

**REPORT ON THE JOINT WORLD HERITAGE CENTRE/ICOMOS
REACTIVE MONITORING MISSION TO ASHUR (QAL'AT SHERQAT)
IRAQ**

FROM 28 MARCH TO 1 APRIL 2022



Western view of the Ziggurat of Ashur and the Old Palace © ICOMOS/Y.Makaroun



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The mission team would like to acknowledge the following persons for their decisive role that they have played for the success of this mission:

Iraqi Ministers

HE Hassan Nadhem, Minister of Culture, Tourism and Antiquities

HE Mehdi R. Al Hamdani, Minister of Water Resources

Iraqi State Board of Antiquities and Heritage (SBAH), Ministry of Culture

Mr. Laith Hussein, Chairman

Mr. Riyadh Mouhamed, Eng, Dept of Remote sensing

Mr. Salem A. Ali, Director of Ashur Archaeological Site, Inspector of Salah-Addin Province

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Mr. Junaid Sorosh-Wali, Chief of Culture Programme

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ICOMOS

Ms. Regina Durighello, Director of World Heritage Programme

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Sincere gratitude is also extended to Mr. Salem Abdallah Ali, Director of Ashur Archaeological Site and his team for their hospitality and for all the information provided during our site visit, as well as to Mr Riyadh Mohamed for his diligence in supplying all requested documents and his support.

Finally, the mission was honoured by the trust placed by Dr Laith Hussein and his availability, as well as all the facilities he provided for our mission.

Mission Representatives

Mr. Toufik Hamoum, representing the World Heritage Centre

Ms. Yasmine Makaroun, ICOMOS International

Mr. Giuseppe Sappa, ICOMOS International

EXECUTIVE SUMMARY AND LIST OF RECOMMENDATIONS

In accordance with Decisions **43 COM 7A.18** and **44 COM 7A.6** of the of the World Heritage Committee, a joint World Heritage Centre/ICOMOS Reactive Monitoring mission to Ashur (Qal'at Sherqat) took place from 28 March to 1 April 2022. The main objective of this mission was to ascertain the state of conservation of the property and to assess the damages to the site.

Considering the intention of the State Party to reactivate the Makhool Dam construction project, the mission also had the task of assessing the potential risks and direct threats that the dam would pose to the Outstanding Universal Value of the property.

The site assessment highlighted the existence of several degradation factors that threaten the integrity of the archaeological site, and in particular the potential existential danger posed by the construction of the future Makhool Dam on the Tigris River on the property. Other major threats observed are common to mudbrick archaeological sites, but some are specific to the natural conditions of the property. The most significant monument undergoing erosion is the Ziggurat.

Regular maintenance of the site, conservation, and restoration are the main needs to maintain the Outstanding Universal Value of the property. The establishment of a conservation plan responding to the various imminent threats to the site is becoming more urgent and necessary. This plan should specify the general conservation strategies, physical techniques, protection and stabilisation of the property's structures and its eastern bank.

Based on the information available to the mission concerning the Makhool dam project, the potential existential impact on the property as a whole can already be confirmed. The dam's direct impact would also extend to the entire floodplain of the reservoir, which contains several archaeological sites in the hinterland of the property. Further relevant investigations are urgently needed in order to allow a full technical understanding of the impacts of the dam in relation to whether any physical protection measures might be feasible. Given the potential scale and scope of the impacts on the property that the dam could bring, it is nevertheless recommended to consider the relocation or cancellation of the project.

Recommendations

Recommendation 1: Prepare an overall comprehensive conservation plan for the property as a matter of priority in full consultation with the World Heritage Centre and the Advisory Bodies, which will be a framework for addressing the necessary interventions. It should comprise detailed documentation on the current state of the mud structures and the periodicity of maintenance works that will be carried out. In the framework of establishing this plan, it is further recommended to conduct comprehensive analysis and research on the original materials used, and the techniques and methods of construction, as well as detailed surveys and assessments.

In addition, baseline documentation and data collection should be carried out on all previous interventions undertaken at the property, and all details of interventions must be adequately recorded to allow for a referencing system for the future.

All planned and ongoing interventions must be integrated into the comprehensive conservation plan for the property. Priority conservation actions would comprise such maintenance works in areas where further damage is imminent and according to the principle of minimal intervention.

It is also recommended to initiate a capacity building programme focusing on documentation, conservation of earthen materials and site management.

Recommendation 2: Carry out regular maintenance activities, which would include:

- a) Cleaning and removal of debris and spoil heaps, including the removal of vegetation after biocide treatment.
- b) Backfilling of gullies and deep depressions to prevent further deterioration.
- c) Installing protective capping and sacrificial plaster to reduce the rate of rainfall erosion on the vertical surfaces of the walls.
- d) Treatment of the wall foundations to counteract the decay, by rebuilding the eroded sections with stabilized material (after testing and identifying the most compatible materials and techniques). However, it is recommended to not remove eroded layers along the bottom part of walls, in order to avoid additional erosion.
- e) Treatment and protection of all the wall surfaces.

In order to ensure the suitability of the materials used and the techniques applied by the technical teams, works should be first carried out in a pilot area and monitored over a certain period. Based on these results, the same technique can be applied to other areas.

Such maintenance work should be carried out at the property as a matter of urgency in order to ensure the preservation of the structures. It is recommended that the State Party consider submitting a request for International Assistance through the World Heritage Fund in order to support these works

Recommendation 3: Submit a detailed report on all planned and ongoing interventions carried out and their priority to the World Heritage Centre. All interventions must be integrated into the comprehensive conservation plan for the property.

- a) **Ziggurat of the God of Ashur:** Plan and undertake further intervention at the Ziggurat as a priority to stop the progression of the severe gullies and cavities, and, preventive measures must also be undertaken on the surfaces of the Ziggurat in order to protect the structures against weathering and rainfall. Consolidating documentation on all interventions undertaken at the property will allow for a referencing system for future interventions. Uncontrolled access of visitors to the Ziggurat should be stopped as a matter of urgency.
- b) **The Tabira Gate:** Undertake a comprehensive structural study in order to assess the safety of the monument and reconsider the propping system. Some preventative works are also necessary in order to fill the cracks at all levels, and in particular at the arches, to fill cavities on the top of the walls, and to install a capping layer on top of all structures to prevent water infiltration, in addition to improving the drainage system of the whole area. The State Party is urged to prevent access to the Gate until after it is deemed safe and stable.
- c) **The Royal Cemetery:** Investigate options for new roofing material to replace the broken glass roof. It is recommended that the new material selected to cover the shelter is sustainable and insulated (low UV), and compatible with the environment in order to minimize the visual and physical impact. In this regard, the State Party is invited to consult the ICCROM guidance on “protective shelters for archeological sites”. Meanwhile, some

maintenance work (anti-rust and paint) can be started on the metallic structures of the shelter in a color matching the context of the property.

- d) **The Walter Andrea Residence:** The planned project for the rehabilitation of the residence into an excavation house is promising. However, the State Party is requested to submit documentation on this project to the World Heritage Centre, in compliance with paragraph 172 of the Operational Guidelines for examination prior to approval of the project or to carrying out any interventions. It is recommended to carry out a detailed survey and structural assessment of the building. Based on the limited information provided by the State Party concerning the building's modern part, it is recommended that priority be given on the reinforcement and the waterproofing of roof slabs to ensure security of the building. The scraping of internal wall surfaces can be avoided, and a general cleaning may be carried out with an overall painting of surfaces. The rehabilitation of necessary electrical and sanitary infrastructure should be undertaken using sustainable energy resources (solar panels). Repair and completion of the external plaster along with new windows is recommended, and the historical character of the building is to be recognized, with its iconic feature named the "Agatha Christie balcony".

Recommendation 4: Considering the fragility of the mudbrick structures and the fact that majority of the property has not been excavated, it is crucial that uncontrolled access of motor vehicles and people into the property is prevented. Rebuilding the fence to protect the property should be carried out as a matter of urgency. Proper signage, with clear information indicating that the area is protected should be put up and activities to raise awareness of the local population, particularly to encourage them to contribute to the protection of heritage should be carried out.

Recommendation 5: A management system should be elaborated and implemented and, as soon as possible, a Management Plan draft that defines the attributes of Outstanding Universal Value (OUV), the management system, the aims and objectives of protection and management, and the supportive constraints in place/or needed, should be submitted.

Recommendation 6: On the basis of information presented to the mission, plans to resume the construction of Makhool Dam present potential existential threats to the property and therefore it is still recommended that due consideration is given by the State Party for the relocation or cancellation of the project in view of its potential impact on the Outstanding Universal Value (OUV) of the property and other archaeological sites, as previously requested by the World Heritage Committee.

Recommendation 7: Based on the available technical information, it is not possible to define precisely whether, and if so, how the property could be protected by physical measures sufficient to sustain its OUV.

Therefore, it is necessary to carry out, as a matter of urgency, the following technical studies and scientific assessments in order to allow a full understanding of the feasibility of physical protection measures:

- a. Undertake a hydraulic assessment of the area, an assessment of the hydraulic impact of the complete filling of the reservoir at ordinary water levels and at extreme hydraulic events, and also undertake geological, hydrological, and geotechnical soil investigation surveys at the property.
- b. Define, on the basis of the collected data, different potential options for physical protection measures in order to allow assessment as to whether any such measures might be

feasible in protecting the property from flooding, water seepage, salt infiltration and new micro-climates.

- c. Undertake, if such physical measures are considered to be feasible, a detailed Heritage Impact Assessment (HIA) for the designed flood protection structures (retaining walls, embankments, dikes, etc.), and also an Environmental Impact Assessment (EIA), to assess any potential negative impact on the OUV of the property and to demonstrate how the measures might be sufficient to sustain OUV, and submit the results of the assessments and surveys, as well as details of proposed mitigation measures and the EIA and HIA for review before any decisions are taken

Recommendation 8: While gabions might be a suitable technical solution that could be used against the current erosion of the River Tigris banks, adequate investigations and studies are needed to find the most viable solution. Larger gravel would need to be used in order to withstand the force of the water flow in ordinary conditions and in case of flooding when the force of the river increases. Further investigations are also needed to address the underwater archaeological potential along the eastern boundary, as well as exploring synergies with the UNESCO 2001 Convention on the Protection of the Underwater Cultural Heritage place.

I. THE PROPERTY

Inscription History

Ashur (Qal'at Sherqat) was inscribed in 2003 on the list of World Heritage in Danger at the 27th session of the World Heritage Committee (Decision **27 COM 8C.46**) simultaneously with its inscription on the World Heritage List. At the time of nomination, the project for the construction of Makhool Dam threatened the site, entailing partial flooding and seepage. Although the suspension of the project in 2013 was welcomed, the Committee requested the State Party to develop, in consultation with the World Heritage Centre and the Advisory Bodies, proposals for corrective measures and for the Desired state of conservation for the removal of the property from the List of World Heritage in Danger, together with a proposed timeframe, and to finalize the retrospective Statement of Outstanding Universal Value. The threat of future dam construction, as well as the lack of adequate protection, justified the property's inscription on the list of World Heritage in Danger.

Summary of the Statement of Outstanding Universal Value (SOUV)

The property does not yet have an elaborated Statement of Outstanding Universal Value (SOUV). Below is a brief description of the significance and the criteria adopted at the time of inscription.

Brief Description

The ancient city of Ashur is located on the Tigris River in northern Mesopotamia in a specific geo-ecological zone, at the borderline between rain-fed and irrigation agriculture. The city dates back to the 3rd millennium BC. From the 14th to the 9th centuries BC it was the first capital of the Assyrian Empire, a city-state and trading platform of international importance. It also served as the religious capital of the Assyrians, associated with the god Ashur. The city was destroyed by the Babylonians, but revived during the Parthian period in the 1st and 2nd centuries AD.

Criterion (iii): Founded in the 3rd millennium BC, the most important role of Ashur was from the 14th to 9th century BC when it was the first capital of the Assyrian empire. Ashur was also the religious capital of Assyrians, and the place for crowning and burial of its kings.

Criterion (iv):

The excavated remains of the public and residential buildings of Ashur provide an outstanding record of the evolution of building practice from the Sumerian and Akkadian period through the Assyrian empire, as well as including the short revival during the Parthian period.

Key Decisions of the World Heritage Committee

Ashur (Qal'at Sherqat) was inscribed on the World Heritage List in 2003, and simultaneously inscribed on the List of World Heritage in Danger due to the potential threat of a large dam project which would threaten the property and could potentially cause its partial flooding and lead to water seepage. Therefore, the Committee decisions since the inscription of the property requested the State Party to relocate or cancel the dam project. In 2013 (10 years after inscription), the State Party confirmed the cancellation of the Makhool Dam project, which was welcomed by the Committee by Decision **37 COM 7A.21** (Phnom Penh, 2013).

A joint World Heritage/ICOMOS Reactive Monitoring Mission was undertaken to the property in 2011. It confirmed that the construction of the Makhool Dam, would constitute a significant risk to the property given the expected flooding of the river. The mission provided a general strategy for conservation interventions, given the risk of flooding and to mitigate the ongoing erosive action of the Tigris River.

In Decision **36 COM 7A.21**, the Committee took note of the results of the 2011 Reactive Monitoring mission, and encouraged the State Party to implement its recommendations, urging it to prioritize the implementation of the following actions:

- Develop baseline documentation to carry out a comprehensive condition assessment of the property, including architectural drawings and topographical maps that have yet to be completed.
- Undertake identified priority conservation actions to improve the conservation conditions of the built fabric.
- Undertake a planning process for the formulation of a Management Plan for the property, including a comprehensive conservation plan, a risk Management Plan and provisions for maintenance and monitoring.
- Implement capacity building activities for earthen architecture conservation and site management.

Between 2011 and 2014, the Committee Decisions concerning Ashur (Qal'at Sherqat) mainly requested the State Party to develop proposals for corrective measures and the Desired State of Conservation for the removal of the property from the List of World Heritage in Danger, in light of the fact that the main threat to the property – the Makhool Dam project – had by this time been cancelled. The Committee also encouraged the State Party to submit a request for International Assistance from the World Heritage Fund to support the preparation of the requested conservation and management plans. In Decision **37 COM 7A.24** (Doha, 2014), the committee expressed regret that the protective shelter was built at the Royal Cemetery in spite of the request made to submit details for the intervention for review prior to its construction, and noted the physical and visual impacts of the shelter on the attributes of the property, requesting the State Party to work with the World Heritage Centre and the Advisory Bodies in identifying options for the archaeological area and to reverse and/or mitigate the impacts generated by the intervention.

During the most recent conflict, between 2014 and 2018, the Committee expressed concern about the lack of information regarding the state of conservation of the property, and in 2019 requested the State Party to provide a full and detailed assessment of the damages incurred at the property (Decision **43 COM 7A.18**).

At the 44th session of the Committee (Fuzhou (China)/Online, 2021), and following the notification received by the secretariat from the State Party regarding the intention to resume the construction of Makhool Dam, the Committee reiterated its request to the State Party to provide a detailed review of the damages and the potential risks to the property and expressed regret at the State Party's intention to reactivate plans to construct the Makhool Dam. The Committee requested the States Party to submit the full technical information including a comprehensive Environmental Impact Assessment to the World Heritage Centre for technical review, and called upon the State Party to suspend any work towards the dam construction, pending consideration of cancellation or relocation of the project and review of the technical information for the project. The decision of the Committee reiterated its previous request that interventions be addressed within the framework of the overall assessment of damage and risks and a comprehensive conservation plan prepared in full consultation with the World Heritage Centre and the Advisory Bodies. It also requested that a joint World Heritage Centre/ICOMOS Reactive Monitoring mission visit the property to assist in assessing damage incurred, preparatory to the development of a comprehensive Conservation Plan and to identify corrective measures for the development of a desired state of conservation for the removal of the property from the List of World Heritage in Danger (DSOCR).

II. SUMMARY OF THE NATIONAL MANAGEMENT SYSTEM FOR THE PRESERVATION AND MANAGEMENT OF THE WORLD HERITAGE PROPERTY

The State Board of Antiquities and Heritage (SBAH), under the Ministry of Culture, Tourism and Antiquities, is responsible for the management of the World Heritage sites including Ashur (Qal'at Sherqat). Cultural heritage is protected under Iraq's Antiquities and Heritage Law Number 55 of 2002.

To achieve the objectives of this law, Article 2 stipulates that the Antiquities Authority (State Board of Antiquities and Heritage (SBAH)) is authorized to:

- *First, to designate sites that are rich in antiquities and cultural treasures as well as sites of historical significance.*
- *Second, to use the latest scientific and technical methods and means to search for antiquities.*
- *Third, to maintain the countries antiquities, its heritage, and its historical sites and to protect them from damage, harm and deterioration.*
- *Fourth, to build modern museums where antiquities and cultural heritage materials and models may be displayed, thereby enabling citizens and visitors to peruse them and learn about them.*
- *Fifth, to manufacture models of antiquities and cultural heritage materials and to produce for display, sale or exchange depictions of these antiques and cultural heritage materials in photographs, slides and films.*
- *Sixth, to conduct studies and research that highlight the antiquities and cultural heritage of Iraq.*

- Seventh, to effect the temporary and occasional display of antiquities and cultural heritage materials or copies therefor in foreign museums, to enable foreigners to become acquainted with Iraq's ancient culture and civilization.
- Eighth, to educate specialist in antiquities and cultural heritage and to upgrade the efficiency of those specialists by means of training courses, academic scholarships, and fellowships.
- Ninth, to organize survey teams for the purpose of conducting comprehensive surveys of antiquities and cultural heritage buildings in Iraq.

The Antiquities and Heritage Law also contains the following articles:

- Article 6 (Second): The Antiquities Authority may evacuate persons and property from archeological and cultural heritage sites as well as from their no-use perimeters in case to threat to people and to the archeological and cultural heritage sites.
- Article 7: All historic and archaeological sites, including archeological hills and mounds, owned by public juristic persons, shall be registered under the name of the Ministry of Finance. Their use shall be designated and dedicated to serve the purposes of the Public Authority for Antiquities and Heritage.
- Article 8: Acting in coordination with relevant state agencies the Antiquities Authority shall conduct a comprehensive archeological survey of archeological and cultural heritage sites and buildings in Iraq. It shall pinpoint those sites and structures on survey maps and documents with fixed coordinates, and it shall incorporate them in its own basic design plans. It shall indicate how these sites are being used as archeological land and buildings and it shall send notice to that effect to the competent municipalities.
- Article 9 (Third): Agencies responsible for the preservation and maintenance of archeological sites, [cultural] heritage sites and historical sites shall obtain the written consent of the Antiquities Authority before making or altering any plans for locating general, industrial, agricultural, and housing projects at those sites. They shall also obtain a written consent from the Antiquates Authority before making or altering any plans for the construction, expansion, or beautification of cities and villages or for irrigation, [water] filtration, and or road construction projects at these sites.
- Article 9 (Fifth): Building permits shall not be issued for areas comprising archeological sites and for areas that are within one kilometer of such sites without the written consent of the Antiquities Authority...

Furthermore, Article 15 of the legislation prohibits the following:

- First, Trespassing on archeological, cultural heritage, historical sites.
- Second, Farming, residing, building a residence, or constructing any other structures on archeological and cultural heritage sites...
- Third, Using archeological sites to deposit construction debris or refuse to erect buildings or burial structures or using them as quarries.
- Fourth, Uprooting trees and vegetation and removing structures from archeological sites or undertaking any work that will result in the changing of the features of the archeological site.

- *Fifth, Establishing industries that pollute the environment or pose a threat to public health in areas that are less than three (3) kilometers away in all directions from archeological sites and cultural heritage buildings.*
- *Sixth, Tearing down an archeological or a cultural heritage building, disposing of its construction materials, or using it in such a way as to risk damaging it, harming it or altering its distinguishing features.*

The law also stipulates penalties for such illegal activities, which may imply an imprisonment for a term not more than 10 years, and the payment of a fine.

Moreover, the State Party has ratified the 1972 World Heritage Convention on 5 March 1974, as well as other UNESCO Culture Conventions as follows:

Title	Date of Ratification
1954 Convention for the Protection of Cultural Property in the Event of Armed Conflict	21 December 1967
The 1954 First Protocol	21 December 1967
The 1999 Second Protocol	6 April 2022
The 1970 Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property	12 February 1973
The 2003 Convention for the Safeguarding of the Intangible Cultural Heritage	06 January 2010
The 2005 Convention for the Protection and Promotion of the Diversity of Cultural Expressions	22 July 2013

III. THE MISSION

At its 43rd (Baku, 2019) and 44th (Fuzhou (China)/Online, 2021) sessions, the World Heritage Committee requested the State Party to invite a Joint World Heritage Centre/ICOMOS Reactive Monitoring mission to the property (Decisions 43 COM 7A.18 and 44 COM 7A.6). The Committee underscored the need for a joint World Heritage Centre/ICOMOS Reactive Monitoring mission to assist in assessing damage to the property incurred during the recent armed conflict as a preparatory step for the development of a comprehensive Conservation Plan.

In 2021, UNESCO was notified of the intention of the State Party to proceed with the construction of the Makhool Dam that had previously been cancelled. The proposed dam project is the same project as proposed in 2003, which then was considered as a major threat to the property justifying the inscription of the site on the List of World Heritage in Danger. Considering the foreseen threat the construction of the dam would pose to the Outstanding Universal Value (OUV) of the property, an immediate independent assessment of the condition of the property was seen as a first step towards the development of a retrospective Statement of Outstanding Universal Value, a comprehensive conservation plan, the identification of corrective measures, and the development of a Desired state of conservation for the removal of the property from the List of World Heritage in Danger (DSOCR).

The mission team was composed of Mr. Toufik Hamoum, representing the World Heritage Centre, and, Ms. Yasmine Makaroun and Mr. Giuseppe Sappa, representing ICOMOS International. However, one of the ICOMOS experts was not able to travel, but provided a technical note based

on the documents and information gathered from the State Party during the mission. The mission was accompanied by Mr. Junaid Sorosh-Wali, Chief of Culture at the UNESCO Office in Iraq throughout its duration

Within the timeframe of the mission, site visits were conducted at the following parts of the property: the Ziggurat of the God of Ashur, the Tabira Gate, the Royal Cemetery, and the Walter Andrea Residence. Additionally, the mission team visited the location of the planned Makhool Dam.

During the site visit, the mission team met with Dr. Laith Hussain (Director of the State Board of Antiquities), Mr. Salim Abdullah Ali (Site Manager of Ashur) and Mr. Riyadh Mohammed (Engineer, Department of Remote Sensing). Furthermore, the mission team also met with Mr. Kadhim Jaber (Director General of the State Commission of Dams and Reservoirs “SCODAR”) at the Makhool Dam site. The mission also had the opportunity to meet with representatives from the American University Sulaimaniyah (AUIS) who are working on different onsite projects.

Furthermore, two formal meetings were organized in Baghdad as part of the mission. On the morning of 30 March 2022, the mission met with H.E. Mr. Hassan Nadhem the Minister of Culture, Tourism and Antiquities in the presence of Dr. Laith Hussain (Director of the Iraqi State Board of Antiquities and Heritage, SBAH). In the afternoon, the mission team met H.E. Mr Mehdi Al Hamdani the Minister of Water Resources in the presence of Mr. Kadhim Jaber (Director General of the State Commission of Dams and Reservoirs, SCODAR). The Ministers underscored that the plans to go ahead with the construction of the Makhool Dam is a government priority needed to ensure water security. It was highlighted that mitigation measures will be identified in order to ensure the protection of the cultural heritage while also allowing plans for construction to go forward.

The terms of reference of the mission comprised assessing the overall state of conservation of the property, taking into consideration any identified attributes of the property which may support its Outstanding Universal Value (OUV), as well as an overall assessment of the condition of the property which could contribute to the development of a Retrospective Statement of Outstanding Universal Value (RSOUV), a comprehensive conservation plan, and the identification of corrective measures in the framework of the eventual development of a Desired state of conservation for the removal of the property from the list of World Heritage in Danger (DSOCR). Moreover, the mission team was requested to review the current situation and plans for the construction of the Makhool Dam and its potential impact on the property, as well as considerations for its cancellation or relocation. This includes the review of any condition or impact assessments carried out, as well as protection measures undertaken to mitigate the impact of the prevailing threats, in addition to any progress and steps undertaken towards a comprehensive conservation and management plan for the property.

IV. ASSESMENT OF THE STATE OF CONSERVATION OF THE PROPERTY

Within the time available for the site visit, the mission team focused on the major overall problems affecting the property, noting that limited information was available for review prior to the mission, as the state of conservation reports provided by the State Party in recent years did not contain detailed information or sufficient documentation. Therefore, there was no detailed assessment of the damages incurred at the property during the recent armed conflict, or substantive information on conservation projects or interventions undertaken at the property. Similarly, information previously requested regarding the design or plans for the construction of the Makhool Dam was

not available prior to the mission. However, the State Party kindly provided several documents and studies to the team upon request during the mission.

In order to assess the state of conservation of the property, the mission took into consideration its terms of reference as well as previous decisions of the World heritage Committee and issues already identified in the 2011 Reactive Monitoring mission, many of which had not been sufficiently addressed.

The main issues impacting the property have been identified in relation the protection of structures and maintenance measures, intervention and conservation works, management of the property, erosion of the Tigris Riverbank and the threats arising from the planned construction of the Makhool Dam.

Issue 1: Protection of structures and maintenance measures

During the site visit, it was evident that almost all mudbrick structures at the property are affected by weathering and decay due to erosion, artificial topography (due to excavations), rainwater, ground humidity, vegetation, and anthropic activities. More specifically the following was noted:

- b) Wall foundations of the mudbrick structures have eroded due to the combined action of humidity and the rising salt levels.
- c) Climate related conditions (heavy rain and wind) have contributed to the erosion of the vertical surfaces of the walls which resulted in large amount of material loss, mainly redeposited at the base of the walls constituting a temporary cover or 'talus'. Furthermore, rainwater on the soft mudbrick surface has created soil depressions and gullies.
- d) Ground surface erosion has taken place due to water stagnation (resulting from artificial topography after excavations). The surface erosion is amplified due to the gullies formed from heavy rain and the lack of soil absorption. The power of the runoff is strong enough to cut deep channels into the ground, allowing for large amounts of material to be transported away.
- e) There is uncontrolled vegetation growth under the glass shelter area of the Royal Cemetery due to a humid microclimate that was created by runoff water.
- f) The artificial topography of the site as a result of excavations is aggravating erosion and increasing surface runoff due to the lack of sufficient drainage.

The above-mentioned factors are strongly exacerbated due to the lack of a drainage system, the absence of monitoring and documentation and the uncontrolled access of visitors to the property. No regular maintenance is undertaken at the property, and this is crucial to ensure its preservation.

The negative impact of the erosion is particularly apparent at the Ziggurat of the God of Ashur. Photographic documentation clearly demonstrates the loss of material gradually over time. The loss of material is estimated to be a minimum of 25% and as a result the Ziggurat is losing its shape. The harsh environmental conditions resulted in gullies and cavities in the mudbrick structures, and these cavities have exposed the inner core of the tunnels to water infiltration. Furthermore, the decay process of the sun-dried masonry is also evident particularly in the Old Palace. Moreover, it is clear that previous interventions undertaken on the monuments have not always used compatible materials and techniques which has impacted negatively on the integrity of the structures. Previous interventions are not sufficiently documented, and it is essential that comprehensive records of all interventions are kept in order to monitor structures and allow for a reference system for future interventions.

Recommendations:

It is recommended that an overall comprehensive conservation plan for the property be prepared as a matter of priority, which will be a framework for addressing the necessary interventions. In order to ensure the preservation of the mudbrick structures over time, and regular maintenance activities must be carried out. The conservation plan for the property should include detailed information on the periodicity of maintenance works that will be carried out at the property. Furthermore, detailed documentation of the current state of the mud structures should be undertaken in order to allow for continuous monitoring of the state of the structures.

The maintenance works to be carried out at the property should include:

- a) Cleaning and removal of debris and spoil heaps, including the removal of vegetation after biocide treatment.
- b) Backfilling of gullies and deep depressions to prevent further deterioration.
- c) Installing protective capping and sacrificial plaster to reduce the rate of rainfall erosion on the vertical surfaces of the walls.
- d) Treatment of the wall foundations to counteract the decay, by rebuilding the eroded sections with stabilized material (after testing and identifying the most compatible materials and techniques). However, it is recommended to not remove eroded layers along the bottom part of walls, in order to avoid additional erosion.
- e) Treatment and protection of all the wall surfaces.

It is recommended that, in the framework of establishing the conservation plan, comprehensive analysis and research is conducted on the original materials used, and the techniques and methods of construction. Additionally, detailed surveys and assessments (structural and architectural studies) must be carried out to ensure the appropriateness of interventions. Finally, in order to ensure the suitability of the materials used and the techniques applied by the technical teams, works should be first carried out in a pilot area and monitored over a certain period. Based on these results, the same technique can be applied to other areas.

Furthermore, baseline documentation and data collection should be carried out on all previous interventions undertaken at the property. Coming forward, all details of interventions must be adequately recorded to allow for a referencing system for the future.

Priority conservation actions would comprise such maintenance works in areas where further damage is imminent and according to the principle of minimal intervention. They should be carried out at the property as a matter of urgency in order to ensure the preservation of the structures. It is recommended that the State Party consider submitting a request for International Assistance through the World Heritage Fund in order to support these works.

Finally, it is recommended to initiate a capacity building program focusing on documentation, conservation of earthen materials and site management.

Issue 2: Interventions and Conservation Works

The mission team conducted a site visit and had the opportunity to examine parts of the property. The information provided below gives a description of the main intervention works and conservation issues observed specifically at the Ziggurat of the God of Ashur, the Tabira Gate, the Royal Cemetery, and the Walter Andrea Palace.

Additionally, it is important to note that during the armed conflict several sites within the property suffered from deliberate destruction, vandalism, and looting. For instance, the Ottoman Baraks (Farhan Palace) was damaged by explosives, the Water Andrea Residence was vandalized, the headquarters of the site management unit and the guard rooms were damaged, the glass of the shelter covering the royal cemetery has been smashed, part of Tabira Gate collapsed, and the fences around the property have been destroyed. No direct damages on archaeological remains were reported by the State Party, but this can only be properly analyzed with comparative photos as such damages might not be obvious by visual onsite inspection.

Recommendations: It is recommended that the State Party submit a detailed report on all planned and ongoing interventions carried out and their priority. However, all interventions must be integrated into the comprehensive conservation plan for the property which should be prepared in full consultation with the World Heritage Centre and the Advisory Bodies.

Ziggurat of the God of Ashur

The Ziggurat of the God of Ashur has undergone several conservation and protection works over the years. Nevertheless, mudbrick structures are vulnerable and thus are susceptible to continuous gradual erosion due to the climatic conditions. The mission observed several cavities and gullies on the fragile mud structures caused by water infiltration and runoff. In addition, the masonry layers and foundation of the inner core of the Ziggurat is exposed to water infiltration from the cavities on the surface.

In 2020, the peripheral trench of the Ziggurat was backfilled with earth material to limit water infiltration into its base. This intervention is a temporary solution however, and more strategic actions are required for the protection of this landmark, specifically after the rainy season. It is also evident that the lack of regular maintenance at this landmark has resulted in the loss of its shape and material over the years, this is further exacerbated by the uncontrolled visitor access to the top of the Ziggurat.

Recommendation: Within the framework of the comprehensive conservation plan that will be established, and as a priority, further interventions must be undertaken at the Ziggurat to stop the progression of the severe gullies and cavities caused by water infiltration as this gradual damage continues to pose an imminent danger to the structure. In the same sense, preventive measures must also be undertaken on the surfaces of the Ziggurat in order to protect the structures against weathering and rainfall. In addition, the State Party should consider consolidating the available documentation on all interventions undertaken, including studies, photographic evidence, surveys etc. in order to allow for a referencing system for future interventions. Finally, as a matter of urgency, it is necessary to stop uncontrolled access of visitors to the Ziggurat.

Tabira Gate

Tabira Gate was mostly reconstructed in 1978, and in 2010 maintenance work was carried out, which was considered as acceptable by the Committee, but in need of upgrading. During the armed conflict in 2015, Tabira Gate was severely damaged. In 2020, emergency stabilization works were undertaken in collaboration with the American University of Sulaimaniyah (AUIS), financed by ALIPH in order to stabilize the arches and remove the rubble and debris from the area. Local material (clay, vegetal fibers, ghee) and traditional techniques (fabrication of mud and baked brick in situ) were used for these works which is regarded as positive.

The mission team observed that it would be important that further assessments are conducted and several considerations be taken into account in the conservation of this structure, such as ensuring the compatibility and homogeneity of the materials and techniques used as well as structural stability. Detailed drawings and documentation of all interventions need to be provided, including documentation on previous interventions and as-built drawings that would serve as a reference. The mission found that some elements appeared unstable and at risk of collapse, and that a well-designed propping system would be necessary to meet the required safety conditions, since the existing metal props which are in direct contact with the brick masonry (without any transitional material) may not be sufficient. Therefore, it would be best to prevent public access through this gate until its stability is assured.

Recommendation: A comprehensive structural study should be undertaken in order to assess the safety of the monument and reconsider the propping system, and a detailed report on all proposed interventions submitted before implementation. Some preventative works are also necessary in order to fill the cracks at all levels, and in particular at the arches, to fill cavities on top of the walls, and to install a capping layer on top of all structures to prevent water infiltration, in addition to improving the drainage system of the whole area. The State Party is urged to prevent access to the Gate until after it is deemed safe and stable.

The Royal Cemetery

During the armed conflict, the glass which covered of the Royal Cemetery was smashed, leaving it open to environmental conditions. Prior to the construction of the shelter, no information was shared with the World Heritage Centre. In 2014, the World Heritage Committee expressed its regret that the protective shelter was constructed in spite of the request made to submit details for the intervention, and noted its physical and visual impacts on the attributes of the property (Decision **37 COM 7A.24**). There are currently no plans for the replacement of the glass cover. However, it is important to note that there is insufficient drainage in the area, which is evident because of the visible cavities and gullies inside and outside the cemetery. Additionally, the concentration of runoff water in the burials is leading to the growth of vegetation.

Recommendation: It is necessary for the State Party to investigate options for new roofing material to replace the broken glass roof. It is recommended that the new material that will be selected to cover the shelter is sustainable and insulated (low UV). The material should also be compatible with the environment in order to minimize the visual and physical impact. In this regard, the State Party is invited to consult the ICCROM guidance on “protective shelters for archeological sites”. Meanwhile, some maintenance work (anti-rust and paint) can be undertaken on the metallic structures of the shelter in a color matching the context of the property.

The Walter Andrea Residence

The Walter Andrea Residence was also affected by armed conflict. All the doors and windows were dismantled, the tiles were removed from the floors and even the water and electricity systems were taken. Graffiti is also visible on the walls of the building. The residence was cleaned and is currently closed. However, the eastern side of the residence is about 7 meters away from a cliff overlooking the Tigris River, which is crumbling due to humidity and the flow of the river. In 2011, a retaining wall made of gabions was constructed but did not ensure sufficient protection on the cliff which is made of soft geological layers. In 2022/2023, a German project (University of Munich (Ludwig-Maximilians - Universität München)) will work on the rehabilitation of the residence into an excavation house.

Recommendation: The planned project for the rehabilitation of the residence into an excavation house is promising. However, the State Party is requested to submit documentation on this project to the World Heritage Centre, in compliance with paragraph 172 of the Operational Guidelines for examination prior to approval of the project or to carrying out any interventions. It is recommended to carry out a detailed survey and structural assessment of the building. Based on the limited information provided by the State Party concerning the building's modern part, it is recommended that priority be given on the reinforcement and the waterproofing of roof slabs to ensure security of the building. The scraping of internal wall surfaces can be avoided, and a general cleaning may be carried out with an overall painting of surfaces. The rehabilitation of necessary electrical and sanitary infrastructure should be undertaken using sustainable energy resources (solar panels). Repair and completion of the external plaster along with new windows is recommended, and the historical character of the building is to be recognized, with its iconic feature named the "Agatha Christie balcony".

Issue 3: Management of the property

The team responsible for the property is composed of five employees, who are in charge of the entire province of Salah-Addin, consisting of 173 archeological sites including the World Heritage site of Ashur (Qal'at Sherqat). There is a lack of equipment and facilities as well as lack of adequate budget, making it extremely challenging for the team to carry out activities relating to the management and conservation of the property. For the moment, interventions are only undertaken in urgent situations. The property does not have a management system in place, and this has a negative impact on the overall management of the property, which is also suffering due to lack of physical protection and visitor management.

There are currently no physical protection measures at the property. During the armed conflict, the barbed wire that served as a protection measure was taken out and what has remained are only concrete posts, with no fence. There are no official guards protecting the site, only the presence of military police at the main entrance of the site. However, this is not sufficient to ensure the protection of the property since it is accessible from several directions. Furthermore, the headquarters of the site management team is located on the eastern edge of the property, below the level of the old city, and does not allow visual control of the property. No means of digital monitoring (cameras) are currently installed.

There is a total absence of infrastructure and facilities dedicated to site presentation. The signage at the main entrance is very poor, written by hand on metal panels. There are almost no visitors at the property. No official trails are laid out throughout the property, only gravel roads which are accessible to motor vehicles. The local population have uncontrolled access to the property, for instance, the site area is used as a playground for the local youth.

Recommendations:

Considering the fragility of the mud-brick structures and the fact that majority of the property has not been excavated, it is crucial that uncontrolled access of motor vehicles and people into the property is stopped. Rebuilding the fence to protect the property should be carried out as a matter of urgency. Proper signage, with clear information indicating that the area is protected should be put up, and activities to raise awareness of the local population, particularly to encourage them to contribute to the protection of heritage should be carried out.

A management system should be elaborated and implemented and, as soon as possible, a Management Plan draft that defines the attributes of OUV, the management system, the aims

and objectives of protection and management, and the supportive constraints in place/or needed, should be submitted.

Issue 4: Boundaries of the Property

Encroachments within the buffer zone of the property (as indicated in the 2003 nomination file) were observed during the site visit. The Iraqi authorities informed the mission team that the boundaries of the property have been revised in 2018 and again in 2019 in order to increase the area of the property to almost 100ha. The justification for the proposed enlargement of the property in the 2019 maps for the protection of newly discovered archeological sites from development. However, the width of the buffer zone seems to have been substantially reduced. There are currently no regulations in place to prevent further developments, and the area surrounding the property is not regulated by a masterplan. For the moment all construction permits are treated on a case-by-case basis by the Municipality of Sherqat.

With reference to the 2018 map, which was submitted to the World Heritage Centre in February 2019, the State Party was informed by the World Heritage Centre that the buffer zone did not correspond to the boundaries of the buffer zone as inscribed by the World Heritage Committee. Modification of a buffer zone for a property already inscribed on the List is considered as a minor modification to the boundaries of the property, and hence the State Party was encouraged to complete the minor boundary modification requests in accordance with the *Operational Guidelines for the Implementation of the World Heritage Convention*.

On the other hand, the map of 2019 illustrating changes to the property/buffer zone that were shared with the mission team, was not submitted officially to the World Heritage Centre for review and approval by the World Heritage Committee. While the State Party's intention to further protect the World Heritage property is recognized, the proper procedure for boundary modification proposals, whether in relation to the boundaries of properties or buffer zones must be in accordance with the Annex 11 of the *Operational Guidelines for the Implementation of the World Heritage Convention*.

Issue 5: Construction of Makhool Dam

The mission team had the opportunity to visit the site of the planned construction of the Makhool dam, which is located some 40km south of the World Heritage site of Ashur (Qal'at Sherqat). The construction of the Makhool Dam would have a direct potential impact on the property which will flood during certain periods of the year when the reservoir is full. For this reason, the construction of the Makhool Dam was identified as a major potential threat to the property, at the time of inscription in 2003 and the property was at the same time included on the List of World Heritage in Danger.

While the Iraqi authorities confirmed the cancellation of the Makhool Dam project in 2013, plans to go ahead with the construction were reactivated in 2021 as a priority due to water security issues. However, the State Party expressed their intention to find a solution to mitigate the risk to the World Heritage property. In this regard, the State Party provided the mission team with an Environmental Impact Assessment (EIA), documents on the dam design and plans for protective measures to mitigate the risk on the heritage sites in the vicinity. The information provided in this section is based on the evaluation by the ICOMOS expert of the documents provided by the State Party.

Since the planned reservoir will be used for hydroelectric power generation, it will generally be kept at the maximum possible level, compatible with the available runoff from the catchment and any provision for irrigation water to downstream users. The possibility of water infiltration and seepage to the archeological sites is a real threat, and provisions must be put in place to mitigate this problem. However, sufficient technical documentation is not available in order to accurately evaluate the potential risks of the dam construction on the property. Nevertheless, based on the documentation provided by the State Party, an approximate assessment of the risks can be provided.

The planned dam seems to be a zoned earth embankment structure with a cut off wall, which is 1m thick and constructed in bentonitic cement slurry to create an impermeable barrier in the sedimentary foundation strata. The dam wall has a free overflow spillway concrete structure on one of the abutments that incorporates the outlets for the irrigation water releases. At the downstream toe of the dam, there is a hydropower station with all appurtenant works, which will be used for irrigation purposes.

Based on the topographical information available, protective measures will be essential to protect the property particularly on the south, but also on the eastern flank and to its north, where the ancient course of the Tigris still exists and will also be flooded by the reservoir.

Since the reservoir will be used for hydroelectric power generation, it will be kept to the maximum possible water level. Based on the elevation data distribution set up after the GIS survey carried out in January 2022 by the Bologna University Team, the highest water level in the reservoir after the dam construction will be 152 m a.s.l., the Tigris River level will be higher than 152 m a.s.l and the lowest elevation of the Ashur area is 150.2 m a.s.l. This means that in ordinary conditions the Makhool Dam would partially flood the Ashur area.

Specific measures are thus required to hold back the waters of the impounding lake to prevent the flooding of the archeological sites on the promontory which forms part of Ashur (Qal'at Sherqat), as such flooding could result in their complete destruction. Furthermore, the archeological areas which are not at risk of flooding will possibly suffer from water infiltration and seepage and a solution is also needed to address this problem, as over time such seepage could also lead to permanent loss of archaeological fabric.

The State Party has provided some information regarding proposed protective measures including a small protection dam and perimetral embankments, however it is the opinion of the mission team that these proposals will not be sufficient to protect the World Heritage property of Ashur (Qal'at Sherqat) from flooding. More specifically, the proposed height of the protection dam will not be adequate to protect the area, as the dam itself will be submerged. Furthermore, the proposed embankment seems to be too large to be inserted in the narrow area between the site and the Tigris River. Additionally, the height of the embankment is not high enough to protect the Ashur area from flooding neither.

This is not to say that the Ashur area cannot be protected, but based on the information currently available, different types of protection measures are required from those proposed. Moreover, the such alternative protection works can only be defined, and their effectiveness assessed, after a comprehensive study and additional investigations are undertaken in the area, including a detailed hydraulic study, which is the only way to get a reliable output of the required height of the protection dam in this area.

Moreover, the property is quite vulnerable and has been suffering from water seepage and environmental degradation for some time, which has been accelerating its deterioration. Hence, in addition to the threat of flooding in the event of the dam's construction, several other threats should be taken into consideration when assessing the effectiveness of protective measures, including the potential increase in water seepage, salt infiltration, the creation of a new micro-climate, and the potential impact of any new large constructions on the property's OUV.

Recommendations:

Plans to resume the construction of Makhool Dam present potential existential threats to the property and therefore it is still recommended that due consideration is given by the State Party for the relocation or cancellation of the project in view of its potential impact on the Outstanding Universal Value (OUV) of the property and other archaeological sites, as previously requested by the World Heritage Committee.

Based on the available information, it is confirmed that the proposed protection measures will not protect the World Heritage property of Ashur (Qal'at Sherqat) from flooding arising from the construction of the Makhool dam. With the limited available technical and topographic documentation on the environmental impact of the dam and on the level of water in the future reservoir, it is currently not possible to define precisely to what degree the property will be impacted and thus whether and how it might be protected sufficiently to sustain its OUV.

Additionally, it is not possible to define, or assess the effectiveness of any alternative mitigation measures to protect the property, until a fully comprehensive hydrological, hydraulic, geological, hydrogeological, and geotechnical investigation is carried out in the area in order to allow a full understanding of the impacts of the dam. Only with the availability of this information will it be possible to consider the feasibility of physical protection measures, and if feasible, the most effective measures to protect the property.

In order to help in arriving at different protection designs that might satisfy the height requirements to protect the property from flooding, additional in-depth studies are needed focusing on the hydraulic assessment of the area. An Environmental Impact Assessment (EIA) should also be undertaken which studies the hydraulic impact of the complete filling of the reservoir at ordinary water levels and at extreme hydraulic events. Additionally, sound geological, hydrological, and geotechnical soil investigation surveys are needed for the property itself, to identify the most suitable structures for its protection. This should be followed by a detailed Heritage Impact Assessment (HIA) for the designed protection structure/s (retaining walls, embankments, dikes, etc.), to assess the potential negative impact of these structures on the Outstanding Universal Value (OUV) of the property beyond only protection from flooding.

More technical details regarding the required studies can be found in the technical note (Annex 10).

Issue 6: Erosion of the Tigris Riverbank

The mission team observed significant current erosion of the Tigris riverbank including structural cracks which resulted in the collapse of the upper part of the Tell. Additionally, the retaining wall made up of gabions has almost completely eroded. As a result, the Walter Andrea Residence, which is close to the riverbank (less than 7 meters), is in danger. The mission team considers the erosion to the riverbank to be in an advanced stage, and thus it is expected that the construction of the Makhool Dam will further intensify the damage.

The issue at hand is that the eastern base of the Tell is constantly in contact with the course of the Tigris River, with the water levels constantly fluctuating and rise rapidly during the rainy season. This phenomenon, coupled with a high concentration of humidity, contributes significantly to the erosion. The mission team would also like to point out that underwater cultural heritage is also at risk since there are adjacent fluvial port structures, boats and other potentially important submerged heritage in the vicinity.

Recommendation:

While gabions might be a suitable technical solution that could be used against erosion of the River Tigris banks, however, adequate investigations and studies are needed to find the most viable solution. Larger gravel would need to be used in order to withstand the force of the water flow in ordinary conditions and in case of flooding when the force of the river increases. Further investigations are also needed to address the underwater archaeological potential along the eastern boundary, as well as exploring synergies with the UNESCO 2001 Convention on the Protection of the Underwater Cultural Heritage

V. CONCLUSIONS AND RECOMMENDATIONS

Response to the Mission Terms of Reference

The mission has addressed the items outlined in its Terms of Reference, as follows:

- **Overall State of Conservation of the property, having particular regard to any identified attributes of the property which may support its Outstanding Universal Value (OUV)**

The mission team had an overview of the state of conservation of the property by visiting several sites of the property. Unfortunately, it was not possible for the mission team to visit all sites at the property within the allocated timeframe. The property does not have a management plan or a conservation plan in place. Several sites within the property have been impacted negatively due to the environmental conditions and the lack of regular maintenance. Moreover, some sites incurred damage due to the armed conflict. The planned construction of the Makhool Dam continues to cause concern as the site would be partially flooded by the reservoir putting the OUV of the property under imminent threat. For the moment, none of the mitigation measures being considered will be sufficient to protect the property from flooding.

- **Overall assessment of the condition of the property, which would contribute to the development of a Retrospective Statement of Outstanding Universal Value, a comprehensive conservation plan, the identification of corrective measures, and the development of a Desired state of conservation for the removal of the property from the List of World Heritage in Danger (DSOCR)**

The mission team found that the site suffers from several factors, some of which were not sufficiently addressed since the last Reactive Monitoring mission to the property in 2011, including: deterioration of mudbrick structures, lack of adequate conservation interventions, lack of physical protection, absence of site and visitor management facilities and damages due to armed conflict. The property needs a comprehensive conservation plan to address the different issues at the sites. Additionally, maintenance and preventive

conservation works must be carried out as a matter of urgency in order to address and counteract damages already incurred at the property and mitigate further damage and deterioration.

- **Review of the current situation and plans for the Makhool Dam and its potential impact on the OUV of the property, as well as consideration for its possible cancellation or relocation**

The mission team had the opportunity to meet with the Minister of Culture, Tourism and Antiquities and the Minister of Water Resources in order to discuss the Makhool Dam construction and the impact that it would have on the World Heritage site of Ashur (Qal'at Sherqat) and other archeological sites in the vicinity. However, the mission team was informed that Iraq is going through a national water crisis and the construction of the dam is a national priority needed in order to ensure water security, and therefore there is the intention to move forward with the project. Nevertheless, the mission team was informed of the efforts taken by the authorities in order to find a solution to ensure that the cultural heritage is preserved. The Iraqi authorities shared plans for mitigation measures and some studies undertaken in order to prevent the negative impact of the dam on the World Heritage site.

- **Progress and steps undertaken towards a comprehensive conservation and management plan**

The mission confirmed that the State Party has not taken steps towards the elaboration of a comprehensive conservation nor management plan for the property. Although, a conservation plan (in particular) must be elaborated as a priority in order to ensure effective and strategic interventions to protect and preserve sites around the property.

Recommendations:

The mission recommends the following:

Recommendation 1: Prepare an overall comprehensive conservation plan for the property as a matter of priority in full consultation with the World Heritage Centre and the Advisory Bodies, which will be a framework for addressing the necessary interventions. It should comprise detailed documentation on the current state of the mud structures and the periodicity of maintenance works that will be carried out. In the framework of establishing this plan, it is further recommended to conduct comprehensive analysis and research on the original materials used, and the techniques and methods of construction, as well as detailed surveys and assessments.

In addition, baseline documentation and data collection should be carried out on all previous interventions undertaken at the property, and all details of interventions must be adequately recorded to allow for a referencing system for the future.

All planned and ongoing interventions must be integrated into the comprehensive conservation plan for the property. Priority conservation actions would comprise such maintenance works in areas where further damage is imminent and according to the principle of minimal intervention.

It is also recommended to initiate a capacity building program focusing on documentation, conservation of earthen materials and site management.

Recommendation 2: Carry out regular maintenance activities, which would include:

- a) Cleaning and removal of debris and spoil heaps, including the removal of vegetation after biocide treatment.
- b) Backfilling of gullies and deep depressions to prevent further deterioration.
- c) Installing protective capping and sacrificial plaster to reduce the rate of rainfall erosion on the vertical surfaces of the walls.
- d) Treatment of the wall foundations to counteract the decay, by rebuilding the eroded sections with stabilized material (after testing and identifying the most compatible materials and techniques). However, it is recommended to not remove eroded layers along the bottom part of walls, in order to avoid additional erosion.
- e) Treatment and protection of all the wall surfaces.

In order to ensure the suitability of the materials used and the techniques applied by the technical teams, works should be first carried out in a pilot area and monitored over a certain period. Based on these results, the same technique can be applied to other areas.

Such maintenance work should be carried out at the property as a matter of urgency in order to ensure the preservation of the structures. It is recommended that the State Party consider submitting a request for International Assistance through the World Heritage Fund in order to support these works

Recommendation 3: Submit a detailed report on all planned and ongoing interventions carried out and their priority to the World Heritage Centre. All interventions must be integrated into the comprehensive conservation plan for the property.

- e) **Ziggurat of the God of Ashur:** Plan and undertake further intervention at the Ziggurat as a priority to stop the progression of the severe gullies and cavities, and, preventive measures must also be undertaken on the surfaces of the Ziggurat in order to protect the structures against weathering and rainfall. Consolidating documentation on all interventions undertaken at the property will allow for a referencing system for future interventions. Uncontrolled access of visitors to the Ziggurat should be stopped as a matter of urgency.
- f) **The Tabira Gate:** Undertake a comprehensive structural study in order to assess the safety of the monument and reconsider the propping system. Some preventative works are also necessary in order to fill the cracks at all levels, and in particular at the arches, to fill cavities on the top of the walls, and to install a capping layer on top of all structures to prevent water infiltration, in addition to improving the drainage system of the whole area. The State Party is urged to prevent access to the Gate until after it is deemed safe and stable.
- g) **The Royal Cemetery:** Investigate options for new roofing material to replace the broken glass roof. It is recommended that the new material selected to cover the shelter is sustainable and insulated (low UV), and compatible with the environment in order to minimize the visual and physical impact. In this regard, the State Party is invited to consult the ICCROM guidance on “protective shelters for archeological sites”. Meanwhile, some maintenance work (anti-rust and paint) can be started on the metallic structures of the shelter in a color matching the context of the property.

- h) **The Walter Andrea Residence:** The planned project for the rehabilitation of the residence into an excavation house is promising. However, the State Party is requested to submit documentation on this project to the World Heritage Centre, in compliance with paragraph 172 of the Operational Guidelines for examination prior to approval of the project or to carrying out any interventions. It is recommended to carry out a detailed survey and structural assessment of the building. Based on the limited information provided by the State Party concerning the building's modern part, it is recommended that priority be given on the reinforcement and the waterproofing of roof slabs to ensure security of the building. The scraping of internal wall surfaces can be avoided and a general cleaning may be carried out with an overall painting of surfaces. The rehabilitation of necessary electrical and sanitary infrastructure should be undertaken using sustainable energy resources (solar panels). Repair and completion of the external plaster along with new windows is recommended, and the historical character of the building is to be recognized, with its iconic feature named the "Agatha Christie balcony".

Recommendation 4: Considering the fragility of the mudbrick structures and the fact that majority of the property has not been excavated, it is crucial that uncontrolled access of motor vehicles and people into the property is prevented. Rebuilding the fence to protect the property should be carried out as a matter of urgency. Proper signage, with clear information indicating that the area is protected should be put up and activities to raise awareness of the local population, particularly to encourage them to contribute to the protection of heritage should be carried out.

Recommendation 5: A management system should be elaborated and implemented and, as soon as possible, a Management Plan draft that defines the attributes of Outstanding Universal Value (OUV), the management system, the aims and objectives of protection and management, and the supportive constraints in place/or needed, should be submitted.

Recommendation 6: On the basis of information presented to the mission, plans to resume the construction of Makhool Dam present potential existential threats to the property and therefore it is still recommended that due consideration is given by the State Party for the relocation or cancellation of the project in view of its potential impact on the Outstanding Universal Value (OUV) of the property and other archaeological sites, as previously requested by the World Heritage Committee.

Recommendation 7: Based on the available technical information, it is not possible to define precisely whether, and if so, how the property could be protected by physical measures sufficient to sustain its OUV.

Therefore, it is necessary to carry out, as a matter of urgency, the following technical studies and scientific assessments in order to allow a full understanding of the feasibility of physical protection measures:

- a. Undertake a hydraulic assessment of the area, an assessment of the hydraulic impact of the complete filling of the reservoir at ordinary water levels and at extreme hydraulic events, and also undertake geological, hydrological, and geotechnical soil investigation surveys at the property.
- b. Define, on the basis of the collected data, different potential options for physical protection measures in order to allow assessment as to whether any such measures might be feasible in protecting the property from flooding, water seepage, salt infiltration and new micro-climates.

- c. Undertake, if such physical measures are considered to be feasible , a detailed Heritage Impact Assessment (HIA) for the designed flood protection structures (retaining walls, embankments, dikes, etc.), and also an Environmental Impact Assessment (EIA), to assess any potential negative impact on the OUV of the property and to demonstrate how the measures might be sufficient to sustain OUV, and submit the results of the assessments and surveys, as well as details of proposed mitigation measures and the EIA and HIA for review before any decisions are taken

Recommendation 8: While gabions might be a suitable technical solution that could be used against the current erosion of the River Tigris banks, adequate investigations and studies are needed to find the most viable solution. Larger gravel would need to be used in order to withstand the force of the water flow in ordinary conditions and in case of flooding when the force of the river increases. Further investigations are also needed to address the underwater archaeological potential along the eastern boundary, as well as exploring synergies with the UNESCO 2001 Convention on the Protection of the Underwater Cultural Heritage.

ANNEXES

- ANNEX 1: TERMS OF REFERENCE (TOR) OF THE MISSION
- ANNEX 2: COMPOSITION OF MISSION TEAM
- ANNEX 3: ITINERARY AND PROGRAMME
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ANNEX 1: TERMS OF REFERENCE (TOR) OF THE MISSION

At its 43rd (Baku, 2019) and 44th (Fuzhou/online, 2021) sessions, the World Heritage Committee requested the State Party of Iraq to invite a Joint World Heritage Centre/ICOMOS Reactive Monitoring mission to Ashur (Qal'at Sherqat) (Decisions **43 COM 7A.18** and **44 COM 7A.6**). The Committee underscored the need for a joint World Heritage Centre/ICOMOS Reactive Monitoring Mission to be sent to assist in assessing the damage to the property as a preparatory step for the development of a comprehensive Conservation Plan.

In 2021, UNESCO was notified of the intention of the State Party to proceed with the construction of the Makhool Dam that had previously been cancelled. The proposed dam project is the same project proposed in 2003, which was considered as a major threat to the property justifying the inscription of the site on the List of World Heritage in Danger at that time.

Considering the foreseen threat the construction of the dam would pose to the Outstanding Universal Value (OUV) of the property, immediate independent assessment of the condition of the property is seen as a first step towards the development of a Retrospective Statement of Outstanding Universal Value, a comprehensive conservation plan, the identification of corrective measures, and the development of a Desired state of conservation for the removal of the property from the List of World Heritage in Danger (DSOCR).

In particular, the mission will assess the following issues:

1. The overall state of conservation of the property, having particular regard to any identified attributes of the property which may support its Outstanding Universal Value (OUV).
2. An overall assessment of the condition of the property, which would contribute to the development of a Retrospective Statement of Outstanding Universal Value, a comprehensive conservation plan, the identification of corrective measures, and the development of a Desired state of conservation for the removal of the property from the List of World Heritage in Danger (DSOCR).
3. Review of the current situation and plans for Makhool Dam and its potential impact on the OUV of the property, as well as considerations for its possible cancellation or relocation.
4. Review of any condition or impact assessments that have been already carried out, as well as intervention measures undertaken to mitigate the impact of prevailing threats and aiming at the conservation of the property.
5. Progress and steps undertaken towards a comprehensive conservation and management plan for the property.
6. Any other matter that may be relevant.

The mission will be conducted by Mr. Toufik Hamoum representing the UNESCO World Heritage Centre, and Ms Yasmine Makaroun and Mr Giuseppe Sappa representing ICOMOS.

The State Party will facilitate necessary field visits to key locations and meeting with stakeholders, including the Ministry of Culture, Tourism and Antiquities, the State Board of Antiquities and Heritage, the Ministry of Water Resources, and other authorities and stakeholders involved in the management of the property.

In order to enable the preparation of the mission, it would be necessary that the following items are provided to the World Heritage Centre and ICOMOS as soon as possible:

1. Background information about the property, including (where available) base plans showing significant components, photographs (both historic and contemporary) and any reports that document the condition of the property over time.
2. Full reports and plans concerning the planned construction of the Makhool Dam, including any Environmental and/or Heritage Impact Assessment.

3. Detailed maps of the property, indicating clearly the planned location for the Dam and all surrounding archeological sites and any available impact assessment studies carried out.
4. Information on all emergency interventions or conservation measures, undertaken or planned at the property.
5. Information on any planned conservation or development projects or other potential interventions at the property.
6. A brief outline of the statutory protection available to the property, and the current management arrangements, including resources and personnel.

Please note that additional information may be requested during the mission.

Based on the results of the above-mentioned reviews, assessments and discussions with the State Party representatives, authorities and stakeholders, the mission will prepare a concise report on the findings and recommendations as soon as possible after the completion of the mission, following the standard format, for review by the World Heritage Committee at its 45th session. The recommendations will be provided with the mission report, and not during the course of the mission.

ANNEX 2: COMPOSITION OF MISSION TEAM

- Toufik Hamoum, representing the Unesco World Heritage Center
- Yasmine Makaroun Bou Assaf, representing ICOMOS
- Giuseppe Sappa, representing ICOMOS

ANNEX 3: ITINERARY AND PROGRAMME

Monday, 28 March 2022:

Plane travel of Dr Yasmine Makaroun from Beirut to Erbil via Doha and arrival to Erbil.

Tuesday, 29 March 2022:

- Meeting at UNESCO Office in Erbil with the representant of The American University of Iraq at Sulaimani, Dr Tobin Hartnell.
- Arrival of Dr Toufik Hamoum to Erbil at 10pm coming from Alger via Doha (on day stop due to flight delay)

Wednesday, 30 March 2022:

- Departure from Erbil to Al-Sherqat with UNESCO security escort: Meeting at the site office in Ashur with the SBAH management team and Dam project delegation. Field visit of the site of Ashur
- Transfer to the site of Makhool Dam: Lunch break and meeting with the Dam project team before field visit of the Dam future location.
- Return to Erbil and transfer to Baghdad via internal flight.

Thursday, 31 March 2022:

- Official meeting with the Minister of Culture, Tourism and Antiquities and the chairman of State board of Antiquities and Heritage
- Official meeting with the Minister of Water Resources and the Director General of the Makhool Dam Project
- Diner with the director of SBAH and UNESCO representative in Iraq

Friday, 1 April 2022:

Return flight to Beirut via Doha for Yasmine Makaroun, and to Alger via Istanbul for Toufik Hamoum.

ANNEX 4: LIST OF PEOPLE MET

Iraqi authorities

- H.E Dr Hassan Nadhem, *Minister of Culture, Tourism and Antiquities*
- H.E Dr Mehdi R. Al Hamdani, *Minister of Water Resources*

State board of Antiquities and Heritage (SBAH)

- Dr Laith Majeed Hussein, *Chairman*
- Riyadh H. Mohamad, *Remote Sensing Department Manager*
- Salem A. Ali, *Director of the archaeological site of Ashur, Inspector Salah-Addin province*

State Commission Of Dams And Reservoirs (SCODAR)

- Kadhim S. Jaber, *Director General of SCODAR*
- Hatim T. Falhi, *R.E of Makhool Dam Project*
- Muhammad S. Safi, *Engineer SCODAR*
- Wissam H. Ali, *Makhool Dam Project*

American University of Iraq in Sulaimani (AUIS)

- Dr Tobin Hartnell, *Director Archaeological Heritage*

ANNEX 5: STATEMENT OF OUTSTANDING UNIVERSAL VALUE OF THE PROPERTY

The property does not yet have an elaborated Statement of Outstanding Universal Value (SOUV). Below is a brief description of the significance and the criteria adopted at the time of inscription.

Brief Description

The ancient city of Ashur is located on the Tigris River in northern Mesopotamia in a specific geo-ecological zone, at the borderline between rain-fed and irrigation agriculture. The city dates back to the 3rd millennium BC. From the 14th to the 9th centuries BC it was the first capital of the Assyrian Empire, a city-state and trading platform of international importance. It also served as the religious capital of the Assyrians, associated with the god Ashur. The city was destroyed by the Babylonians, but revived during the Parthian period in the 1st and 2nd centuries AD.

Criterion (iii): Founded in the 3rd millennium BCE, the most important role of Ashur was from the 14th to 9th century BCE when it was the first capital of the Assyrian empire. Ashur was also the religious capital of Assyrians, and the place for crowning and burial of its kings.

Criterion (iv):

The excavated remains of the public and residential buildings of Ashur provide an outstanding record of the evolution of building practice from the Sumerian and Akkadian period through the Assyrian empire, as well as including the short revival during the Parthian period.

ANNEX 6: LIST OF KEY DOCUMENTS

A. LIST OF DOCUMENTS REQUESTED FROM SBAH

1. Antiquities law, institutional frameworks documentation
2. GIS Survey 2022
3. Report AUIS on Tabira Gate and schedule of works
4. Administrative structure of SBAH
5. Proposals of boundaries revision including buffer zone
6. List of staff on site and tasks scope
7. Technical report on retaining wall executed along the river bank bellow W.Andrea residence
8. Aerial pictures of the site (2003/2013/2022) including context
9. Any survey of structures/buildings standing on site
10. Any evaluation of the Dam project (in 2003 and actual)

B. LIST OF DOCUMENTS REQUESTED FROM THE MINISTRY OF WATER RESOURCES

1. The dam project of 2003, updated in 2022
2. propositions for the protection of the site of Ashur (a-temporary dam, b-embankment wall)
3. alternatives proposals for the dam project and reasons of no selection (comparative study): *not submitted*
4. Power point slides/maps shown on site
5. impact studies: EIA and any studies taking heritage into consideration. *Only HIA shared*

ANNEX 7: NATIONAL IRAQI CULTURAL HERITAGE LAW

Extract from the Iraqi Cultural Heritage Law:

<https://iraqheritage.org/pdf/antiquities.pdf>

LAW No.55 of 2002 For The Antiquities & Heritage of Iraq

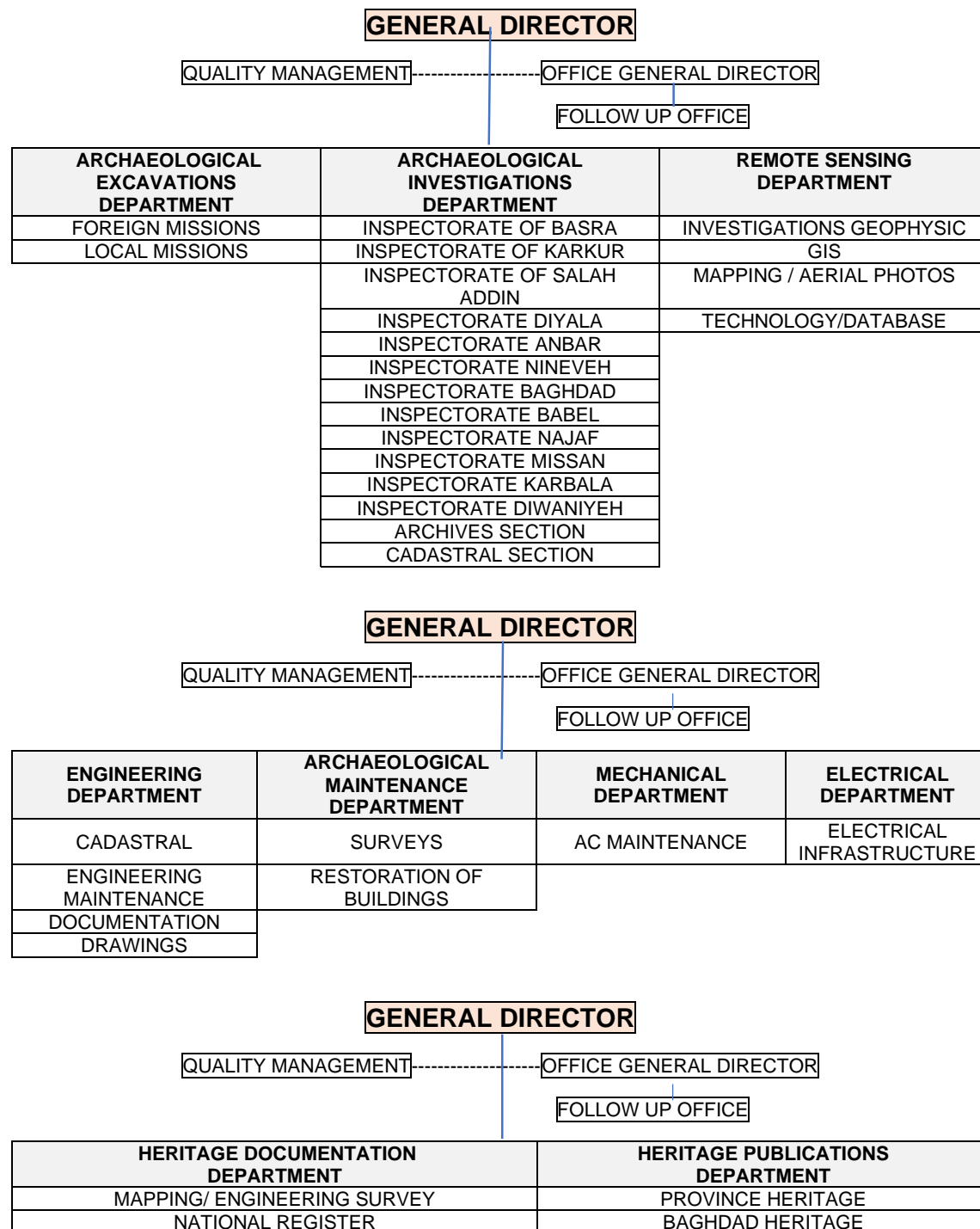
CHAPTER 2

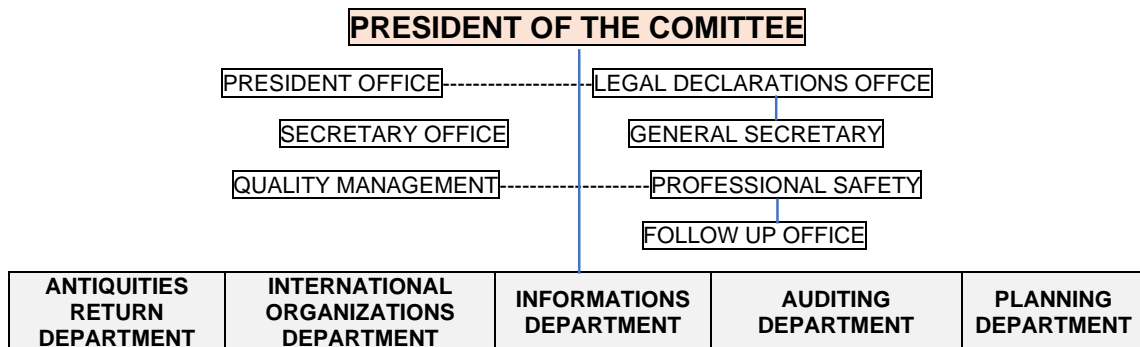
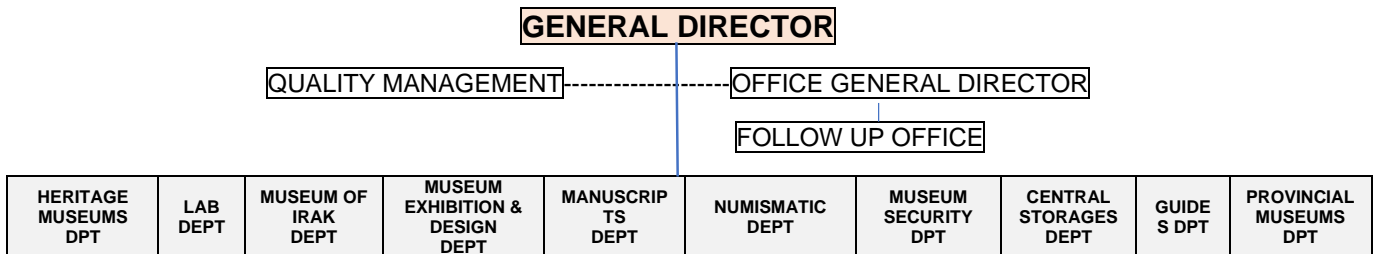
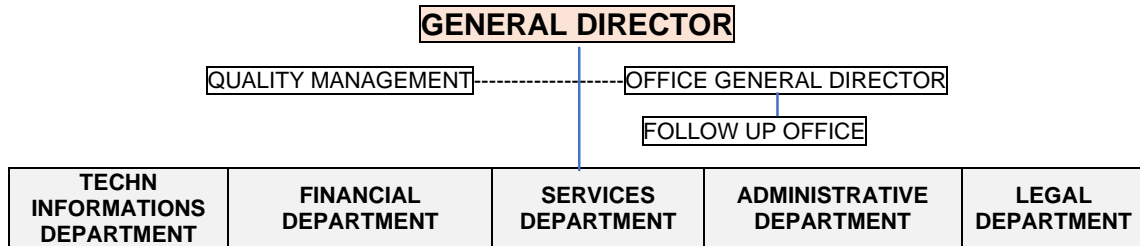
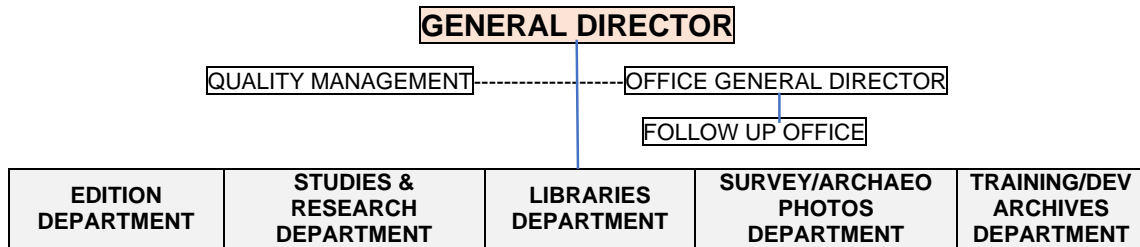
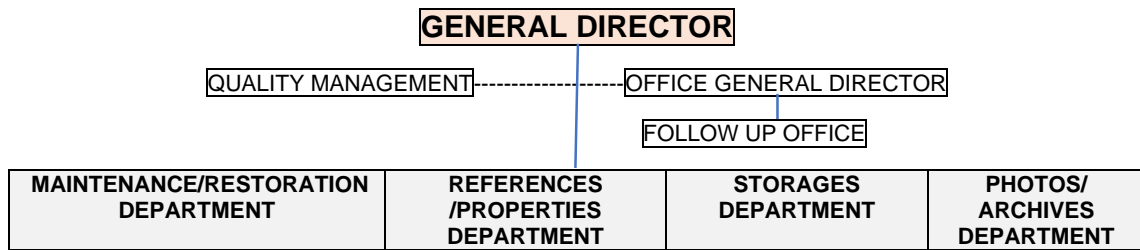
Article 5

1. The Antiquity Authority shall be entitled to hold its own registrations, to register the Archaeological Monuments (Buildings and Sites), besides inserting the data, documents and the attachment rights related to the neighbouring real estate and publishing it in the official Gazette to secure permanent protection and restoration.
2. If a monument has already been registered, while the attachment rights of the neighbouring real estate were not determined, this shall be done in accordance with the Law.
3. The attachment rights should include determination of a prohibited zone (no man's land) around the archaeological areas besides securing roads and pathways to reach them.
4. The Stylistic Character of the modern buildings adjacent to the Archaeological sites should also be determined, the new or renewed buildings, their heights, frontispiece and colours so they will be harmonious to the neighbouring antiquity buildings, in coordination with the Antiquity Authority and the Participation Authority.

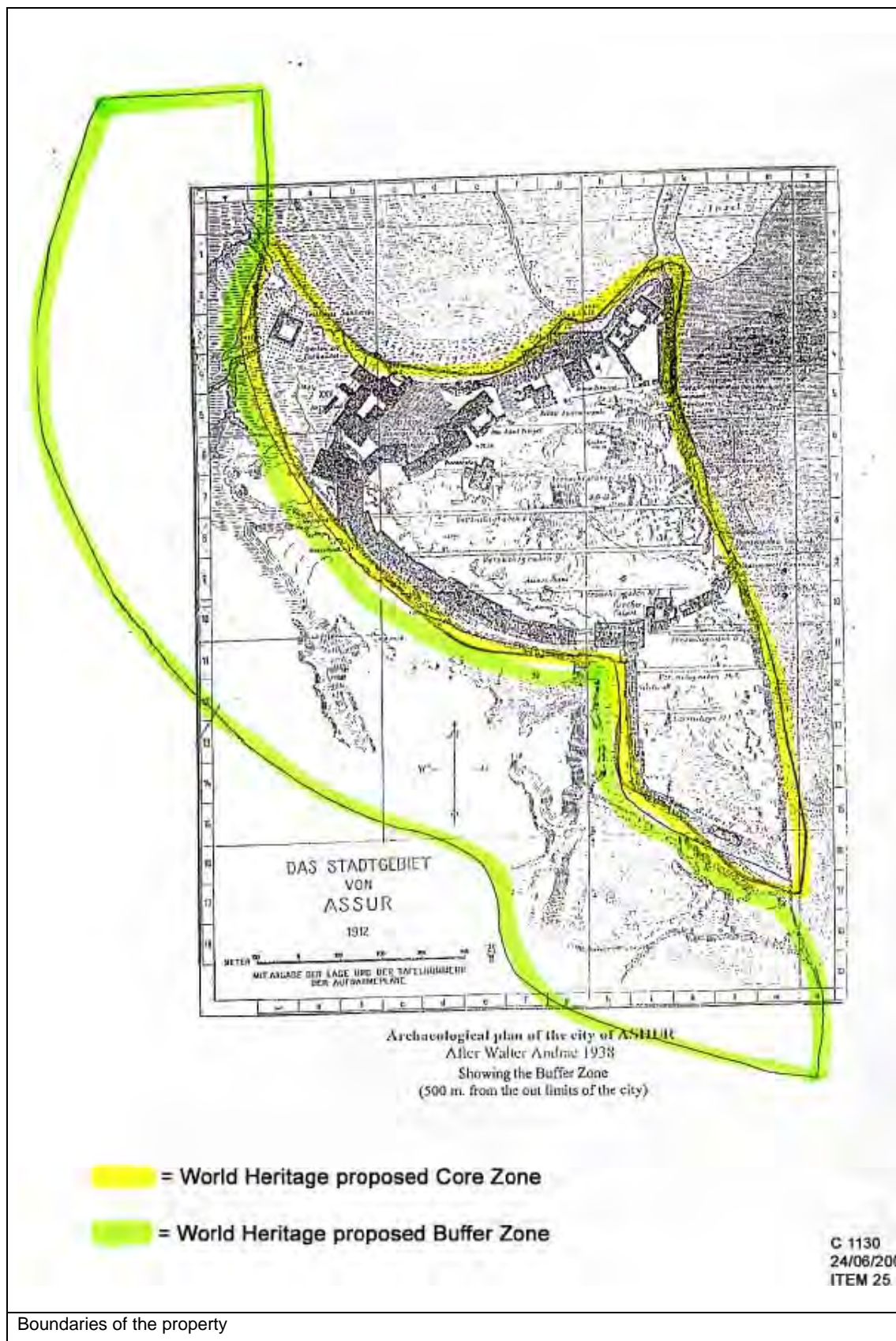
ANNEX 8: NATIONAL MANAGEMENT SYSTEM

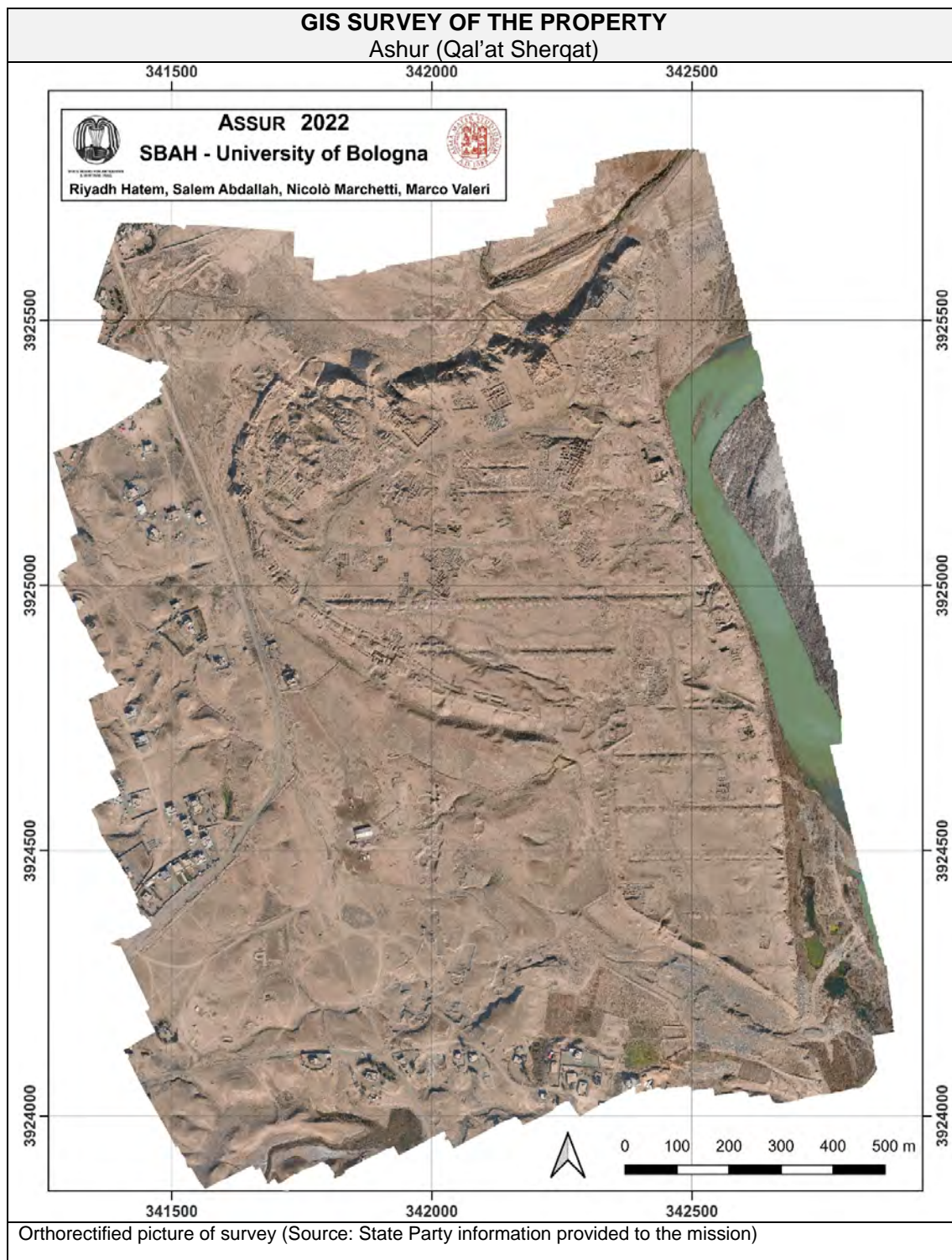
SBAH STRUCTURE

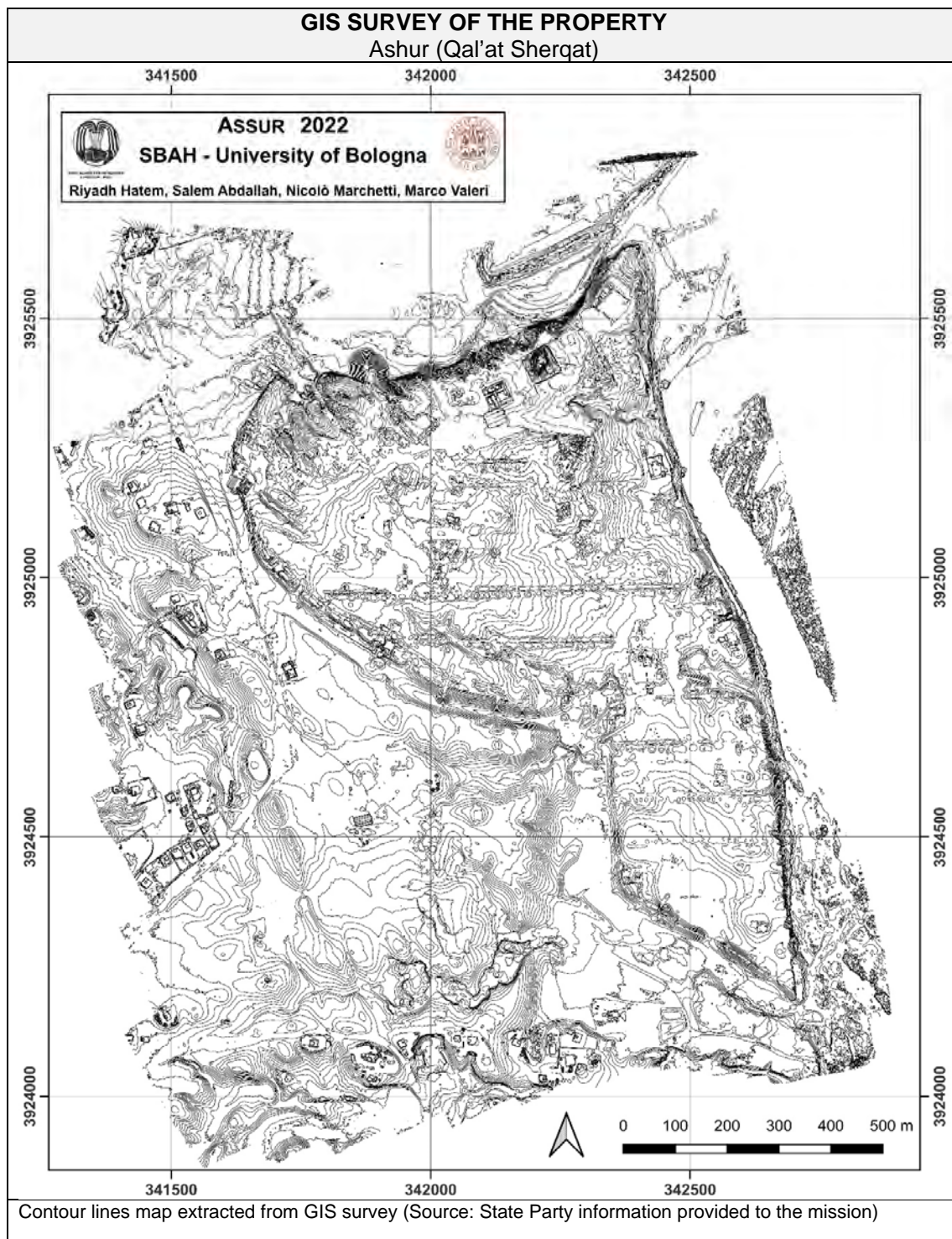




ANNEX 9: MAPS AND PHOTOGRAPHS







THE ZIGGURAT



Western view on the Ziggurat with the Old Palace © ICOMOS/Y.Makaroun



North-Western side with deep erosion "ravines" © ICOMOS/Y.Makaroun

THE ZIGGURAT



Close-up view on the masonry at the base on western side © ICOMOS/Y.Makaroun



General view and ceiling detail of the tunnel opened on the western side © ICOMOS/Y.Makaroun

MAIN ZIGURRAT / COMPARATIVE PICTURES



Status in 2011 (Source: Report on the Joint World Heritage Centre-ICOMOS Reactive Monitoring Mission to Ashur (Qal'at Sherqat), Iraq (C 1130), 5 to 9 June 2011)



Status of the property (Source: State of conservation report by the State Party, 2020)

RIVER LANDSCAPE FROM THE ZIGGURAT



Northern area of the site on the derivation of the Um-Chababit river branch
© ICOMOS/Y.Makaroun



North-eastern side of the site/ Tigris river (picture taken from the top of the Ziggurat)
© ICOMOS/Y.Makaroun



Eastern side of the site/Tigris river side branch along the Tell with Walter Andrea Residence (picture taken from the top of the Ziggurat) © ICOMOS/Y.Makaroun

OLD PALACE



View of standing authentic eroded remains © ICOMOS/Y.Makaroun



Detail of typical decay process and sun-dried mud brick masonry © ICOMOS/Y.Makaroun



Remains of brick well © ICOMOS/Y.Makaroun



Eroded vertical walls © ICOMOS/Y.Makaroun

THE ROYAL CEMETERY



Eastern view from the top of the Ziggurat on the shelter and the Old Palace © ICOMOS/Y.Makaroun



Southern side of the shelter © ICOMOS/Y.Makaroun



Western side of the shelter with deep erosion of the ground © ICOMOS/Y.Makaroun

THE ROYAL CEMETERY



View of the inner space under the shelter (western corner): levels inside below outer surface © ICOMOS/Y.Makaroun



View of the inner space under the shelter (Northern corner): reconstructed masonry © ICOMOS/Y.Makaroun

THE ROYAL CEMETERY



Details of reconstructed baked brick masonry © ICOMOS/Y.Makaroun



View of "tunnels" opened during previous excavations - holes from water infiltrations ©ICOMOS/Y.Makaroun



General views from the inner space below the shelter © ICOMOS/Y.Makaroun

ROYAL CEMETERY / COMPARATIVE PICTURES



Status before any damage inflicted on the site (Source: State Party, SBAH, Damage Assessment report 2017, p.73)



Left: Status in 2011 (Source: Report on the Joint World Heritage Centre-ICOMOS Reactive Monitoring Mission to Ashur (Qal'at Sherqat), Iraq (C 1130), 5 to 9 June 2011)

Right: Status 2012 (Source: State Party State of Conservation Report, 2012, p.11)

ROYAL CEMETERY / COMPARATIVE PICTURES



Glass debris inside the shelter (Source: State Party, State of Conservation Report 2017, p.11)



Damage in 2017 (Source: State Party, SBAH, Damage Assessment report 2017, p.76-77)

FARHAN PACHA PALACE



Southern view from the top of the Ziggurat © ICOMOS/Y.Makaroun



Documentation in 2022 (Source: State Party, SBAH archives)



Documentation in 2022 (Source: State Party, SBAH archives)



Documentation in 2022 (Source: State Party, SBAH archives)

FARHAN PACHA PALACE/ COMPARATIVE PICTURE



Interior vaults before 2015 (Source: State Party, SBAH, Damage Assessment report, 2017, p.40)



During the flooding season (Source: State Party, SBAH, Damage Assessment report 2017, p.35)



Status before 2015 Source: (State Party, SBAH, Damage Assessment report, 2017, p.34)

ISHTAR TEMPLE



© ICOMOS/Y.Makaroun

PARTHIAN PALACE



Recent restoration works implemented in 2021 by SBAH © ICOMOS/Y.Makaroun



Recent restoration works implemented in 2021 by SBAH (close-up view) © ICOMOS/Y.Makaroun

PARTHIAN PALACE/ COMPARATIVE PICTURE



Previous restoration works (Source: Report on the Joint World Heritage Centre-ICOMOS Reactive Monitoring Mission to Ashur (Qal'at Sherqat), Iraq (C 1130), 5 to 9 June 2011)



Cleaning works documented in 2012 (Source, State Party State of Conservation Report, 2012, p.10)

THE TABIRA GATE (current project)



Eastern elevation from inside the site (*intra-muros*) © ICOMOS/Y.Makaroun



Details of propping and surfaces cleaned © ICOMOS/Y.Makaroun

THE TABIRA GATE (current project)



Views of middle arch propping system and cracks (©ICOMOS/Y.Makaroun 2022)



View of the outer arch pile restored with new baked brick and propping © ICOMOS/Y.Makaroun

THE TABIRA GATE



View of the middle arch intrados with some cracks and unstable elements ©ICOMOS/Y.Makaroun 2022



Detailed views of propping system on the outer elevation of the gate © ICOMOS/Y.Makaroun



Status of the gate following its damage in 2015 (Source: (State Party, SBAH, Damage Assessment report 2017, p.12)

TABIRA GATE/ COMPARATIVE PHOTOS



Status of the gate (eastern elevation) before 2015 Source: State Party State of Conservation Report, 2020, p. 35)



Status of the gate western elevation before 2015 (Source: State Party, SBAH, Damage Assessment 2017, p.8)

THE WALTER ANDREA RESIDENCE



External southern elevation © ICOMOS/Y.Makaroun

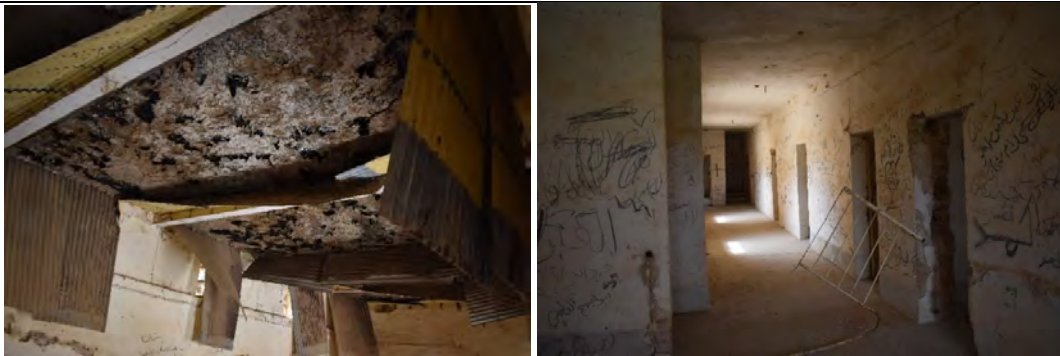


External eastern elevation © ICOMOS/Y.Makaroun

THE WALTER ANDREA RESIDENCE



Inner courtyard © ICOMOS/Y.Makaroun



Interior damage: decayed concrete slab ceilings; graffiti © ICOMOS/Y.Makaroun



View from the main entrance with the 2-level wing © ICOMOS/Y.Makaroun

THE WALTER ANDREA RESIDENCE



View of from the Tigris river (Source: State Party, SBAH, Damage Assessment report 2017, p.53)



Views on the Tigris river from the so called "Agatha Christie balcony" © ICOMOS/Y.Makaroun

GUARD HOUSE



(Source: State Party, SBAH, Damage Assessment report 2017, p.64)

SBAH ADMINISTRATION OFFICES



Management unit offices – Actual signage at the entrance of the site © ICOMOS/Y.Makaroun



Meeting at site offices with SBAH and SCODAR representatives © ICOMOS/Y.Makaroun

MAKHOOOL DAM SITE LOCATION



View of the Tigris river with a recent bridge © ICOMOS/Y.Makaroun

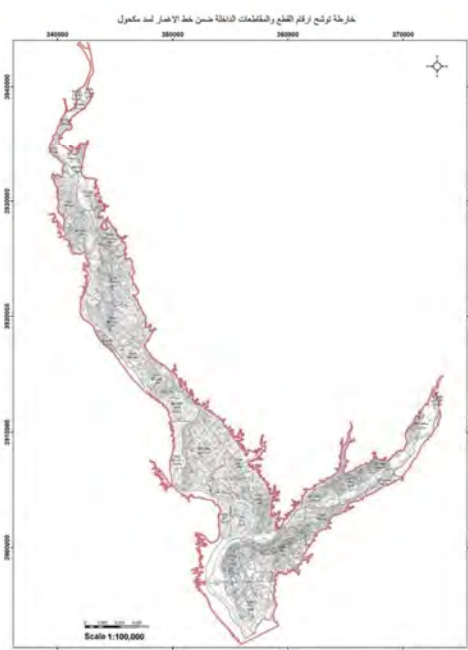
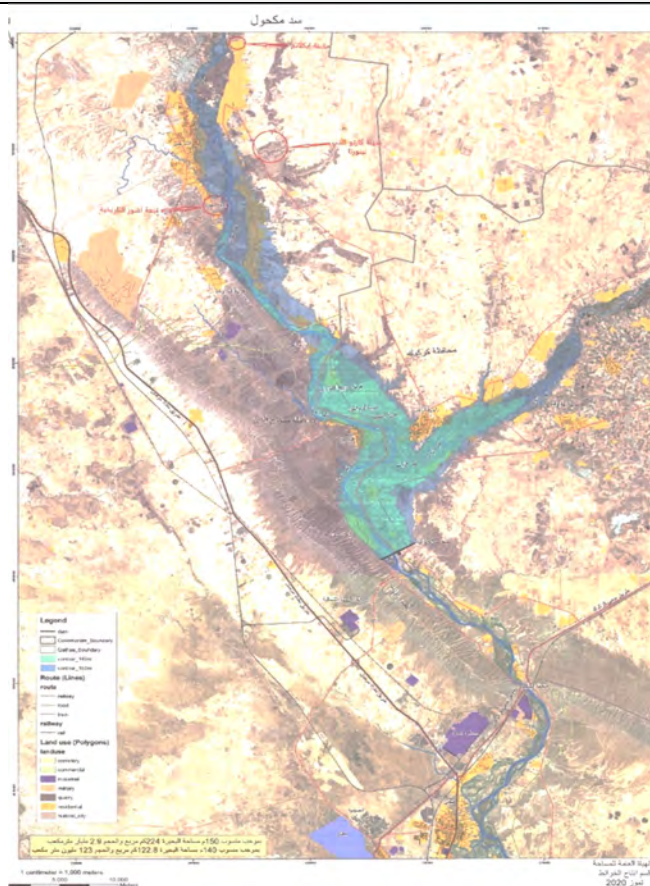


View of river banks context © ICOMOS/Y.Makaroun



Implementation of the dam – View on rivers banks © ICOMOS/Y.Makaroun

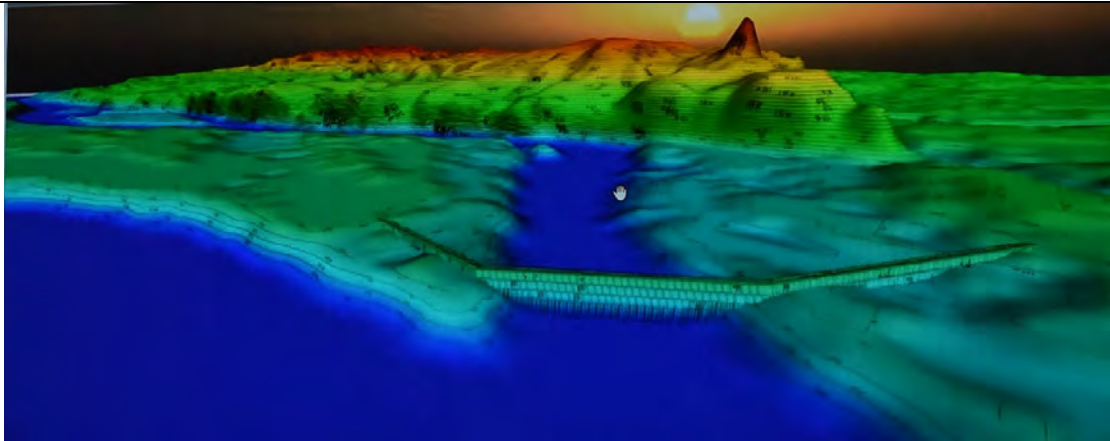
MAKHOOOL DAM PROJECT



Maps indicating the most important archaeological sites located near the reservoir, and areas that would be flooded by the dam construction, 2020 (Source: State Party information provided to the mission)

PROPOSED PROTECTION MEASURES FOR THE SITE OF ASHUR

THE TEMPORARY DAM



3D modelling (Source: State Party information provided to the mission)



Location of the temporary dam (Source: State Party information provided to the mission)

ACTUAL STATUS OF THE RETAINING WALL (GABIONS) ERECTED IN 2011



Current status of gabion protection of the eastern Tell © ICOMOS/Y.Makaroun



Comparative aerial images of the eastern bank of the Tell from 2002 to 2020, SBAH Documentation (Source: State Party information provided to the mission)

CULTURAL ACTIVITIES



Assyrian Festival of Spring, procession from the Ziggurat to The New Year Residence (Bit Akitu) (Source: State Party, SBAH site documentation, 2022)



The intangible heritage of the site of Ashur (Source: State Party, SBAH site documentation, 2022)

Ashur (Qal'at Sherqat)
Hydrogeological Risk Assessment
Technical Note

May, 2022

Prof. Giuseppe Sappa

UNESCO Mission to Ashur in November 2002

The UNESCO Assessment mission to Ashur in November 2002 involved a hydraulics engineer and an archaeologist to assess the impact of the construction of the Makhool Dam currently underway on the Tigris River. The main objective of the mission was to assess the impact on the archaeological sites by the flooding of a large area for the construction of the Makhool Dam. A general assessment of the site was carried out, in view of the possible inscription of the site on the World Heritage List and, particularly, as regards the risks of flooding.

The following is an excerpt from the 2002 Executive Summary of the mission report

“Since the reservoir is to be used for hydroelectric power generation, it will generally be kept at the maximum possible level, compatible with the available runoff from the catchment and any provision of irrigation water to downstream users. The possibility of water infiltration and seepage to the archaeological excavation areas is a real threat and provisions must be made to deal with the problem. However, due to the non-availability of the technical documentation on the environmental impact of the dam and on the level of water of the future reservoir, as well as of detailed topographic information, the expected damage on the archaeological remains, and the possible measures to avoid it (retaining wall, gabions, etc.), could only be evaluated approximately.

The planning of salvage measures which can be envisaged for the site of Ashur is to bear two components: the feasibility of building a retaining wall, for which detailed information is needed (see above); the development of an integrated research strategy for the site including archaeological exploration and excavations, conservation and restoration measures as well as the presentation and interpretation of the remains”.

The following quotations are taken from the ICOMOS evaluation of the nomination of the property to the WH List (2003):

“The ICOMOS evaluation has been referred to the mission organised by the UNESCO (World Heritage Centre, Division of Cultural Heritage, Amman Office) to Iraq, 18- 28 November 2002 [...], the experts were not provided with technical information regarding the Makhool Dam itself and its environmental impact. Therefore, it was not possible to make a full assessment of the specific risks faced by the archaeological site, nor of the interventions that would be required”. In 2003, “Iraq [was] implementing extensive agricultural and economic plans, which involved the construction of a large dam on the Tigris River some 30-40 km downstream from the archaeological site of Ashur”. The construction of the dam was expected to be completed in 2006, and the “level of water would then cover the lower parts of the archaeological site of Ashur and its surroundings”. At the time of the mission report (November 2002), the main risk was represented by the dam construction some 30-40 km downstream, expected to be completed by 2006, after which the basin would be filled with water. “The archaeological site of Ashur remains within the perimeter of this reservoir, [...] In any case, the archaeological remains would suffer from infiltration and seepage of underground waters.”

“Regarding the Ashur site, the UNESCO report presents three possible scenarios:

1. No retaining wall is constructed to protect Ashur. This is the worst scenario, and the site would be flooded and infiltrated from 2006 on. [...]
2. A retaining wall is constructed separate from the site. This is the least bad scenario. [...]
3. A system of protection is constructed directly on the borders of the site. This is the most cost-effective protection as discussed by the Iraqi authorities”.

1. DAM FEASIBILITY AND RISKS FOR ASHUR

The World Heritage Committee, in one of its last meeting (extended 44th session of the World Heritage Committee, Fuzhou, China 2021), reiterated that the construction of the Makhool Dam, about 40 km from Ashur, represents a threat to the maintenance and protection of the archaeological site of UNESCO heritage, which falls within the basin of the dam itself. The dam project has been suspended, but its future construction, as well as the present lack of adequate protection, justified the inscription of the site on the List of World Heritage in Danger.

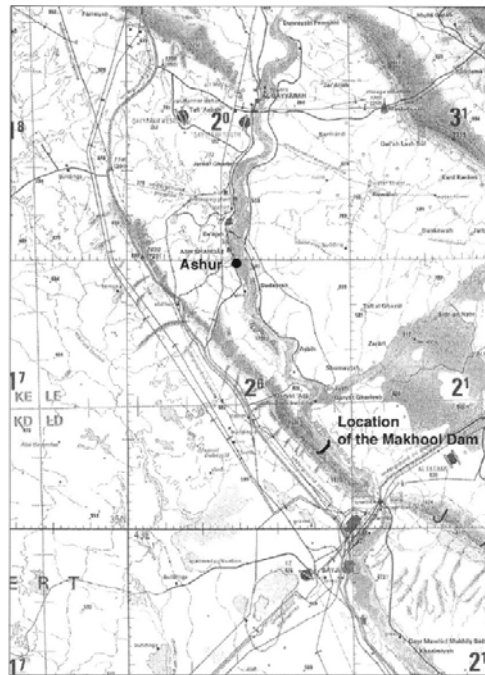


Figure 1 – Location of the Makhool Dam and the site of Ashur (Source: Report on the UNESCO assessment mission to Iraq (17th to 29th November 2002) for the evaluation of the impact of the Makhool Dam project on the site of Ashur and the archaeological sites in the reservoir area” Dr. Arnulf Hausleiter, January 2003)

With the construction of the Makhool Dam, an area of approximately 45 km² will be flooded by the dam's reservoir. In fact, the dam was designed to store "more than three billion cubic metres of water which is the minimum requested level for the agricultural and humanitarian use" (Ministry of culture 2002). The expected water level for the basin of the dam is c. 152 m a.s.l. (lake in Figure 2).

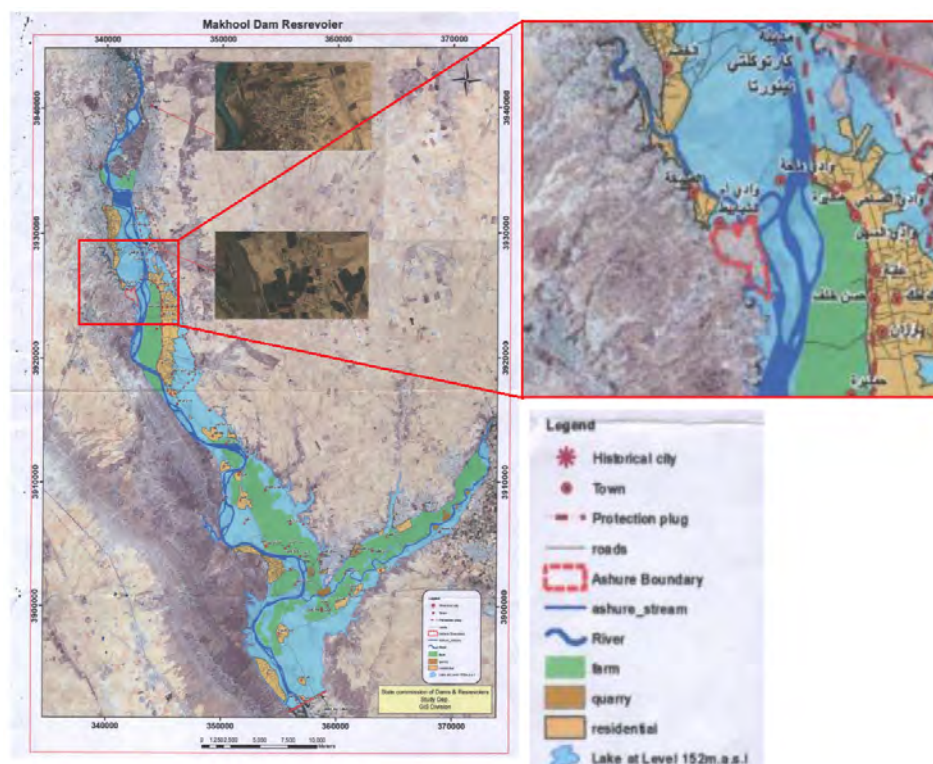


Figure 2 – Makhoor Dam reservoir and Ashur boundary (Source: State Party information/maps)

The archaeological site of Ashur remains near the perimeter of this reservoir and it has been noted that the archaeological remains could suffer from infiltration and seepage of underground waters.

As shown in the excerpt of the maps taken from the "State of Conservation report"¹, Figure 3 (b) shows the possible effects that construction of the dam might incur. As described in the Engineering Report of Eng. Lucio Cavazza, hydraulic expert in the 2002 Mission, the project for the Makhoor dam and reservoir has been carried out by the Ministry of Irrigation, with the assistance of the Al Furat Company, which is a specialized department of the same Ministry. This company is also responsible for the studies, investigations and design of the protective measures for the Ashur property. It would seem that a feasibility study has also been carried out, comprehensive of an EIA (Environmental Impact Assessment), but at the time of writing the present report, no factual information has been supplied by the Iraqi authorities to the members of the Mission regarding the eventual feasibility study carried out, the preliminary and final designs documents for the dam and, no information was made available on the protective measures being studied for the city of Ashur.

¹ State of Conservation report, Ashur (Qal'at Sherqat) In response to the extended 44th session of the World Heritage Committee (online, Fuzhou, 2021 - Decision 44 COM 7A.7)

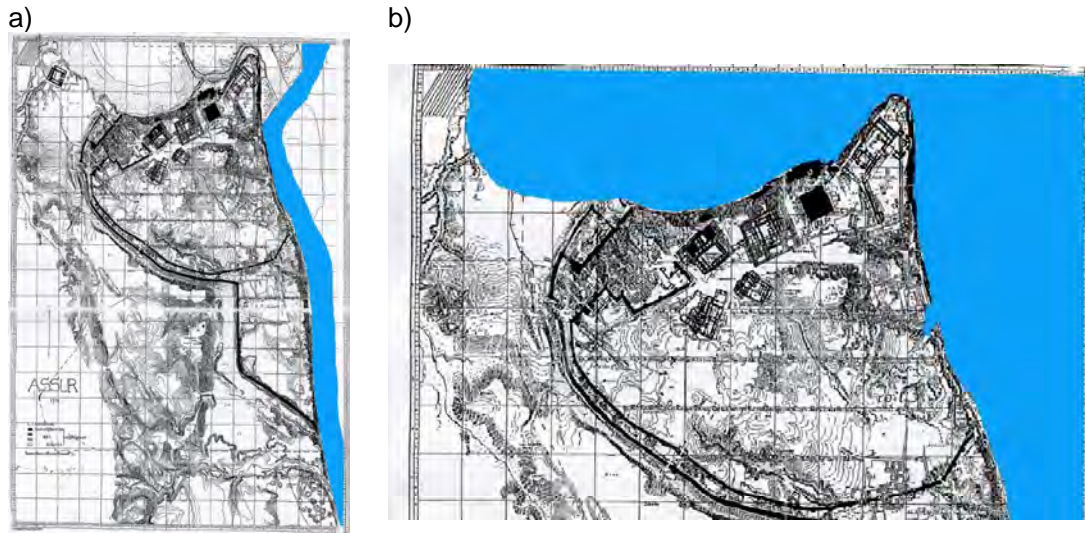


Figure 3 – a) the current course of Tigris river, b) Possible Makhool Dam effects (Source: State Party State of Conservation Report, 2022, pages 57-58)

The dam appears to consist of a zoned earth embankment structure with a cut off wall 1m thick in bentonitic cement slurry to create an impermeable barrier in the sedimentary foundation strata, with a free overflow spillway structure in concrete on one of the abutments, in which the outlets for the irrigation water releases are incorporated.

At the downstream end of the dam, there is also a hydropower station with all relevant works, so that the hydroelectric station may be utilised for irrigation purposes. From the topographical data available, it would seem that some protective measures are necessary especially to the south, but also on the eastern flank and to the north of the Ashur property, where the ancient course of the Tigris still exists and would also be flooded by the reservoir. In fact, as the reservoir is to be used for hydroelectric power generation, it will generally be kept at the maximum possible water level, compatible with the available runoff from the catchment and any provision of irrigation water to downstream users. However, according to information collected after the mission carried out in March 2022, it is noted that the top water level in the reservoir, due to the dam's construction, is at 152 m a.s.l. Consequently, it is noted that in correspondence with the Ashur site area, the Tigris River level would be higher than 152 m a.s.l., while the lowest elevation of this area is 150.2 m a.s.l., signifying that in ordinary conditions, the Makhool Dam will cause the Ashur site area to be partially flooded, according to the GIS surveys elevation data distribution, carried out in January 2022 by the Bologna University Team. Due to this situation, specific measures would be required to hold back the waters of the impounding lake and prevent flooding of the archaeological sites on the promontory which forms the property of Ashur.

On the other hand, for the portion of the area not subjected to flooding the possibility of water infiltration and seepage to the archaeological excavation areas is a real threat and provisions should be made to deal with the problem, even if there is no information about hydraulic conductivity of soil outcropping in this area. However, due to the lack of technical documentation on the environmental impact of the dam, it is not possible to evaluate if, and how, this assessment has analysed possible impacts of the dam, and of the reservoir on the Ashur property.

With this in mind, the planning of protective measures, which can be envisaged for the site of Ashur should include two components:

- the feasibility of building a retaining wall, in relation to the detailed information which has been collected during the March 2022 mission;
- the development of an integrated research strategy for the property including archaeological exploration and excavations, conservation and restoration measures as well as the presentation and interpretation of the remains.

2. OUTCOMES OF MARCH 2022 MISSION

Regarding the documents reviewed during the mission, it is possible to give an overview of the factors that still threaten the Ashur (Qal'at Sherqat) World Heritage property and to give some preliminary recommendations for the increased protection of this important property.

It is recommended that hydrogeological protection of the area should consider the effects of the Makhool Dam construction on the ordinary flooding events at the property, due to natural hydrological trends of the Tigris River.

In this regard, Professor Nicolò Marchetti and his team at the University of Bologna, have carried out on-site activities in January 2022 with the aim of producing a new 3D topographic map of UNESCO World Heritage property. Thanks to this work, achieved with a polygonal set of 11 reference points, which were cemented to the ground, georeferenced using GPS and measured through total station, it was possible to build up a Digital Elevation Model (DEM) of the area of interest. An image created with the Q-GIS application, using the DEM, is shown in Figure 4.

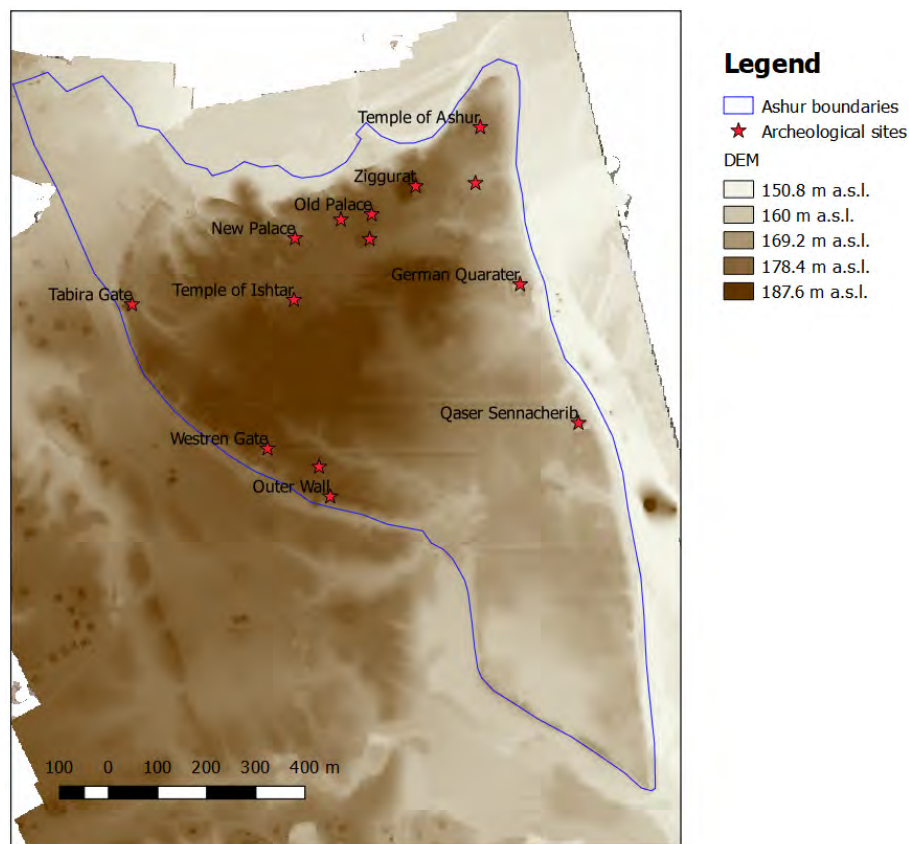


Figure 4 – Elevation map of the archaeological site of Ashur (After DEM map provided by the State Party; GIS Survey, SBAH-University of Bologna)

According to the Elevation Map (Figure 4), we can see that the minimum altitude found is 150.8 m A.S.L. For the hydrogeological protection of this area, this exact information is very important

and should be included to correctly design the protection works, their height, and final perimeters. As a matter of fact, the Iraqi Ministry of Culture, Tourism and Antiquities and the American University of Iraq - Sulaimani (AUIS) proposed a work plan to identify the steps for detecting and documenting archaeological sites at risk in the 2022 State of Conservation report². Among some suitable activities mentioned are “aerial documentation”, “geophysical survey” and “remote sensing”. It is hoped that these activities have been included in the survey carried out by the Bologna University Team, whose report has been released in January 2022.

Based on the outcomes of the above-mentioned survey, the small protection dam and perimetral embankments, proposed with the aim of protecting the Ashur area from flooding events and erosion, due also to the construction of the Makhool Dam, do not seem sufficient to deal with the real demand of protection and durability of the area. According to the available information, the protection works including the protection dam, as represented in Figure 5, are designed to have a final height, which is not sufficient to protect the area of Ashur, as Figure 6 well represents. In case of flooding, the little island dividing the stream flow in ordinary trend, would disappear, because it is submersion, and the proposed protection dam would be submerged as well.

It is therefore necessary to request a preliminary detailed hydraulic study to give a reliable output of the required height of the protection works in this area so that efficient planning can be undertaken.



Figure 5 – Location of the temporary dam (Source: State Party information provided to the mission)



Figure 6 – View of Tigris River view from Museum Farhan Bacha Palace during flooding (Source: State Party, SBAH, Damage Assessment report 2017, p.35)

² State of Conservation report, Ashur (Qal'at Sherqat) In response to the extended 44th session of the World Heritage Committee (Online, Fuzhou, 2021 - Decision 44 COM 7A.7)

Furthermore, technical solutions proposed from a hydrogeological stand point to protect the Ashur area, as it is represented in Figure 7, have been analyzed, including the section of the embankment, which appear to be too large to be inserted in the narrow area rising between the Ashur remains and the Tigris River, as many pictures taken during this last mission clearly show.

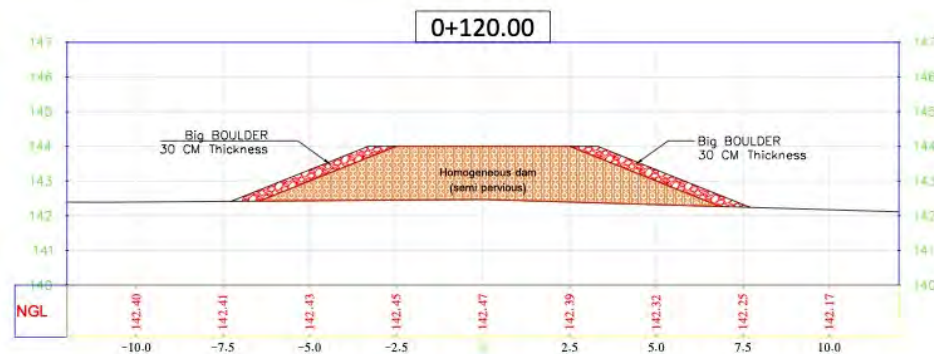


Figure 7 – Embankment section and plan for the protection of Ashur area (Source: State Party information provided to the mission)

As is possible to remark, despite the section being the highest of the proposed protective works, it is still not high enough when compared with the required height of 152 m a.s.l., reported in the Makhool Dam project. On the other hand, this section seems to be too large with respect to the narrow area available between the Ashur property and the Tigris River embankment, to its west side. This is not to say that the west side of the Ashur property cannot be protected, but that it requires a different kind of protective installation, as will be suggested in the following, based on a proper investigative campaign.

From a geotechnical perspective, there is currently a lack of adequate data, to evaluate the most suitable protection work for the proposed area. More information regarding the hydraulic conductivity, cohesion, and friction angle of outcropping soils are required, to ensure there will be no seepage hazards, or slopes hazards, as the final remarks of this report suggest. Both phenomena risk seriously damaging the Ashur property from a hydrogeological perspective. Regarding these aspects, the suggested investigations are required when choosing the best suitable protection work, and its most reliable section. On the other hand, the proposed section of the protection embankment appears suitable to protect the Ashur site area to the North, East and South sides, solving also the problem of guaranteeing the proper continuity with villages, placed at the East side of the property.

All these considerations can be related to the protection of the Ashur remains area, with regard to the present ordinary flooding events, as with the Makhool Dam should it be built. In this latter case, there is currently a lack of information about the impact of the dam's construction and functioning on the hydraulic trends of the Tigris River in the portion around the Ashur remains area. For instance, there is insufficient information on the increase of hydraulic levels in the Tigris River in the case of extreme hydrological events, when the dam is constructed and the reservoir is full. The only available information, as mentioned above, is that the maximum level of water, when the Makhool Dam is full, will reach 152 m a.s.l., or 2m over the lowest elevation of the Ashur remains area. Due to the respective location of these two areas, it is to be expected that when the reservoir is full the water level of the Tigris River at the Ashur remains area will be a few meters higher than 152m a.s.l. Until now an Environment Impact Assessment for the Makhool Dam has not been available, and so it has been impossible to gauge whether these important aspects have been studied and how the protection of the Ashur remains area has been treated. This fact could have a potential threatening impact on the protection of the

Ashur remains area, as at the site the Tigris River is already under enhanced erosion, as is represented in Figure 8.



Figure 8 – Damaged riverbank protection measures © ICOMOS/Y.Makaroun

In this image, gabions built in the recent past have been damaged. It is expected that the construction of the Makhool Dam would increase this damage to the riverside. In this regard, gabions used as protection against erosion, could be a suitable technical solution, but they require a larger gravel content. The gravel or coarse filled gabions are expected to be large enough to give the required stability to these works, which should be resistant to the erosive forces represented by the water flow, in ordinary conditions, as well as in case of flooding, when these forces would greatly increase. As it will be explained in more details in the final remarks, gabions, as well as terramesh, could be a proper solution in the case of riverside erosion, as well as in the case of the hydraulic protection of the Ashur site area to its west side, however this would require adequate preliminary investigations and appropriate calculations to be undertaken.

3. FINAL REMARKS

This paper has aimed at describing the critical technical aspects, referred to the hydrogeological assessment of the Ashur site area in Iraq. Standing on the information available until now, including the interesting result of the GIS Survey, carried out by the Bologna University Team, and the outcomes of the mission on site, carried on between 28 and 31 March 2022, this site is still exposed to serious hydrogeological risks, and more detailed investigations are required to evaluate if there are the conditions for being sure that this site is no more under hydrogeological hazards. Followings are some suggestions/prescriptions to give a contribution to the best protection of the area.

- 1) Ordinary conditions hydraulics aspects – It is required to carry out a specific hydraulic assessment of the Ashur site area aimed to output the forecasted flooding hazard, related to 10, 50, 100, 200- year return time meteoric and hydraulic extreme events, including the evaluation of the erosion forces acting on Tigris riversides along this kind of events. This study can be carried on setting up a one-dimensional numerical model coupled with two-dimensional model in unsteady conditions, after having carried out a bathymetric survey of the Tigris River.
- 2) Makhool Dam construction hydraulics aspects – In the environmental impact assessment, included in the Dam Project, it has to be studied the hydraulic impact of the complete filling of the reservoir on the ordinary water levels of Tigris River, in the part of it, which is close to the Ashur site area, and the consequences on it in case of 10, 50, 100, 200- year return time meteoric and hydraulic extreme events. This study can be carried on setting up a one-dimensional numerical model coupled with two-

dimensional model in unsteady conditions, after having carried out a bathymetric survey of the Tigris River, in its part between Ashur area and the area where the Makhool Dam would be built and a topographic survey of the same area. Only after setting up this kind of hydraulics studies, it will be possible to verify the feasibility of the little dam, proposed by the Iraqi Authorities, as represented in Figure 9, for the Ashur site Area protection. Standing on the information available until now this opera seems to be not useful.

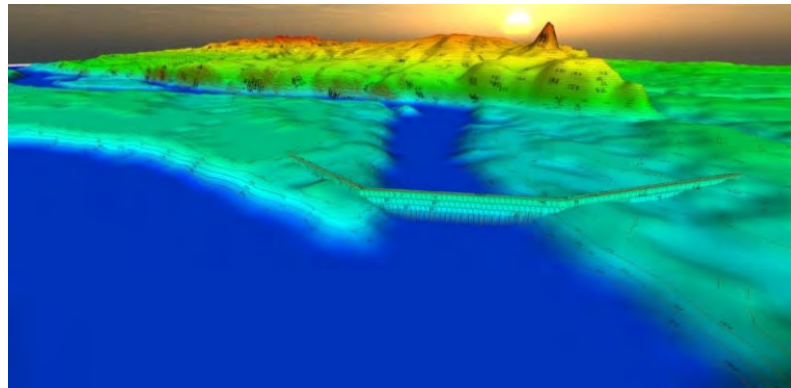


Figure 9 – Temporary Dam proposal Source: State Party information provided to the mission)

- 3) Protection works design – As mentioned above, protection works for the Ashur site area have to be designed after knowing the required height, which could be output from hydraulics studies. When this dimension has been evaluated, to guarantee the hydraulic protection of the area, different types of protection work should be considered for the riverside of Tigris River, and for the Ashur site area perimeter according to the available areas. For the riverside and the west side of the perimeter of Ashur site area it could be suggested to design a combined system of terramesh and gabions.

On the other hand, the rest of the perimeter of the Ashur site area could be protected by a traditional embankment section as it has been proposed by Iraqi Authorities and it is represented in Figure 10. In order to arrive at a correct design of these works it is required to carry out a proper geological, hydrogeological, and geotechnical survey, to find out the specific design parameters of this area, as listed below.

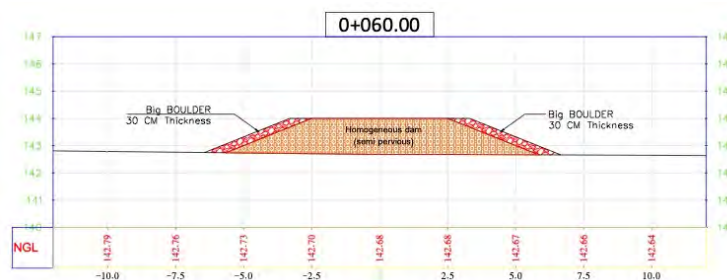


Figure 10 – Traditional embankment section (Source: State Party information provided to the mission)

- 4) Soil investigation survey – Any correct choice of the most suitable protections work for the the Ashur site area must be based on the outputs of a sound geological, hydrogeological, and geotechnical survey, which can drive to find out the most important physical and mechanical properties of soils involved in the construction of these protection works. It means, that, on the outset, a set of at least 10 rotary drilled boreholes are required, at a depth of 20 m, the reports of which could give the basic

information for setting up a detailed stratigraphic assessment of the area. Along with the rotary drilling of these boreholes, one undisturbed sample of soil is required for each borehole, to undergo laboratory tests, in order to find out the physical properties of the soil. Next to each one of these boreholes, and in the same number, at least, of CPTUs, and Cone Penetration Tests Undrained should be undertaken, with the aim of having an evaluation of the most important mechanical properties, such as drained cohesion and friction angle, and hydraulic conductivity, along the thickness of the investigated soil. At the end of this investigation campaign, it can be expected to have a reliable geological, hydrogeological, and geotechnical model of soils outcropping in this area.

At the end of this path, including hydrological, hydraulic, geological, hydrogeological, and geotechnical investigations, and the setting up of a report based on the physical properties of this area, it will be possible to choose and design, correctly, the most suitable protection work for the area of Ashur site.