

**Preliminary Results of Post-Disaster Archaeological Investigations at the Char Narayan Temple and within Patan's Durbar Square, Kathmandu Valley UNESCO World Heritage Property (Nepal)**

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## **1. Introduction**

The 7.8 Magnitude earthquake that struck Nepal and surrounding regions on the 25th April 2015, not only caused catastrophic loss of life but also the destruction of cultural heritage. Monuments across Nepal were damaged or destroyed but much media attention was focused on the destruction of monuments within the UNESCO World Heritage Property of the Kathmandu Valley. The medieval Durbar Square of Patan was one such area of this Property adversely affected by the earthquake, an area where many monuments were damaged and several collapsed. In response, a collaborative team of international and national experts from the Department of Archaeology, Government of Nepal, Durham University and the University of Stirling was invited to participate in a UNESCO-sponsored mission of post-disaster surveys and rescue excavations at earthquake-damaged monuments and areas within the UNESCO Kathmandu Valley World Heritage Property, including Patan's Durbar Square.

## **2. Earthquake Damaged Monuments in Patan's Durbar Square**

Patan's main Durbar Square covers an area of some 7,700 square metres, roughly measuring some 140 metres north to south and between 70 and 40 metres east to west. Known also as Mangal Bazaar, the majority of the visible monuments of the square were constructed in the sixteenth and seventeenth centuries and it has been noted that Siddhi Narasingh (r. 1619-61 CE) and his son Shri Nivas (r. 1661- 84) were responsible for much of the development of the palace and its surrounding environs (Gellner 1994: 143). Unlike Hanuman Dhoka with its later development of neo-classical architecture and the reduction in size of Bhaktapur's Durbar square from its former extent during that city's fluorescence, it has been said that Patan hosts the best preserved Malla period palace and square complex in the Kathmandu Valley (Slusser 1982: 199).

Several monuments within the square were damaged during the earthquake of the 25th April 2015 (Figure 1). These include the palace structure, which houses Patan Museum, where the octagonal Temple of Telgua in the north-east corner of the Mul Chok was damaged. Damage was sustained to several other monuments in the square, which are now strengthened through supporting wooden props, such as the Krishna Temple. Monuments that collapsed included the Mani Mandapa at the top of the steps of the Mani Dhara, or jewel fountain, which tradition states was consecrated in 1694 CE and renovated in 1701 CE (Gellner 1994: 144) (Figure 2). The three-storeyed Harishankar Temple, which is stated to have been constructed in 1706 CE by Rudramati, Yog Narendra Malla's (r. 1685-1705 CE) sister (ibid.: 148), also collapsed during the earthquake. Finally, the other major monument to have collapsed was the Char Narayan Temple (Figure 3). Of these monuments, the Char Narayan Temple was identified for investigation on two accounts. Firstly, it was generally considered to be one of the oldest standing monuments in Patan's Durbar Square and, secondly, its location afforded the opportunity to excavate a slot trench east-west across the current brick paved square.

### **3. Archaeological Excavations at the Char Narayan Temple and Patan's Durbar Square**

The Char Narayan Temple, also known as the Jagannarayan, is located in the middle of Patan's Durbar square to the west of the Palace complex (Gellner 1994: 147). Oriented to the east, it stands on a rectangular plinth with the Krishnan *sikhara*-style Temple to its north and the Narayan Temple to the south (Korn 1976: 81). A temple of the four principal forms of Narayan (Vishnu), the monument has been dated to 1566 CE and attributed to the patronage one of the city's *pradhana mahapatras* or principal nobles, Purandharsingha, who controlled much of the city of Patan in the sixteenth century (Slusser 1982: 199), although other scholars favour a seventeenth century construction. Korn has suggested that the Temple has undergone "only minor alterations" since its construction in 1566 CE (1976: 102). He has also provided detailed measurements for the visible parts of the superstructure and states that the ground floor of the 10.6 metre high temple measures an

area of 6.62 by 6.63 metres (1976: 114). The monument stands on a 2.49 metre high plinth measuring 13.19 by 13.95 metres (ibid.) and the Temple is accessed by a two flights of short stairs, the lower of which is flanked by a pair of lions. Little has been written about the monument's foundations but Korn notes that the building is constructed of fired brick set in clay and that the plinths are faced with a brick skin and provided with stone corners and curbs (Korn 1976: 114).

During our post-disaster archaeological season, three trenches were opened at Patan, forming a partially-interrupted slot trench east-west across the Durbar Square from the southern side of the main stairs at the Char Narayan Temple. Trench 1C was located on the platform that the Char Narayan Temple shares with several other Temples, including the Narayan Temple, Narasingh Temple and the Krishna Udyan (Gellner 1994: 142). Trench 1A was located east of this, below the upper platform's retaining wall and Trench 1B was located on the lowest level of the current Durbar Square adjacent to the west-facing palace façade. These three trenches were designated to investigate the foundations of the collapsed Char Narayan Temple and also the developmental sequence of Patan's Durbar Square.

### **3.1 Trench 1A**

Trench 1A was a slot trench measuring one x 10.5 metres running on an east-west alignment across Patan's Durbar Square. The surface of the square where this trench was located is paved with modern brick, laid in several different designs, the majority conforming to a herring-bone pattern. Within this paving was a small modern posthole. This had cut through the brickwork and highlights the use of the Durbar square to house temporary structures in its seemingly vast open spaces. The trench was defined on the east by a modern drain, which ran on a north-south alignment and formed a baulk between this trench and Trench 1B. To the west, the trench was defined by the brick wall of the upper platform edge adjacent to Trench 1C. The upper courses of this wall were constructed from conserved and repointed brick and were capped by large stones. Adjacent to the wall was a modern fill, creating a gap between the modern paving and the platform. The brick paving was removed down to a thin skim of cement, which was prepared over a setting constructed from modern and reclaimed old bricks, laid for the current paved surface. This brick setting was laid on top of sand, which covered an earlier tiled surface, which began at the same depth as the lowest course of the wall of the upper platform edge. Therefore, this wall and paving may have been constructed at a similar date.

Representing an earlier surface over the Durbar Square, this pavement was formed by a single regular course of square tiles that individually measured 0.18 by 0.18 by 0.045 metres (Figure 4). This paving appears to be on a slightly different alignment from that of the

current Durbar Square and suggests a somewhat different configuration to the square in an earlier period, though this needs further investigation. Similar shaped tiles are recognisable in Henry Ambrose Oldfield's paintings of the Durbar Square (Gutschow 2015: 131) and this feature may well relate to the paved surface of the square dating to the nineteenth century and earlier. The tiled paving stopped to the east of the trench, where it was defined by row of modern bricks laid on edge and end-to-end, running north-south, which was located next to a large section of concrete. Due to time constraints, these modern features were not removed and became the west facing section of the trench. It would appear that during a renovation of the square, this area was extended to the east through the placement of concrete, and then the modern brick paving was set above both the concrete and tiled paving. The earlier square tiled paving was set on levelling material, which included large quantities of rubble, including brickbat and broken tile. This levelling also included many broken ceramic vessels, including oil lamps, as well as terracotta plaques depicting Ganesh, many of which were attached to oil lamps (Figure 5). Whilst the oil lamps suggest ritual activity, there is a potential that much of this material is evidence of earlier earthquake damage, where material from surrounding damaged structures was repurposed for levelling areas of Patan, reconfiguring the layout of the Durbar Square.

At the east-facing section, a sondage measuring one metre north-south and 0.80 metres east-west was excavated through various levelling deposits onto a grey silty clay deposit, which may represent an occupation deposit, comparable with those in the lowest levels of Trench 1C. Once this material was removed a clean yellow clay surface was identified, which was believed to be the natural soil. This potential natural was encountered at a depth of 2.20 metres from the top of the modern brick paving.

### **3.2 Trench 1B**

Trench 1B was a small trench opened to the east of drain that formed the baulk to the east of Trench 1A. Measuring 3.50 east-west and 1.70 metres north-south Trench 1B was opened to continue the stratigraphic profile across the Durbar Square. The modern brick paving, which contained elements of a basket-weave design, was removed onto a silt deposit that contained cement, which acted as a setting for the paving above. Once this was removed, another brick paving level, also of basket-weave design, was encountered. This may have been further setting for the current paved surface of the square or an earlier paving, which was subsequently covered. The lowest level of brick paving was placed on a sand setting, which lay over a mottled and mixed material that contained brickbats.

Below this material was a surface of stone cobbles to the east of the trench (Figure 6). These cobbles may represent an earlier episode of surfacing of the square or may have been related to an earlier structure. Also at this level were the remains of a brick wall stump,

which survived to two courses (Figure 7). These features were cut by modern pipelines, running north-south in line with the current thoroughfare through the Durbar Square. As these features did not cut-through the two levels of brick paving and were sealed by these surfaces, it would appear that these interventions had occurred before the current paving of the Durbar square was laid. The stone cobbled surface and brick wall stump clearly illustrate the presence of archaeological features and surfaces below the current level of brick paving in the Durbar Square. The pipelines that cut through these features also highlight the need for future archaeological assessments and archaeological watching briefs before any intrusive digging across Patan's Durbar Square.

### **3.3 Trench 1C**

Trench 1C was located on the platform to the west of Trench 1A, which was adjacent to the Temple foundations of the Char Narayan Temple. This trench measured one metre east-west and 7.50 metres north-south and was opened to investigate the foundations of the Char Narayan Temple and to gain a profile across the Durbar square linked to Trenches 1A and 1B. Unlike the lower levels to the east of the Durbar Square, this surface was formed from square tiles and these were removed onto a loose sandy setting. The use of squared tiles, rather than modern brick might be suggestive that this area of paving was laid at an earlier date to that elsewhere investigated. Like the other areas of the current paving of the square, this was placed on a setting of bricks but, in this location, constructed entirely out of reused old bricks. There is a possibility that this setting may have been an earlier paving surface and, again, suggests a different phase of construction when compared elsewhere in the square. Such an assertion is made more likely due to the lack of the use of cement in this construction.

Once this setting was removed, along with a shallow levelling deposit that contained brickbat, broken tile and pottery, two walls were uncovered. Forming a return, one of these walls ran north-south at the eastern edge of the trench to the west of the current exposed facing of the tiled Temple platform, which formed a baulk between Trenches 1A and 1C. However, although this wall in all probability followed the same alignment as the current facing, it might be an earlier phasing of walling, though further excavation is required to ascertain this relationship. In the south-east corner of the trench was the wall return, which ran on a slight south-west to north-east alignment, different to that of the Char Narayan Temple (Figure 8). However, though the alignment was slightly different, the wall did appear to run towards the south-east corner of the foundation platform, which further to the north formed the east-facing section of Trench 1C.

Further removal of the levelling material revealed a rectangular platform constructed from clay in the north-west of the trench, laid on a similar alignment to the foundation platforms

of the current Char Narayan Temple (Figure 9). This clay platform suggests that the site of the Char Narayan Temple had hosted non-durable monumental architecture prior to the construction of the current brick, stone and timber Temple, or that earlier configurations of the Temple incorporated such architecture before the square was paved with tiled or brick surfaces. Several phases of clay platforms were removed on this same alignment and these were cut by a large semi-circular feature that ran underneath the south-facing section. This cut, with its fairly firm silty clay fill, which included brickbats and ceramics, was evidence of a large posthole cut. Most likely for a large timber architectural element, this feature and associated clay platforms may relate to an earlier Temple footprint, constructed from non-durable materials. There is also a possibility that it might relate to a non-durable architectural element associated with the current Temple, perhaps relating to a pavilion or more temporary shelter located to the east.

However, before we are able to process scientific dating samples, we believe that it is more likely to represent an earlier phasing of construction as the brick wall of the Char Narayan Temple in the west-facing section cuts through these platforms, suggesting that the current Temple is later in date (Figure 10). The foundation wall of the current Temple included a course of tiles, forming a conservation line below the currently visible conserved and repointed bricks. Below this course of tiles were seven courses of original brick, which then sat on top of three visible irregular courses of stone cobbles (Figure 11). The slot that this wall sat within appeared to be cut through the earlier clay platforms, suggesting the placement of stone cobbles and the brick courses were a later intervention at the site.

The clay platforms sat on a surface that comprised small brickbat pieces. Once this was exposed in the entirety of the trench, a small sondage, measuring two metres east-west by one metre north-south was opened to gain a deep sequence. This was opened 0.5 metres from the east facing section. Several deposits were removed, with a concentration of brickbats potentially representing an earlier surface at a depth of c. 0.5 metres from the top of this sondage (Figure 12). Below this brickbat spread was a greyish silty clay deposit, which may have related to the deposit found at the base of the sequence in Trench 1A. This overlaid a very thin deposit of dark charcoal rich silt, which itself covered a very compact brown material containing small brickbat fragments. Forming a rectangular shape in plan, this material may represent an early floor surface. Once removed, a yellow sterile clay, lacking any indication of cultural material, and potentially representing the natural soil, was reached at a depth of 2.50 metres from the top of the current paved surface of this platform within the Durbar Square (Figure 13).

#### **4. Ground Penetrating Radar Survey**

We investigated four areas of Patan's Durbar Square with a Ground Penetrating Radar (GPR): (1) north and east of the Mani Dhara tank; (2) the north-south thoroughfare between the palace and the main square; (3) the main square west of the thoroughfare, including the platform abutting east to the Char Narayan Temple (Figures 14, 15 and 16); and (4) the first step of the Char Narayan Temple. Compared with our surveys in Hanuman Dhoka (Coningham et al. 2016a) and Bhaktapur (Coningham et al. 2016b), the interpretation of linear anomalies as modern utilities was less obvious at Patan. However, where the anomalies are narrow, such attribution has been made. Other anomalies that are located adjacent to these were preferably interpreted as being also modern and related to these utilities but not in all cases, for example, where the anomalies' shapes suggested an archaeological origin.

In the area next to the tank, some narrow curvilinear utilities can be seen, in addition to wider curvilinear anomalies for which the interpretation as utilities is uncertain. There is only one short anomaly visible (running west-east) that seems to relate to the square man-hole covers from the telecom utilities. This suggests that neither the trenches nor the telecom cables are easily detectable in this survey. There are several broad areas of enhanced reflectivity visible, extending over a depth range of 0.8 -1.6 metres and it is likely that they are destruction debris from older structures. These areas were not outlined in the interpretation diagrams as they would have swamped the remaining anomalies. One of them is situated to the north of the survey area, extending west-east on both sides of the monument. Another extends north-east from the north-east corner of the tank.

The north-south thoroughfare has several narrow linear anomalies that are interpreted as utilities; some run along the road, others cross at a right angle. They do not form a consistent network and it is likely that not all sections of buried pipes are represented in the data. The pipe that was found in Trench 1B only produces a weak signal to the south of the trench and seems to be 'missing' for about five metres north of that trench. It therefore has to be assumed that not all utilities are clearly visible in the data. There are several wider linear anomalies (up to 0.7 metres) aligned with the road and these are interpreted as walls or wall foundations, similar to the one visible in Trench 1B. To the north of Trench 1B, two walls or their fragments seem to run parallel to each other in a distance of 1.5-2 metres. To the south of the trench, the separation is around three metres. In the southern part of the road, there are several rectilinear box-anomalies that are adjacent to both the walls and the utilities and their interpretation is therefore unclear.

On the main square many anomalies are visible that are most likely of archaeological origin. As the depth range of these anomalies is very varied, they appear in the summative interpretation diagram to cover nearly all of the area surveyed. The most interesting is the set of anomalies in the north-east section of the square, just south of the fenced-off platform used for offerings. The anomalies resemble the outline of a building of

approximately six metres by two metres. Its strongly varying shape over the full depth range (0.2-0.8 metres and 1.2-1.6 metres) suggests that it is not consistently preserved. On the Temple's platform several north-south trending walls are visible in the data; the eastern most is the one excavated in Trench 1C. In addition, there is at least another wall running parallel, c. 0.5 metres further west.

On the temple's first step, several anomalies are visible between the walls that form the 'concentric' platforms of the stepped structure. These anomalies extend to a depth of about 2.8 metres, down from the level of the step's platform. Although there are several wall stumps visible in the data, i.e. extending from the walls into the space that supports the step, the data do not provide definitive evidence for further cross-walls between the two walls that would mirror the cross-wall found in the one of the KVPT extraction holes on the middle platform of the Char Narayan Temple. Further data processing is necessary to clarify these anomalies in the space between the walls.

## **5. Provisional Archaeological Risk Map for Patan's Durbar Square**

The archaeological investigations at the Char Narayan Temple and within Patan's Durbar Square have illustrated the extent of subsurface heritage at this World Heritage site. The GPR survey has highlighted areas of potential archaeological features below the current square and excavations have revealed the character of some of these signatures. What is clear is that the Durbar Square was not always an open space but has developed over time, only in the last few centuries reaching its current configuration of standing monuments. One of the key features identified through GPR survey and excavation were pipelines running through the Durbar Square, which we have clearly demonstrated have cut through archaeological stratigraphy and earlier phases of human activity. Such interventions are therefore a concern as the laying of any infrastructure has the potential to damage and destroy subsurface heritage of this site of Outstanding Universal Value.

The damage caused by the earthquakes will require reconstruction and also the repair and laying of amenities in Patan and whilst we do not recommend the suspension of the laying services and reconstruction we do advocate the mobilisation of rescue archaeology teams to undertake rescue excavations in advance of interventions (Coningham et al. 2016c). The Archaeological Risk Map for Patan will provide information for site managers and stakeholders as to the risks posed to subsurface heritage and help guide future development (Figure 17). Indeed, from our observations and investigations, we feel there needs to be a heightened awareness that the cultural heritage of Patan is not restricted to its standing remains and architectural treasures but that it should extend also to the foundations of these monuments and to preceding phases of cultural development, which are found below the current ground level. The Archaeological Risk Maps and our



interventions should facilitate the development of this awareness and protect subsurface heritage whilst not being of detriment to reconstruction.

## **6. Discussion and Conclusion**

Our archaeological investigations have illustrated the complex development of Patan's Durbar Square from its earliest cultural activity through to the current configuration of the visible monuments in the present. Whilst we can provide a preliminary phasing through relative stratigraphy, we await the results of the analysis of scientific dating samples to provide an absolute chronology for the cultural sequence of Patan's Durbar Square and the Char Narayan Temple. Due to limited time-frames of access to the site during our field season in October-November 2015 because of festival activities, we were not able to extract geoarchaeological samples during that field season. However, it was possible to open the trench again in February-March 2016 and Professor Ian Simpson of the University of Stirling was able to take Optically Stimulated Luminescence dating samples from the exposed stratigraphy as well as kubiena tins for the analysis of soil micromorphology. Once processed, the results of these analyses will be published in due course.

The GPR survey across the Durbar Square has illustrated several areas where earlier structures may have been located. From our excavations in Trench 1A, it would appear that from the quantity of brickbat and broken tile that the raised platform of the Durbar Square may have been built through the reuse of debris, possibly from earthquake damaged structures. In future, we hope to undertake further research excavations in the Durbar Square, guided by the GPR survey results, to identify damaged structures, which may have later been covered by levelling material to create a new configuration for the monuments of the Durbar Square. Within the trenches opened, we do have some potential evidence for these structures, or architectural features, particularly in Trench 1B, where a stump of a brick wall was uncovered as well as a stone cobbled surface. Later covered by paving, these features would once have been visible on the surface of the square but may have been demolished, disused and then sealed below later paving. The excavations here indicated the damage that modern interventions had inflicted on the subsurface heritage of Patan's Durbar Square, as pipelines had cut through these earlier cultural phases, with no record provided or available for the subsurface archaeology that had been destroyed.

This is especially true across the square where we not only uncovered earlier phases of paving in the square, specifically the square tiled surface in Trench 1A, but we also uncovered monumental architecture constructed from non-durable materials. The successive clay platforms in Trench 1C highlight again the rich sub-surface heritage of Patan's Durbar Square (Figures 18 and 19). Rather than heritage being confined to the

footprint of the current Char Narayan Temple, our investigations have shown how earlier architectural phases may have been located underneath the current square. They also illustrate how the earlier architecture of the Kathmandu Valley may not have been solely brick and tile, but in all probability included unfired materials.

Our investigations have also provided the first published indications of how the foundations of the Char Narayan Temple were configured. Similar to those exposed within the cuttings undertaken by KVPT on the western platform edges of the Char Narayan Temple, which are yet to be published (Figure 20) (Coningham et al. 2016c) and those at the Vatsala Temple in Bhaktapur's Durbar Square (Coningham et al. 2016b), the brick walls rested on stone cobble foundations. Preliminary results from the GPR survey indicate wall stumps within this platform and indications from the subsurface interventions next to the foundations suggest that the platforms of the temple may have been formed through bracing cross-walls, similar in plan to those exposed by the rescue excavations at Kasthamandap (Coningham et al. 2016a). However, further processing of the GPR survey data is required as well as further investigations of the platforms through formal archaeological excavation to fully substantiate this postulation. However, it must be emphasised again that any subsurface investigation that is undertaken requires scientific excavation and systematic recording of the soil and artefacts that are removed as well as the masonry that is exposed.

The complicated archaeological sequence and the evidence of multiple phases of activity highlights the major threat to archaeological heritage across Patan's Durbar Square from subsurface interventions and the necessity for archaeological assessments prior to any development or construction work at the site. The results suggest the presence of earlier monumental phases at the Char Narayan Temple site and earlier occupation phases, which would be best further investigated through the opening of larger excavation trenches. These would not only provide archaeological sequences but would also illustrate the character of development of the sub-surface architectural phases of the site, particularly in the vicinity of Trench 1C. Accompanied by material analysis, the investigations and archaeological assessment at Char Narayan Temple and across Patan's Durbar Square could provide an exemplar for reconstruction and the use of traditional technologies.

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## Figures



Figure 1: Damage in Patan's Durbar Square, including the damaged pillar of the statue of King Siddhi Narasingh Malla, and the collapsed Harishankar Temple, looking south.



Figure 2: The collapsed Mani Mandapa, looking east.



Figure 3: The collapsed Char Narayan Temple.



Figure 4: Tiled paving surface below the current paved Durbar Square, in Trench 1A.



Figure 5: Terracotta plaque, depicting Ganesh, from an oil lamp, excavated from Trench 1A.





Figure 6: Stone cobbled surface below current paving of the Durbar Square, looking North West in Trench 1B



Figure 7: Brick wall, looking south west, Trench 1B.

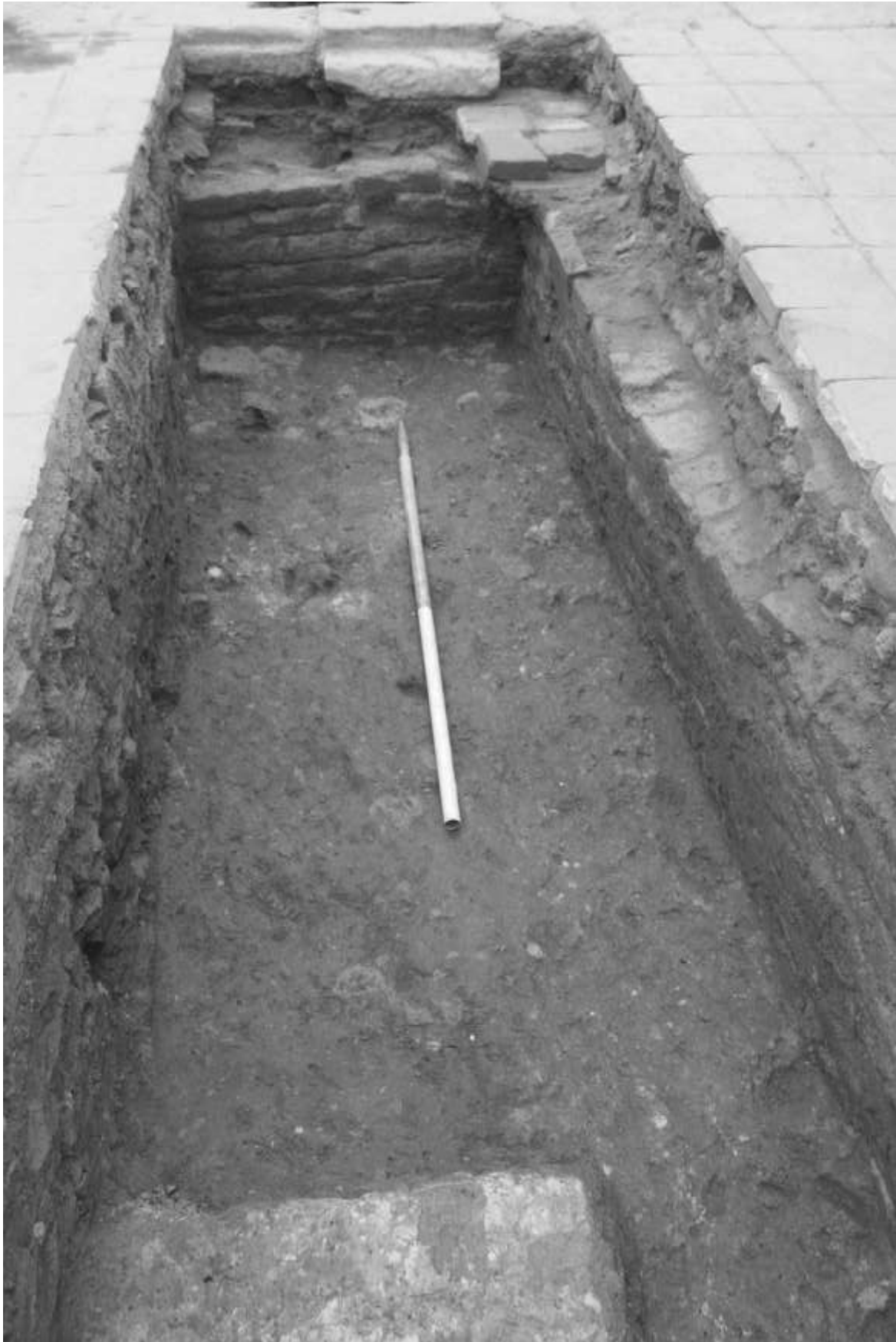


Figure 8: Wall alignment below current paving in Trench 1C, looking east.



Figure 9: Earlier clay platform with large posthole, in Trench 1C, looking west.



Figure 10: Stone cobble foundations, cutting through clay platform, in Trench 1C.



Figure 11: Stone cobble and brick foundations of Char Narayan Temple in Trench 1C.



Figure 12: Brickbat surface in Trench 1C, looking west.



Figure 13: Possible natural at the base of the sequence of Trench 1C, looking north.



Figure 14: GPR survey in Patan's Durbar Square.



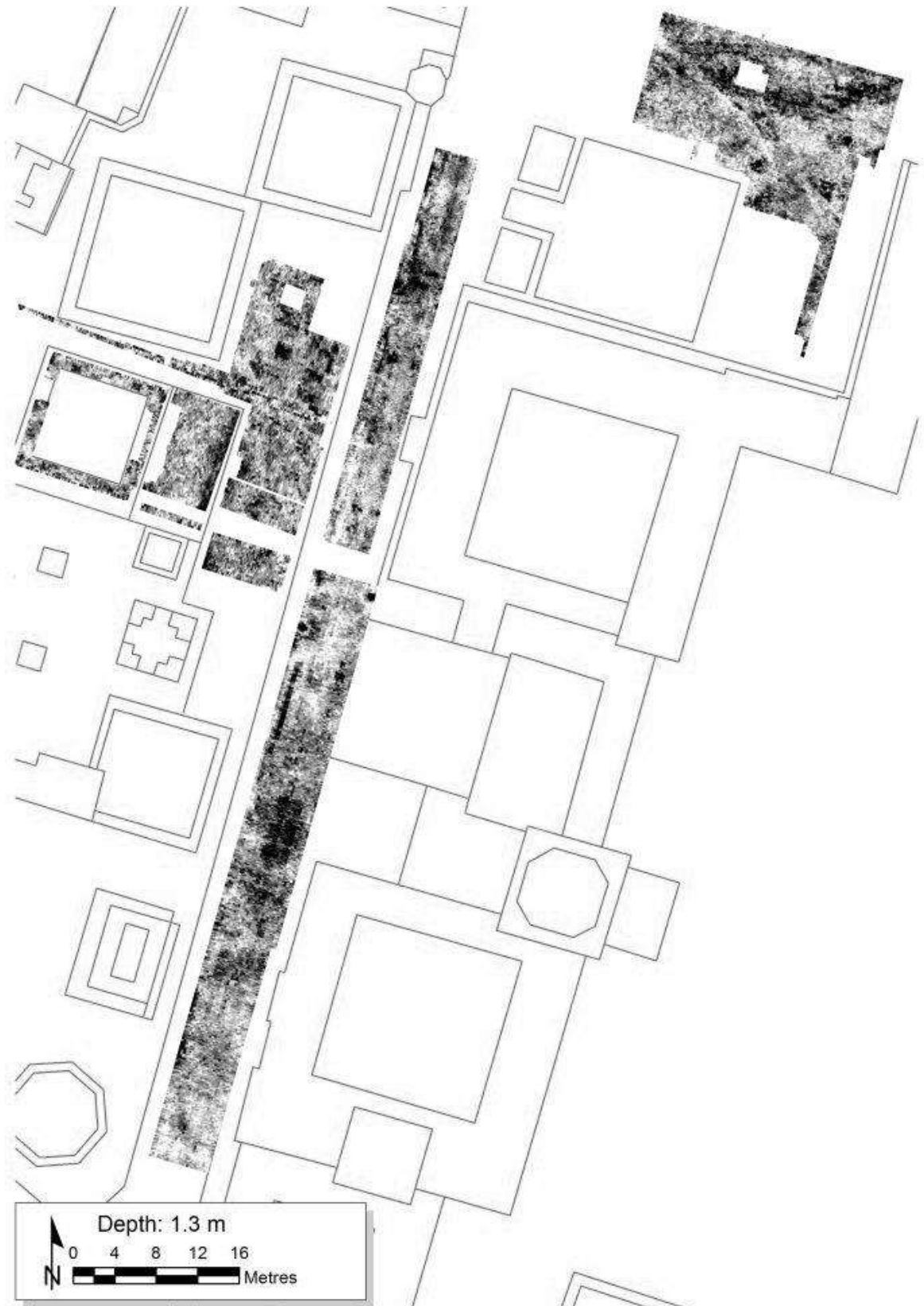


Figure 15: GPR results from Patan's Durbar Square at a depth of 1.3 metres.

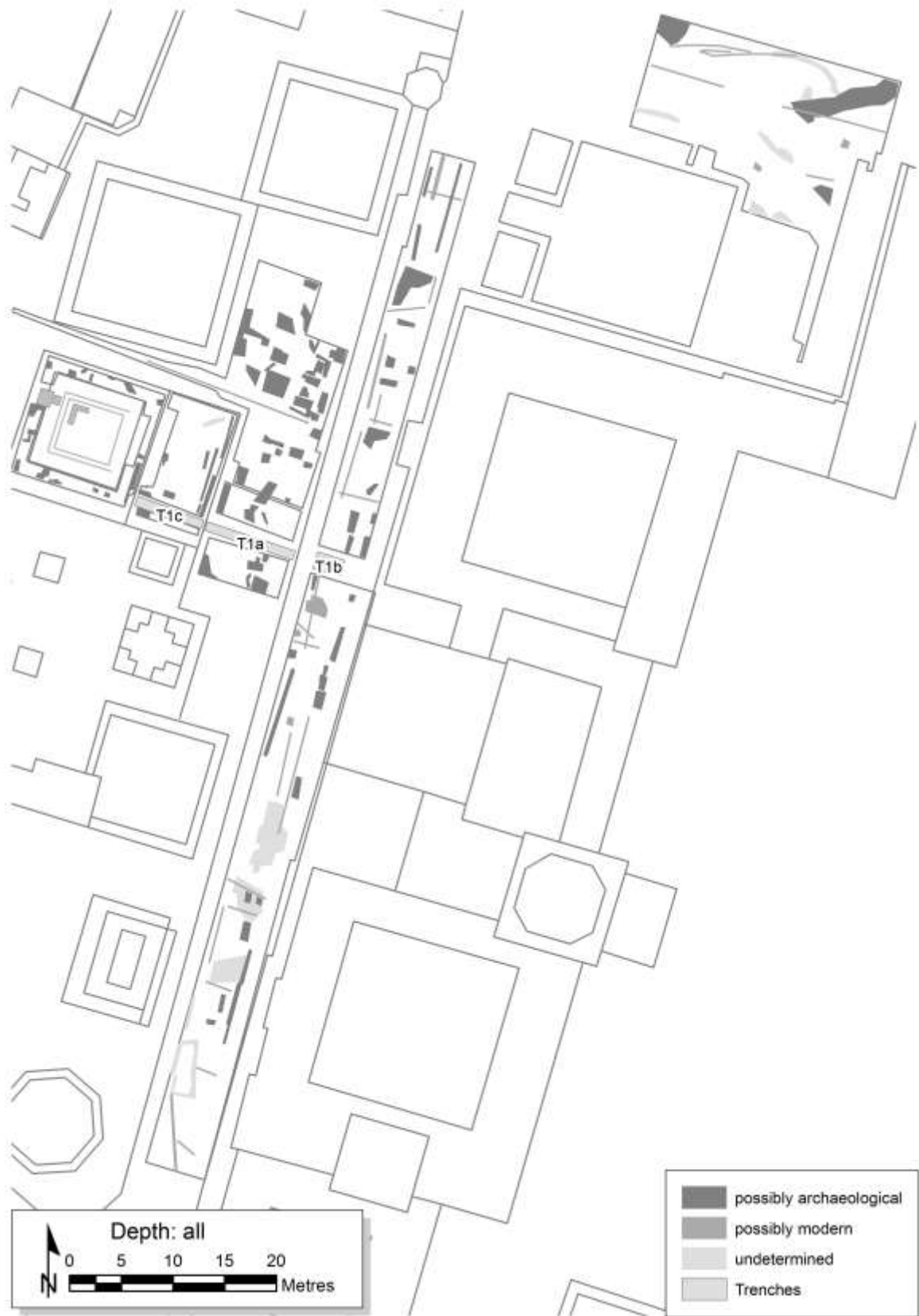


Figure 16: Interpretation of GPR results at Patan's Durbar Square.



Figure 17: Provisional Archaeological Risk Map for Patan's Durbar Square.

Char Narayan Temple  
Patan

PTN15  
Trench 1C  
East Facing Section

- Brick
- Stone
- Tile

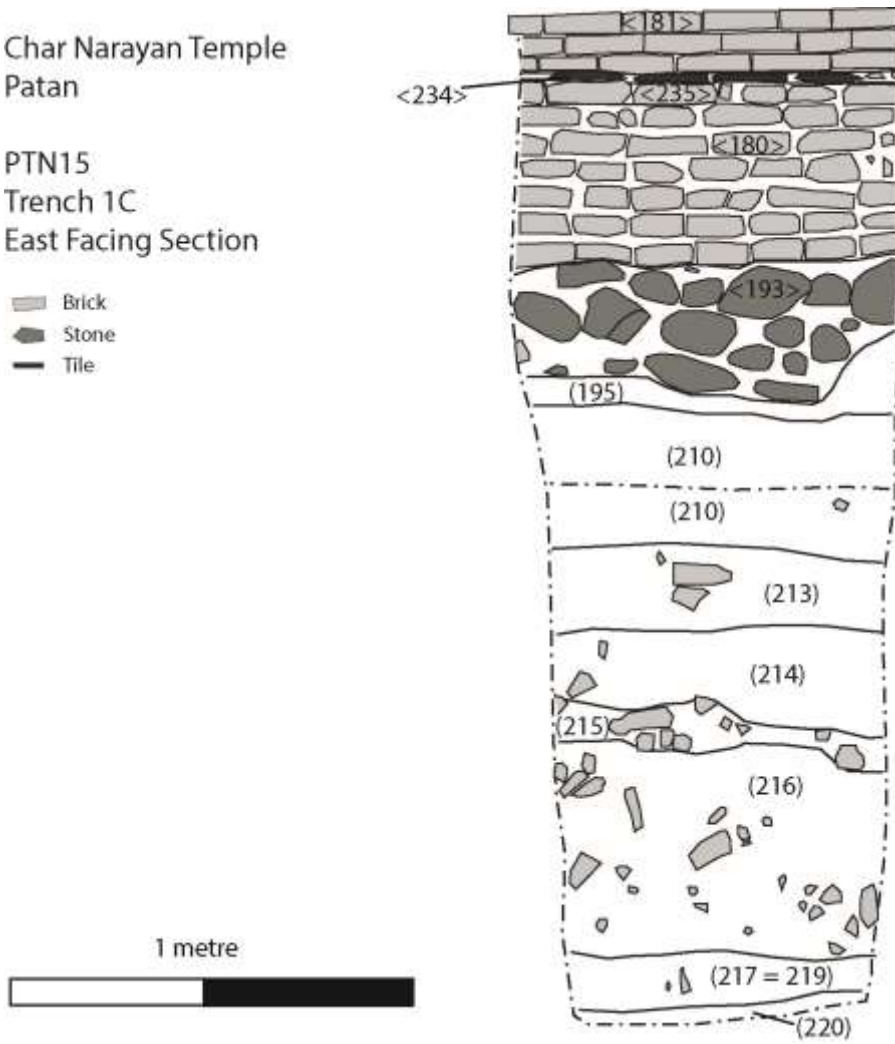


Figure 18: East facing section of Trench 1C.

Char Narayan Temple  
Patan

PTN15  
Trench 1C  
East Facing Section

- Brick
- Stone
- Tile

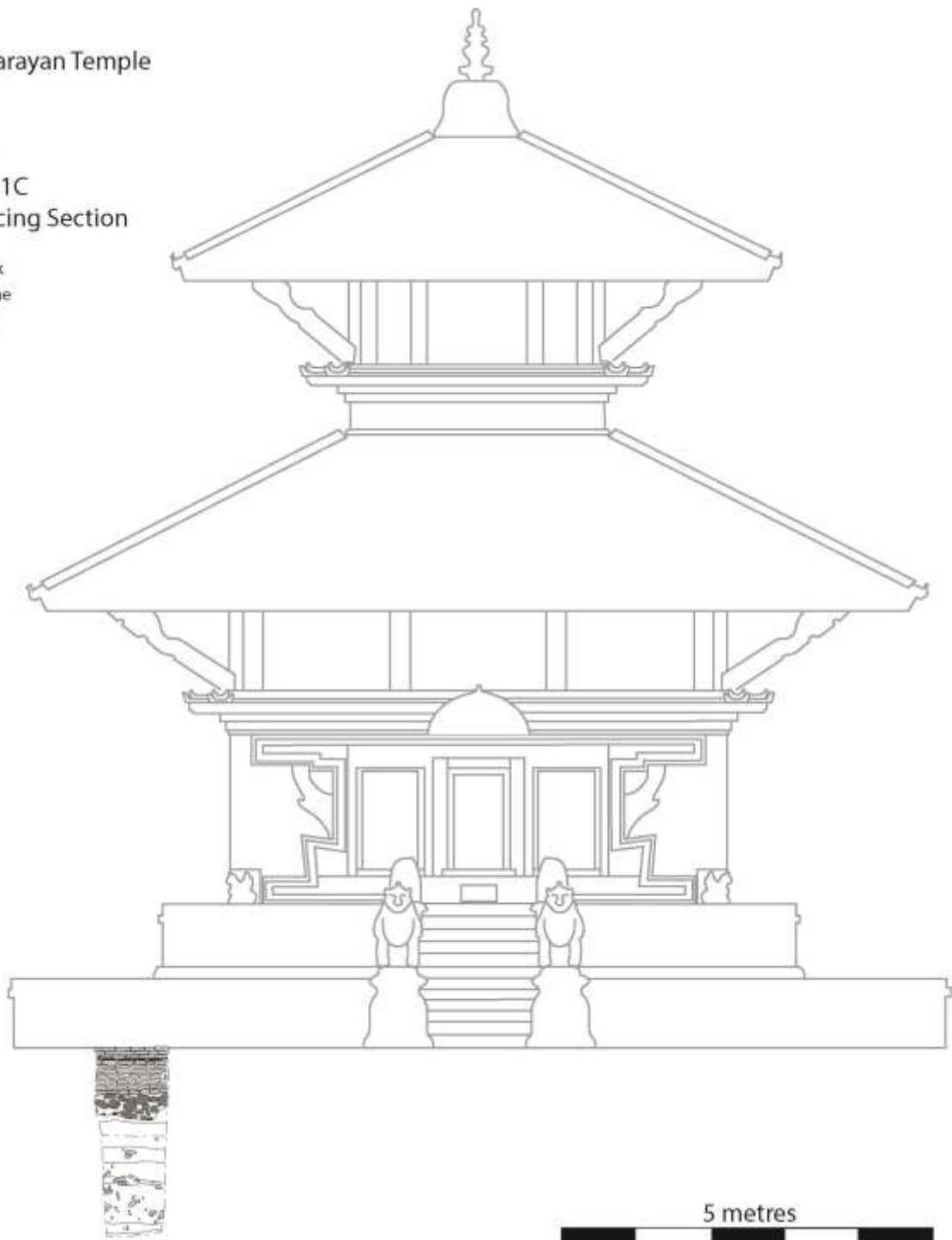


Figure 19: East facing section of Trench 1C, illustrating depth of foundations, with superimposed elevation of the Char Narayan Temple before collapse (Elevation of Char Narayan Temple after Korn 2007).



Figure 20: Stone cobble foundations visible in trench cleaned by the team that was left open by KVPT on the western side of the Char Narayan Temple, looking north.