Preliminary results and recommendations from a UNESCO mission of post-disaster surveys and rescue excavations at UNESCO World heritage sites in the Kathmandu Valley, Nepal conducted by a joint Department of Archaeology, Government of Nepal and Durham University Archaeological Team.

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Between the 5th October and the 22nd November 2015, a collaborative team of international and national experts from the Department of Archaeology, Government of Nepal (DoA) and Durham University (DU), undertook a series of post-disaster surveys and rescue excavations at earthquake damaged UNESCO World Heritage monuments in the Kathmandu Valley.

After the earthquakes of the 25th April and the 12th May 2015, vast areas of Nepal and neighbouring regions were devastated with thousands of people made homeless and over 9,000 fatalities. A human catastrophe of enormous proportions, this natural disaster and its associated aftershocks, also generated a cultural catastrophe, damaging and destroying much of Nepal’s unique cultural heritage including monuments within the UNESCO Kathmandu Valley World Heritage Site of Universal Outstanding Value.

Their mission has also demonstrated that a number of immediate post-disaster emergency recovery interventions badly damaged some buildings, such as the Kasthamandap. Whilst these interventions were undertaken in haste, with a priority of recovery the injured and dead, more recent damage from non-emergency activities have ranged between engineering contractors cutting exploratory trenches into monuments, engineering contractors drilling soil cores as part of subsoil investigation and workmen cutting foundations for lights to the deliberate collapse of some monuments and dismantling of others.

Not only architectural and historical treasures of Outstanding Universal Value, the monuments of the medieval city squares are a major source of economic growth through domestic and international tourism. The various temples and monuments within the square are also of intangible value, playing a central ritual role in the daily lives of thousands of the Kathmandu Valley’s inhabitants. For these reasons, the damaged heritage sites of Nepal will be subject to a major program of reconstruction and conservation.

In response, national experts from the Department of Archaeology, Government of Nepal, in collaboration with archaeologists from Durham University, undertook a series of archaeological investigations, including surveys and excavations in the three earthquake damaged Durbar Squares of Hanuman Dhoka, Patan and Bhaktapur. The project was directed by Kosh Prasad Acharya, former Director-
General of Archaeology and Professor Robin Coningham, UNESCO Chair at Durham, supported by Mr Ram Bahadur Kunwar of the DoA and Dr Christopher Davis, Dr Jennifer Tremblay of DU and Anouk LaFortune Bernard. These investigations have highlighted the necessity for archaeological investigations prior to any below ground interventions to protect subsurface heritage.

At each of the Durbar Squares, the team of national and international experts identified further areas of archaeological significance through the use of Ground Penetrating Radar (GPR) by Dr Armin Schmidt of DU. The GPR allowed us to identify and map the location of subsurface archaeological features, such as buildings, below the brick paved surface without excavation. Whilst this data is still being processed, to provide accurate data regarding the depth and extent of subsurface archaeological features, provisional Archaeological Risk Maps have been produced, which will protect subsurface heritage by guiding the placing of new water, power and sewerage infrastructure and informing the enhanced management and long-term protection of these sites for sustainable development, including the repair of infrastructure and the construction of amenities for tourists and pilgrims.

In combination with the GPR investigations, the team began excavations within each of the Durbar Squares. The aim of these excavations were to explore the state of the foundations of key damaged monuments and to evaluate the subsurface stratigraphy adjacent to these foundations and across the Durbar Squares in order to inform engineers and architects tasked with the construction of new foundations for the collapsed monuments.

At Patan the Char Narayan Temple, generally attributed to 1566 AD, was investigated. Identifying levelling material across the square, which included broken bricks and tile, possibly from earlier earthquake events, the team also uncovered earlier paved surfaces, including phases of squared tiles and cobblestones. From their investigations, it became clear that the subsurface heritage had been damaged by modern interventions, including pipelines and sewers. Closer to the ruins of the Temple’s plinth they also identified an earlier brick-built phase on the same alignment. Resting on a cobblestone foundation, its wall was laid in clay mortar and had cut through earlier structures. The latter comprised earlier rectilinear clay platforms and the presence of a large posthole within one of these platforms indicated that the site had first hosted monumental timber architecture.

In Bhaktapur, they uncovered the clearest examples of the archaeological features identified in the GPR. Running a trench from the stone-clad Vatsala Temple across the Square, the team first exposed an earlier phase of brick paving, which was laid over a series of pavements, drains and truncated walls on north-south and east-west alignments. They believe that these walls belonged to a two-storied resthouse, depicted in a painting by Henry Ambrose Oldfield in the 1850s, which collapsed in the 1934 earthquake. In some of these walls, they tentatively identified earlier
earthquake damage, including fractures, whilst also identifying the damage caused by modern pipelines.

At Hanuman Dhoka Durbar Square, the team focused on the Kasthamandap. The monument that gives Kathmandu its name, it completely collapsed on the 25th April with a tragically high loss of life, and was then cleared by bulldozers, which destroyed at least 30% of the monument. After clearing rubble at the site, they identified the monument’s huge foundation walls. Rather than four independent corner plinths linking by double rows of timber pillars, as previously identified in architectural reports, they found that the main foundation was two metres deep and one metre wide measuring some 12 by 12 metres and was set in a clay mortar. The only damage visible was from bulldozers during the emergency and the team was unable to find signs of damage relating to the recent or previous earthquakes. The wall sat within a slot cut through earlier occupation levels below, illustrating the long sequence of human activity at the site.

Within this foundation, they excavated several phases of Shah and Rana renovations and then exposed brick cross-walls running east-west and north-south. These cross-walls represented a secondary intervention and indicate that the original design had included four central brick piers to support the four large central wooden pillars. Measuring 2.01 metres deep, the pier’s brickwork was well preserved and again did not reveal any noticeable earthquake distortion. Inserted later, and running between the large foundation and the piers, the cross-walls formed a plan of nine mandala-like cells. In addition, our cleaning of three of the four central saddlestones demonstrated that their pillars had originally rested on a copper plate on top of each stone as damp-proofing. Furthermore, each of these saddlestones had a deposit that included a gold foil mandala. Such objects are relatively rare and probably relate to elaborate construction rituals and the creation of cosmological significance. By exposing the foundations, they have not only illustrated the nature of monumental construction in the Kathmandu Valley, but also the cosmological significance that was placed on their construction.

There is debate as to the date of construction for the Kasthamandap with dates ranging between the 12th and 16th centuries AD. The team’s use of scientific dating analysis, which is currently being processed will soon provide absolute dates for this structure, and others investigated during this field season, to begin to refine the chronologies of the monumental cores of the Kathmandu Valley. In addition to Optically Stimulated Luminescence (OSL) dating samples from soil profiles at the Kasthamandap and Bhaktapur, Professor Simpson from Stirling University also microscopically studied the deposits to interpret the nature of the Valley’s past environment change, and noted a transition from sediments with charcoal frequencies from earlier phases to later sediments dominated by brick inclusions. The team currently interpret this evidence as a transition from rural to urban landscapes but await further analyses.
From these investigations, the team concluded that in many cases the foundations were resilient and undamaged by the 2015 earthquakes or previous seismic events and the collapse of many monuments may be linked to superstructure maintenance issues. Indeed, whilst they had successfully identified the location of saddlestones supporting three of the Kasthamandap’s central timber pillars, they could find no trace of the fourth. Located in the north-east corner of the monument’s heart, the team was only able to locate its position by a set of concave tiles, distorted by the weight of a large wooden pillar. The 6.2 metre long pillar itself was then located and they noted that neither end had a tenon. This indicates that the Kasthamandap’s superstructure rested on three locked joints and one mobile one, weakening the building.

Offering training in rescue and urban archaeology to officers of the DoA and three municipalities, the team concluded by recognising that plans to swiftly reconstruct temples on existing ruined platforms will first necessitate detailed recording and scientific analysis of their foundations as few architectural studies of Kathmandu’s monuments have considered them. Offering additions to the Department of Archaeology’s Conservation Guidelines for the Post 2015 Earthquake Rehabilitation, they recommended that all subsurface interventions, including the rebuilding of monuments, should be preceded by rescue excavations in order to evaluate the presence of sub-surface archaeological heritage as well as to evaluate the stability of foundations to avoid a second cultural catastrophe - the destruction of the subsurface heritage of the Kathmandu Valley through rapid reconstruction.

“These archaeological investigations have provided training to DOA officers in urban and rescue archaeology through the use of traditional excavations in combination with geoarchaeology and Ground Penetrating Radar. This capacity building linked to these investigations has enabled the recording of the damage that the earthquakes caused, but have also enabled the refining of guidelines for the post-disaster recovery and reconstruction phase, highlighting the need for archaeological interventions to protect both standing architecture and subsurface heritage, especially at Nepal’s monuments of Outstanding Universal Value” stated Bhesh Narayan Dahal, Director General Department of Archaeology, Government of Nepal.

Christian Manhart, UNESCO Representative to Nepal added that “These investigations have provided an exemplar in the role that archaeology can play in the post-disaster phase of the cultural response to a large natural disaster, such as an earthquake. Whilst illustrating the complex pasts of the monumental Durbar Squares, the Archaeological Risk Maps will also guide reconstruction and future development of these historic sites to protect the subsurface heritage that these investigations have revealed".
Professor Coningham, the UNESCO Chair in Archaeological Ethics and Practice in Cultural Heritage, Durham University stated that “for the first time, archaeological investigations have been pivotal in the aftermath of a natural disaster, illustrating the role that archaeology can play in guiding post-disaster responses to reconstruction and rehabilitation of earthquake damaged heritage. Our pilot investigations have illustrated the dynamic histories and developments of the three Durbar Squares as well as informing architects and engineers as to the integrity of the foundations of the collapsed monuments, illustrating the resilience of traditional construction techniques through the centuries within a seismically active region, providing information that will aid the sympathetic reconstruction of collapsed and damaged monuments whilst protecting subsurface archaeological heritage”.

Looking forward, Professor Coningham also observed: “Whilst a human and cultural catastrophe, UNESCO’s involvement in the post-disaster environment of the Kathmandu Valley has the potential to both offer invaluable training for professionals as well as exemplars for the scientific documentation and recording of ‘in situ’ debris, archaeological risk mapping and structural sub-surface foundations in advance of reconstruction and rehabilitation. The resultant exemplars, supported by research into traditional construction technologies and the reuse of materials, provide the potential to offer robust methodologies and techniques for those tasked with the clear up and subsequent research, rehabilitation and rebuilding of damaged and destroyed heritage superstructures, particularly that of the Middle East.”

The archaeological work was undertaken jointly by the Department of Archaeology, Government of Nepal and Durham University and Stirling University, with financial support from UNESCO. The rescue excavations and archaeological investigations are part of the remit of the UNESCO Chair in Archaeological Ethics and Practice in Cultural Heritage, at Durham University, to develop debates, policies and methodologies to evaluate the economic, ethical and social impacts of cultural heritage, and particular to strengthen the protection of heritage in crisis situations.