



THE RESTORATION OF  
THE EAST WING OF SUNDARI COK  
AT THE PATAN PALACE COMPLEX – A UNESCO WORLD HERITAGE SITE

PROJECT APPLICATION | DECEMBER 2013

SUBMITTED TO

THE EMBASSY OF THE FEDERAL REPUBLIC OF GERMANY, KATHMANDU, NEPAL  
THE MINISTRY OF FOREIGN AFFAIRS, BERLIN, GERMANY



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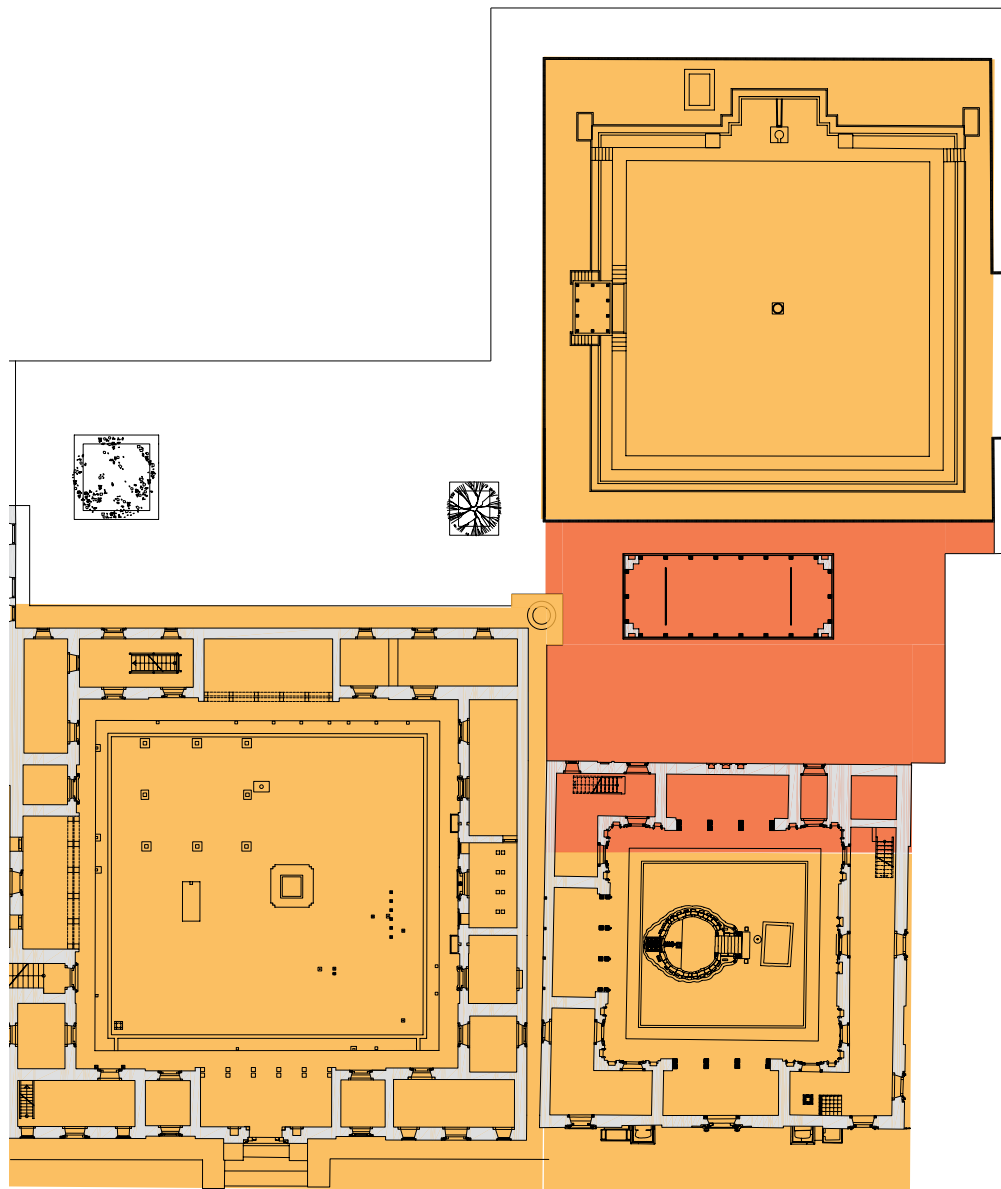
*cover, left:*

**Sundari Cok - East Wing, east façade** | Stanisław Klimek, 2008

*cover, right:*

**Sundari Cok - East Wing, courtyard façade** | Stanisław Klimek, 2006

|    |  |
|----|--|
| 5  | PROJECT SUMMARY                              |
| 9  | RESTORATION PLAN FOR 2014                    |
| 11 | HISTORICAL SIGNIFICANCE                      |
| 13 | EXISTING CONDITIONS AND PROPOSED RESTORATION |
| 13 | COMPONENT A      EAST WING BUILDING          |
| 39 | COMPONENT B      ARCADED PLATFORM            |
| 43 | COMPONENT C      TILE PAVING                 |
| 55 | KVPT ACHIEVEMENTS & WORKING METHOD           |



- Completed projects: Bhandarkhal Tank and Pavilion (2011), Mulcok - Golden Doorway Ensemble (2012), Sundari Cok - South Wing (2013)
- Proposed projects: Sundari Cok - East Wing, Arcaded Platform, Tile Paving (2014)

#### Site plan of 2014 project area

This plan shows project contributions from the Federal Republic of Germany. The proposed restoration for 2014 is the last remaining construction component of the Patan Palace Restoration Project.





# PROJECT SUMMARY

## THE PROJECT

The restoration of the east wing of Sundari Cok is the final part of an extensive project to restore the entire Patan Palace Complex, a UNESCO World Heritage Site. This work began when the Keshav Narayan Cok was restored and reconfigured as the Patan Museum with support from the Austrian government. This restoration, completed in 1997, included careful preservation of existing conditions guided by principles of monument conservation, reconstruction of the lost east façade, and the design of contemporary features for the reuse of the palace as a public space and museum.

In May 2006 seven architects and conservation experts (Department of Archaeology, Government of Nepal; Kathmandu Valley Preservation Trust, Venice University; Heidelberg University) convened in Patan to lay down principles of a future project, aimed at the preservation of the entire Patan Palace Complex.

## PROJECT SCHEDULE

The first phase (2007 to 2009) succeeded, with funds from the World Monuments Fund, the US Ambassadors Fund, the Sumitomo Foundation, the Nepal Investment Bank and private donors, in preserving the main courtyard (Mulcok) of the palace. During the second phase (2010 to 2012) the preservation of the pond in the rear area (Bhandarkhal) and the preservation of the north and west wings of the southernmost courtyard (Sundari Cok) were completed.

The following buildings were successfully restored with funds from the Ministry of Foreign Affairs of the Federal Republic of Germany:

|      |   |          |
|------|---|----------|
| 2011 | Restoration of Bhandarkhal Tank and Tushahiti     | €115.000 |
| 2012 | Restoration of the Mulcok golden doorway ensemble | €53.000  |
| 2013 | Restoration of the south wing of Sundari Cok      | €73.000  |

The restoration of the east wing of Sundari Cok will be a major contribution to the ongoing work of restoring the Patan Palace Complex, following the successful restoration of the water architecture at Tushahiti, the adjacent Bhandarkhal Tank and Pavilion, as well as the south wing of Sundari Cok. This constitutes the final step in opening the Sundari Cok courtyard to the public.

## PROJECT GOALS

The 2006 Joint Mission Report aimed at integrating the entire complex into a single Patan Museum entity. The two courtyards and the Bhandarkhal water tank will be joined to the Patan Museum and opened to the public upon completion of restoration work in 2014. The legal prerequisites are in place to transfer the management of these spaces to the Patan Museum Board, including the rear garden which will be designed in the coming years. This will result in the opening of an architectural ensemble of extraordinary historical depth.





**Aerial view of Patan Darbar from the east** | Johann Reinhard, 1979

This view of the palace complex from the east shows the east wings of Sundari Cok, Mulcok, and Keshav Narayan Cok. After the buildings collapsed eastwards in 1934, the rear façades were rebuilt with little ornament, in contrast to the rest of the palace.



# ZUSAMMENFASSUNG

## ANLASS

Im Jahr 1997 wurde das Patan Museum eröffnet, nachdem der nördliche Hof des Palastes in Patan, der Keshava Narayan Cok, über einen Zeitraum von 12 Jahren mit Mitteln der österreichischen Entwicklungshilfe umgebaut wurde. Dieser Umbau vereinte sorgfältige Erhaltungsmaßnahmen im Sinne von Denkmalpflege, rekonstruktiven Gestaltungen im Innenhof und den Entwurf zeitgenössischer Elemente, um zu verdeutlichen, daß die Nutzung des ehemaligen Palastes der newarischen Könige als Museum möglich ist.

Im Mai 2006 kamen sieben Architekten und Denkmalpfleger (Department of Archaeology, Nepal; Kathmandu Valley Preservation Trust; Universität Venedig; Universität Heidelberg) in Patan zusammen, um die Grundlagen für ein zukünftiges Projekt zur Erhaltung des "Patan Royal Palace Complex" zum Ziel zu formulieren.

## PROJEKtablauf

In der ersten Phase (2007 bis 2009) gelang es, mit Unterstützung des World Monument Fund, der Sumitomo Foundation, der Nepal Investment Bank und privaten Stiftern den Haupthof (Mulcok) des Palastes wiederherzustellen. In der zweiten Phase (2010-2012) wurde die Restaurierung der Teichanlage im rückwärtigen Bereich (Bhandarkhal), die Restaurierung des Nord- sowie des Westflügels des Sundaricok und die Restaurierung des Stufenbrunnens (Tusahiti) durchgeführt.

Maßnahmen, die bisher durch das Auswärtige Amt (Kulturerhalt) der Bundesrepublik Deutschland gefördert wurden:

|      |   |          |
|------|---|----------|
| 2011 | Bhandarkhal Teichanlage und Tushahiti   | €115.000 |
| 2012 | Eingangs zum Taleju Schrein im Haupthof | €53.000  |
| 2013 | Südflügel des Sundaricoks               | €73.000  |

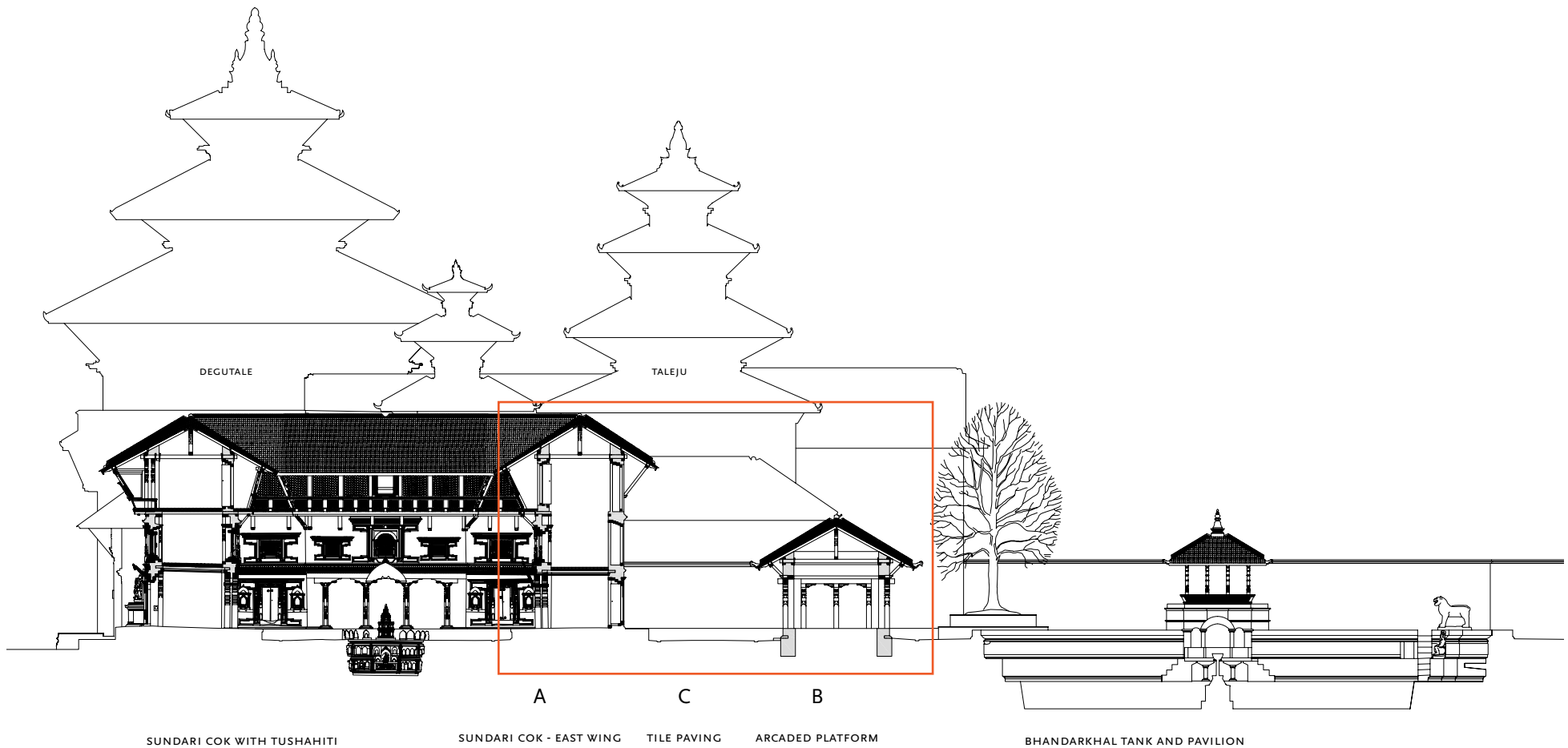
## ZIELE

Die im Sommer 2006 aufgestellte Planung sah bereits vor, den gesamten Palastkomplex über eine Länge von 140 Metern in das Patan Museum zu integrieren. Nunmehr galt es die beiden südlichen Höfe sowie die Teichanlage als eine Einheit zu betrachten, die dem Museum bis 2014 angegliedert werden sollen. Die rechtlichen Voraussetzungen dafür sind bereits geschaffen; dem Museum Board untersteht seit 2013 der gesamte Palastbereich mit dem rückwärtigen Garten, dessen Gestaltung in den kommenden Jahren erfolgen wird.

Mit dem Patan Museum entstand eine Institution, die international uneingeschränkte Würdigung erfuhr. Indem zwei weitere Höfe restauriert und für Museumszwecke hergerichtet werden, entsteht ein Komplex von außergewöhnlicher historischer Dichte. Dadurch wird eine, ins späte 17. und frühe 18. Jahrhundert datierbare Architektur als ein Ensemble gesichert, das wie kaum ein anderes für die Besonderheit des nepalesischen kulturellen Erbes steht.







#### Sundari Cok and Bhandarkhal Tank, West-East section

The proposed restoration includes the east wing of Sundari Cok and the rear area between the building and the recently restored Bhandarkhal water tank. The project components for 2014 are: east wing of Sundari Cok (A), arcaded platform (B), and historic tile paving (C).



At **€ 153,869** the proposal for **2014** exceeds the funds that have been requested and granted in the preceding five years. The aim is to use this final grant to complete the remaining construction components of the project that are focused on the east wing of Sundari Cok and its immediate surroundings. Funds granted by the Sumitomo Foundation will ensure the completion of museological design and implementation by the end of 2014. The proposed restoration has been structured into three components:

- A East wing building and rear façade
- B Arcaded platform
- C Tile paving

The main component of the project is the restoration of the **east wing building and the rear façade of Sundari Cok (A = € 86,614)**. The design of the façade was finalized in September 2013 after a long process of discussion and deliberation. The façade will be preserved, i.e. carefully repaired. A new roof is mandatory. The upper floors will be combined to serve as a gallery with architectural drawings by Nepali and German artists.

Between the east wing of Sundari Cok and the Bhandarkhal water tank an **arcaded platform (B = € 40,160)** is planned for exhibits from the rich collection of the museum. During the archaeological study, traces of structures were found in the location of the proposed arcaded platform.

The restoration of excavated Malla-period **tile paving (C = € 27,094)** in the area between courtyard and platform completes the building project.

Priorities: In case the funding of the entire application exceeds the available budget, we ask that priority is given to the restoration of the east wing (A = € 86,614).

Der Antrag für das **Jahr 2014** übersteigt mit der **Gesamtsumme von € 153,869** deutlich die in den vorangegangenen fünf Jahren beantragten und entsprechend bewilligten Mittel. Ziel ist es, mit dieser letztmalig erfolgenden Bitte um Förderung, die baulichen Maßnahmen des gesamten Projektes abzuschließen. Mittel der Sumitomo Foundation und des Kathmandu Valley Preservation Trust werden zudem die museologische Ausgestaltung des Sundaricok bis Ende 2014 ermöglichen.

- A Ostflügel und dessen rückwärtiger Fassade
- B Arkadenplattform
- C Pflasterung

Zu diesen, noch ausstehenden baulichen Maßnahmen, gehört die **Restaurierung des Ostflügels des Sundaricoks und dessen rückwärtiger Fassade (A = € 86,614)**, deren Entwurf seit September 2013 vorliegt. Dabei wird die Fassade weitgehend erhalten, d.h. ausgebessert. Der Flügel erhält ein völlig neues Dach. Beide Obergeschosse werden zusammengelegt. Hierdurch entsteht eine Galerie mit originalen Zeichnungen nepalesischer Architektur, erstellt von deutschen und nepalesischen Zeichnern.

Dazu soll zwischen dem Sundaricok und der Teichanlage eine **Arkadenplattform (B = € 40,160)** entstehen, in der Exponate aus der reichen Sammlung des Museums ausgestellt werden. Die Wiederherstellung der **Pflasterung (C = € 27,094)** in diesem Bereich schliesst die gesamte Maßnahme ab. Die Wiederherstellung der Pflasterung wird Fragmente integrieren, die 2008 freigelegt und gesichert wurden. Dabei konnten Spuren einer ehemaligen rückwärtigen Bebauung festgestellt werden.

Prioritäten: Sollte es nicht möglich sein, die Maßnahme im gesamten Umfang zu fördern, so bitten wir, der Wiederherstellung des Ostflügels Priorität einzuräumen (A = € 86,614).





**View of Patan Palace from the rear garden** | Henry Ambrose Oldfield, ca. 1853

This sketch shows what appears to be a three to five bayed terrace in the east wing of Sundaricok. Inscribed on reverse: "Rajah Sidhi Nur Singh's tank and Summer House, in the Garden at the rear of the Darbar, Patan - constructed AD 1647."

*British Library, Oriental and India Office Collection*



**View of Patan Palace across the Bhandarkhal Tank** | Rajman Singh, ca. 1844

Drawn from a different perspective, this sketch also suggests there was once a bayed terrace in the east wing of Sundari Cok.

*Hodgson Collection of the Royal Asiatic Society*





# HISTORICAL SIGNIFICANCE

## SUNDARI COK PALACE

The Sundari Cok courtyard is an outstanding example of Malla-period palace architecture, situated at the southeast corner of Patan Darbar Square. Its prominent position at the major crossroads of the city makes it an important public monument, while its extraordinary courtyard enclosure - never before opened to the public - makes it the most significant structure within the former palace complex. Commissioned in 1628 by King Siddhinarasimha Malla, the courtyard served primarily as the stage for the Tushahiti, a sunken carved stone stepwell. While little is known of the exact interior layout and function of the building itself, the rooms on the ground floor level were likely used for rituals related to Tushahiti.

The courtyard's intimate scale gives it a unique atmosphere, while its intricately carved doors and windows attest to an extraordinary artistic legacy. Since its construction in the 17th century, the building has undergone a series of interventions, retaining stylistic features from various time periods. The building was initially a free-standing two-storied. The pillars of the court's *dalan* arcades and the wall brackets of the principal entrance represent 17th century traditions.

In the 1730s, the building received an additional floor, distinctive triple-bayed windows, and an ambulatory running along the courtyard façade. The introduction of dragon-shaped struts toward the square and a screened gallery facing the court is a departure from earlier building practices and anticipates a

change in style that became more common later in the 18th century. With minimal written documentation and few historical photographs, the reading of history from the physical layers of the building itself becomes important. Adding to the complexity of reading the building is its history of repeated earthquakes and cyclical renewal, resulting in the blurring of traces of physical history. For this reason, KVPT has undertaken extensive documentation and analyses of the building's existing conditions.

## EAST WING

The east wing is notable for facing the Bhandarkhal garden to the east of the courtyard, of which little is known. The building collapsed eastward during the 1934 earthquake, leaving the east wing in ruins. There is no historical evidence that tells us anything about the design of the 18th century east façade except for 19th century drawings that suggest the introduction of a terrace on the top floor.

The existing east façade, designed and constructed after the 1934 earthquake, contrasts starkly with the rest of the building for its lack of ornament and use of ordinary bricks (*ma apa*). This façade breaks with the conventions of Newar architecture by introducing upright rectangular windows. The elongation to the north, covering the gap between Sundari Cok and Mulcok, may have originated earlier.





## COMPONENT A EAST WING BUILDING

The proposed restoration of the east wing aims to preserve as much of the historic fabric as possible, to repair and replace damaged or lost elements, and to structurally reinforce the building's bearing structure of brick and timber. Modern concealed methods will be employed to seismically strengthen the building, reversing the damaging effects of improper restorations undertaken after the 1934 earthquake. It is understood that the history of a monument should be celebrated and exhibited, rather than obscured and falsified during the preservation process.

The objective of the present restoration is not to bring the building back to its original form but to restore certain missing elements that are central to its cultural and religious history, and to repair damages that would cause further deterioration. With this in mind, several designs were proposed for the east façade. Rather than adopt a conjectural approach, the restoration aims to “freeze” the existing east façade as a testament to the 1934 earthquake. This is particularly important in the absence of historical evidence of what the east wing looked like before 1934. The façade was rebuilt after the 1934 earthquake to suit the requirements of administrative offices and eventually the central police station, with certain space reserved for a temporary jail.

An important aspect of the restoration is thus the coexistence of the two opposite elevations. The “poor” east façade does not diminish the value of the “rich” courtyard façade. On the contrary, it enriches the space by highlighting the layers of history translated into bricks, stones, and timber. An important distinction of the east façade is that it belongs to Bhandarkhal, a physically distinct space from both Patan Darbar Square and the palace courtyards. The fact that the other façades are never visible at the same time as the east façade further justifies its distinct character.

KVPT proposes the following restoration plan for the east wing building:

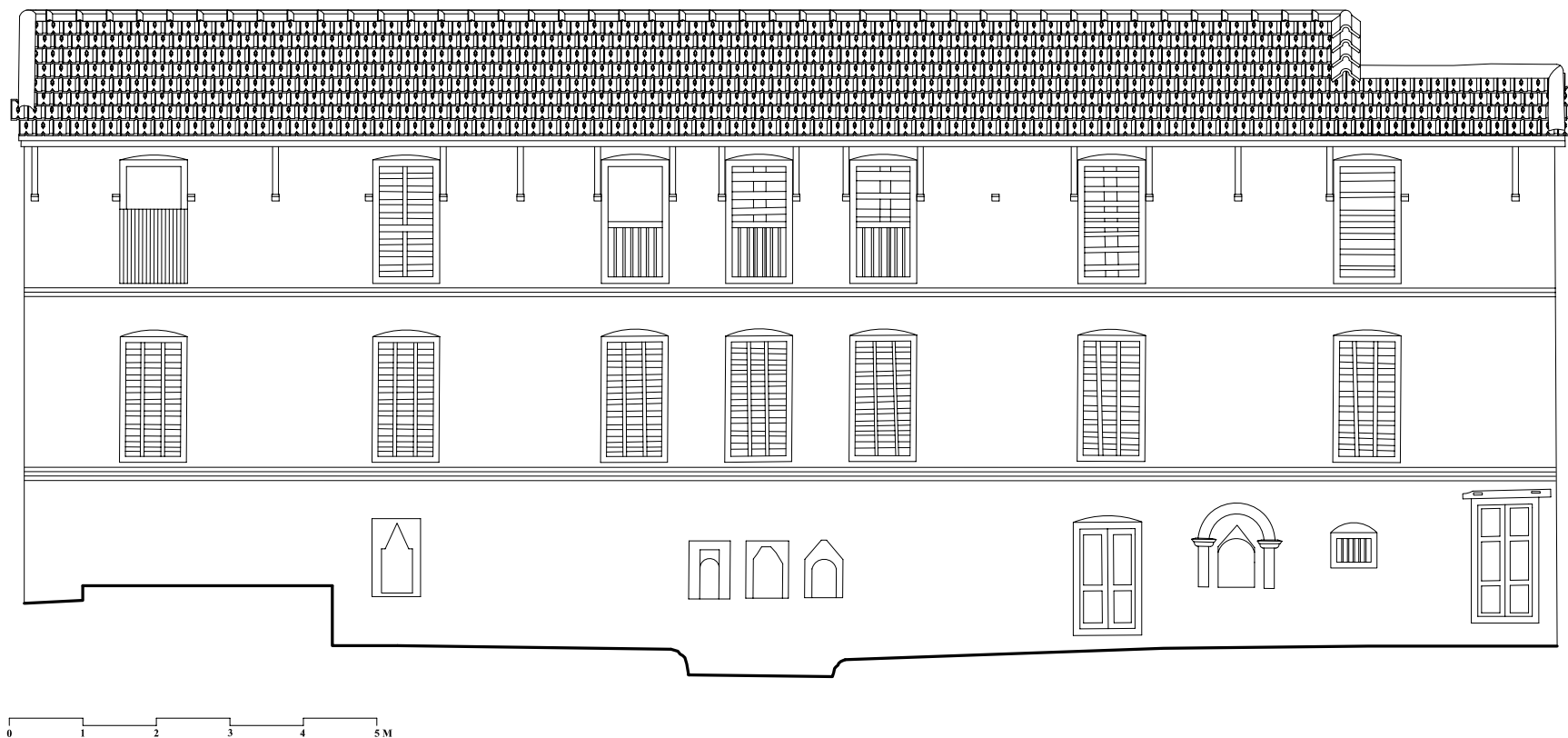
- Cleaning and repair of the existing façade walls and restoration of masonry
- Restoration of wall openings and decorative elements
- Structural reinforcement and seismic strengthening of all three floors
- Reconstruction of traditional tiled roof using new wall plates and hardwood timber trusses
- In some cases, replication of key carved components that are broken or missing

**East façade** | Stanisław Klimek, 2008

View of the east façade from the rear garden near Bhandarkhal Tank. Due to shortage of funds and building materials, regular bricks were used and simple windows installed. The smaller building to the left is an addition dating to the 1970s when the east wing was used as a temporary jail.







East façade of Sundari Cok, existing conditions | 2008



# EAST FAÇADE

## DESIGN PROCESS

When the mission of architects and experts met in November 2006 to draft a conservation and restoration master plan for the entire Patan Palace Complex, it became clear that the redefinition of the east façade of Sundari Cok would be a major challenge. Over a period of six years, several designs were made in order to explore various options and different restoration approaches. During this process, two principal options appeared: A. the complete or partial preservation and “improvement” of the existing façade, or B. the design of a “traditional” Newar façade, in the royal Malla style or following standards of Newar domestic architecture.

In the early phases of the design discussions, it was felt that the post-1934 façade, though carefully designed, would not meet the aesthetic standards of a Malla-period palace. Many voices, referring to “the spirit of place,” demanded a dignified façade that recalls Newar architectural traditions. Conjectural designs along these lines, however, were either too ostentatious or too simple. The involved designers and architects encountered the problem that no prototype for such a façade could be found.

All of the design proposals included the restoration of the roof to a traditional shape that, although undocumented, is suggested by our knowledge of historic roof covers. A few design proposals opted to enhance the post-1934 design by adding pilasters, emphasizing the building’s symmetry, or by enlarging the openings – all performed along the principles of a neoclassical tradition that first entered Nepal in the early 19th century.

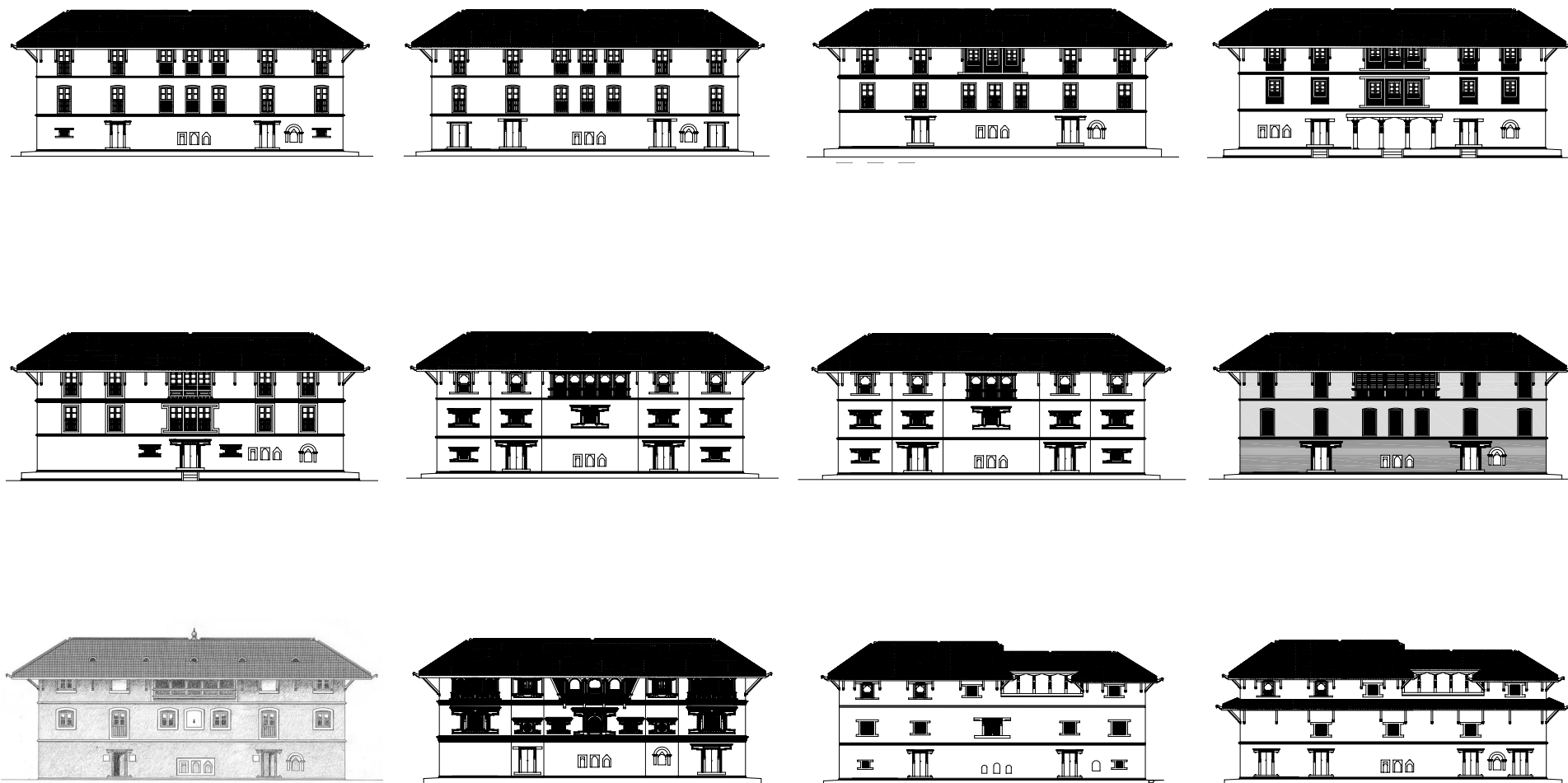
## SELECTED DESIGN

The selected design strives to maintain the post-1934 façade configuration with minor interventions to accommodate the functional needs for the future museum. This design proposal follows a traditional design at the ground floor level, with the addition of an early 18th century doorway on the southern end of the wing, the frame of which was salvaged from the neighboring Mulcok. In this design, the doorway is returned to its original location, similar to the position of the doorway in the east courtyard façade of the neighboring Keshava Narayan Cok.

The conjectural design of the roof and the ground floor façade is a minor tribute to Newar architectural principles. Harsh criticism could claim the design of these levels as a falsification, or at best, a beautification undertaken to placate those who yearn for a once glorious past that was lost to earthquakes and neglect. The preservation of the first and second floor face of bricks and the configuration of windows, however, constitute a counterbalance to the design elements that are more fantastically derived. The preservation of the post-1934 design at these levels recalls a recent disaster, an earthquake that devastated the valley’s settlements.

The survey of the façade in 2006 revealed that only one window railing survived, while none of the shutters survived. The proposed design does not redesign such shutters but instead introduces vertical wooden battens to create a simple lattice. This lattice commemorates the use of the east wing as a jail and allows the design not to return to a perfect façade with shuttered windows. Furthermore, the lattice window veils the new function of the two floors as a single gallery of architectural drawings.



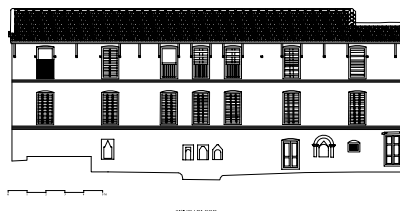
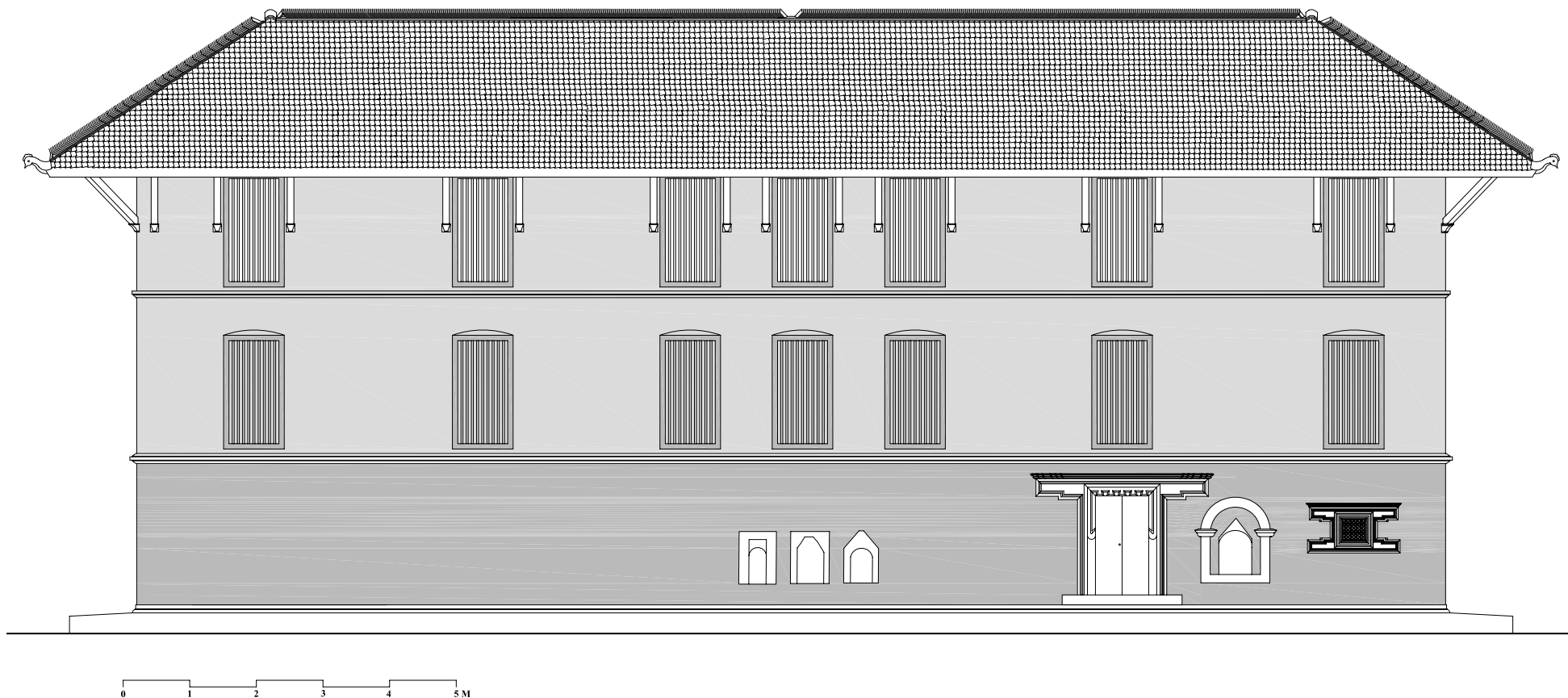


#### East façade, proposed restoration designs | 2013

Various façade designs prepared by consulting architects and designers have been discussed over the past five years.







East façade, selected design | 2013





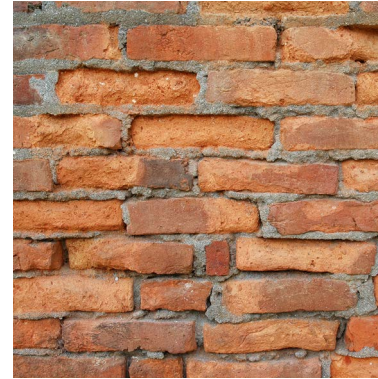
SPALLING



BIOLOGICAL PATINA



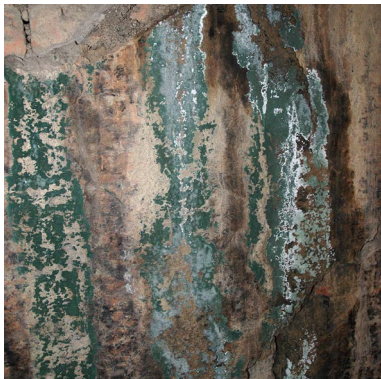
LOST POINTING



CORROSION



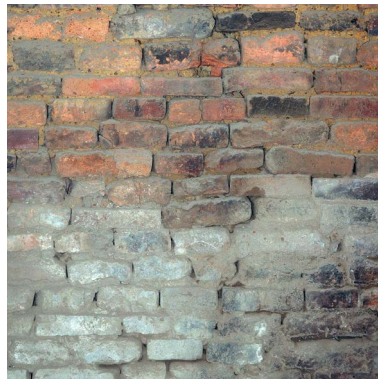
CEMENT POINTING



DELAMINATION



SPALLING



LOST POINTING



INCOMPATIBLE PATCHES



CRACKS

#### Ground floor bricks, existing conditions | 2012

Layers of history are visible in the bricks that make up the ground floor of the east wing façade (top). The *ma apa* in the interior (bottom) are heavily damaged, largely due to the impact rising damp and careless cement pointing. There is considerable variation in the brick bonding throughout the building, with mud, lime (*surkhi*), and cement layers. The cement mortar dates from 1936 onwards.



## EXISTING CONDITIONS

The order of the façade with seven windows each on first and second floor levels is carefully designed with a central range of three windows, flanked by two windows on each side at intervals of 2.20 and 2.50 meters. Two doors provided access at the northern end and a few roughly framed niches house sculptural fragments. Almost all of the brickwork of the ground floor has eroded due to rising dampness and one window frame is entirely lost.

The east façade was entirely rebuilt in 1936 using low-fired mud bricks (*ma apa*). There has been no structural repair since then, but the façade has undergone minor repairs such as cement pointing of bricks on the ground floor level. This has caused severe spalling in several locations. Many brick surfaces are completely lost: in some cases, half or more of the mass of the individual bricks is gone. The upper two floors were not pointed with cement and thus retain some mud mortar.

The building has no plinth and rests instead on the ground plane of the rear garden area.

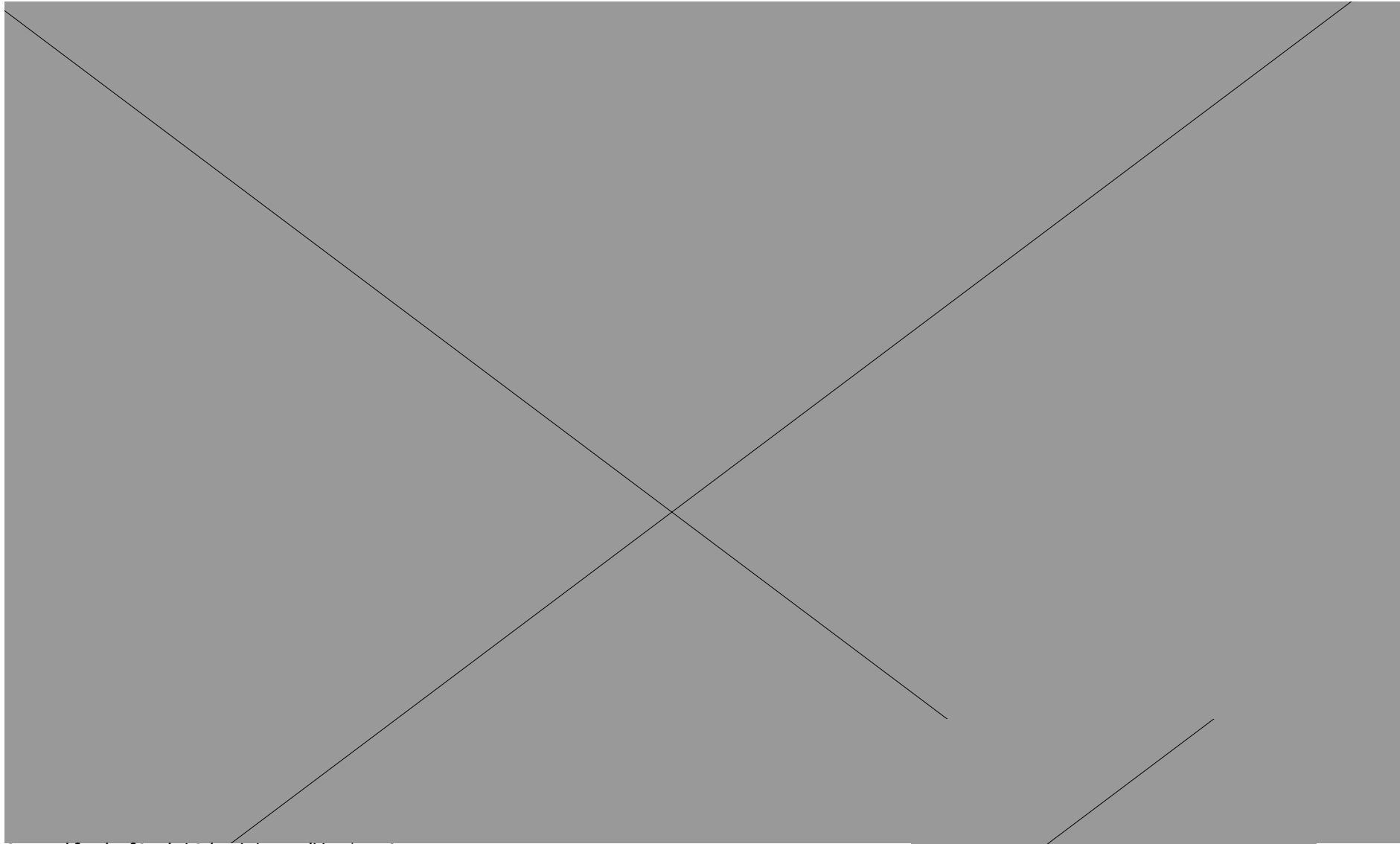
## PROPOSED RESTORATION

The existing bricks on the façade wall will be preserved and reused wherever possible. Since parts of the ground floor wall requires new bricks, several wall sections will be dismantled and reconstructed with both existing and salvaged *ma apa* bricks in mud mortar.

Areas with cement mortar will be re-pointed with traditional yellow mud mortar. Severely damaged and missing bricks will be replaced with salvaged bricks matching the surrounding brick size and coursing.

A new stone plinth has been designed to produce a continuous base around the entire building, as is typical in Newar architecture.





Courtyard façade of Sundari Cok, existing condition | 2008





## COURTYARD FAÇADE

### EXISTING CONDITIONS

The façade wall retains high-fired veneer bricks (*daci apa*) that were used in the 1936 restoration, many of which date to the 18th century. The wall is in a poor structural condition due to the failure of weakened floor joists to withstand seismic activity. The courtyard wall of the ground floor is bulging outwards due to seismic movement over a period of decades, causing voids to develop inside the walls. This has also caused the wooden cornices to pull apart.

Loss of brick surface material occurs in patches throughout the zone of rising damp at the base of the walls in the ground floor area. Without the protective surface, bricks are susceptible to water infiltration. The brick also tends to spall. Where heavy efflorescence is observed, severe spalling tends to follow (see page 27). The varied types of bricks used in repairs since 1936 are also a factor in spalling.

Although the brick fabricated and installed in 1936 is not exactly of the same size, color, and quality as the older *daci apa*, its appearance is generally similar enough to satisfy the casual eye at a middle distance.

The moulded eyebrow cornices above the windows (*mikhafusi*) were replaced in 1936 with inferior replicas that were not moulded but merely dressed.

### PROPOSED RESTORATION

The majority of the individual bricks will be reused. However, many areas will need to be dismantled and reconstructed using mud mortar. Often, structural weaknesses are only revealed by carefully removing the façade bricks. As past experience has shown, hidden voids inside the walls pose structural dangers. For this reason, parts of the wall will be dismantled and voids will be filled with brick masonry in mud mortar.

To slow the process of brick deterioration, the rising damp will be minimized by lowering the grade to the historical levels and improving the drainage on both sides of the east wing.

Because of the difficulty of producing appropriate *daci apa* bricks, replacements will be limited to bricks salvaged from demolished buildings. Only bricks which have lost more than 60% of their original veneer will be replaced.

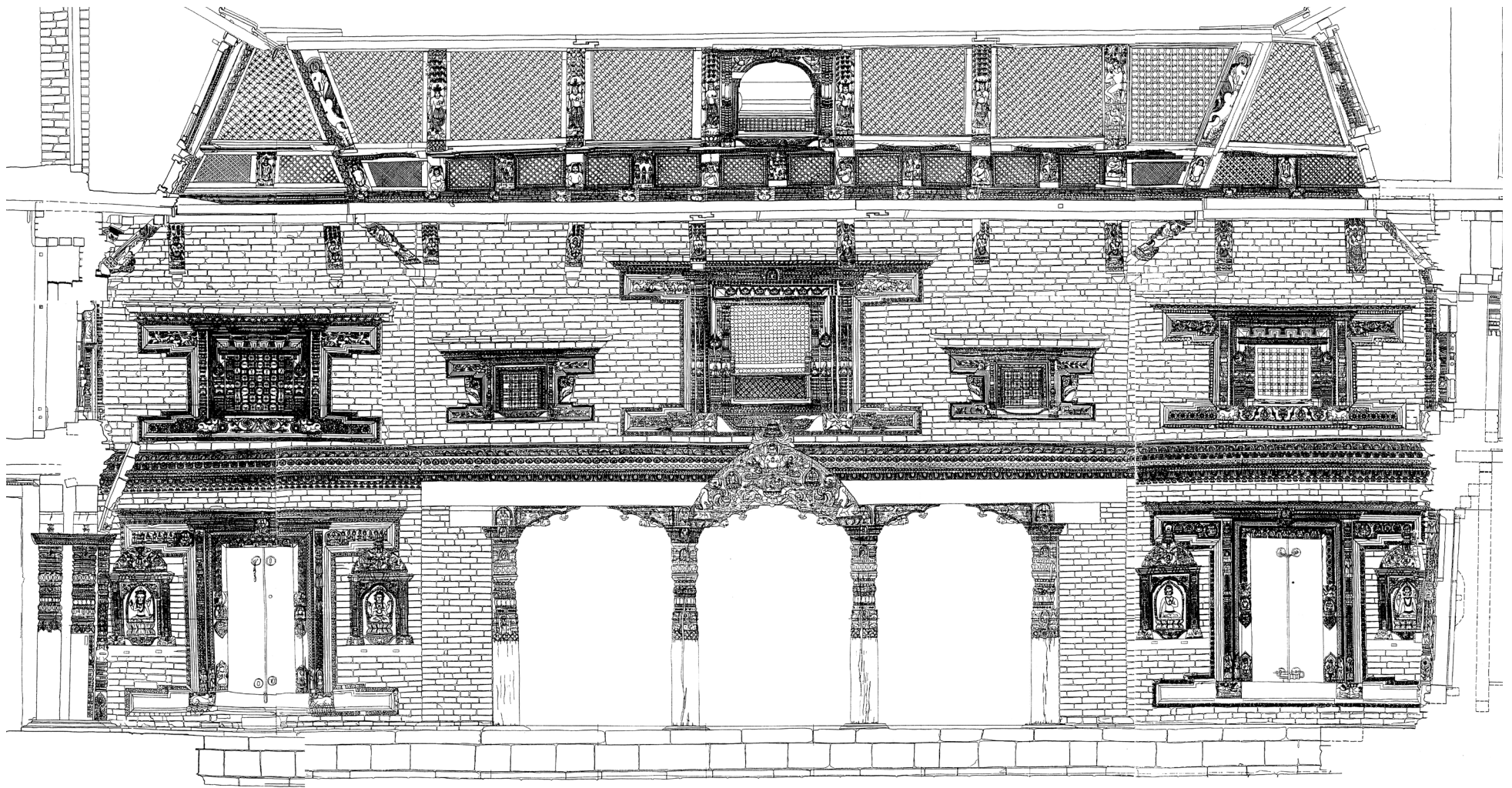
The brick cornices dating to 1936 will be carefully removed. New terracotta cornices will be moulded by local tile-makers following historic samples.







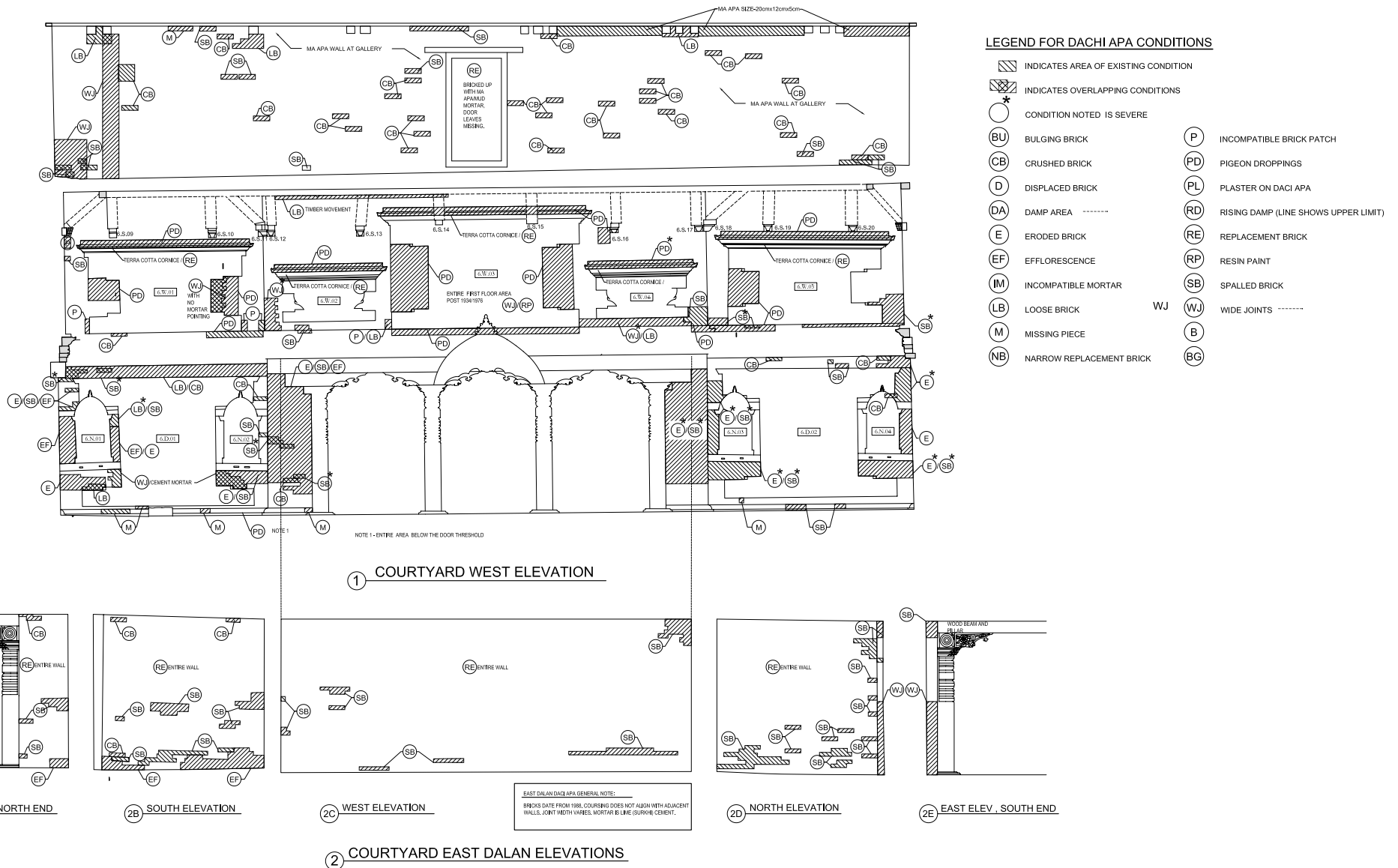




Courtyard façade | Stanisław Klimek, 2006

Courtyard façade | Hans Bjonness, 1995  
Historical and Architectural Investigation, HMG/UNESCO/Japan Trust  
Fund project 536/NEP/71, Vol. I, Kathmandu, 1995





Courtyard façade, inventory of daci apa brick conditions | 2009-2012







WIDE JOINTS



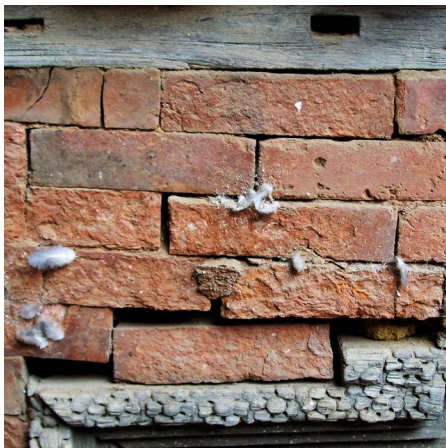
PIGEON DROPPINGS



CRUSHED BRICK



DISPLACED BRICK



REPLACEMENT BRICK, WIDE JOINTS



ERODED BRICK, DAMP AREA



EFFLORESCENCE, SPALLING



LOOSE BRICK, EFFLORESCENCE

**Courtyard façade bricks, existing conditions | 2009-2012**

The existing *daci apa* bricks are largely intact and will be reused except when severely spalled. Loose and missing joints will be repointed with mud mortar. Historic *daci apa* bricks are constructed with a very thin joint width to minimize exposure to weather, and for aesthetic reasons. Each brick is tapered, which also improves bonding with the inner core of the wall.







## WALL OPENINGS AND DECORATIVE ELEMENTS

### EXISTING CONDITIONS

The principal decorative feature of Sundari Cok is its wealth of finely carved wood. Wooden elements on the ground floor such as door thresholds and wall niches have been severely affected by rising damp. Several windows have broken or missing latticework. Likewise, the arms and attributes of the majority of strut images are lost. Many of the carvings on the ground floor level are crude replacements that date to the 1936 reconstruction.

Almost all of the decorative carvings are painted black while the struts and tympana are painted with polychrome paint (red, blue, green, yellow, and white). The most recent layer of paint dates from King Birendra's coronation in 1975. Much of the paint on the ground floor level is faded and barely noticeable, but the paint on the struts is largely intact.

Bleaching of timber elements, caused by the evaporation of rising damp from the ground, is common on door thresholds and niche frames on the ground floor. At the southern end of the courtyard façade, discolored elements can be detected as high as the ground floor cornice level.

Large splits along the grain of the wood, ranging from 0.5 cm to 2 cm, are evident in the vertical members of door frames and other load-bearing elements such as arcade columns. The extended lintels at some of the doors and windows also exhibit thinner, hairline cracks.

#### **Courtyard façade, existing conditions of arcade columns | 2012**

Though largely intact, the detailed carvings on the columns are obscured by layers of paint and grime. The thin vertical cracks do not have structural implications.

### PROPOSED RESTORATION

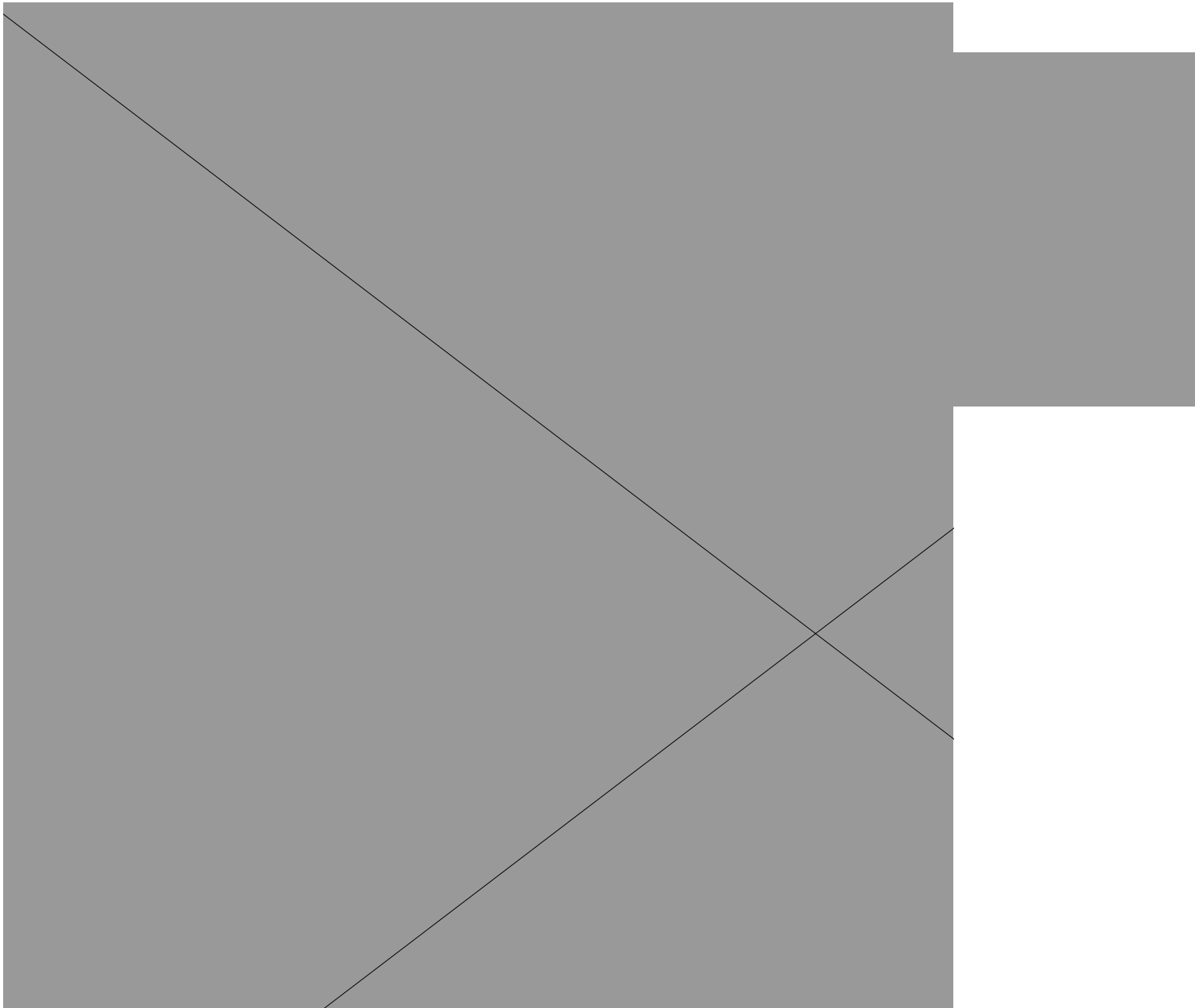
Damaged and missing latticework will be replaced with reference to historical samples. In some cases, carved elements of the door thresholds and wall niches will be refabricated. Copper sheets will be used to protect the timber elements of the door and window openings from rising damp.

Both the black paint and the polychrome paint will be carefully cleaned using liquid soap in order to reveal the detail of the carvings, recovering the design intentions of the 18th century.

Since the discoloration does not currently have structural implications, bleached elements will be preserved as they are. Bleached wood will not be removed to achieve a consistent color.

In most cases the vertical cracks do not have structural implications and will be retained without any intervention. Where cracking is structural, reinforcement may be required.





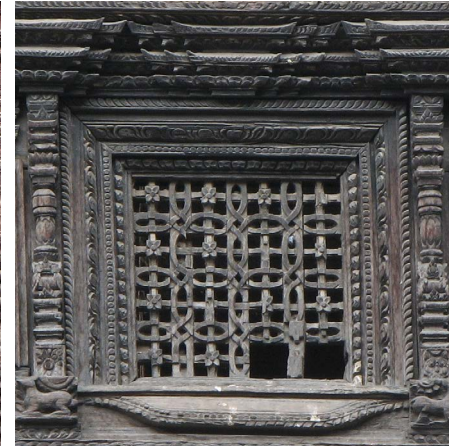




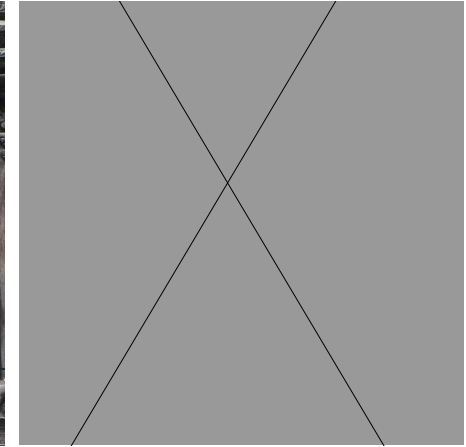
REPLACEMENT (1936)



DISPLACED ELEMENT, REPLACEMENT (1936)



MISSING PIECE - BROKEN



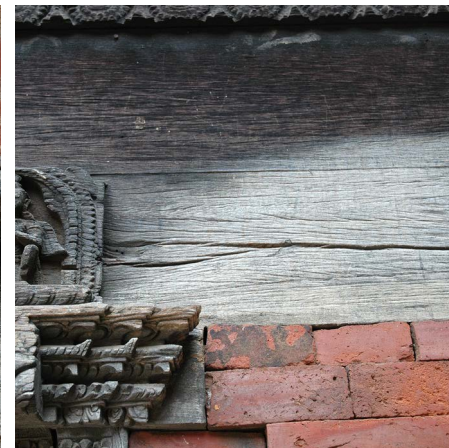
POLYCHROME PAINT



CRACKS



ROT, MISSING PIECE - BROKEN



BLEACHING



REPLACEMENT (1936)

#### Inventory of wood conditions | 2009-2012

The majority of carved elements date from the 18th century and are largely intact, except for some missing and broken pieces.







#### First floor windows, existing conditions | 2011

The carved timber windows are intact except for broken lattice pieces that will be replaced. The crude brick cornices dating to 1936 will be replaced by newly moulded eyebrow cornices (*mikhafusi*). The water-soluble black paint will be removed from all windows to reveal the detail of the deep relief carvings.





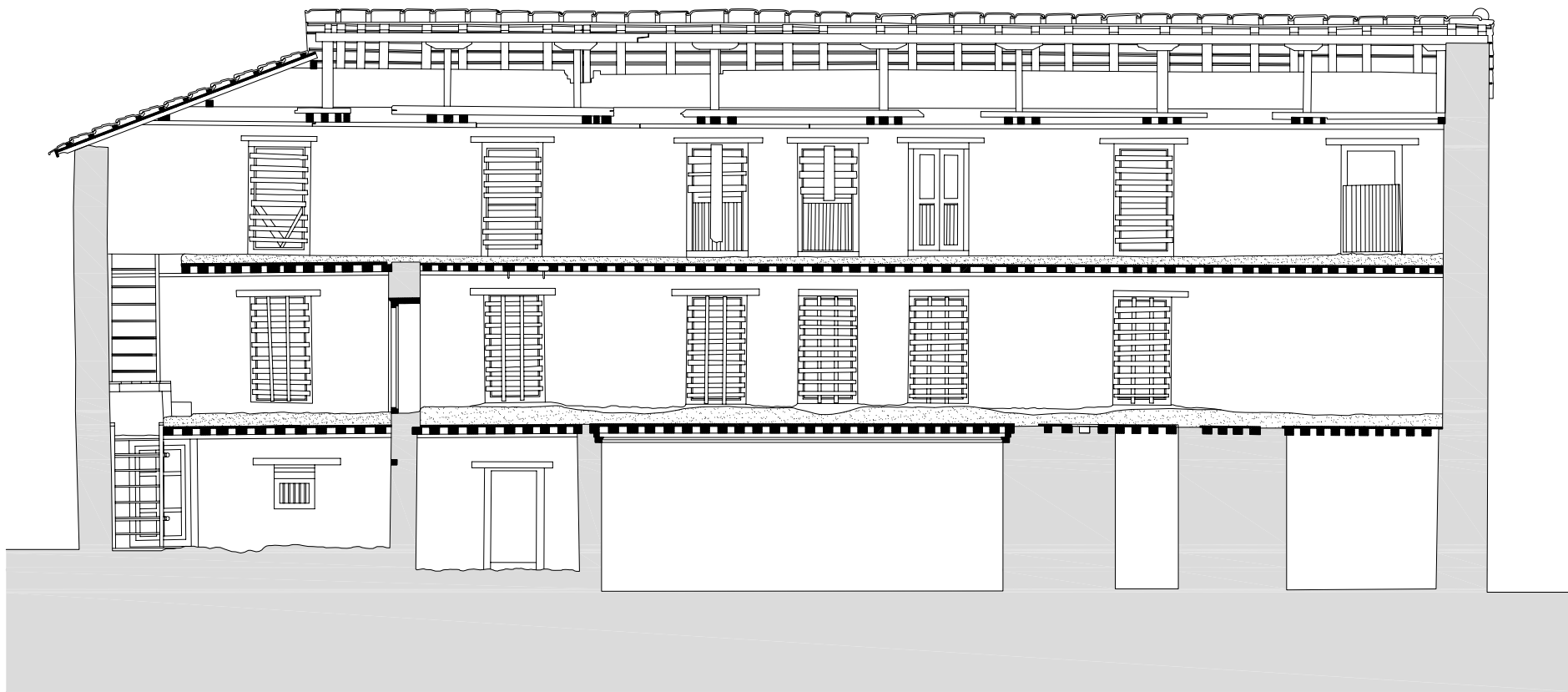


**Ground floor door, existing conditions | 2011**

The base of the door has been heavily eroded and is unstable due to the crumbling of the surrounding masonry. The niches on either side of the door contain carved deities dating to the 1936 restoration. These are noticeably crude compared to the fine carvings found elsewhere, most of which date to the 17th-18th century.







East wing of Sundari Cok, South-North section, existing conditions | 2008



# FLOOR STRUCTURE

## EXISTING CONDITIONS

Damages to the floor structure are largely responsible for the seismic instability of the building, since floor joists tie the inner and outer wall plates. The rotting of floor joists is caused by water infiltration through the poorly built roof. The loose timber joints cannot withstand lateral movement, making the building vulnerable to seismic motion.

The majority of the joists and wall plates have been affected by rising damp. There are severe cases of wet rot in the joists of the ground floor. Dry rot has affected joists on the first and second floors. In many cases, timber members affected by dry rot also show damp areas. Damp timber is more susceptible to fungal growth which in turn causes dry rot. Termite infestation is generally seen at the weak areas of the joists.

Floor joists, rafters, planking and wall plates were all added in 1936 and exhibit inconsistencies in size, grade, spacing, and species.

## PROPOSED RESTORATION

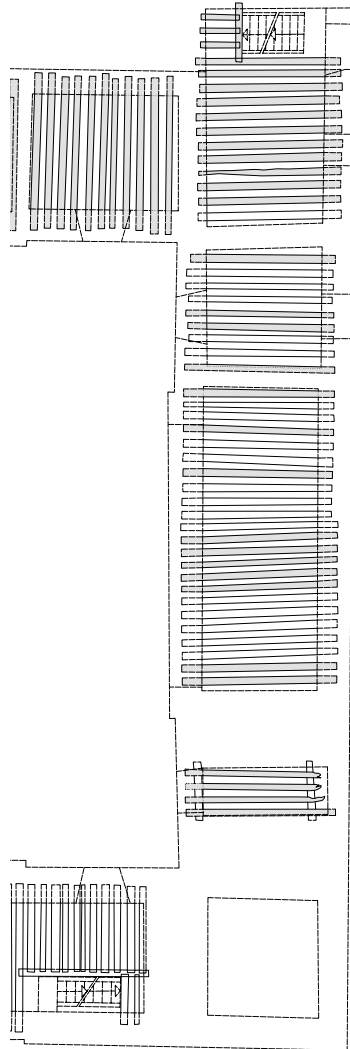
More than 75% of the floor joists on both first and second floors will be replaced. They will be chemically treated before being re-installed in a traditional configuration.

Rotten timbers will be removed and replaced. If the damp or damaged area is fairly small, it will be cut away and replaced with a new piece of timber. Removing the source of moisture will prevent further instances of rot. This will be achieved through the reconstruction of the roof, preventing leakage of water through the building (see pages 36-37).

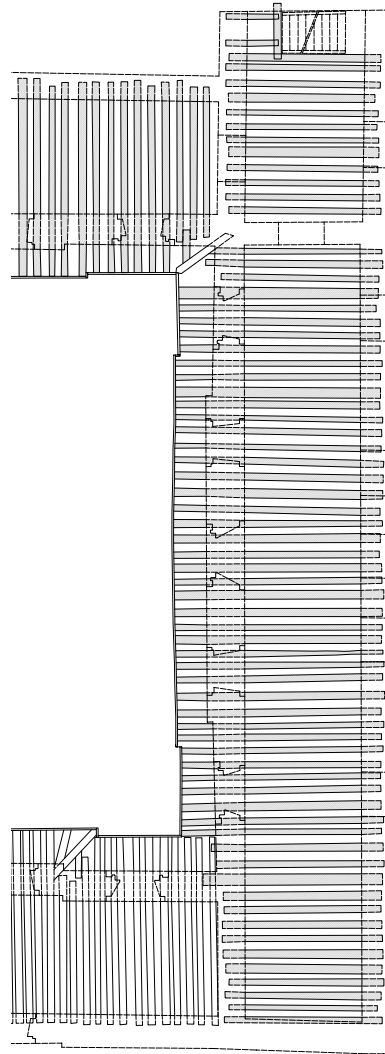
The floors will be modified from the traditional design with two layers of marine-grade plywood on hardwood planking, fastened with galvanized screws. This will form a strong diaphragm connecting all the joists securely to withstand seismic motion. The traditional Newari construction technique of using timber pegs to connect joists to wall plates will be improved by using stainless steel pins and straps. Two layers of brick soling will be added above the plywood. The traditional mud floor covering will be restored.



# FIRST FLOOR



# SECOND FLOOR



## East wing joist plans, existing conditions | 2008

The joist plan shows inconsistency in size and spacing. The weak joinery between joists and wall plates weakens the lateral stability of the building.







**Second floor, existing conditions | 2012**

When the east wing was rebuilt in 1936, large tiles were placed directly onto timber battens, causing water to leak through the numerous gaps. This caused the timber members supporting the roof to quickly deteriorate. The floor joists have also been affected by the passage of moisture through the entire building.







#### Roof reconstruction, northwest corner | March - April 2012

The reconstruction of the east wing roof will follow the same procedure as the recently completed roofs on the south, west, and north wings. New purlins (1) and rafters (2) form the roof structure in a traditional configuration. Layers of hardwood planking and marine-grade plywood (3) unite the timber members to create a stable diaphragm and uniform surface for a waterproof membrane (4). Salvaged terracotta roof tiles are then laid on a mud bed (5, 6). The large machine-made pan tiles of the east wing are visible in the background.



## ROOF STRUCTURE AND COVER

### EXISTING CONDITIONS

The condition of the roof is very poor due to an improper and hasty reconstruction effort following the 1934 earthquake. Ceiling joists, rafters, planking, wall plates, and ridge beams all exhibit inconsistencies in size, grade, spacing, and species. The large and random spacing between rafters departs from the traditional aesthetic configuration of closely-spaced rafters. Rough carpentry by unskilled carpenters has caused numerous problems including discontinuous wall plates and inadequate seats for rafters on beams. The roof cover was built using large pan tiles laid directly on timber battens, causing significant water leakage into the building. The majority of timber elements of the roof have an excess of moisture well above safety standards.

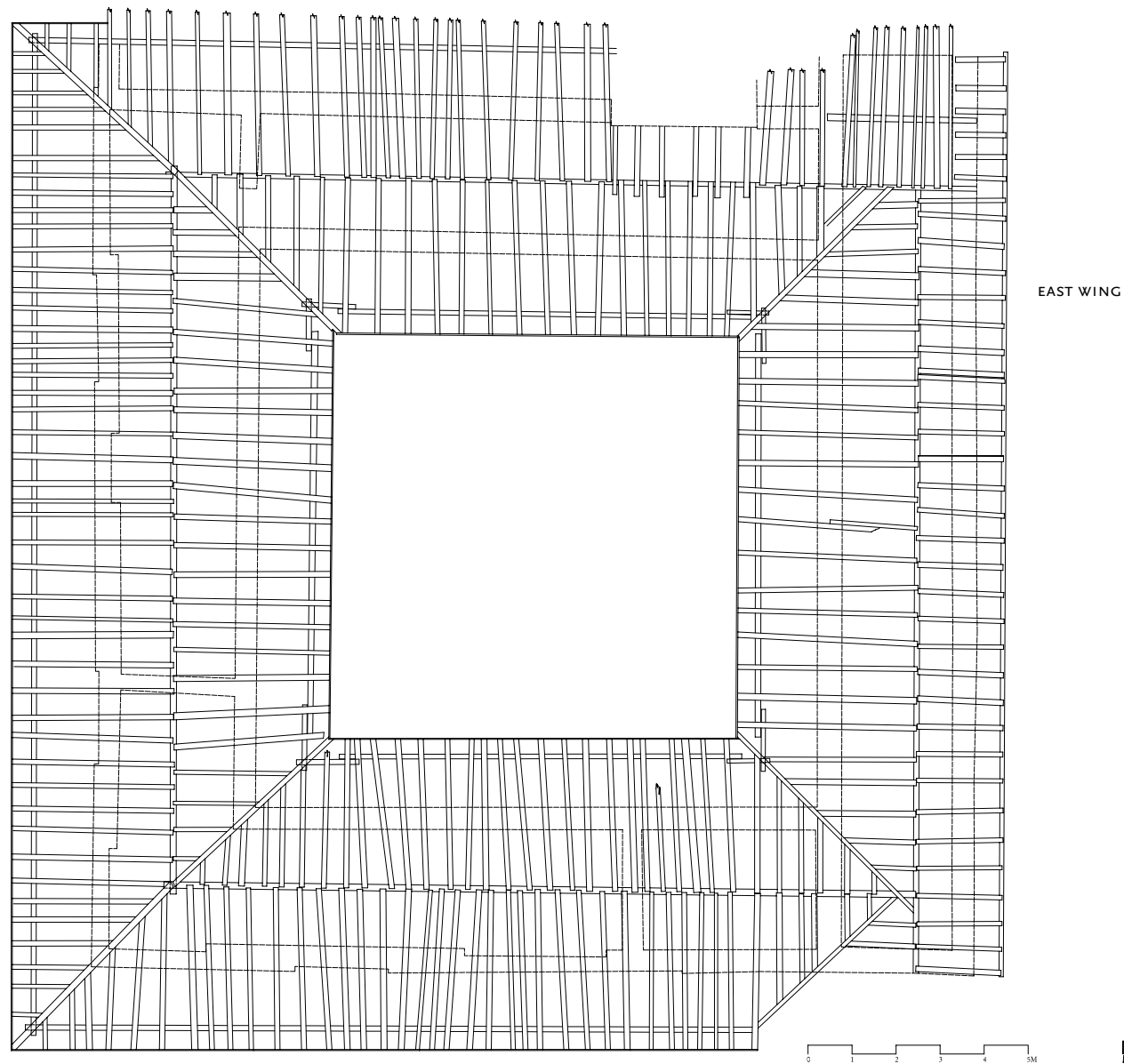
### PROPOSED RESTORATION

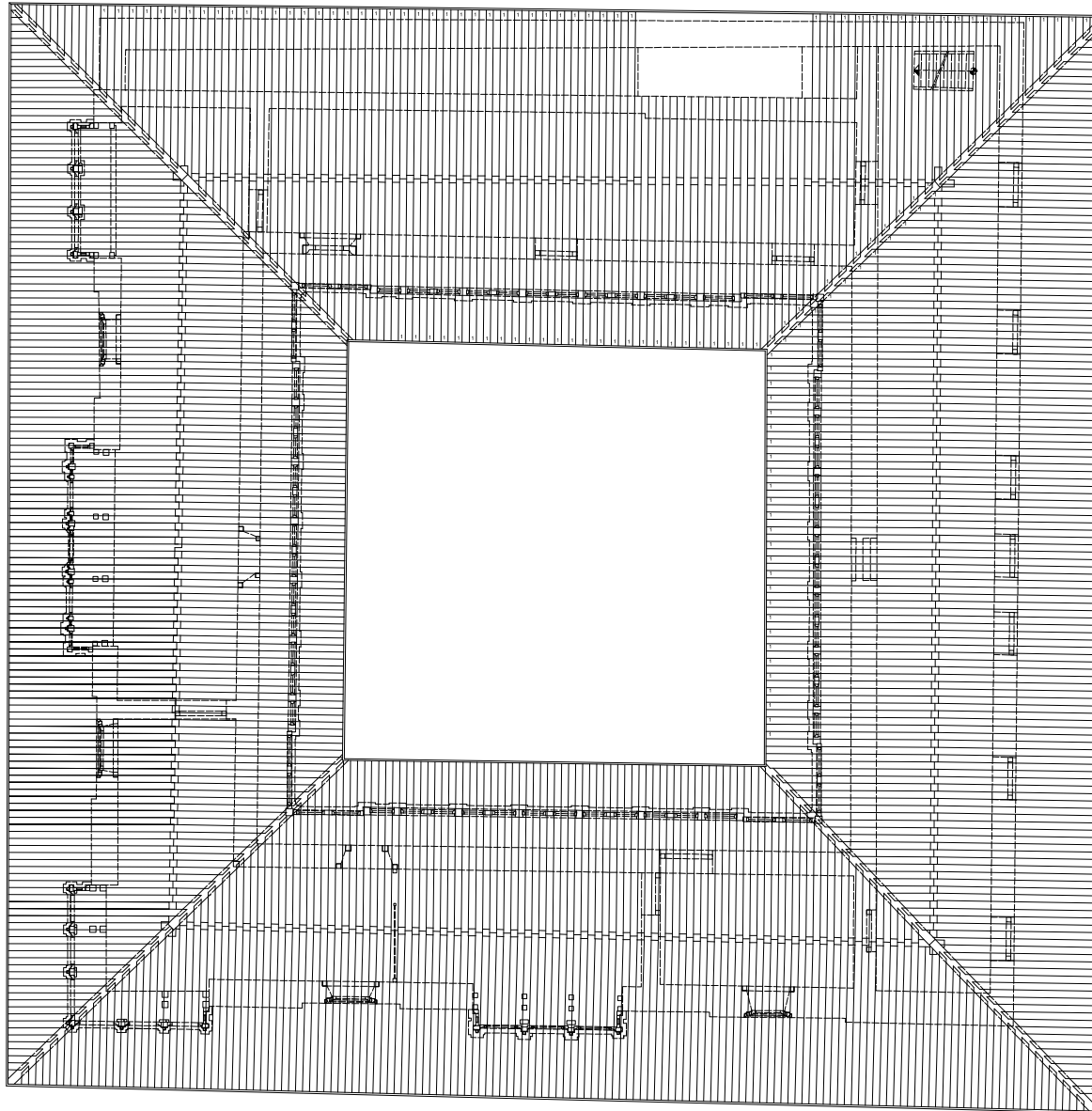
The timber structure will be reconstructed in the traditional configuration using both hardwood and pine. Salvageable timber will be reused where possible, along with new timber elements. The connections between rafters, joists, and window frames will be improved using concealed stainless steel pins and braces. Most wall plates will be replaced and fixed in two layers so that they act as ring beams above the wall, stabilizing the structure in the event of seismic movement. 1 inch *sal* hardwood planking and 3/4 inch marine-grade plywood will unite the roof timber members to create a rigid diaphragm and a uniform surface for a waterproof membrane. Finally, a roof cover of hand-made terracotta roof tiles (*jhingati*) will be laid on a mud bed.





**Sundari Cok, rafter plan, existing conditions** | 2009  
 When the building was reconstructed in 1936, the minimum number of rafters was used. The rafter plan clearly shows inconsistency in size, spacing, and joinery.





EAST WING

**Sundari Cok, rafter plan, proposed restoration | 2013**  
 The new rafters will be sized and spaced to achieve a traditional configuration that will also help to strengthen the entire roof structure. The roof slope and ridge height will be consistent throughout the building, as is typical in the architecture of Newar *viharas* and palace courtyards.







**Sundari Cok from the south** | March 2005

This photograph shows the condition of the building before restoration work began. The poorly constructed roof, covered with machine-made pan tiles in 1936, was responsible for much of the damages endured by the building.







**Sundari Cok from the south** | November 2013

The roof has been reconstructed on the north, south, and west wings. The remaining east wing roof is temporarily covered with tarpaulin.





**Sundari Cok to Bhandarkhal Tank, West-East elevation/ section | 2013**

This drawing shows location of the arcaded platform between Sundari Cok's east wing and the Bhandarkhal Tank. The platform will function as an architectural link between the imposing three-storeyed palace courtyard building and the sunken stone water tank.



## COMPONENT B     ARCADED PLATFORM (PATI)

### INTRODUCTION

KVPT proposes to create an arcaded platform to provide additional exhibition space in the rear area behind the palace building. This platform is designed as a traditional rest-house (*pati*), a fixture of traditional Newar architecture, and will seamlessly integrate with the existing ensemble of courtyard buildings, carved stone water tanks, rooftop temples, and *patis*.

The exhibition platform, *Pradarshan Mandapa* in Nepali, will house additional objects and artefacts from the rich collection of the Patan Museum, complementing the Architecture Galleries within the adjacent courtyard buildings. It will provide a peaceful place for museum visitors to rest and enjoy spectacular views of the palace complex and surrounding gardens. The platform will also diversify the Museum's venues for display, serving as a unique, open-air exhibition space.

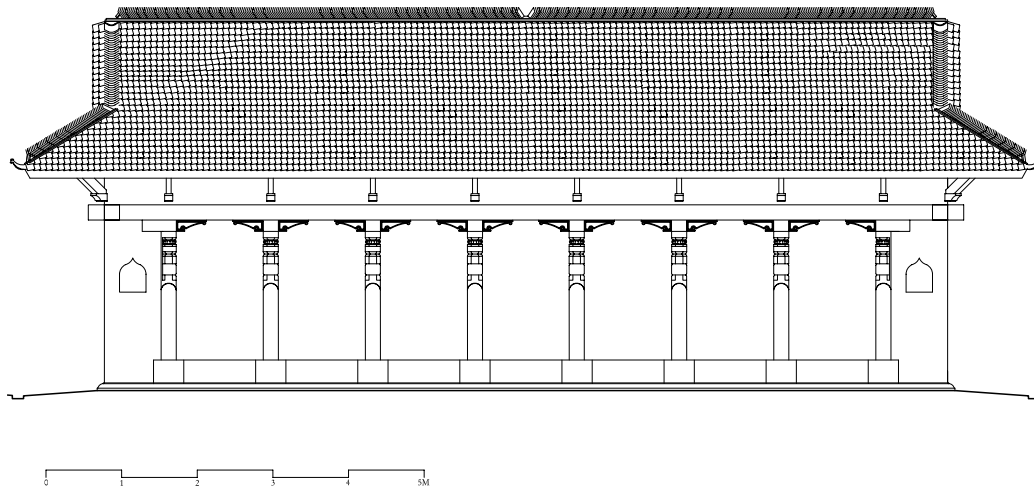
### LOCATION AND SPATIAL CHARACTER

During the 2008 archaeological excavation, several base stones of pillars were found, indicating that there was once an open arcade adjacent to the east wing. The proposed arcaded platform will be located in this area between the east wing and the Bhandarkhal pond. This platform will serve as a mediating link between the three-storied brick and timber bulk of the palace buildings and the wide-open outdoor space of the Bhandarkhal pond.

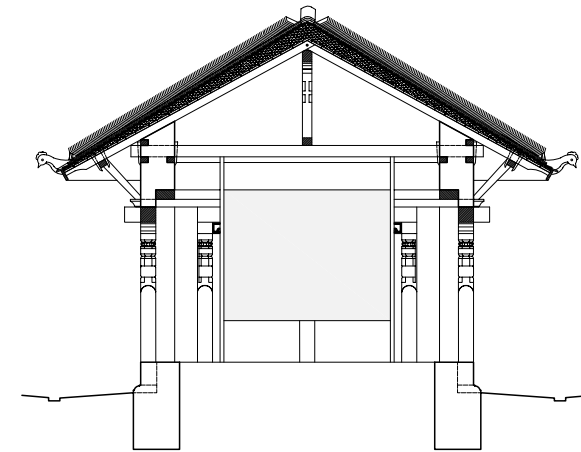
This open-air, columned platform is a carefully designed structure marking the transition between the courtyard's interior architecture and the palace's outdoor water architecture. The platform, slightly raised and covered by a traditional tiled roof, is meant to form a kind of curtain to soften the passage of space from interior to the exterior. Short walls at both ends of the platform serve as exhibition panels without blocking the visitor's view of the impressive pond beyond.



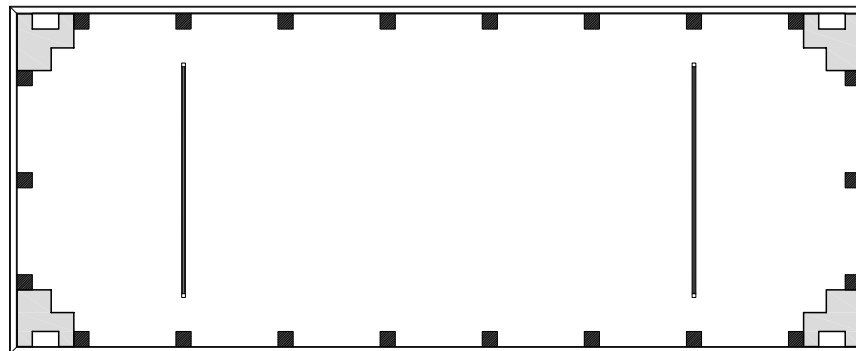




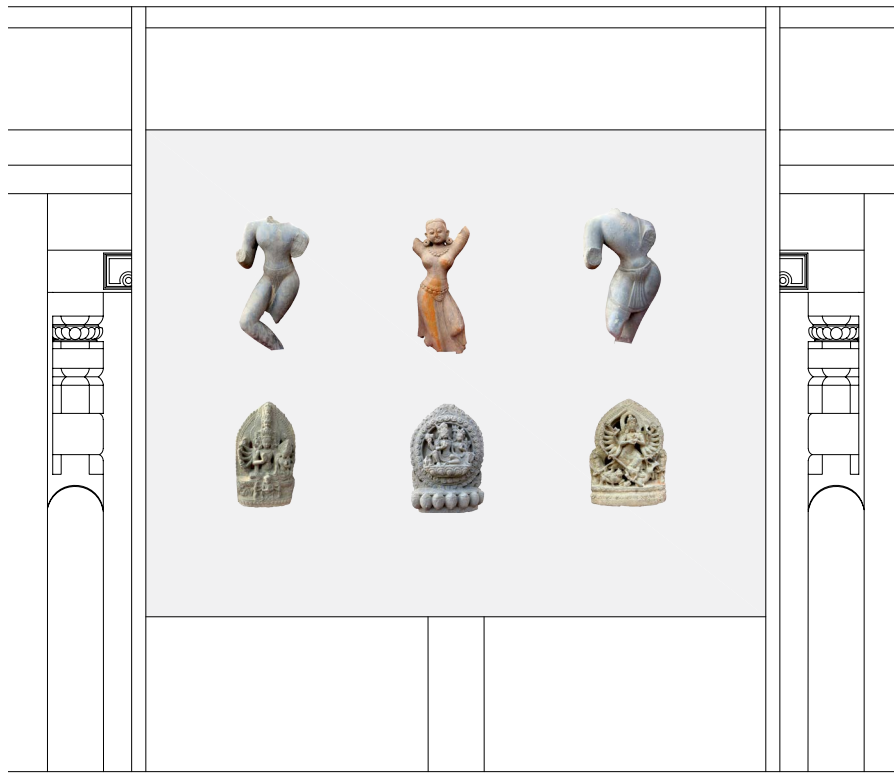
**Arcaded platform, longitudinal east elevation** | 2013  
The proposed arcaded platform is constructed as a traditional rest-house, or *pati*, a fixture and common structure in Newar architecture.



**Arcaded platform, east section** | 2013



**Arcaded platform, floor plan** | 2013  
Two panels stand at the northern and southern ends of the platform, providing a surface for exhibit display.



#### Archaeological objects | 2013

Objects discovered in the area, such as these stone-carved deities, will be put on display in the arcaded platform.

#### FUNCTION

The Architecture Galleries of the extended Patan Museum will be arranged along a typological order, presenting elements of Newar architecture such as windows, columns, struts and tympana. The display of original building parts salvaged from demolition sites and retrieved from the storerooms of the Patan Museum will be supplemented with replicas, enriching the collection to present the full range of these typologies. The newly rendered replicas will pay tribute to the craftsmanship of Shilpakar woodcarvers as representatives of a living tradition. These galleries will also include measured drawings, adding to the complexity of the displayed artefacts, and texts explaining the structural and iconographical peculiarities of Newar architecture.

The proposed exhibition platform and a number of other installations will allow for the display of additional exhibits of architectural and sculptural fragments within the wide space that opens up behind the two courtyard buildings, Mulcok and Sundari Cok. Other large sculptures and the collection of stone spouts (*hitimanga*) found during excavations, will also be displayed in this outdoor area. This makes full use of the available open space and green surroundings behind the palace – rare in the dense urban center of Patan – providing a unique setting for the display of objects from the rich collection of the Patan Museum.

The arcaded platform will have panels at both ends exhibiting artefacts and objects that were retrieved from the sacred room (*bidyapith*) in the west wing of the principal courtyard (Mulcok). One exhibition panel will explain the configuration and function of the Bhandharkal Tank and Sundari Cok, the two 17th century structures that the arcaded platform stands between.







#### Historical tile paving | 2008

Tile paving between the east wing of Sundari Cok and the Bhandarkhal tank was discovered after preliminary digs in 2008. The paving is composed of square *telia* tiles in a rectangular configuration, probably dating to the 18th century.





## COMPONENT C TILE PAVING

### EXISTING CONDITIONS

After archaeological excavations behind Sundari Cok's east wing in 2008, fragments of historical *telia* tile were discovered, indicating that the area between Sundari Cok and Bhandarkhal Tank was once paved. The tiles are believed to date to the 18th century. Fragments of paving extend all the way to Duimaju shrine, where a carved stone turtle was also discovered.

The paving outside Sundari Cok is composed of square tiles in a rectangular configuration. The name *telia* (oiled) suggests that the sheen is derived from oil added to the clay during manufacturing process. However recent research suggests that the lustrous "oily" finish actually derives from a glaze. This glaze is made from a special clay that is tempered and colored by a microscopic red fungus produced by moist rice straw in the monsoon season.

Although the original paved level is uneven and broken in many places, the configuration of the paving can still be discerned, along with the location of rainwater drainage canals, also made from the same tiles.

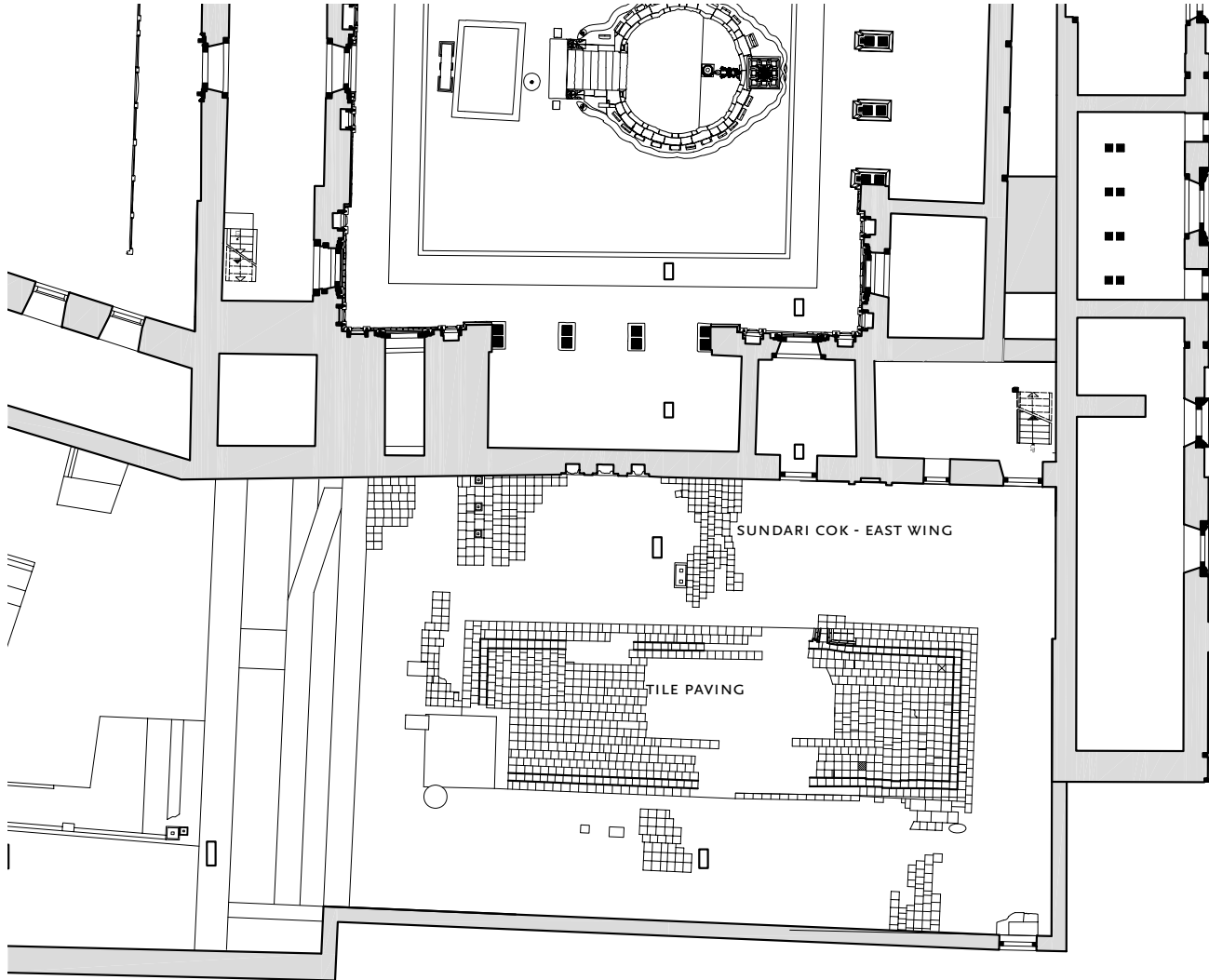
### PROPOSED RESTORATION

The area behind Sundari Cok's east wing will be excavated approximately 1 meter down to the original paved level where the historical tiles have been preserved beneath a sand bed. The historical configuration of the tiles has already been carefully documented. Based on the 2008 investigation, it is estimated that only 10% of the tiles will be re-usable. The tiles will be preserved in their historical configuration and level, forming a sunken courtyard adjacent to the plinth of Sundari Cok.

Due to the fact that the historical tiles are larger than today's commonly used *telia* tiles, new tiles will be ordered for custom fabrication from a workshop in Thimi. The tile paving will then be re-laid in the historical configuration, using both original and newly fabricated tiles. The tiles will be pointed with traditional mortar.

The tiles will be laid on top of brick soling to provide a firm base upon which to grade a drainage system.





**Historic tile paving behind Sundari Cok, existing conditions | 2008**

This drawing documents the exact location of the excavated tiles and other historical objects in the paved area between Sundari Cok and Bhandarkhal Tank.





#### Archaeological excavation | 2008

An archaeological dig was conducted with care to preserve the historical *telia* tiles. The dig revealed other objects such as stone bases for timber pillars, indicating that there was once an open arcade adjacent to the east wing.

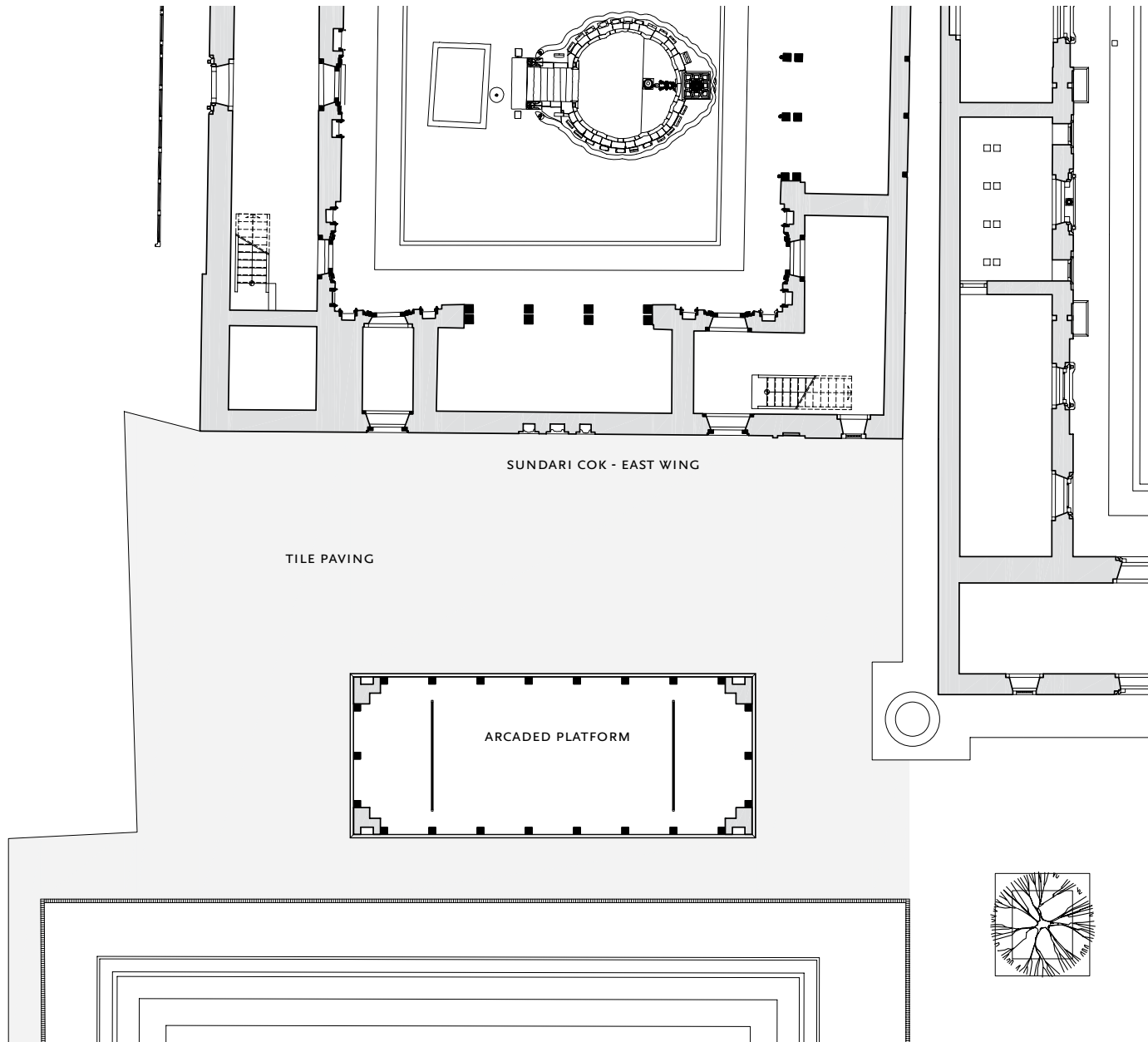


#### Stone tortoise | 2008

This stone tortoise was discovered 1 meter below the ground between the east wing of Sundari Cok and Duimaju Shrine. The tortoise has been restored using lime mortar to bind the stone pieces.







**Arcaded Platform and tile paving, proposed plan | 2008**  
 This plan shows the proposed restoration of the area between the east wing of Sundari Cok and the Bhandarkhal Tank.



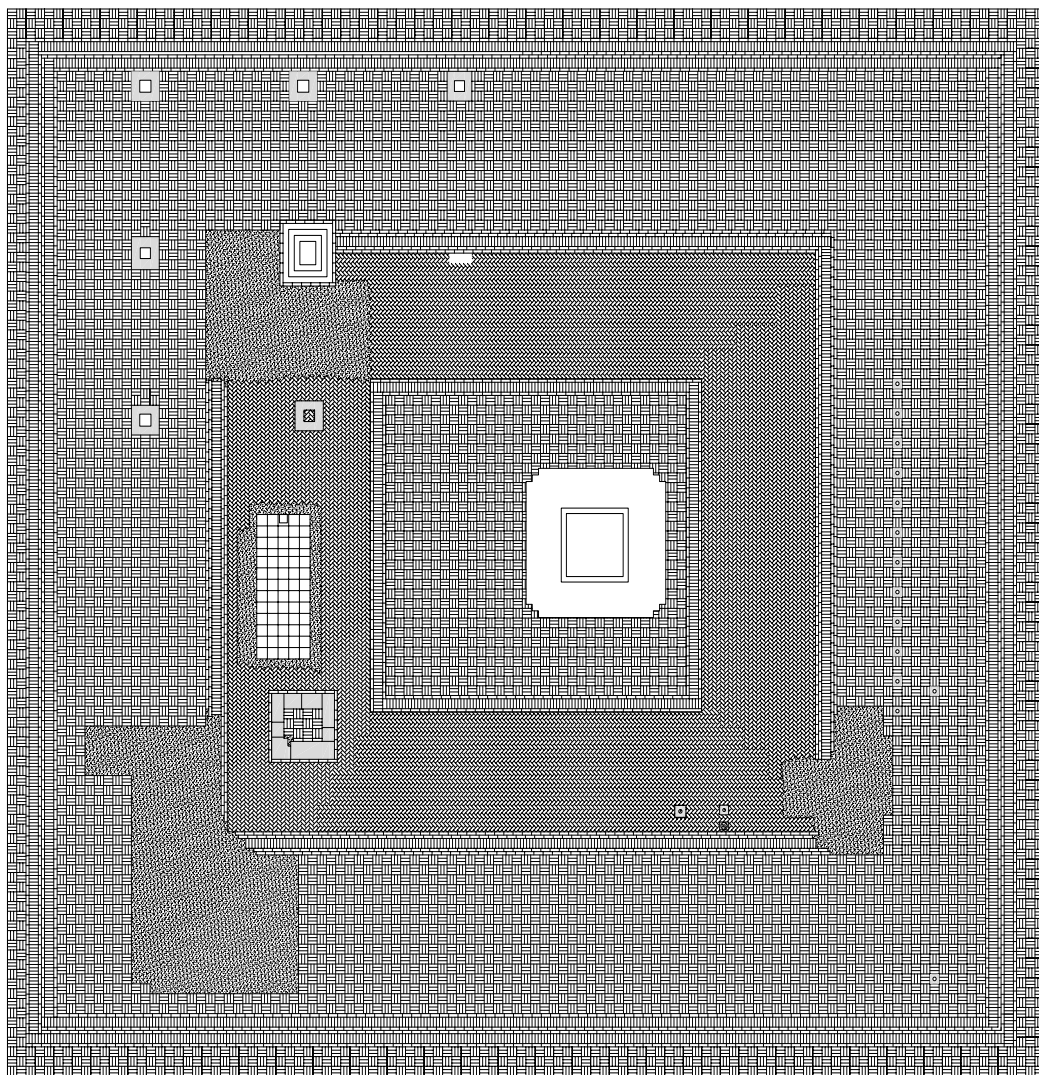


#### **Tile paving detail | 2008**

The terracotta tiles exhibit worn rose-colored surfaces of various shades, caused by differential pigmentation during manufacture and loss of pigment over time due to weathering. Existing tiles will be reused wherever possible.





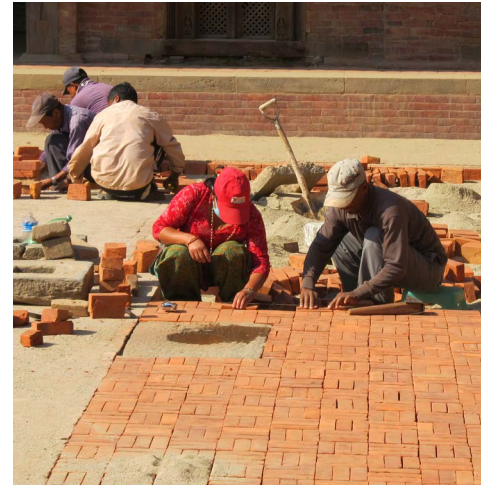
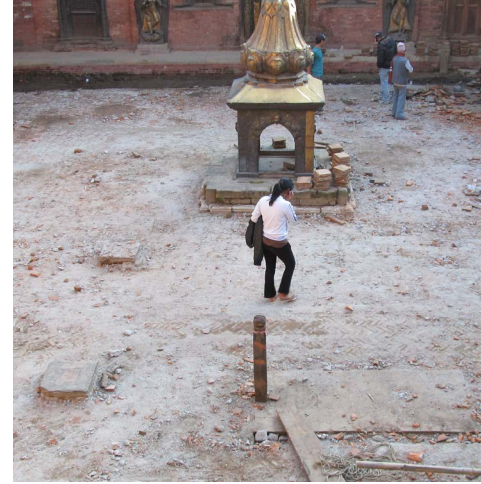


**Historical brick paving of Mulcok courtyard | 2011**

This drawing documents the configuration of the historic brick paving of the nearby Mulcok courtyard as it was discovered after excavation.







#### Restoration of Mulcok brick paving | March 2012

Excavation of the Mulcok courtyard for drainage purposes revealed historical brick paving. The existing bricks were removed, cleaned, and re-laid in the original configuration based on detailed documentation of existing conditions (left).







#### Brick paving after restoration | May 2012

The restored brick paving after all original bricks were excavated, cleaned, and re-laid in the historical configuration. As can be seen, new bricks were used where existing bricks were not salvageable.



## Patan Royal Palace

### Cost Estimate for the restoration of Sundari Cok East Wing revised Dec 19, 2013

| s.n.   | description of works   | Nos. | L     | B    | H    | quantity | unit   | rate    | Amount NRS | Amount Euro |
|--|--|------|-------|------|------|----------|--------|---------|------------|-------------|
| <b>Site preparation and demolition works</b> |  |      |       |      |      |          |        |         |            |             |
| 1  | scaffolding  | 1    | 20.00 |      | 9.00 | 180.00   | s.m.   | 290     | 52,200.00  | € 401.54    |
| 2  | construction of temporary work sheds in back garden                      | 1    |       |      |      | 1.00     | l/s    | 25,000  | 25,000.00  | € 192.31    |
| 3  | demolition of roof and stacking of reusable materials                    | 1    | 19.00 | 8.00 |      | 152.00   | s.m.   | 160     | 24,320.00  | € 187.08    |
| 4  | demolition of floors (removal of mud and stacking of reusable materials) | 2    | 17.00 | 3.00 |      | 102.00   | s.m.   | 230     | 23,460.00  | € 180.46    |
| 5  | trash disposal including removal from building, loading and unloading    |      |       |      |      | 40.00    | trucks | 1,500   | 60,000.00  | € 461.54    |
| <b>Ground Floor</b>                          |  |      |       |      |      |          |        |         |            |             |
| 6  | structural wall repairs  |      |       |      |      | 12.50    | cub/m  | 7,800   | 97,500.00  | € 750.00    |
| 7  | repair of exterior doors   | 4    |       |      |      | 4        | nos    | 23,500  | 94,000.00  | € 723.08    |
| 8  | partial replacement of door inner frames and lintels                     | 4    |       |      |      | 4        | nos    | 22,000  | 88,000.00  | € 676.92    |
| 9  | recarving of lost niche sculptures                                       | 4    |       |      |      | 4        | nos    | 38,000  | 152,000.00 | € 1,169.23  |
| 10   | repair of timber cornice   | 1    |       |      |      | 1        | level  | 52,000  | 52,000.00  | € 400.00    |
| 11   | staircase  | 1    |       |      |      | 1        | nos    | 55,000  | 52,000.00  | € 400.00    |
| 12   | brick soling on floor in lime <i>surkhi</i> mortar                       | 1    |       |      |      | 48.60    | s.m.   | 694     | 33,728.40  | € 259.45    |
| 13   | floor tiles ( <i>telia</i> ) in lime <i>surkhi</i> mortar                | 1    | 18.00 | 2.70 |      | 48.60    | s.m.   | 1,450   | 70,470.00  | € 542.08    |
| 14   | stone edge on east plinth in lime <i>surkhi</i> mortar                   | 22   |       |      |      | 22.00    | r.m.   | 4,800   | 105,600.00 | € 812.31    |
| <b>1st Floor</b>                             |  |      |       |      |      |          |        |         |            |             |
| 15   | structural wall repairs in mud mortar                                    | 1    |       |      |      | 8.75     | cum/m  | 7,800   | 68,250.00  | € 525.00    |
| 16   | repair of plain windows from east façade                                 | 7    |       |      |      | 7        | nos    | 18,000  | 126,000.00 | € 969.23    |
| 17   | repair of east window inner frames                                       | 7    |       |      |      | 7        | nos    | 4,500   | 31,500.00  | € 242.31    |
| 18   | repair of carved windows on courtyard wall                               | 5    |       |      |      | 5        | nos    | 22,000  | 110,000.00 | € 846.15    |
| 19   | repair of window inner frames and niches                                 | 5    |       |      |      | 5        | nos    | 15,000  | 75,000.00  | € 576.92    |
| 20   | lintels above all windows  | 1    |       |      |      | 1.50     | c.m    | 299,200 | 448,800.00 | € 3,452.31  |
| 21   | traditional mud wall plaster (two layers)                                | 3    | 17.00 | 2.20 |      | 112.20   | s.m.   | 1,100   | 123,420.00 | € 949.38    |
| 22   | staircase  | 1    |       |      |      | 1        | nos    | 55,000  | 55,000.00  | € 423.08    |
| 23   | repair of timber cornices  | 1    |       |      |      | 1        | levels | 52,000  | 52,000.00  | € 400.00    |
| 24   | joists (pine)  | 56   | 4.00  | 0.14 | 0.10 | 3.14     | c.m    | 97,100  | 304,505.60 | € 2,342.35  |
| 25   | planking (1" hard wood)  | 1    |       |      |      | 50.40    | s.m.   | 4,500   | 226,800.00 | € 1,744.62  |
| 26   | marine grade plywood diaphragm   | 1    |       |      |      | 50.40    | s.m.   | 800     | 40,320.00  | € 310.15    |
| 27   | brick soling in lime <i>surkhi</i> mortar                                | 1    |       |      |      | 50.40    | s.m.   | 694     | 34,977.60  | € 269.06    |
| 28   | traditional mud floor  | 1    | 18.00 | 2.80 |      | 50.40    | s.m.   | 900     | 45,360.00  | € 348.92    |





| 2nd Floor |   |     |       |      |      |        |       |         |            |            |
|-----------|---|-----|-------|------|------|--------|-------|---------|------------|------------|
| 29        | wall repair in mud mortar   | 1   |       |      |      | 14.00  | cub/m | 7,800   | 109,200.00 | € 840.00   |
| 30        | repair and carving of lost elements of courtyard balcony                | 1   | 11.50 |      | 1.80 | 20.70  | s.m.  | 7,500   | 155,250.00 | € 1,194.23 |
| 31        | repair of plain windows from east façade                                | 7   |       |      |      | 7      | nos   | 18,000  | 126,000.00 | € 969.23   |
| 32        | repair of east window inner frames                                      | 7   |       |      |      | 7      | nos   | 4,500   | 31,500.00  | € 242.31   |
| 33        | repair of carved door on courtyard wall                                 | 1   |       |      |      | 1      | nos   | 20,000  | 20,000.00  | € 153.85   |
| 34        | repair of window inner frames and door                                  | 8   |       |      |      | 8      | nos   | 12,000  | 96,000.00  | € 738.46   |
| 35        | lintels above all windows   | 1   |       |      |      | 1.90   | c.m   | 264,675 | 502,882.50 | € 3,868.33 |
| 36        | repair and cleaning of balcony struts                                   | 14  |       |      |      | 14     | nos   | 5,000   | 70,000.00  | € 538.46   |
| 37        | traditional mud wall plaster (two layers)                               | 3   | 16.00 |      | 2.25 | 108.00 | s.m.  | 1,100   | 118,800.00 | € 913.85   |
| 38        | joists (area of leaning balcony in courtyard & south bay window - pine) | 17  | 5.20  | 0.14 | 0.10 | 1.24   | c.m   | 77,638  | 96,084.79  | € 739.11   |
| 39        | regular joists (pine)   | 42  | 4.50  | 0.14 | 0.10 | 2.65   | c.m   | 77,638  | 205,430.15 | € 1,580.23 |
| 40        | planking (1" thick) in between plyboards and joist                      | 1   | 16.00 | 2.50 |      | 40.00  | s.m.  | 4,035   | 161,400.00 | € 1,241.54 |
| 41        | marine grade plywood diaphragm  | 1   | 16.00 | 2.50 |      | 40.00  | s.m.  | 800     | 32,000.00  | € 246.15   |
| 42        | brick soling in lime <i>surkhi</i> mortar                               | 1   | 16.00 | 2.50 |      | 40.00  | s.m.  | 694     | 27,760.00  | € 213.54   |
| 43        | mud floor   | 1   | 16.00 | 2.50 |      | 40.00  | s.m.  | 900     | 36,000.00  | € 276.92   |
| Roof      |   |     |       |      |      |        |       |         |            |            |
| 44        | wall plates and timber trusses (hard wood)                              | 6   | 18.00 | 0.10 | 0.14 | 1.51   | c.m   | 264,675 | 400,188.60 | € 3,078.37 |
| 45        | wall plates and timber trusses (hard wood)                              | 10  | 5.50  | 0.10 | 0.14 | 0.77   | c.m   | 264,675 | 203,799.75 | € 1,567.69 |
| 46        | base plates for ridge posts (hard wood)                                 | 1   | 18.00 | 0.15 | 0.14 | 0.38   | c.m   | 264,675 | 100,047.15 | € 769.59   |
| 47        | ridge beams (hard wood)   | 1   | 16.00 | 0.15 | 0.15 | 0.36   | c.m   | 264,675 | 95,283.00  | € 732.95   |
| 48        | ridge posts (hard wood)   | 6   | 1.20  | 0.15 | 0.15 | 0.16   | c.m   | 264,675 | 42,877.35  | € 329.83   |
| 49        | capitals (hard wood)  | 6   | 1.00  | 0.15 | 0.12 | 0.11   | c.m   | 264,675 | 28,584.90  | € 219.88   |
| 50        | purlins (hard wood)   | 2   | 18.00 | 0.10 | 0.10 | 0.36   | c.m   | 264,675 | 95,283.00  | € 732.95   |
| 51        | rafters (pine)  | 120 | 4.50  | 0.14 | 0.10 | 7.56   | c.m   | 77,638  | 586,943.28 | € 4,514.95 |
| 52        | ceiling joists (pine)   | 56  | 4.00  | 0.14 | 0.10 | 3.14   | c.m   | 77,638  | 243,472.77 | € 1,872.87 |
| 53        | eave boards (hard wood)   | 2   | 19.00 |      |      | 38.00  | r.m   | 950     | 36,100.00  | € 277.69   |
| 54        | planking ( hard wood)   | 2   | 18.00 | 4.50 |      | 162.00 | s.m   | 4,035   | 653,670.00 | € 5,028.23 |
| 55        | one layer of marine grade plywood above planking                        |     |       |      |      | 171.00 | s.m   | 800     | 136,800.00 | € 1,052.31 |
| 56        | water proof membrane ( <i>multiplas</i> )                               |     |       |      |      | 171.00 | s.m   | 750     | 128,250.00 | € 986.54   |
| 57        | traditional roof cover ( <i>jhingati</i> tile on mud bed)               |     |       |      |      | 171.00 | s.m.  | 1,500   | 256,500.00 | € 1,973.08 |
| 58        | anti vegetation chemical ( <i>karmex</i> )                              |     |       |      |      | 20.00  | kg    | 2,700   | 54,000.00  | € 415.38   |
| 59        | ridge tiles   | 1   | 22.00 |      |      | 22.00  | r.m   | 900     | 19,800.00  | € 152.31   |
| 60        | valley tiles  | 2   | 5.25  |      |      | 10.50  | r.m.  | 600     | 6,300.00   | € 48.46    |
| 61        | copper valley flashing  | 2   | 5.25  |      |      | 10.50  | r.m.  | 2,650   | 27,825.00  | € 214.04   |
| 62        | corner tiles ( <i>gongachha</i> )                                       | 2   |       |      |      | 2      | pcs   | 1,500   | 3,000.00   | € 23.08    |



|   |  |     |     |  |          |             |                     |
|---|--|-----|-----|--|----------|-------------|---------------------|
| 63  | corner metal plates  | 2   | 2   | pcs  | 5,500    | 11,000.00   | € 84.62             |
| 64  | copper strips for eaves board  | 120 | 120 | pcs  | 135      | 16,200.00   | € 124.62            |
| <b><i>Facades (courtyard and east facing)</i></b>   |  |     |     |  |          |             |                     |
| 65  | new roof struts on east façade   | 16  | 16  | nos  | 7,000    | 112,000.00  | € 861.54            |
| 66  | repair of timber cornices  | 2   | 2   | levels   | 35,000   | 70,000.00   | € 538.46            |
| 67  | repair and replacement of <i>kulans</i> above the openings                 | 5   | 5   | l/s  | 25,000   | 125,000.00  | € 961.54            |
| 68  | cleaning of façade brick and timber elements                               | 1   | 1   | l/s  | 40,000   | 40,000.00   | € 307.69            |
| 69  | repair of plinth   | 1   | 1   | l/s  | 38,000   | 38,000.00   | € 292.31            |
| 70  | Exterior <i>dachi apa</i> repair in courtyard including terracotta lintels | 1   | 1   | l/s  | 90,000   | 80,000.00   | € 615.38            |
| 71  | Exterior wall repair on east façade  | 1   | 1   | l/s  | 50,000   | 50,000.00   | € 384.62            |
| <b><i>Other Works</i></b>   |  |     |     |  |          |             |                     |
| 72  | structural strengthening/seismic reinforcement                             | 1   | 3   | levels   | 125,000  | 375,000.00  | € 2,884.62          |
| 73  | concealed conduits for electrical wiring                                   | 1   | 1   | l/s  | 55,000   | 55,000.00   | € 423.08            |
| 74  | final site cleaning  | 1   | 1   | l/s  | 50,000   | 50,000.00   | € 384.62            |
| 75  | project documentation and research publication                             | 1   | 1   | l/s  | 110,000  | 110,000.00  | € 846.15            |
| 76  | linseed oil on wood surfaces   | 1   | 2   | floors   | 50,000   | 100,000.00  | € 769.23            |
| 77  | white wash of interior surfaces  | 1   | 220 | s.m.   | 2,200    | 484,440.00  | € 3,726.46          |
| <b><i>Implementation Team</i></b>   |  |     |     |  |          |             |                     |
| 1   | historic preservation specialist   | 1   | 20  | man/days   | 400.00 € |             | € 8,000.00          |
| 2   | architect/ half time   | 1   | 12  | man/months   | 37,000   | 444,000.00  | € 3,415.38          |
| 3   | construction supervisor  | 1   | 12  | man/months   | 25,000   | 300,000.00  | € 2,307.69          |
| 4   | project runner   | 1   | 12  | man/months   | 15,000   | 180,000.00  | € 1,384.62          |
| <b>Total requested:</b>   |  |     |     |  |          |             | <b>€ 86,614.49</b>  |
| <b><i>Already received support:</i></b>   |  |     |     |  |          |             |                     |
| project survey, measured drawings, detailed conditions report, historic structures report           |  |     |     | <i>funded by the World Monuments Fund</i>                    |          | € 9,000.00  |                     |
| detailed photographic documentation by Stanislaw Klimek   |  |     |     | <i>funded by a grant from Beatrix Ost and Ludwig Kuttner</i> |          | € 3,500.00  |                     |
| seismic engineering analysis and implementation proposal by Dr. Matthias Beck, University of Munich |  |     |     | <i>funded by KVPT private fundraising</i>                    |          | € 5,500.00  |                     |
| <b><i>Secured support for additional future activities:</i></b>                                     |  |     |     |  |          |             |                     |
| office man't and implementation overheads, utilities, documentation, auditing, government liaison   |  |     |     | <i>KVPT private fundraising</i>                              |          | € 12,000.00 |                     |
| future museum galleries installations including lighting and interior finishes                      |  |     |     | <i>funded by the Patan Museum Development committee</i>      |          | € 18,500.00 |                     |
| <b>KVPT supplied funding:</b>   |  |     |     |  |          |             | <b>€ 48,500.00</b>  |
| <b>Total project cost:</b>  |  |     |     |  |          |             | <b>€ 135,114.49</b> |



**Cost Estimate for construction of Arcaded Platform in Bhandarkhal Nov. 22, 2013**

| s.n.         | description of works  | Nos. | L   | B    | H    | quantity | unit   | rate       | Amount NRS          | Amount Euro        |
|--------------|---|------|-----|------|------|----------|--------|------------|---------------------|--------------------|
| 1            | excavation of foundation  | 1    |     |      |      | 13.28    | c.m    | 508.00     | 6,746.24            | 51.89              |
| 2            | brick work (ma apa) in foundation in lime surkhi mortar                 | 1    |     |      |      | 12.41    | c.m    | 19,300.00  | 239,513.00          | 1,842.41           |
| 3            | 4" thick nago   | 1    |     |      |      | 31.90    | c.m    | 3,000.00   | 95,700.00           | 736.15             |
| 4            |   |      |     |      |      |          |        |            |                     |                    |
| 5            |   |      |     |      |      |          |        |            |                     |                    |
| 6            | brick work above nina (beam)  | 30   |     |      |      | 15.51    | pcs    | 19,300.00  | 299,343.00          | 2,302.64           |
| 7            | tepu loh (base stone for pillars)                                       | 22   |     |      |      | 22.00    | sets   | 2,500.00   | 55,000.00           | 423.08             |
| 8            | telia tile pavement on platform   | 22   |     |      |      | 22.00    | s.m.   | 55,000.00  | 1,210,000.00        | 9,307.69           |
| 9            | nina (beam)   | 1    |     |      |      | 1.22     | c.m    | 299,200.00 | 365,024.00          | 2,807.88           |
| 10           | lintel beam   | 1    |     |      |      | 0.55     | s.m.   | 299,200.00 | 164,560.00          | 1,265.85           |
| 11           | wall plate/ strut base/ struts/ chalu etc.                              | 1    |     |      |      | 0.75     | s.m.   | 299,200.00 | 224,100.80          | 1,723.85           |
| 12           | supporting beam (jo dhalin) lakah sin/ pillars/ corner post/ ridge beam | 2    |     |      |      | 1.17     | c.m    | 299,200.00 | 350,064.00          | 2,692.80           |
| 13           | rafters (pine)  | 54   | 3.3 | 0.13 | 0.10 | 2.32     | c.m    | 97,100.00  | 224,941.86          | 1,730.32           |
|              |   | 26   | 1.5 | 0.13 | 0.10 | 0.51     | c.m    | 97,100.00  | 49,229.70           | 378.69             |
| 14           | 1" thick eaves board  |      |     |      |      | 5.92     | s.m.   | 12,580.00  | 74,473.60           | 572.87             |
| 15           | telia tile pavement   |      |     |      |      | 22.55    |        | 2,300.00   | 51,865.00           | 398.96             |
| 16           | small gahjhah   | 8    |     |      |      | 8.00     |        | 15,000.00  | 120,000.00          | 923.08             |
| 17           | copper stripes for eaves board  | 80   |     |      |      | 80.00    |        | 135.00     | 10,800.00           | 83.08              |
| 18           | planking  |      |     |      |      | 189.70   |        | 4,500.00   | 853,650.00          | 6,566.54           |
| 19           | water proofing membrane   |      |     |      |      | 189.70   |        | 800.00     | 151,760.00          | 1,167.38           |
| 20           | roof tiles laying   |      |     |      |      | 189.70   |        | 1,500.00   | 284,550.00          | 2,188.85           |
| 21           | ridge tiles   |      |     |      |      | 24.00    |        | 900.00     | 21,600.00           | 166.15             |
| 22           | gongacha  | 4    |     |      |      | 4.00     |        | 500.00     | 2,000.00            | 15.38              |
| 23           | scaffolding   |      |     |      |      | 1.00     |        | 80,000.00  | 80,000.00           | 615.38             |
| 24           | site clearance and trash disposal                                       | 1    |     |      |      | 1.00     | trucks | 75,000.00  | 75,000.00           | 576.92             |
| <b>Total</b> |   |      |     |      |      |          |        |            | <b>5,220,870.20</b> | <b>€ 40,160.54</b> |

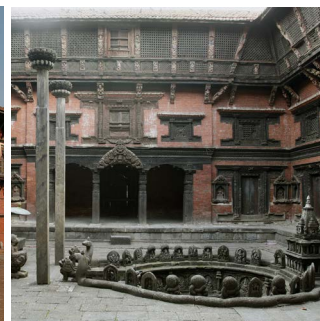
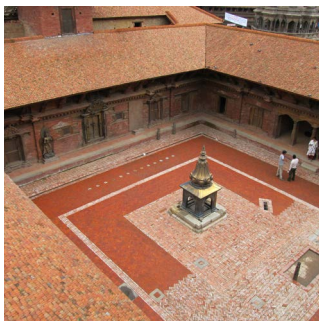
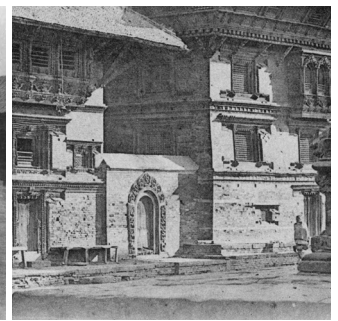
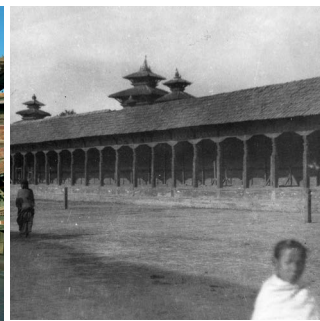
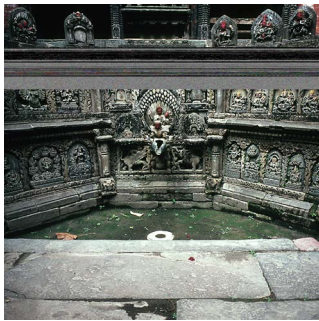
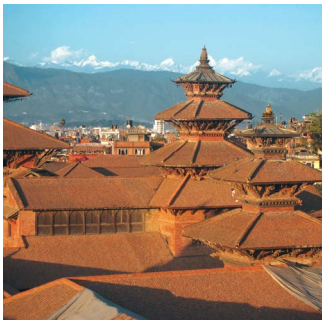
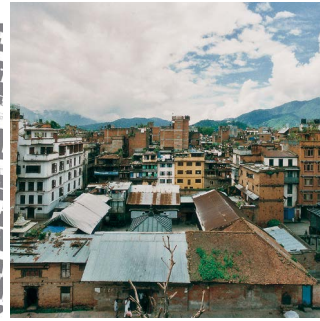
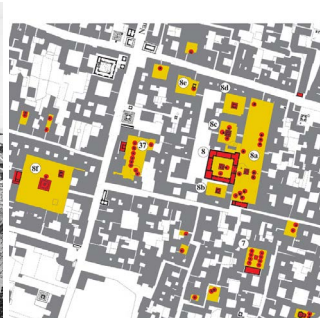




**Cost Estimate for the restoration of Tile paving in Bhandarkhal Nov. 22, 2013**

| s.n.   | description of works   | Nos. | L     | B     | H    | quantity | unit   | rate   | Amount NRS          | Amount Euros       |
|--|--|------|-------|-------|------|----------|--------|--------|---------------------|--------------------|
| <b>Site preparation and demolition works</b> |  |      |       |       |      |          |        |        |                     |                    |
| 1  | excavation of existing flooring up to the historic layer                   | 1    | 31.75 | 13.50 | 0.60 | 257.18   | c.m.   | 410    | 105,441.75          | € 811.09           |
| 2  | taking out historic floor tiles carefully and store for reuse              | 1    | 15.00 | 10.00 |      | 150.00   | s.m.   | 160    | 24,000.00           | € 184.62           |
| 3  | excavation of existing flooring below the historic layer                   | 1    | 31.75 | 13.50 | 0.30 | 128.59   | c.m.   | 410    | 52,720.88           | € 405.55           |
| 4  | trash disposal including removal from courtyard, loading and unloading     |      |       |       |      | 30.00    | trucks | 1,500  | 45,000.00           | € 346.15           |
| <b>Courtyard &amp; Plinth Walls</b>          |  |      |       |       |      |          |        |        |                     |                    |
| 5  | one layer of brick soling on sand base on the sunken courtyard/ North side | 1    | 15.50 | 8.40  |      | 130.20   | s.m.   | 694    | 90,358.80           | € 695.07           |
| 6  | one layer of brick soling on sand base on the sunken courtyard/ South side | 1    | 11.00 | 9.55  |      | 105.05   | s.m.   | 694    | 72,904.70           | € 560.81           |
| 7  | tile pavement on north side  | 4    | 15.50 | 8.40  |      | 130.20   | s.m.   | 1,450  | 188,790.00          | € 1,452.23         |
| 8  | tile pavement on south side  | 4    | 11.00 | 9.55  |      | 105.05   | s.m.   | 1,450  | 152,322.50          | € 1,171.71         |
| 9  | foundation for plinth wall/ north part                                     | 1    | 57.00 | 1.20  | 0.60 | 41.04    | c.m    | 19,300 | 792,072.00          | € 6,092.86         |
| 10   | foundation for plinth wall/ south part                                     | 1    | 36.75 | 1.20  | 0.60 | 26.46    | c.m    | 19,300 | 510,678.00          | € 3,928.29         |
| 11   | plinth walls/ north part   | 1    | 57.00 | 1.10  | 0.45 | 28.22    | c.m    | 19,300 | 544,549.50          | € 4,188.84         |
| 12   | plinth walls/ south part   | 1    | 36.75 | 1.10  | 0.45 | 18.19    | c.m    | 19,300 | 351,091.13          | € 2,700.70         |
| 13   | plinth edge stone  | 1    | 93.75 |       |      | 93.75    | r.m.   | 4,800  | 450,000.00          | € 3,461.54         |
| 14   | tile pavement on plinth  | 1    | 93.75 | 0.90  |      | 84.38    | s.m.   | 1,450  | 122,343.75          | € 941.11           |
| 15   | final site clearance   | 1    |       |       |      | 1        | l.m.   | 20,000 | 20,000.00           | € 153.85           |
| <b>Total</b>                                 |  |      |       |       |      |          |        |        | <b>3,522,273.00</b> | <b>€ 27,094.41</b> |





## KVPT ACHIEVEMENTS & WORKING METHOD

The Kathmandu Valley Preservation Trust (KVPT) is the only international agency dedicated to safeguarding the architectural heritage of the Kathmandu Valley, and the only such agency registered with the Government of Nepal, Social Welfare Council. Over the past two decades KVPT has saved over 50 buildings throughout the valley including temples, step-wells, monasteries, palaces, and homes. KVPT has developed a unique partnership model, providing research and documentation to guide restoration projects which are executed to the highest standards by a dedicated team of carpenters, builders, and craftspeople.

From the outset KVPT has been inspired by, and to a certain extent modeled on, the success of early German aid projects at Pujari Math and the Bhaktapur Development Project. Over the past twenty years, KVPT has developed a successful working relationship with the Government of the Federal Republic of Germany, as well as other German aid and development projects in Nepal. Numerous buildings and monuments have been restored through these joint efforts.

Of these, the following restoration and conservation projects were implemented by KVPT with support from the Federal Republic of Germany:

|           |                                |
|-----------|--------------------------------|
| 2001-2002 | Chusya Baha Monastery          |
| 2002-2004 | Kathmandu Darbar Initiative    |
| 2002-2004 | Itum Baha Monastery            |
| 2008-2010 | Tushahiti and Bhandarkhal Tank |
| 2011      | Mulcok - Golden Door Ensemble  |
| 2011-2012 | Sundari Cok - South Wing       |

In addition to the German Government, KVPT collaborates closely with other donors and academic institutions. The close partnership with the University of Applied Arts Vienna since 2009 has resulted in significant technological achievements in solving delicate problems inherent to restoration and conservation work.





