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Report on

Mission to Evaluate

the State of Conservation of

THE COMPLEX OF HUE MONUMENTS

(Republic of Vietnam)

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1 BACKGROUND TO THE MISSION

At the meeting of the 23rd session of the Bureau of the World Heritage Committee held in Paris in June 1999 it was suggested that the State Party (Vietnam) might seek to have the Complex of Hue Monuments placed on the List of World Heritage Sites in Danger. This and the various projects for disaster mitigation that have been proposed by the Hue Monuments Conservation Centre formed the background to this mission. This report sets out to consider the following questions:

1 To what extent can Hue be considered to be a World Heritage Site in Danger?

2 Are the projects for which funds are being sought appropriate for disaster mitigation: i.e. are they necessary and/or sufficient for the relief of that danger? In examining these they have not been considered in numerical order but have been grouped in a way that reflects various concerns.

I was supplied, *inter alia*, with a list of the projects for which funds are being sought and the resolution of the 23rd session of the Bureau (I.39) referring to this site. I was also supplied by David Michelmore with his report of the damage caused by the 1999 flood and with the report by Dr Ridout on timber decay within the site. It is appropriate to begin by some general notes on the state of the monuments and by considering aspects of the flood report, which relate to some of the specific projects.

2 INTRODUCTION

The Hue World Heritage Site contains a large number of monuments of mainly timber construction on brick foundations with some brick walls. In addition there are substantial masonry works, which include the Thien Mu Pagoda but mainly comprise the defensive works round the citadel of Hue. The state of the buildings comprising the monuments varies considerably, from recently restored and reconstructed buildings to those in a state of near collapse. Management of the overall site requires a balance between restoration work, maintenance of the restored buildings, preventive maintenance of the buildings awaiting restoration, and even emergency support, and protection of minor buildings that will have to wait for some time before work can be carried out on them. It is not for me to judge the way that this balance is being struck, but the Hue Monuments Conservation Centre appears to be well and competently staffed and to be managing the site effectively. However, its ability to balance the required activities relates to three of the funding applications. If the Conservation Centre is not properly equipped it may be unable to manage its work properly, and this may in itself increase the risk of loses at the site. This is in no way a criticism of the staff or the management of the Centre but simply an observation on the magnitude of their task. Therefore the first projects that need to be considered are those relating to the capacity of the Conservation Centre to undertake its work.

Two principal natural threats to the site have already been identified in the reports referred to above. These are the flooding from the Perfume River and the degradation of the timber structures as a result of fungal and insect attack. These are both serious problems and a number of the projects relate to the mitigation of these effects. Thus I have grouped these projects together for discussion.

In addition to this I noted that there has been substantial ground settlement at a number of the sites. At present it is difficult to gauge the seriousness of this but the fact is referred to in more than one of the applications for funding. I have therefore included a specific note on this problem with a recommendation for action.

In my discussions with the Director and Deputy Director of the Hue Monuments Conservation Centre, I raised the issue of the recommendation of the Bureau that the State Party consider asking for Hue to be placed on the List of World Heritage Sites in Danger. They indicated that they were in favour of this being done. Naturally this can only be an informal note of their intention, but it was useful to have this information as background in surveying the various monuments and in my discussions with staff.

3 STAFF TRAINING AND EQUIPMENT

There are three projects concerned with the general development of the Hue Monuments Conservation Centre and these might usefully be taken together. The Centre may be said to be under-resourced in a number of important areas and this is hindering their work. The first two projects discussed below are of particular importance since all other work depends upon the management facilities of the office and the ability of the laboratory to provide a back-up service.

3.1 Extending the capacity of the Hue Monuments Conservation Centre (Project 5)

The management of a complex situation faced by the Hue Monuments Conservation Centre, with such a large number of monuments in widely different states of repair, calls for the most up-to-date management facilities available. Whilst the Centre has computer equipment with CAD software, this equipment is old and of limited capacity and needs to be brought up to date.

3.2 Upgrading laboratory equipment (Project 7)

The work carried out by the laboratory is mainly on the mechanical properties of timber and on preservative treatments. For this they have a staff of four specialists (as well as technicians), comprising a chemist, a physicist, and two biologists. Extension of the scope of work of the laboratory would require additional specialist staff, and possibly additional technician support.

The laboratory is seriously under-equipped to carry out work needed for conservation of the monuments. The justification for some of the equipment is clear not only from the application for funds but also from the report on timber damage prepared by Dr Ridout. For example, they lack even a basic microscope. If the laboratory is to provide sensible support, then it must be properly equipped and staffed. It is through the services of this laboratory that the risks from fungal and insect attack to the timber structures can be mitigated.

I was told during my visit that the sensitive balance that they have for measuring the absorption of timbers (part of their work on preservative treatments) was damaged in the flooding last year and no longer works. I am concerned about a situation where a valuable piece of equipment like

that can remain unrepaired for so long. Does this mean that there are no facilities within the country for its repair? I also took with me a number of drill bits for the decay detecting drill that they have. This has proved very useful to them and they had asked for these replacements. However, this is another example of an inability to service equipment.

There is little point in providing equipment if its use is limited by the ability to service it. It is essential for the continuance of their work that equipment be serviceable. I raised this issue with the Hue Monuments Conservation Centre, who were aware of the problem. They pointed out that, although training is provided for their technicians, this is often outdated by developments in the equipment they might acquire. I strongly urge that all applications for equipment also take into consideration its long-term maintenance and servicing and build in appropriate provision for these.

There were no facilities for investigating problems with the foundations of buildings. I suspect that this is a problem whose significance has yet to be recognized. Monitoring of ground movement will require precision surveying equipment (ands the staff to use it), whilst any investigation of the soil conditions will require the ability to take samples, so that simple boring equipment might be provided. This is not something that the laboratory has requested but it is something that might be discussed with them. I am not qualified to suggest what apparatus is needed for the useful analysis of soils (but see my note on this below).

3.3 Archaeological training (Project 8)

Proper management of the existing monuments naturally depends upon the understanding of the archaeology of the site. At present the Centre is ill equipped to carry out sophisticated archaeological investigations The extent to which the site remains not fully understood because of this limitation might regarded as a threat to the site, involving the loss of archaeological remains during the development of the wider city of Hue. This is certainly an area of study that the Centre needs to develop.

3.4 Publication of a conservation manual for Hue (Project 6)

It has been pointed out in the project proposal that the availability of such a manual will help to avoid variations in standards of work on different projects and facilitate the proper conservation of traditional timber buildings that are in private hands. I suggested to the Centre that a possible result of such a publication might be increased workload on the Centre in handling enquiries concerning those properties. They were aware of this possibility.

4 THREATS TO THE SITE FROM NATURAL FORCES

The security of the monuments along the river clearly depends upon the extent to which the riverbank itself can be protected. This work is in the hands of the Board of Management of the Perfume River. I am assured that this organization works closely with the Monuments Conservation Centre in determining the need for emergency work to protect the monuments. The long-term security of the monument sites depends upon the long-term control of the river and the assessment of this is beyond my capacity to judge. However, there can be no doubt that it is this is the major and most immediate danger to the World Heritage Site.

4.1 Minh Mang Mausoleum – Embankment protection (Project 1)

The most important wok being carried out at the Minh Mang Mausoleum is the protection of the riverbank and construction of a new boat landing to replace that swept away last year. This is being carried out using pre-cast concrete blocks laid over a protective sheeting (which I presume is to help contain the soil behind). This embankment extends for several hundred metres along the shore and is well in hand. The precedent for this form of protection is a similar scheme carried out previously further down-stream which, to date, has worked successfully.

Work has recently been completed on an important pavilion at this site but there are others that are in various states of decay through insect and fungal attack, and it may be appropriate to carry out emergency protection of some of these to prevent losses.

There is considerable evidence of settlement in the grounds of this monument. Much of the construction is on made ground and there is evidence of movement in the retaining walls of mounds upon which buildings are constructed. The plinths have settled considerably and there is differential movement between buildings, causing failure of connecting walls and disruption of the paving. Whilst this is not the only monument where there has been ground settlement, it is most evident here.

4.2 Hon Chen Temple – Embankment protection and improved drainage (Project 2)

This monument is on a promontory at a bend in the river and takes the full force of the current. The promontory is formed by an outcrop of rock on which the temple buildings stand but, although the rock forms a hard point along the shore, it is very fractured and is being undermined by the current. The rock within cavities in the bank is said to be unstable, threatening the material above. Stabilizing work is urgently needed and this will require specialist advice.

The buildings are also threatened by rainwater run-off from the hill above. This has brought down soil with it which the roots of plants are unable to contain. The soil being washed down has caused scour of the paving (some of which has had to be replaced) and has scoured the soil below the monument. A programme of drainage and retaining walls has been proposed and this is clearly necessary to protect the buildings if future heavy rainfall is not to cause damage.

4.3 Thien Mu Pagoda – Embankment protection and restoration of the architecture (Projects 3 and 12)

The bank protection work is complete here but there are signs of settlement of the ground round the pagoda. The road in front of the pagoda has been closed to traffic to prevent damage from that cause.

A small pavilion that once stood in front of the complex was damaged in a storm. This has been dismantled and re-erected behind the main temple on the base of a larger building that was previously destroyed. This is an example of the vulnerability of some of the structures to storm damage. However, even a superficial examination of the re-erected structure shows distress at some of the joints. This is one of several structures that I noted which showed signs of distress at joints, and this issue is considered separately below.

The temple buildings here have been in the care of the monks who have their own funding. However, buildings that have been restored in the recent past are showing sign of decay of the timbers. This is clearly one group of buildings that require protection of the timber and an ongoing programme of maintenance and repair.

4.4 Tu Duc Mausoleum – Restoration of buildings (Project 9)

Considerable work has been carried out at this monument, but a large number of buildings are in a state of advanced decay. At the moment there are immediate plans to restore only a proportion of these. It is clear that public access is to be limited to a small part of this monument for some time. Some of the area of the site is on made ground and there were signs of settlement. The member of the Hue Monuments Conservation Centre who showed me round this monument opined that movement was continuing.

When I visited there was some recent damage to a gatehouse where a storm had blown out a timber lattice from the upper part of the structure on to the tiles below, causing damage to both. This is an example of continuing repair and maintenance that is needed and which must be a demand upon resources.

This is also a site where the limited pace at which work can be carried out is placing buildings at risk of loss. Although I was shown the buildings for whose restoration grant-aid has been requested, I also came across some minor buildings in an advanced state of decay and for which there were no immediate plans. Emergency action to ensure the stabilization of such buildings is required at a number of sites and should e carried out if there are not to be losses.

4.5 Textile conservation at the Hue Museum of Royal Fine Arts (Project 10)

The problem here concerns the collection of royal garments. This is an unusual problem in that the danger is not to the buildings themselves but to objects housed within them. This is a problem of flooding and of high ambient humidity. The curatorial staff was also concerned about lighting levels affecting the colours of the garments. Only a small proportion of the collection is displayed at any time and the cabinets within which they are housed are very simple. What they require is specialist advice on both their storage and display and the provision of cabinets in which the proper conditions may be maintained.

4.6 Bastions of the Imperial City Wall – Provision of flood refuge (Project 4)

This project is to convert the bastions of the imperial city wall, each to provide temporary shelter for 300 persons during the flooding. In addition, they are to be used for housing emergency facilities such as medical aid and emergency power generation. Whilst this project has clear humanitarian objectives and clearly deserves to be supported on those grounds, it is not clear that its implementation would directly improve the security of the monument itself. It might therefore be the kind of project that would be more appropriately aided by some other agency.

The linking of humanitarian relief to conservation is a desirable connection, and in socio-economic terms this project cannot be faulted, but as a means of protecting the monument the argument needs to be made more clearly. The justification may be that if such a project is not carried out with care, its implementation might increase the danger of loss of historic fabric at these places. For example, if this adaptation work is carried out on the north bastion, without some work being carried out to restore – or at least stabilize – the Tu Phuong Vu Su Pavilion, damage might be done to the latter when the bastion is used as a shelter.

It has been noted that the recurrence of flooding has encouraged many residents of the city to replace traditional single-storey housing with two-storey houses, the latter being more secure. The danger is a degradation of the traditional character of the townscape within the walls and immediately adjacent to the Imperial City. I noted a number of substantial two-storey houses at present under construction. It seems unlikely that the provision of a public refuge will reduce this

risk of further building of this kind, and more effective development or building controls seems to be the answer to this particular problem.

5 POSSIBLE ADDITIONAL WORK

5.1 Timber decay and repair

There are signs of the timber decay and insect infestation mentioned in the report by Dr Ridout. There is little that I can usefully add to that report except to note the serious nature of this problem if there is not a continuing programme of monitoring and treatment. I noticed a common pattern of failure of the tenons at the ends of beams where they joint into columns. A large number of these have been propped or otherwise reinforced, often in buildings that appear to have been recently restored (see my note on the Thien Mu Pagoda, 4.3 above). I am curious about the reasons for this, and it is something that might be investigated. The overall structural form used suggests that high stresses might be caused by wind loading and that some joints may therefore be critical, with the structure as a whole particularly vulnerable to decay at these points. The implication is that a structural investigation of the buildings might indicate a need for particular attention to be paid to the prevention of decay or insect attack on specific elements and joints. I would recommend the carrying out of such an investigation and would be prepared to do this myself if provided with the necessary data on member and joint sizes.

Members of the staff of the Hue Monuments Conservation Centre who showed me round were anxious that I see the work that they had already carried out and the projects that they currently have in hand or for which they are currently seeking funds. It was only when I deviated from their route or was able to walk round by myself that I became aware of buildings that are in an advanced state of decay but for which there are no immediate plans. This, of course, reflects the gap that exists between the scale of the task and the funds available. However, I was not aware of any plans, even of the simplest kind, for work to limit the deterioration of such buildings, i.e. to provide the emergency stabilization referred to above. (I should point out that I only became aware of the possible extent of this problem late in my visit and was not then in a position to ask detailed questions about it.) A major danger to such buildings is fungal and termite attack, and some means of limiting this risk should be implemented if possible.

Much of the restoration work on the timber monuments has involved dismantling and reconstruction. There are arguments both in favour of and against such an approach for timber-framed buildings, but I am concerned about the possible loss of original decoration on structural elements that may result. Training appears to be necessary in the analysis and repair of elements of this kind.

My other concern is that repair *in situ* requires different carpentry skills and methods from those used for dismantling and reconstruction. Such skills are certainly required for the continued maintenance and repair of the buildings. I do not know to what extent the Hue Monuments Conservation Centre is able to draw on such skills and was unable to determine this during the short period of my visit. However, members of the ICOMOS International Wood Committee who visited Hue earlier in the year took the view that training in these skills was needed and I recommend that such a training programme be designed and carried out.

(While not directly relevant to timber repair, I did visit the pottery works within the citadel where they are producing paving and roofing tiles for repair work. This is an excellent example of the continuation of the craft skills necessary to maintain the buildings.)

5.2 Ground settlement.

Settlement of the ground has affected a number of individual buildings, at the Minh Mang Mausoleum, the Thien Mu Pagoda, and the Tu Duc Mausoleum. The effect of flooding on the properties of the soil has been noted in the detailed project proposals. Ground movement may also be affected by subsoil drainage patterns. This lies outside my area of expertise, but some simple observations may be made.

The Hue Monuments Conservation Centre at present has no programme in place to monitor the movement of the ground and no immediate plans to do so. Movement of the ground is dependent upon processes that are invisible from the surface. I would have expected to see at least the establishment of some permanent survey points whose level could be periodically monitored to see how fast settlement is occurring and whether or not this is a seasonal effect. It might also be useful to monitor the level of the water table.

The explanation for this lack was that it had not been thought possible to apply for money to do this, given the other requests that are being made. That may be so but this is a matter of assessing priorities. I can understand that one might wish to concentrate on more visible projects, but there is little point in preserving buildings if their foundations are at risk. My view is that specialist soil mechanics advice should be sought to suggest the level of monitoring appropriate. I have indicated some resources that might be needed, but the specialist should be asked to advise on both appropriate equipment and staffing.

6 SUMMARY

The most urgent projects are those necessary to mitigate the effects of flooding. Work to ensure the long-term protection of the monuments against the effects of insect and fungal attack is equally vital. However, this kind of work does not involve immediate and easily visible projects but is inextricably linked to the development of facilities within the Hue Monuments Conservation Centre, such as the improvement of laboratory facilities. The project proposals for such development should be regarded as essential investment for the long-term protection of the monuments. It has been suggested that the Hue Monuments Conservation Centre could become a centre for such work within the region, and I think that with such investment that could be possible.

Whilst the projects for which funding has been requested provide a sound basis for the development of the capacity of the Hue Monuments Conservation Centre to manage the site and to mitigate many of the threats to it, there are some problems that are not being addressed at present and some areas where additional help would be valuable. These are:

- the emergency stabilization of buildings at risk of collapse;
- the investigation of joint problems within the timber frames;
- the development of skills for in-situ repair;
- the investigation of ground movement.

7 ACKNOWLEDGEMENTS

I would like to thank Mr Thai Cong Nguyen, Director of the Hue Monuments Conservation Centre, and his staff for their help with this mission.

David Yeomans 6 September 2000