monument as a whole, with special emphasis on its upper parts
	Undertake structural conservation treatments based on the condition assessment
	Ensure regular check of the electronic system (gauge) installed on the cupola
	Undertake investigation of the long-term micro-movements on 3D that occurred in the cross arms building ashlar
	Fill the joints and complete broken / missing sections of the ashlar on the church façade using a natural hydraulic lime mortar
1.10. Microclimate monitoring and stabilisation	Follow the suggestions of the “Structural hygrometric and micro-environmental state investigations” (2021-2022) by Alessandro Massari
	Install additional temporary double wooden doors (wind barriers) at the entrances to the naos while closing some of the windows to diminish air circulation inside the church and reduce evaporation on the mural paintings
2. Saint George Church	
2.1. Overall plan	Prepare an overall plan for the conservation of the church, to be shared with stakeholders

2.2. Conservation treatments on façades	Fill the joints and complete broken / missing sections of the ashlar on the church façade using a natural hydraulic lime mortar
2.3. Short-term actions	Follow the suggestions “Assessment-for-design Actions” and “Short-term Actions in St. George and Recommendations”, made by ReStruere during the remote meeting of 28 September 2022
2.4. Mapping, documentation and condition assessment	Undertake a detailed mapping and condition assessment of the mural paintings
2.5. Emergency stabilisation treatments	Undertake emergency stabilisation treatments for the mural paintings, as required by the assessment and monitoring (and following the recommendations made for the Church of the Nativity of the Virgin)
3. Water drainage system	
3.1. Completing and monitoring the water drainage system on site	Undertake periodic monitoring and documentation of the process on the roofs, the gutters and the downspouts, and the whole roof structure
	Consider whether it is necessary to extend the drainage system to other areas of the monastery yard
	Ensure constant monitoring of the entire water drainage system within the monastery courtyard
4. The setting of Gelati Monastery	
4.1. The inflow of groundwater to the monastery yard	Conduct a geotechnical investigation and consider the possibility of moving groundwater flow outside of the enclosure wall of the complex
4.2. Managing the visitor flow	Develop a plan for the operational use of the visitors' centre
4.3. Facilitating the religious function	Develop plans for addressing the effect of increased visitor flow after finishing the restoration works
4.4. Risk preparedness	Assess the necessity and scope of a risk preparedness program
4.5. Management plan	Review and update the management plan for the property
5. Communication	
5.1. Closer dialogue among stakeholders	Ensure good coordination and communication between all teams working at the site, to make sure that the site is considered as a system and decision-making is made jointly
	Pursue a closer dialogue with different stakeholders about the protection measures taken at the property, including through the World Heritage Protection Council

6. Capacity building	
6.1. Assessing capacity building needs	Assess if capacity building is required to reinforce the involvement of Georgian conservation professionals in the long-term conservation project for Gelati, to ensure sustainability of actions and the management of the property

Issue 5: Overall state of conservation of the Gelati Monastery World Heritage property

The challenges related to improving the state of conservation of the property are two-fold. On the one hand, there is a need to address deficiencies with regard to the interventions on the roofs and emergency interventions on the affected wall paintings of the Church of the Nativity of the Virgin (the Main Church) caused by the failure of the roofs installed in 2015-2018 and the resulting moisture ingress and associated decay of the historic murals inside the church. While the mission's focus was on the Main Church, this observation also applies to the Church of Saint George.

On the other hand, the necessary emergency interventions should go hand in hand with developing a holistic conservation programme for the entire property. This programme should include monitoring, research, and implementation of conservation work on wall paintings, mosaics and stonework of the two churches, static analysis and measures to address the cracks in the structure of the Main Church, and water management at the property – rainwater and groundwater.

In the short term, an immediate elaboration of a project for the placement of an overall protective coverage over the monument, including the cupola, is of paramount importance. This is a precondition to any kind of further work on the monument and to all types of monitoring of its condition underlined above. Key issue for its planning is the long-term maintenance of the protection roof in situ, during the whole drying process of the wall paintings inside the church, and until the stabilisation / restoration of the plasters is completed. Only then will it be possible to proceed with the reconstruction of the roofs. In this undertaking, direct synergy and close coordination of the foreign and local groups of experts involved (for the temporary and the new roof and the conservation of the wall paintings) is absolutely necessary.

The design and technical details for the roof construction project should be submitted to the World Heritage Centre in conformity with Paragraph 172 of the Operational Guidelines for the Implementation of the World Heritage Convention, for review and approval in a timely manner, so that as soon as weather conditions permit, the new protective cover can be placed in situ and the upper parts of the church can be unveiled during late spring 2023.

Once the State Party's expert consultants prepare the final guidelines regarding the new permanent roof restoration materials, its design, and components (the filling material, the roofing ventilation system, the overhanging on the roof, the installation of gutters and the rainwater drainage system), the State Party should share them with the World Heritage Centre and the Advisory Bodies for their comments, recommendations and approval.

Systematic monitoring of the state of conservation of the attributes that convey the OUV of the property are key in ensuring the proper design and efficient implementation of the conservation programme. In parallel, systematic documentation of the monitoring findings and of all the interventions is necessary to understand the changing state of conservation of the property and to improve it in the long term. It is regrettable that detailed documentation of the 2015-

2018 restoration interventions does not exist, which has complicated investigations and slowed down emergency interventions on the roofs. Any further work should be carefully documented.

Given the imperative to undertake emergency interventions on the roofs and the affected wall paintings, it is understandable that physical interventions have taken preference over the updating of the management plan. However, it is advised that the management plan update process take place with urgency so that the continuing conservation efforts can be coordinated within an updated management system. It remains important to ensure that the updated management plan is given a legal status.

Lastly, the State Party is advised to continue submitting documentation on further emergency interventions and longer-term conservation strategy and measures, as well as relevant technical material, to the World Heritage Centre for review by the Advisory Bodies before actions are taken. The World Heritage Centre and the Advisory Bodies stand ready to accompany the State Party in all the processes aimed at ensuring the protection and safeguarding of the property.

Conclusions and Recommendations

The protection and preservation of the Gelati Monastery is a high priority for the Government of Georgia and the Patriarchate – the owner of the monastery. The State Party's commitment of resources and expertise and its determination to undertake the necessary interventions to the highest standard, including with the help of international experts, are highly commendable.

The most urgent protection needs are linked to addressing deficiencies with regard to the roofs installed in 2015-2018, which led to moisture ingress and associated decay of the historic murals inside the Main Church. In this regard, the immediate actions should focus on the emergency treatments of the affected mural paintings only, which should be kept to the necessary minimum and undertaken with the use of materials compatible with the original ones while limiting the addition of water. Further conservation work on the murals should be delayed until the emergency interventions are completed, the wall paintings reach a stable condition and a plan for the longer-term conservation of the murals is developed.

Constant monitoring of the condition of the wall paintings – those that are yet to be treated as well as those on which emergency interventions have taken place – is key in redressing the negative impacts of the moisture ingress and decay of the murals. A precondition for such monitoring is a detailed mapping of the existing state of conservation and the pathology of all the wall paintings and mosaics within the church.

Monitoring should also extend to the environmental conditions inside the church and to the water levels inside its walls. It goes without saying that detailed documentation of the monitoring results and of all the interventions undertaken within the property is necessary for a successful long-term conservation strategy and efforts. The lack of detailed documentation on the interventions undertaken prior to 2020, including on the design and installation of the new roofs in 2015-2018, has made developing emergency intervention strategy more difficult.

Two temporary installations are needed to proceed with the programme of redressing the conservation challenges of the Main Church: the extension of a secure scaffolding structure to all areas of the church and the placement of an overall protective coverage of the monument that would provide for optimal conditions for further necessary interventions on the roofs and structural stones of the building.

A longer-term overall conservation strategy for the property and a management plan are of utmost importance in ensuring that all further interventions, including more extensive conservation treatments of the wall paintings, are guided by a well informed and comprehensive vision for the property's future. Such strategy should include a holistic structural investigation of the church and the restoration of its static adequacy, as well as a thorough investigation and management of the water flows at the site.

The conservation strategy will guide the decisions to be made regarding the replacing of the existing roofing, which will have to be designed in a way that is compatible with the architecture of the complex and with its maximum durability in mind, ensuring the maximum protection of the church's interior, including its precious wall paintings.

While the present report focuses mainly on the Main Church, the longer-term conservation strategy should be developed for the property as a whole. The Church of Saint George also merits special attention, in particular its mural paintings some of which are in bad and worsening condition. Its assessment and monitoring are of particular importance, as is ensuring that no water infiltration from the roof and external walls occurs.

While assistance of foreign experts has been beneficial to the State Party's efforts in the emergency response phase, it is highly recommended to involve more Georgian experts in further interventions on the monuments and especially, in the longer-term conservation efforts at Gelati. Increased reliance on local expertise, supported, if need be, by capacity building actions, would go in the direction of ensuring an efficient and sustainable conservation and management of the property. A closer dialogue with different stakeholders about the protection measures taken at the property and in developing a longer-term vision and strategy for Gelati is to be encouraged.

List of all recommendations:

1. Immediate actions should focus on emergency stabilisation works. Further conservation work should be undertaken only once the structures, wall paintings and mosaics should be guided by a thoroughly designed and holistic conservation programme for the entire property and should be underpinned by systematic monitoring, research, and documentation. The existing Conservation Master Plan should be updated accordingly.
2. It is recommended that the State Party continue with the programme to redress the conservation challenges at the property following the recommendations contained in this report and submit to the World Heritage Centre for review by the Advisory Bodies documentation on further emergency interventions and longer-term conservation strategy and measures, as well as relevant technical material, before implementation.
3. The management plan for the property should be updated to guide continuing conservation efforts.
4. Immediately carry out a project for the placement of an overall protective coverage of the monument, including the cupola, following the mission's remarks.
5. Ensure thorough and detailed documentation is continuously produced (both to monitor the condition of the wall paintings and to record all the treatments undertaken). This information must always be available to be used during the emergency conservation works, and for the constant monitoring of the mural paintings, which will be required over an extended period of time.
6. Extend and maintain secure scaffolding in all areas of the church, to be able to assess and monitor all the upper parts of the mural paintings as well as the mosaics in the apse.
7. Extend the condition assessment and monitoring to the mural paintings of the Church of Saint George where infiltrations may also have occurred when the roof was changed.
8. Develop a project and road map for the property, with clear responsibilities and processes to be undertaken. Detailed actions for the emergency treatments of the mural paintings in the upper parts of the vaults (and possibly the dome) should be kept to the minimum necessary, using compatible materials with the original ones, and limiting the addition of water as much as possible. The road map should also include the necessary monitoring of the condition of the paintings, of the environmental conditions inside the church, and of water levels inside the walls. There should also be a plan for the longer-term conservation of the mural paintings at the site, including more

extensive conservation treatments, which may need to be reviewed over time, as the building and the mural paintings slowly dry and reach a stable condition.

9. The State Party is encouraged to pursue a closer dialogue with different stakeholders about the protection measures taken at the property, including through the World Heritage Protection Council.
10. Given the long-term conservation and monitoring actions that will be required at Gelati, it is strongly recommended to involve more Georgian conservators (and plan capacity building if this is required), to ensure the long-term sustainability of the actions.
11. A detailed mapping of the existing state of conservation and the pathology of the wall paintings throughout the interior of the church is necessary, before the elaboration of a detailed project for the emergency and medium-term preservation of the wall paintings and mosaics.
12. A thorough and accurate investigation with the help of devices of the long-term micro-movements on 3D that occurred in the cross arms building ashlar, with emergency emphasis on the west arm, is required.
13. It is recommended to undertake a holistic structural investigation and prepare an intervention project to restore the static adequacy of the monument, with emphasis on the upper parts of its structure. It is advisable that Georgian scientific institutes and university laboratories be involved in the preparation of the project.
14. No work shall be carried out to permanently fix the cracks in the western arm, before the final investigations and the necessary measures resulting from the above study are formulated.
15. Implement a project for thorough filling of joints and completion of broken/missing sections of structural ashlar on the church facades. It is advised to use a repair natural hydraulic lime mortar satisfying the issue of compatibility (ensuring breathability and avoiding percolation of salt solutions to the original building stones), and the issue of the restoration of the mortars' mechanical performance (strength and porosity) to achieve sustainability.
16. Installation of additional temporary double wooden doors (wind barriers) at the three entrances to the naos is recommended, as well as closing of some of the open windows to reduce wind-driven moisture ingress, depending on the monitoring process results.
17. The mission encourages the National Agency and local professionals involved to continue the monitoring project started in December 2020, taking under consideration the suggestions of the "Structural hygrometric and micro-environmental state investigations" (2021-2022), by Alessandro Massari, regarding the duration of monitoring, the number and locations of sensors for measuring the air parameters to be installed, a sensor to measure wind direction and intensity in the monastery area, the data recording intervals, and the conditions under which they are chronicled (depending on the condition of the doors, the presence of visitors, maintenance work, extraordinary openings, etc.).

18. Ensure good coordination and communication between all teams working at the site, to make sure that the site is considered as a system, and decision-making is made jointly.
19. There is a need to address the water flows at the site and the impact of capillary rise on the stones and mural paintings (lower parts of the walls).
20. Regarding the Church of Saint George, there is an immediate need to work on external joints between stone blocks to ensure there is no water infiltration from the external walls, taking into consideration the suggestion in Recommendation 15 regarding the compatibility and sustainability of repair mortars.
21. Regarding the design of the new roof, the options for the “Design criteria determining the guidelines scenario” selected by the State Party during the remote meeting with ReStruere on 28 September 2022 are sound, with the following additional suggestions:
 - to take increased measures for the durability of the new permanent roof construction considering the local environmental conditions of the harsh winter climate [relevant measures can be found in the respective *Eurocodes*];
 - it is advisable to consider shaped copper for the final roofing layer – similar in the form to that applied on the entrance to the Academy building in the Gelati Monastery.

Annexes

Annex I: Terms of Reference of the mission

Terms of Reference

Joint World Heritage Centre/ICOMOS/ICCROM Advisory mission to the World Heritage property “Gelati Monastery” (Georgia), 28 November – 2 December 2022

1. Background

On 22 July 2022, the State Party invited the joint WHC/ ICOMOS/ ICCROM Advisory mission to the World Heritage property ‘Gelati Monastery’ (see letter #29175 of the Ministry of Culture, Sport and Youth of Georgia) to assess the emergency actions carried out by the National Agency for Cultural Heritage Preservation of Georgia with its expert consultants² from June 2021 to September 2022 following the water infiltration dating back to 2019 and 2020.

2. Objective of the Advisory Mission

The joint Advisory mission should:

- 1) Assess the overall state of conservation of the Gelati Monastery World Heritage property, including its setting;
- 2) Evaluate the work carried out by the State Party in 2021 and 2022 for the improvement of the state of conservation of the Nativity of the Virgin Church (the Main Church) with respect to the intervention on its roofs;
- 3) Assess the methods and the materials used from June 2021 to September 2022 for the conservation-restoration of the wall paintings in the west and north arms of the Main Church;
- 4) Review the key findings of the studies conducted from 2021 onwards by the State Party’s expert teams;
- 5) Provide advice on measures to address challenges with regard to the state of conservation of the property, including a course of action with technical advice to address deficiencies discovered, if any, with regards:
 - a. The intervention on the roof of the Nativity of the Virgin Church (the Main Church),
 - b. The methods and materials applied to the conservation work undertaken on the conservation-restoration of the wall paintings in the Nativity of the Virgin Church (the Main Church);
- 6) Engage with local and national stakeholders to understand and report to their views on the state of conservation of the property;
- 7) Assist the State Party in developing indicators for monitoring the state of conservation of the attributes that convey the Outstanding Universal Value of the property, as requested by Decision 44 COM 7B.47 of the World Heritage Committee;
- 8) Provide advice on any other relevant issue observed during the visit.

The State Party shall provide the appointed experts with all required documentation and information necessary for the successful effectuation of their tasks at the latest ten days before

² Architect Professor Ugo Tonietti, Architect Sara Stefanini on behalf of ReStruere Ltd, the Florence University spin-off; the Conservator-restorers Mario (Marco) Pulieri, Vincenzo Centanni, Sabrina Salvatori, Lorenzo Budello, Art Historian Giulia Bordi, Conservation Scientist Davide Melica, Architect and microclimate specialist Alessandro Massari on behalf of the Giovanni Secco Suardo Association.

the mission. In case additional information would be necessary as identified during the mission, it should be provided by the State Party ten days after completion of the mission at the latest.

3. Deliverable

The joint Advisory mission shall prepare a detailed report (in electronic format) reflecting the on-site assessment of the state of conservation the property according to the Terms of Reference for the mission. The mission report will be transmitted to the State Party eight weeks after the completion of the mission, on 30 January 2023, for verification of possible factual errors.

In line with established UNESCO and ICOMOS practices, their experts will not engage with the media, nor discuss the mission findings and recommendations, which should only be presented in the final mission report. The State Party does not bear any responsibility for preventing the media to approach the experts during on-site visit and/or their presence in Georgia.

Annex II: List of documents received from the State Party to inform the mission

Title	Author	Date of the report
Checklist of Tasks for The Nativity of the Virgin Church (the Main Church)	Ministry of Culture, sport and Youth of Georgia (MCSY) and NACHP	December 2022
Mapping of the Interventions Conducted on the Mural Paintings in the Main Church of Gelati Monastery in 2021-2022	Merab Buchukuri	December 2022
Topographical Plan of the Monastery		
Gelati Complex Architectural Survey	Lasha Shartva	May 2022
Activities Report, July-November 2022	Giulia Bordi	November 2022
West arm of the Main Church of the World Heritage site – Gelati Monastery. Examination of hygrometric state of the structures. Mission Arch. Alessandro Massari, Arch. Simona Balsamo of 4-8 October 2022. Rev. 2	Studio Massari & Associazione Giovanni Secco Suardo	December 2022
Scientific investigation on the Mural Paintings. Part II	Davide Melica	23 November 2022
Report on the State of Conservation of the Gelati Monastery World Heritage Property, Georgia. Mission from 15 July to 23 September 2022	Mario Pulieri	23 November 2022
Phase 2 – Analysis and development of the acquired documentation. Deliverable 2. Findings of the analysis: keynotes based on the results of the studies conducted by RS and GET. Remote Meeting	ReStruere ltd	28 September 2022
Comments on the “Report of the International Advisory Board (IAB) on the Safeguarding and Conservation of Gelati Monastery - World Heritage” (IAB report) transmitted by the Ministry of Culture, Sport and Youth - National Agency for Cultural Heritage Preservation of Georgia on 15 August 2022, and evaluation on the state of the work	Ugo Tonietti, Sara Stefanini, Lanfranco Secco Suardo, Marco Pulieri, Davide Melica, Alessandro Massari	14 September 2022
Phase 2: Analysis and development of the acquired documentation. Deliverable 2. Findings of the analysis: keynotes based on the results of the studies conducted by RS and GET	ReStruere ltd	29 July 2022
Emergency Phase: E.1 West arm emergency uncovering: concept, supervision of the design and implementation. Executive Summary on the mission carried out in Kutaisi (Georgia) at Gelati Monastery from 25 May until 31 May 2022	Ugo Tonietti and Sara Stefanini	9 June 2022
Phase 1. Developing of knowledge for diagnostic purpose. Deliverable 1.5. Executive summary of Phase 1 activities and reports	Ugo Tonietti, Sara Stefanini, Arash Boostani	8 June 2022
West arm of the Main Church of the World Heritage site – Gelati Monastery. Examination of hygrometric state of the structures. Mission Arch. Alessandro Massari of 28 May – 1 June 2022	Studio Massari & Associazione Giovanni Secco Suardo	June 2022

Conservation-restoration campaign of the vault and walls of the west arm of the Gelati Monastery - Georgia. Report of the mission of the conservation-restoration expert Marco Pulieri, 27 May – 3 June 2022	Marco Pulieri	June 2022
Church of Saint George. Preliminary investigations on the structural hygrometric state. Missions Arch. Alessandro Massari of 6-12/11/2021 and 28/05 – 1/06/2022. Rev. 1	Studio Massari & Associazione Giovanni Secco Suardo	June 2022
Report on the Safeguarding and Conservation of Gelati Monastery World Heritage Site, Georgia	International Advisory Board	May 2022
Technical report with photo and graphic documentation regarding the new surveys	Tariel Kiparoidze and Lasha Shartava	31 January 2022
Report on the State of Conservation of the Gelati Monastery World Heritage Property, Georgia: Mission of 5-12 November 2021	Mario Pulieri	6 December 2021
Phase 1. Developing of knowledge for diagnostic purposes. Tests on material samples taken on-site. Scientific report explaining the results of the tests. Deliverable 1.1	ReStruere ltd	November/December 2021
Church of the Virgin. Investigations on the structural hygrometric and micro-environmental state aimed at safeguarding the internal wall paintings. Mission Arch. Alessandro Massari of 6-12 November 2021	Studio Massari & Associazione Giovanni Secco Suardo	December 2021
Report on the second mission for the conservation of the paintings	Vincenzo Centanni	20 October 21
Church of the Nativity of the Virgin - Gelati Monastery. Article on the emergency conservation-restoration intervention of the frescoes	Associazione Giovanni Secco Suardo – Vincenzo Centanni, Marco Pulieri	September 2021
ReStruere (1) Report on the mission and preliminary suggestion on the reasons for the water infiltration and the initial recommendations for the protection from water infiltration. Mission carried out in Kutaisi (Georgia) at Gelati Monastery by Ugo Tonietti and Sara Stefanini, 25-29 June 2021	Ugo Tonietti and Sara Stefanini	30 July 2021
Scientific investigation on the Mural Paintings	Davide Melica, Federica Antonelli	19 July 2021
Report on the State of Conservation of the Gelati Monastery World Heritage Property, Georgia: Mission of 22-28 June 2021	Mario Pulieri, Vincenzo Centanni	1 July 2021
Minutes of the meetings of the Minister of Culture, Sport and Youth of Georgia with Georgian conservator-restorers, architects, historians, the representatives of the Patriarchate of Georgia, and other stakeholders held in 2021, concerning the impact of the previous interventions carried out in Gelati Monastery and its state of conservation	Ministry of Culture, Sport and Youth	3 April 2021, 8 May 2021, 25 May 2021, 13 August 2021
Photo documentation depicting the tests of the interventions for the temporary consolidation on the south wall, in the vault of the west arm of the Church of the Nativity of the Virgin (the Main Church) of Gelati Monastery, conducted by 'Betania', E. Privalova Centre for Technical Studies of Paintings, on 19-21 March 2021	Nana Kuprashvili	March 2021

Orthophotos western arm: Christ's Cross, Feet Washing, Juda's Kiss, Last Supper, Prayer in the Garden of Gethsemane, Saviour in front of Jewish chief priests		2017
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Annex III: Last Decision of the World Heritage Committee

Decision 44 COM 7B.47

Gelati Monastery (Georgia) (C 710bis)

The World Heritage Committee,

1. Having examined Document WHC/21/44.COM/7B,
2. Recalling Decisions **41 COM 7A.20** and **41 COM 8B.31**, adopted at its 41st session (Krakow, 2017),
3. Notes the unfortunate failure of the new roof of the Church of the Virgin and the continuing degradation through moisture ingress in St George's Church which is leading to decay of stonework, mosaics and wall paintings;
4. Welcomes the State Party's action to install a temporary roof over the Church of the Virgin, and its monitoring and reporting of the damage to the stonework, wall-paintings and mosaics in the churches of the property, and requests the State Party to urgently:
 - a) Provide a more workable solution to covering over both the Church of the Virgin and St George's Church in a manner that allows for conservation activities to take place uninterruptedly without risk of moisture ingress, and submit this to the World Heritage Centre for review by the Advisory Bodies before implementation,
 - b) Develop a costed conservation programme for the property, including monitoring, research and implementation of conservation work to wall-paintings, mosaics and stonework of the two churches, and submit this to the World Heritage Centre for review by the Advisory Bodies;
5. Also requests the State Party to:
 - a. Continue its efforts to develop monitoring indicators for monitoring the state of conservation of the attributes that convey the Outstanding Universal Value of the property,
 - b. Extend the tri-dimensional structural monitoring to St George's Church and other important structures at the property as well,
 - c. Provide a report on the activities of the World Heritage Protection Council of Georgia in relation to the Committee's request for a coordinating committee for this property in its next report on the state of conservation of this property;
 - b) Further requests the State Party to review and update the Management Plan for the property and submit this to the World Heritage Centre for review by the Advisory Bodies, and establish a Management Committee for its implementation, additionally, reiterates its request to the State Party to consider putting in place a mechanism that will allow the Management Plan, or part of it, to have status in planning processes;
6. Calls for an increased mobilization of the international community to provide more financial and technical support to the State Party, including through a request to the World Heritage Fund "Conservation & Management" International Assistance, to implement the short- and medium-term measures to improve the state of conservation of the property;

7. Finally requests the State Party to submit to the World Heritage Centre, by **1 February 2022**, an updated report on the state of conservation of the property and the implementation of the above, for examination by the World Heritage Committee at its 45th session.

Annex IV: Programme of the mission as implemented

Programme of the Advisory mission

28 November

- Arrival in Tbilisi
- Transfer to Kutaisi and accommodation

29 November

- On-site visit of the Gelati Monastery (with the presence of the Director-General of the National Agency for Cultural Heritage Preservation of Georgia (NACHP), the Head of the UNESCO Unit of the NACHP, two representatives of the Patriarchate of Georgia, and Georgian and international experts)

30 November

- On-site visit of the Gelati Monastery (with the presence of the Head of the UNESCO Unit of the NACHP and Georgian and international experts)
- Working meeting of the mission experts

1 December

- Transfer to Tbilisi
- Meeting with the representatives of the Orthodox Church of Georgia, led by Locum Tenens of the Patriarchal Throne of the Orthodox Church of Georgia, His Eminence Shio (Mujiri)
- Meeting with the representatives of ICOMOS Georgia, led by the President of ICOMOS Georgia, Ms Nato Tsintsabadze
- Concluding meeting with the representatives of the State Party, led by First Deputy Minister, Ministry of Culture, Sport and Youth of Georgia, Mr Kaha (Karlo) Sikharulidze

2 December

- Departure from Tbilisi

Annex V: Composition of the mission team

- Irena Caquet, Programme Specialist, Europe and North America Unit, World Heritage Centre, UNESCO
- Alkiviadis Prepis, ICOMOS Advisor
- Valerie Magar, Manager of the Programmes Unit, ICCROM

Annex VI: List of people met

During on-site visit of the property (29-30 November)

Representatives of the State Party:

- Nikoloz Aznaurashvili, Director-General, National Agency for Cultural Heritage Preservation of Georgia (NACHP)
- Tamar Ketiladze, Acting Head of the UNESCO and International Relations Unit, NACHP
- Tornike Gasviani, Intern of the UNESCO and International Relations Unit, NACHP
- Merab Buchukuri, Wall Paintings Chief Conservator-Restorer, NACHP
- Nikoloz Kiknadze, Wall Paintings Restorer, NACHP
- Lasha Shartava, Architect-Restorer, NACHP
- Ronald Isakadze, Director of Kutaisi Historical Architectural Museum-Reserve

State Party's expert consultants:

- Ugo Tonniati, Architect, President of ReStruere
- Giulia Misseri, Architect, ReStruere
- Alessandro Massari, Architect and Microclimate Specialist, Studio Massari
- Lanfranco Secco Suardo, President of Giovanni Secco Suardo Association
- Mario (Marco) Pulieri, Conservator-Restorer, Giovanni Secco Suardo Association

During meetings in Tbilisi (1 December)

Representatives of the State Party:

- Kaha (Karlo) Sikharulidze, First Deputy Minister, Ministry of Culture, Sport and Youth of Georgia (MCSY)
- Nikoloz Aznaurashvili, Director-General, NACHP
- Tamar Ketiladze, Acting Head of the UNESCO Unit, NACHP
- Salome Jamburia, Senior Specialist, International Relations Department, MCSY
- Merab Buchukuri, Wall Paintings Chief Conservator-Restorer, NACHP
- Nikoloz Zazunishvili, Architect-restorer, NACHP
- Lasha Shartava, Architect-restorer, NACHP

Representatives of the Orthodox Church of Georgia:

- Locum Tenens of the Patriarchal Throne of the Orthodox Church of Georgia, His Eminence Shio (Mujiri)
- Bishop Andrea of Gori and Ateni
- Bishop Davit (Abba) Alaverdeli, the Chair of the Board for Architecture, Art and Restoration at the Patriarchate
- Bishop Ioane of Kutatel-Gaenateli (including Gelati)
- Bishop Vaktangi of Nikortsminda, the Chair of the Department for the Protection of Relics at the Patriarchate
- Decanus Mikael Botkoveli, Secretary of the Patriarchate
- Father Andrea Jaghmaidze, Head of Public Relations Unit
- Archimandrite Kirion of Davit Gareji Monastery

Representatives of ICOMOS Georgia:

- Nato Tsintsabadze, Conservation Architect, President, ICOMOS Georgia
- Manana Tevzadze, Heritage Management Expert, Secretary General, ICOMOS Georgia, Chair of Blue Shield Georgia
- Lia Bokuchava, Conservation Architect, ICOMOS Georgia Board Member, Director
- Lela Ninoshvili, Stone and Wall Painting Conservator, ICOMOS Georgia Board Member
- Tsitsino Chachkhunashvili, Art Historian, ICOMOS Georgia Board Member
- Mariam Khutsilava, Programme Assistant, ICOMOS Georgia
- Gvantsa (Taso) Potskhishvili, Wall Painting Conservator, ICOMOS Georgia (*online*)
- Mariam Sagaradze, Wall Painting Conservator, ICOMOS Georgia (*online*)

Annex VII: Statement of Outstanding Universal Value of the property

Brief synthesis

On the lower southern slopes of the mountains of the Northern Caucasus, Gelati Monastery reflects the 'golden age' of medieval Georgia, a period of political strength and economic growth between the reigns of King David IV 'the Builder' (1089-1125) and Queen Tamar (1184-1213). It was David who, in 1106 began building the monastery near his capital Kutaisi on a wooded hill above the river Tskaltsitela. The Main Church was completed in 1130 in the reign of his son and successor Demetré. Further churches were added to the monastery throughout the 13th and early 14th centuries. The monastery is richly decorated with mural paintings from the 12th to 17th centuries, as well as a 12th century mosaic in the apse of the Main Church, depicting the Virgin with Child flanked by archangels. Its high architectural quality, outstanding decoration, size, and clear spatial quality combine to offer a vivid expression of the artistic idiom of the architecture of the Georgian "Golden Age" and its almost completely intact surroundings allow an understanding of the intended fusion between architecture and landscape.

Gelati was not simply a monastery: it was also a centre of science and education, and the Academy established there was one of the most important centres of culture in ancient Georgia. King David gathered eminent intellectuals to his Academy such as Johannes Petritzi, a Neo-Platonic philosopher best known for his translations of Proclus, and Arsen Ikaltoeli, a learned monk, whose translations of doctrinal and polemical works were compiled into his *Dogmatikon*, or book of teachings, influenced by Aristotelianism. Gelati also had a scriptorium where monastic scribes copied manuscripts (although its location is not known). Among several books created there, the best known is an amply illuminated 12th century gospel, housed in the National Centre of Manuscripts.

As a royal monastery, Gelati possessed extensive lands and was richly endowed with icons, including the well-known gold mounted Icon of the Virgin of Khakhuli (now housed in the Georgian National Museum) and at its peak, it reflected the power and high culture of Eastern Christianity.

Criterion (iv): Gelati Monastery is the masterpiece of the architecture of the "Golden Age" of Georgia and the best representative of its architectural style, characterized by the full facing of smoothly hewn large blocks, perfectly balanced proportions, and the exterior decoration of blind arches. The Main Church of the monastery is one of the most important examples of the cross-in-square architectural type that had a crucial role in the East Christian church architecture from the 7th century onwards. Gelati is one of the largest Medieval Orthodox monasteries, distinguished for its harmony with its natural setting and a well thought-out overall planning concept.

The Main Church of the Gelati Monastery is the only Medieval monument in the larger historic region of Eastern Asia Minor and the Caucasus that still has well-preserved mosaic decoration, comparable with the best Byzantine mosaics, as well as having the largest ensemble of paintings of the middle Byzantine, late Byzantine, and post-Byzantine periods in Georgia, including more than 40 portraits of kings, queens, and high clerics and the earliest depiction of the seven Ecumenical Councils.

Integrity

The whole monastic precinct is included in the property and contains all the main 12th century buildings as well as those added in the 13th century. All the attributes necessary to express the Outstanding Universal Value are present and included in the area. No important original feature of the monastery from the 12th and 13th centuries have been lost during the centuries, and its landscape setting remains largely intact. Not all buildings are in a good state of conservation.

Some development pressures exist, in the buffer zone and the wider setting of the property but the level of threats is low and the processes are currently under control.

Authenticity

Overall, the architectural forms, spatial arrangement and decoration fully convey their value. For a long period, major parts of the mural paintings were in a bad state of conservation. With the repair of the roofs, the process of degradation has been slowed down and restoration work undertaken although some remain vulnerable.

The Academy building which was roofless in 1994 at the time of inscription was re-roofed with reversible material in 2009. The extensive buffer zone allows a full appreciation of the harmony between the enclosed monastery and its natural setting.

Protection and management requirements

Gelati monastery has been a Listed Monument of National Significance since the Soviet period and was listed in the Georgian National Register of Monuments by presidential decree in 2006. The cultural protection area was enlarged beyond Gelati Monastery to encompass the buffer zone in a Decree of the Minister of Culture and Monument Protection in 2014. The buffer zone is protected for its monuments but also for visual attributes. The natural values of the surrounding landscape are regulated by the Forest Code of Georgia, the Law on Soil Protection, the Law on Environmental Protection and the Water Law that constitute the legal framework for the management of the forests and the rivers in the area. Applications for new constructions or reconstructions, including the infrastructure and earthworks within the buffer zone require the approval of the Cultural Heritage Protection Council, Section for Cultural Heritage Protected Zones, and the Agency of Urban Heritage.

Conservation work is guided by the Conservation Master Plan, produced by the Ministry of Culture, Monuments Protection and Sports of Georgia in collaboration with the Orthodox Church of Georgia. This plan covers conservation of the built structures as well as proposals to support the revival of monastic life that started in the 1990s and the needs of visitors. Adequate resources for long-term conservation programmes need to be sustained. A system of documentation for all conservation and restoration work and tri-dimensional measuring and monitoring of the overall stability of the various monastic buildings need to be put in place.

A Memorandum on Collaboration on Cultural Heritage Issues between the Georgian Apostolic Autocephaly Orthodox Church and the Ministry of Culture and Monument Protection of Georgia has been agreed for all properties of the church. Day to day management of the property is entrusted to the monastic community who live in the property. Longer term interventions are implemented by the National Agency for Cultural Heritage Preservation of Georgia. Its local representative agency is the Kutaisi Historical Architectural Museum-Reserve who is also responsible for visitor reception.

The Management Plan 2017-2021 reflects contributions of the Church, and relevant government bodies and community groups who were involved in the consultation process. It aims to set out a shared vision for the property. The Plan was developed in harmony with the Conservation Master Plan, with the Imereti Tourism development strategy, and with the 2014 management plan for the Imereti Protected Areas that includes the valley and canyon of the Tskaltsitela River in the buffer zone. It needs approval to become fully operational and enforceable by relevant authorities. A Management Committee for the property remains to be appointed and it is necessary for key roles and responsibilities to be established.

Annex VIII: List of illustrations



Fig. 1. General view of the church complex in the monastery grounds

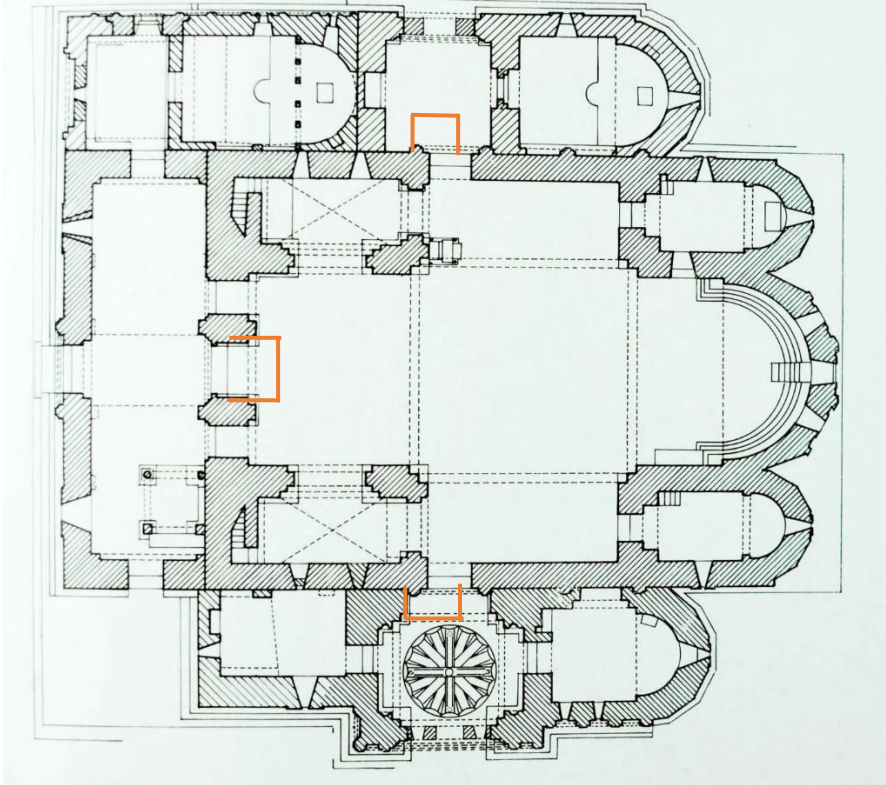


Fig. 2. Church of the Nativity of the Virgin ground plan (with indications of the places of the proposed temporary additional anti-wind doors)



Fig. 3. The central part of the altar apsis with the mosaics

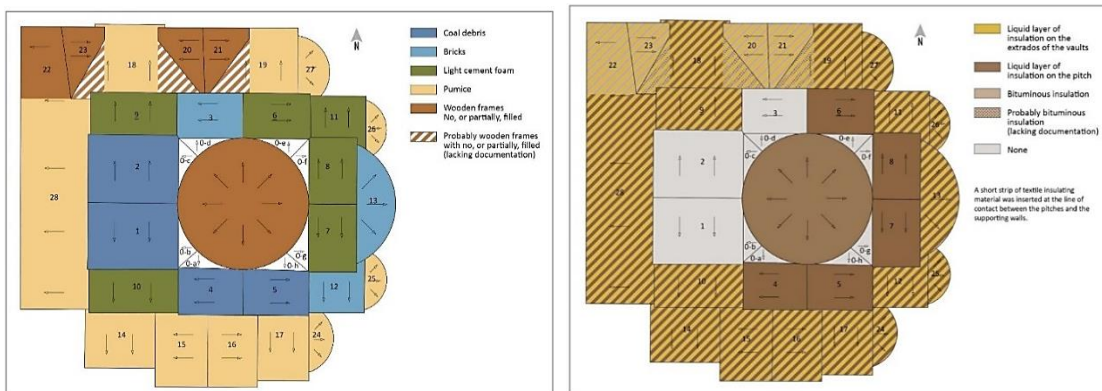


Fig. 4. Typologies of the under-roof filling during the 2016-2019 intervention (by ReStruere)

Fig. 5. Typologies of pitch waterproof insulation (by ReStruere)

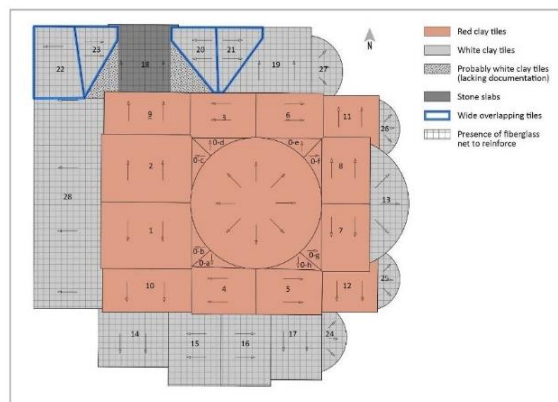


Fig. 6. Typologies of covering (by ReStruere)



Fig. 7. New roof covering on the northern side

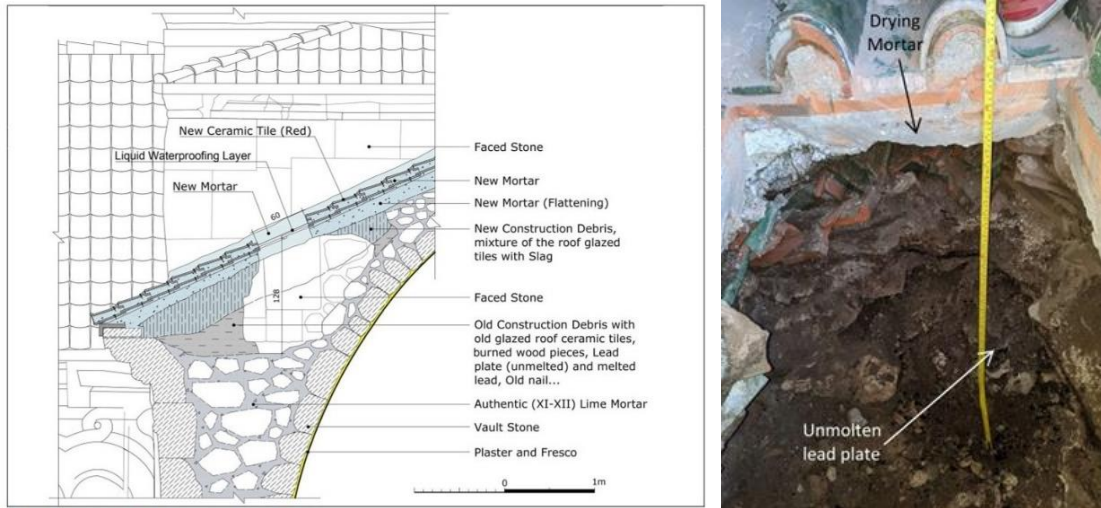


Fig. 8. Survey N1, on the north slope of the west arm and at the edge of the wall of the drum base (pitch N2) – section, view from the west (Georgian team report, 1/2022)

Fig. 9. Survey N1, view from the north: moisture found in the mortar and in the other filling materials (Georgian team report, 1/2022)

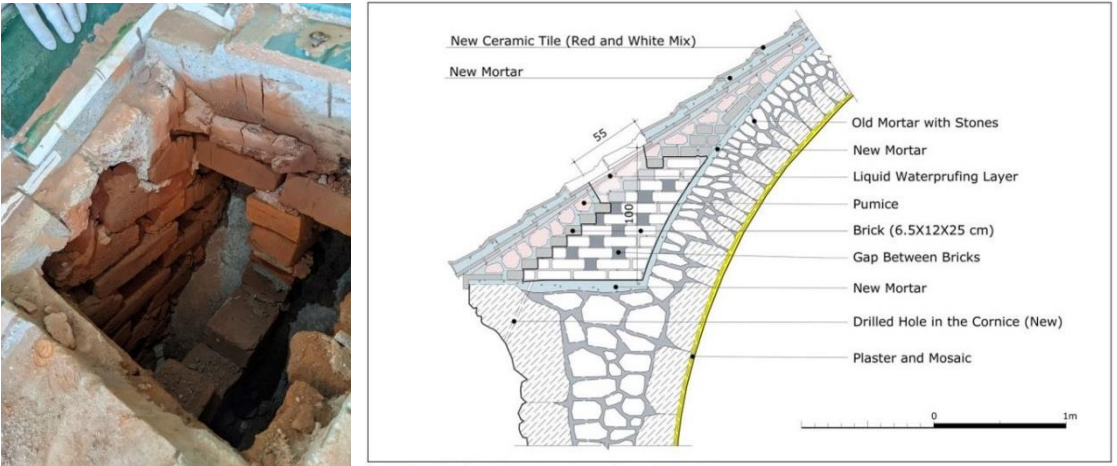


Fig. 10. Survey N3 on the east slope of the apsis roof (pitch N13), view from the north-east: plenty of moisture under the glazed tiles (Georgian team report, 1/2022)

Fig. 11. Survey N3, section, view from the north (Georgian team report, 1/2022)



Fig. 12. Incorrect installation technique: a short strip of insulating material / nails penetrating the liquid insulated mortar (by ReStruere)

Fig. 13. Insulation coating layers added more lately (2022 Joint WHC/ICOMOS/ICCROM mission)

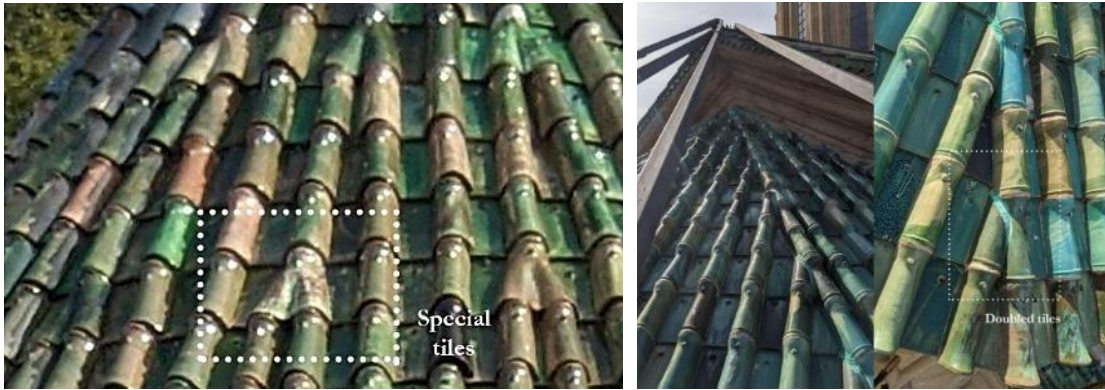


Fig. 14. St. George's dome. The special tiles are clearly visible (photo provided)
 Fig. 15. Doubling of tiles obtained by juxtaposition on the apses (photo provided)

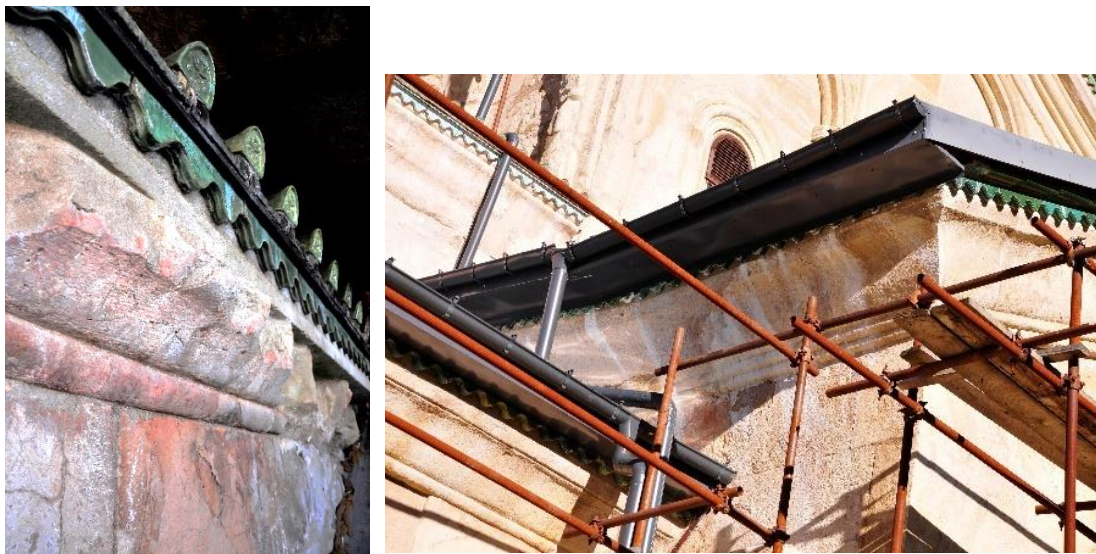


Fig. 16. Base of the cupola drum: the original stone protrudes even more than the new addition
 Fig. 17. Washout results on the carved cornices due to the absence of overhang of the new roofing pitches

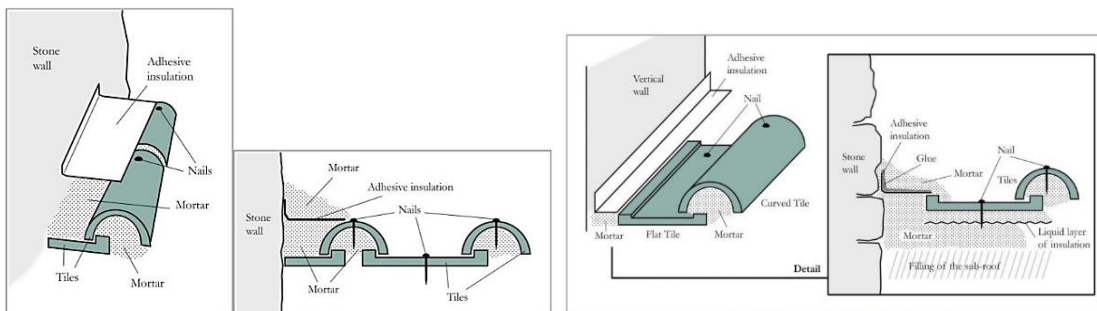


Fig. 18. Scheme of the sontage R2 - Incorrect installation technique (by ReStruere)
 Fig. 19. Scheme of the sontage R3 - Incorrect installation technique (by ReStruere)



Fig. 20. Southern wall of west arm. Longitudinal crack on the top of the wall (by ReStruere)
 Fig. 21. West arm, new temporary roofing
 Fig. 22. Openings allowing air to circulate and facilitating moisture evaporation outside the extrados of the west arm



Fig. 23. The iron truss system supporting the new temporary roof covering the extrados of the west arm
 Fig. 24. The reinforced truss piers supporting the iron truss system, fixed along a concrete base, on the insulated substrate protecting the longitudinal cracks

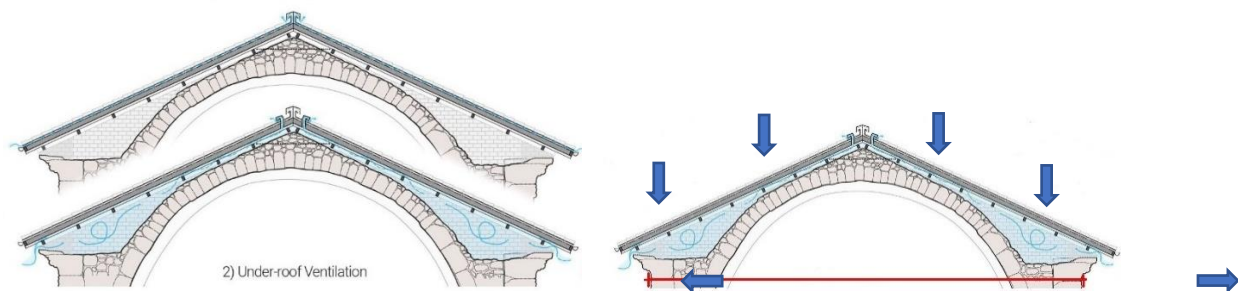


Fig. 25. Proposal for a new roof construction based on two separate circuits for the airflow to obtain an optimal roof ventilation system (by ReStruere)
 Fig. 26. Potential intervention against failure risks under strong future seismic stress (2022 Joint WHC/ICOMOS/ICCROM mission)



Fig. 27, 28. Subflorescences and paint layer detachment in the southern wall of the west wing



Fig. 29, 30. Detachment of paint layer and salt efflorescences in the northern wall of the west wing



Fig. 31. Biological growth is still present in some areas of the mural paintings



Fig. 32,33. Areas with severe plaster decay under the northwest pendentive

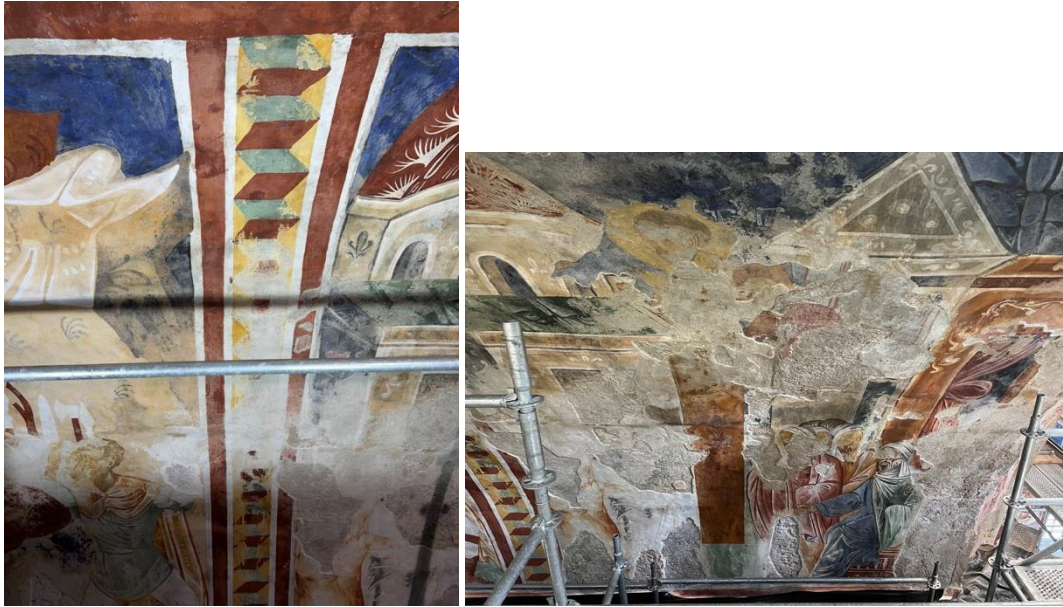


Fig. 34,35. Colour integration in the northern wall of the west wing



Fig. 36, 37. The scaffolding in the interior of the church: view to the cupola and to the altar

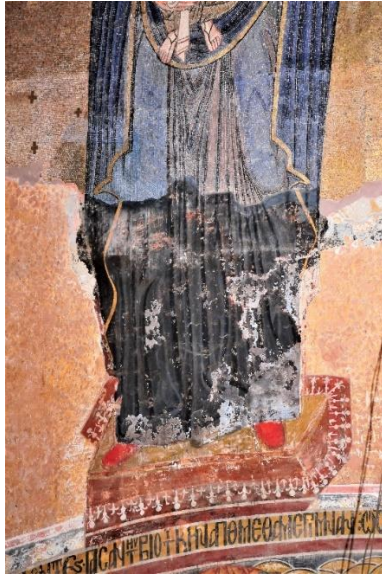


Fig. 38. Left part of the "triumphal arch" to the altar

Fig. 39. Lower part of the *himation* of Mother of God representation

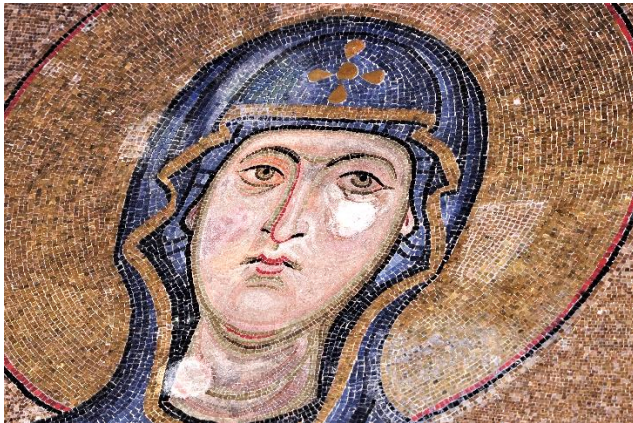


Fig. 40. Mother of God – detail of the head

Fig. 41. Mother of God – detail of the head, as in 1982 (bibliographical research)

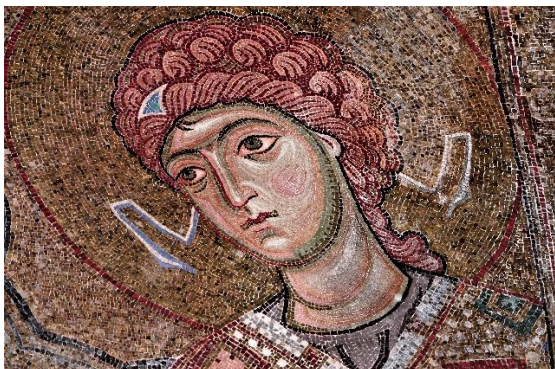


Fig. 42. Head of archangel Gabriel, detail

Fig. 43. Condition of the inscription on the frontal part of the "triumphal arch"



Fig. 44. West arm – south façade: Shifting of structural – decorated ashlars

Fig. 45. West arm – south façade: Permanent humidity, extraction of salts and exfoliation of decorative elements

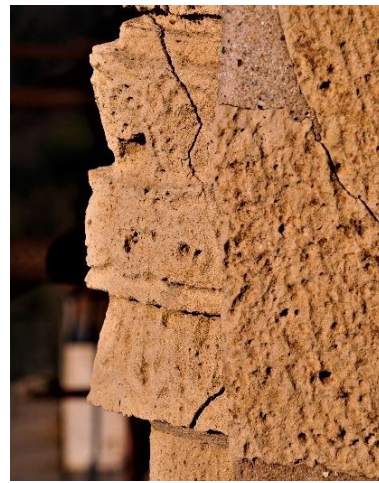


Fig. 46. West arm – south façade: Salt presence on the joints

Fig. 47. West arm – W-S corner: Fractures of structural and decorative elements



Fig. 48, 49. North arm – west wall: shifting of the building ashlars

Fig. 50. North arm – frontal arch: intensive presence of nitrates on the arch surface



Fig. 51, 52. Condition of the north façade near to north arm – recent humidity on the joints' mortar and salt crystallization



Fig. 53, 54. North arm – west façade: open joint cracks, fabric detachment and salt crystallization



Fig. 55. The N-E apsis of the church to the conjunction with the northern parekklesion (2010 Joint World Heritage Centre/ICOMOS/ICCROM Advisory mission)
 Fig. 56. The same area during the 2022 Joint WHC/ICOMOS/ICCROM mission



Fig. 57. The members of the mission with the representatives of the Orthodox Church of Georgia

Saint George Church



Fig. 58, 59. View of the façade of the Church of Saint George: need for infills in external stone joints, to avoid water penetration



Fig. 60. Interior view to the cupola



Fig. 61. St. George: exterior view, north side. Detail of the visible rising damp (by ReStruere)
Fig. 62. St. George: interior view, north side. Detail of the visible rising damp