




RESTORATION
PROPOSAL
FOR
JORBANGLA,
TERRACOTTA
TEMPLE AT
ITONDA,
BIRBHUM,
WEST BENGAL.


INDIAN
NATIONAL
TRUST FOR
ART &
CULTURAL
HERITAGE

RAJATRAY
WITH BISWADIP SEN & TEAM.
JUNE, 1997

RESTORATION PROPOSAL

FOR

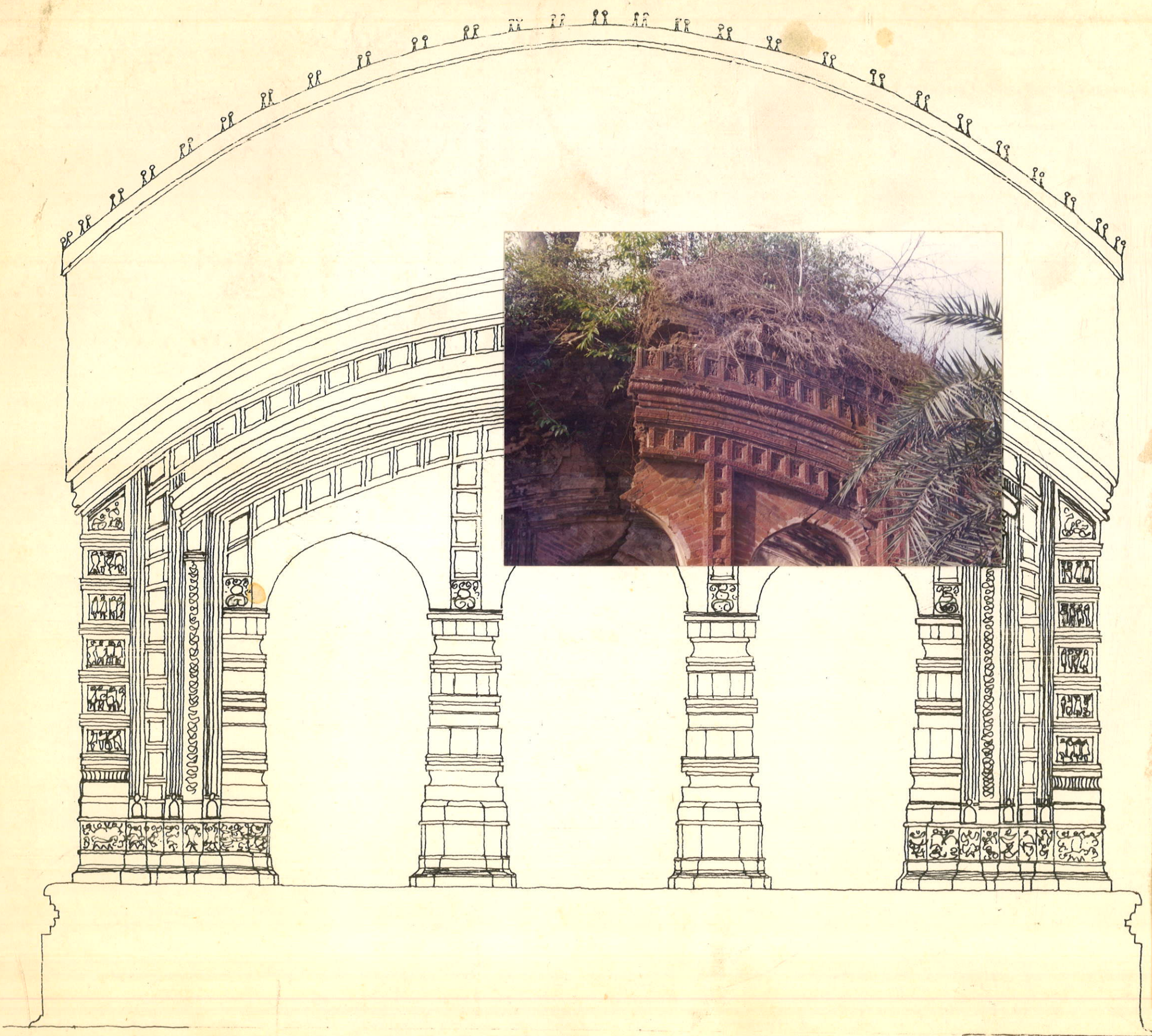
JOR-BANGLA
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INTRODUCTION

The *Jorbangla* terracotta temple near Bolpur-Shantiniketan in the Birbhum District of W.B., now on the verge of collapse, could be considered as a curious example of embodiment of cultural history into humble physical form.

The structure as a product of its time is the physical 'site' of representation of late eighteenth century western central Bengal, where, folk cultures of the red soil, classical religion, Islamic forces, the early English East India Company all came together in a complex field of interaction, generating a particular socio-political - cultural climate.

The late twentieth century awareness in physical remains of such nature is calling for their better protection. Such cases unfortunately remain beyond relatively higher priority areas of concerns for the officials or state systems. The willingness of the new institutions to contribute for such causes is a very welcome change of situation.



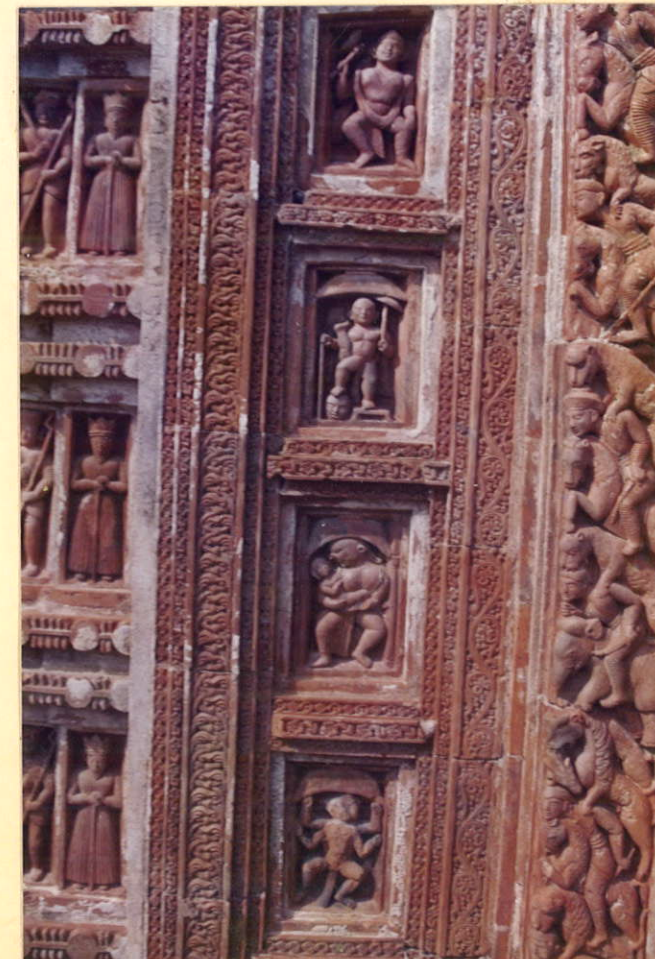


THE STORIES

The village Itonda, according to local folk lore, derived its name from East India Company perhaps by a gradual distortion of the term East India. The location of the village close to the once mighty river Ajay in a land known for old maritime trade and existence of busy river ports and early British endeavours of the famous Indigo Enterprise and the history of nomadic tribes and their nexus with dacoits, thuggees and mugs of eighteenth century Bengal hints at quite an eventful life of the temple and its making. Even the eventual abandoning of worship in the temple is mysteriously located in a village myth.

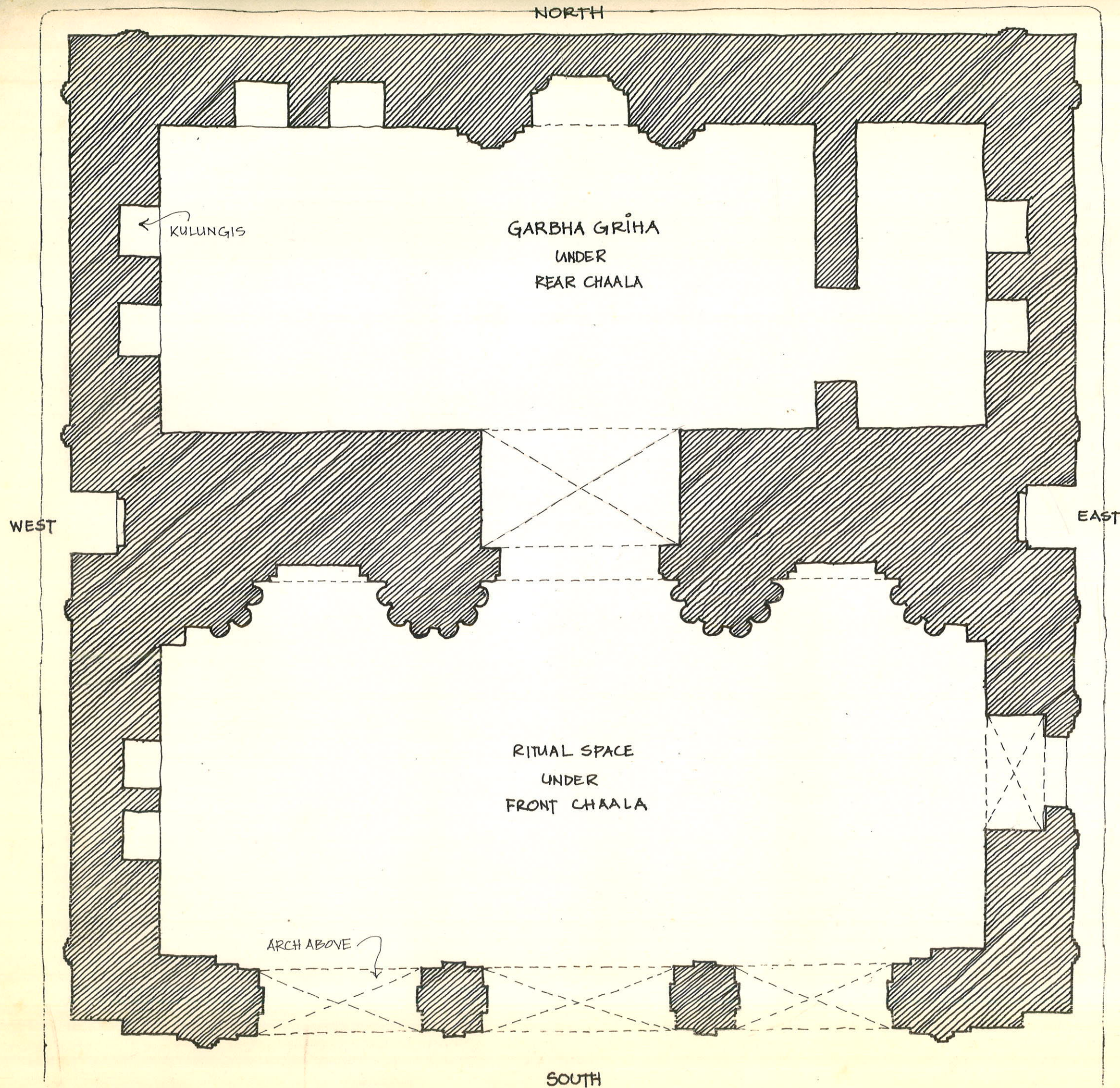
A journalist's newspaper article nicely presented the story and indicated how one can see possible relationships between history, myth and the characteristic iconography of the terracotta work.

"The temple is a treasure trove of richly decorated terracotta motifs. The front wall and pillars are covered with square and rectangular slabs bearing relief works inspired by mythological themes and contemporary rural life. The colonial influence is evident in tiles showing troops in gunboats, brandishing rifles and English soldiers marching with hats and guns next to turbaned Indian regiments. Invading Muslim soldiers also find place here, as do women playing violins and men *sarangis*. Thematic elements of completely different origins reside next to each other. Durga slays the Asura next to British soldiers on horse back. The ten *avtaras* (incarnations) of Vishnu are shown with *Vahan* Garurha. Other mythological figures like Ganesh and Gopal with his mother Yashoda are also to be seen.... The irreplaceable archaeological marvel today stands dilapidated."



To save this temple from total structural collapse and to give it a new lease of life, though still possible, but, has become a difficult and challenging proposition. Immediate intervention is necessary as every other monsoon is going to cause substantial damage to the structure. Yet the operation should be taken up with utmost care, respect and sensitiveness.

This present report is based on closed preliminary observation and a re-assessment of the situation bringing to light the entire scope of work more clearly to reach finally a necessary albeit reasonable, estimation of resources to be called for in such an endeavour.



THE PROBLEM AND THE METHODOLOGY OF INTERVENTION

Since fresh attention was drawn to the crumbling state of the temple in the early nineties, a few attempts were made to assess the physical problems of the structure and possible remedies. The engineering report of 1993 rightly suggested certain temporary measures to check immediate collapse of structure and strongly recommended further detailed examination and study in order to develop a full fledged scheme of restoration. But the subsequent report of 1996 went on to suggest certain quickly devised repair oriented measures in a rather crude manner. This skeletal scheme completely failed to understand or appreciate the architecture and structural system and behaviour of the brick building, and thus a rather wrong impression was created regarding the problem.

The large tree and other small tree roots apart from thick bushy growth of vegetation have fractured the roof and wall joints and even the walls at many places and so extensively that almost seventy five percent of the roof has been rendered useless including around 20% of the roof actually destroyed and lost. Nearly 50% of the walls are pushed out of plinth and have tilted outwards, sometimes, in more than one direction.

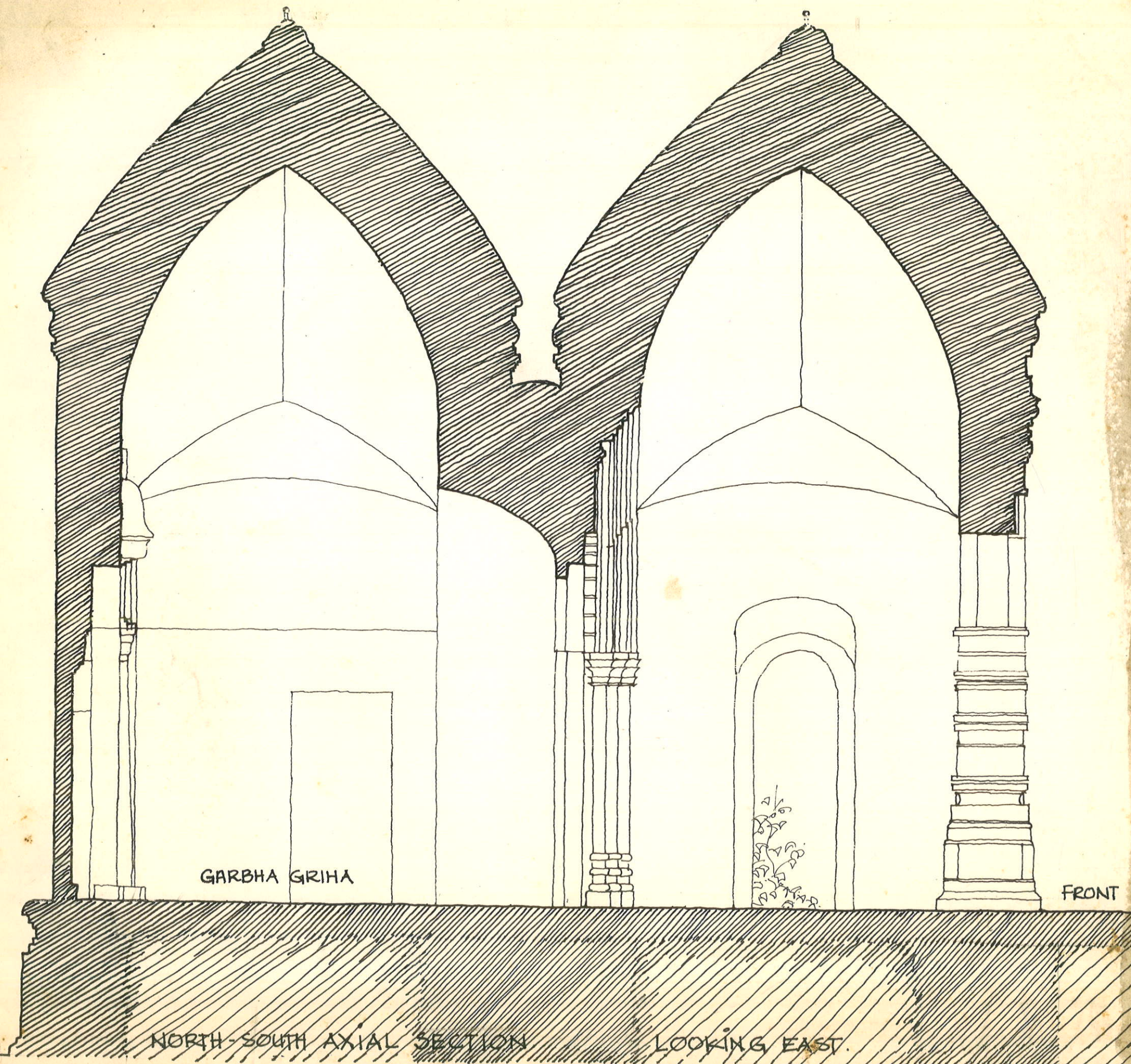
At present the tree roots, which have caused the fracture, are also to a very large extent holding together the broken and loosened parts of the structure and preventing them from absolute collapse, all of a sudden. Yet the roots are growing in girth and also in number continuously and can eventually crush and engulf the temple structure, crumbling into smaller bits, entirely into its folds. The dislodging action of the tree roots are further

aggravated by the sways and movements of the tall trunk of the large tree, as it catches wind and storm and moves widely causing significant amount of pressure on the temple structure by direct transfer of thrust and movement downwards.

STRUCTURAL SUPPORT

In order to remove the tree it becomes necessary to support the building structure very elaborately. As soon as the trees, the roots and branches are now removed, their binding forces will disappear and substantial amount of hold on the broken and fractured masonry will be lost causing immediate fall of such parts. The staging structure or system, therefore, has to be strong and extensive enough to hold all parts of the building in position when the grip of the tree is released.

A complete supporting and propping system has to be introduced to hold the roof from inside. All around the temple structure lateral supports and props are required to prevent fall of the broken walls. Working and standing platforms are necessary to stand upon for cleaning and dismantling work well before any such work may begin. The (vertical) walls being of brick masonry, the lateral support system must be such that point pressures and loads are avoided to cut out possibilities of punching at points. Lateral supports therefore have to be transformed though substantially wide surfaces remain across the wall to be held in position. The walls and masonry portions like pillars, pillasters, freezes etc. have to be completely covered with protective packing and secured before any supporting portion or surface is put against them.



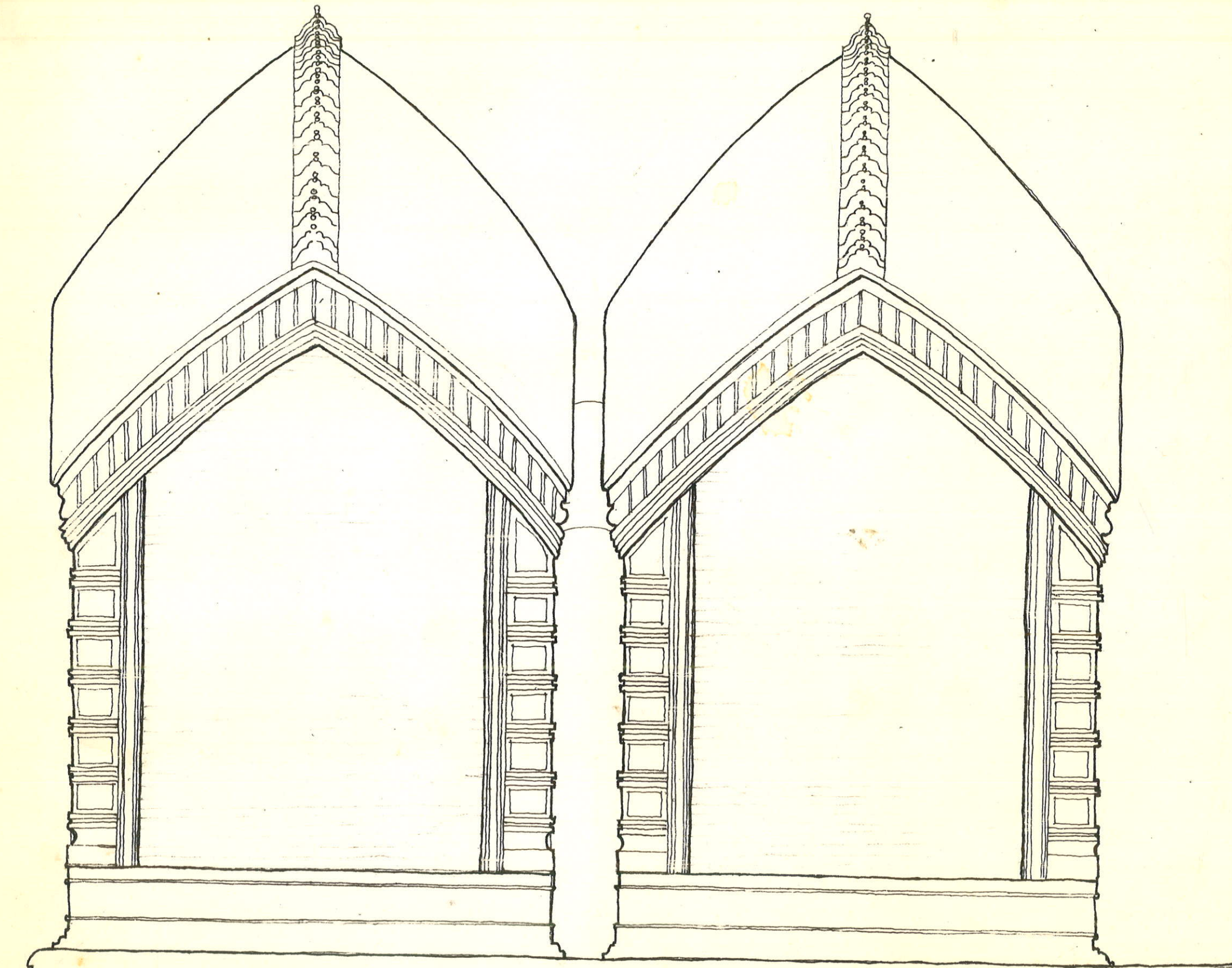


REMOVAL OF VEGETATION AND DISMANTLING

The large tree has to be cut from top at a point/level as close as possible to the top of the roof, from where it has grown outwards. Remaining portion of the trunk and roots should be cut and removed from top as much as possible by cutting and not by pulling up. All bushy growth on top has to be trimmed and treated with suitable biocide in every case including the body, of the main tree. After thorough inspection, portions of roof which are completely destroyed should be physically cut/chiselled out and removed from top including all roots or branches embedded in such portions. After removal of all solid portions to be dismantled, remaining vegetation should be removed first by treating them with biocides and then scooping and pulling them out when loosened sufficiently, without further disturbing the built portions of the roof to be retained.

Below the roof all roots should be killed by biocide treatment and scooped out of portion wherever possible. For removal of all large roots brick work may have to be dismantled partially from walls. Such dismantling may necessitate introduction for the supports to hold up remaining brick work in position. All brick work decided to be redone in proper plumb position must be dismantled carefully salvaging any terracotta work detached and all reusable bricks. After complete removal of vegetation from top down to the plinth level and completion of all necessary dismantling work in the super structure. The top surface of plinth, its surrounding areas should be thoroughly examined for any remaining roots or traces of vegetation. All such vegetation must be treated with biocide and physically removed, and if necessary dug out by opening and removing the plinth filling.





WEST SIDE ELEVATION, CONJECTURALLY RESTORED.



RECONSTRUCTION

After completion of almost all dismantling work and total removal of vegetation from the building and the surrounding strip and sufficient treatment of biocide throughout the entire remaining structure, rebuilding work should begin.

The plinth should be repaired and relevelled accurately. Deformations are to be stabilised structural brick work in walls and columns must be completed with reinstallation of all the masonry blocks cled in terracotta back in position. All retained masonry are to be strengthened and properly levelled with the new work. The conjectural parts of reconstruction and additional work shall have differentiated in particular manner.

After the walls are strongly set together the roof must be completed. The new roof parts have to incorporate as much as possible. The remaining, retained portion which shall have to be strengthened.



PRINCIPLES

1. Preserving Itonda Temple, as it is, in its ruined state, as prevalent in European situation does not appear to be feasible due to its present deteriorated and damaged condition/state, on verge of further collapse.
2. Present condition of some of the portions of the monument, leads to the consensus option of dismantling of the endangered portions of the structure.
3. The long term functional behaviour, safety and durability requirement of the structural system demands the option of reconstruction of the collapsed, dismantled and critical portions of the structure.
4. The dismantling and reconstruction shall be to optimum/minimum level and original portions shall be conserved in as it is state - as much as feasible.
5. The most precious Terracotta Clad portions, in particular, shall be conserved, as much possible, in as it is condition. The Terracotta clad portions shall be protected during work and handled with utmost precaution to avoid further damage.
6. Present day standard Construction Materials and Technology e.g. Cement Concrete, Reinforced, Concrete, Cement Mortar shall be avoided in consideration of incompatibility and low durability.
7. Traditional material and technology e.g. Brick Masonry, Lime Concrete, Lime Mortar etc. is proposed to be adopted along with compatible and proven modern/ traditional Conservation Materials.
8. Extensive short term and long term structural support and protection is envisaged for safety of structure and for enabling Restoration work and further study.
9. This Preliminary Report and Scheme of Restoration is based on an overall preliminary assessment of the structure and the Restoration work involved and to arrive at a budgetary estimate.
10. Further in-depth study and minute detailing the Pre-Restoration and Restoration work, including detailing of material, methodology and sequence, both prior to and during Restoration work, is envisaged and to be undertaken and monitored jointly by a team of experienced Structural Restoration Engineers, Restoration Experts and Conservation Architects.

NEW WORK

New tiles and bricks to be used for restoration should be manufactured with local material. For new terracotta tiles, new design forms may be tried out. However it is also possible to repeat the original design, as it is quite evident from the remaining parts. For repeating old designs, new moulds can be prepared carefully from the old tiles.



PRELIMINARY SCHEME OF RESTORATION

A. PRELIMINARY ENABLING WORK

1. STRUCTURAL SUPPORT TO SUPER STRUCTURE

Providing appropriate Structural Support to restrain further damage, to enable selective dismantling of designed portions, to enable restoration work - to be started immediately.

2. STRUCTURAL SUPPORT TO FOUNDATION

Providing appropriate protection and support to the foundation and plinth to avoid further settlement/ movement and to allow the work of consolidation, restoration and protection of the Foundation and Plinth - to be started immediately.

3. SCAFFOLDING AND STAGING

Providing appropriate scaffolding staging to enable detailed inspection, removal of trees, dismantling of Roof & Wall portions.

4. REMOVAL OF BIOLOGICAL GROWTH

a. REMOVAL OF WEEDS & SHRUBS

Removal of weeds & shrubs from Roof, & Wall and surrounding.

b. REMOVAL OF LARGE TREES/ TRUNKS

Removal of the large trees, piece by piece from top avoiding disturbance of the roof.

c. TREATMENT OF ROOTS

Treatment of roots embedded in roof & wall weedcides & other means.

d. REMOVAL OF ROOTS

Removal of roots from the Roof, Wall & Foundation to the extent feasible without endangering the structure.

B. PRE RESTORATION DETAILED STUDY & DETAILING OF SCHEME OF RESTORATION

1. INSPECTION & STUDY

Detailed inspection and study of the structure and Restoration options, prior to taking up of Restoration work and also during execution of Restoration.

2. SCHEME OF RESTORATION

Detailing of Restoration Scheme (Final Implementation Scheme) based on Preliminary Scheme of Restoration, with necessary changes, modifications and improvements, as deemed necessary based on detailed inspection and study and subsequent modifications has been on in-work observations during execution of Restoration work.

3. DOCUMENTATION AND DETAILED MEASURED DRAWING

Making Documentation of entire structure, structural elements, Architectural elements, finishings and decorative works, mouldings, coloured lime etchings ornaments (Pankha work) by.

a. Still Photopgraphy

b. Video Photography

c. Measured Drawing.



C. CONTROL OF SOIL/ FOUNDATION MOVEMENT

1. Taking any one of undernoted measures and/ or their combination, as deemed appropriate.
 Timber Soring all along the Plinth - particularly in Western Side.

2. Making appropriate Diaphragm Wall along West side, and if deemed necessary extending partly in South and North side to control movement of Soil, rotation and settlement of the foundation.

3. Soil Consolidation by Soil Grouting, with compatible particulate Grout.

4. Making a low height deep foundation plinth wall, all round the existing plinth and consolidation Grouting of the interace.

D. RESTORATION OF FOUNDATION

1. Dismantling and removal of damaged damped Brick Masonary, Facia and Core.

2. Reforming of Brick Masonary with Similar Brick and Lime Surkhi Mortar.

3. Exploring feasibility of Lifting/ Pushing south-west corner Foundation and Plinth by controlled jacking, and execution of same, as feasible.

4. Consolidation Grouting of the Foundation/ Plinth with Polymer Modified Lime-Surkhi.

5. Providing Anti Termite Treatment to Foundation.

6. Providing Biocide Treatment to Foundation.

7. Reforming of Plaster with Lime Mortar.

8. Reforming Moulding with Lime Mortar and Lime.

E. RESTORATION OF WALL

E1. UNSERVICEABLE WALL

1. Providing appropriate Lateral & Vertical supports as deemed necessary over & above general support as provided under item.

2. Dismantling of unserviceable portion of wall.

3. Reforming of wall in Brick Masonary with similar Bricks & modified Lime Mortar.

4. Reforming & making Plaster with Lime Mortar.

5. Reforming & making Mouldings & Architectural finish is as per original.

6. Providing Preservative Treatment.

E2. RESTORATION OF SERVICEABLE WALL

1. Removal of damaged or non critical plaster.

2. Cleaning of the surface.

3. Sealing of the crack line, fixing Grout Ports and Grouting with Polymer Modified Non Shrink Lime Surkhi based Grout.

4. Sealing of the Brick Joints in Polymer Modified Non Shrink Lime Surkhi Mortar.



5. Consolidation Grouting & Strengthening of wall system as deemed necessary with Polymer Modified Non Shrink Lime Surkhi Mortar.
6. Reforming & making Plaster with Lime Mortar.
7. Reforming & making broken/damaged Mouldings & Architectural finishes - leaving as much portion as possible in original, as it is state.
8. Providing Preservative Treatment.

F. RESTORATION OF ROOF

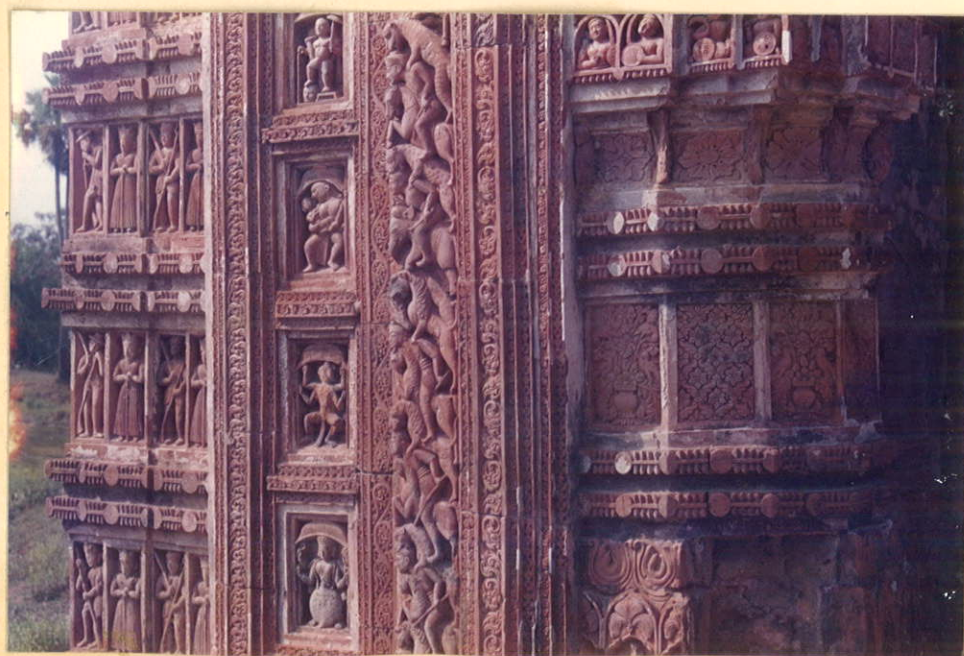
1. Providing appropriate support to Roof and Wall, as deemed necessary, over and above as provided under item.
2. Dismantling of entire or unserviceable portion of Roof.
3. Reforming of the Roof with Brick Masonry - Lime Mortar and modified Lime Concrete (to be done after Restoration of Wall).
4. Providing Waterproofing & Protective Treatment with Polymer Modified Lime Membrane.
5. Reforming & Remarking of original shape and Architectural finish of the Roof.
6. Providing Biocide Treatment.
7. Providing Preservative Treatment.

G. FRONT FACIA STRUCTURAL SYSTEM

1. Providing appropriate support as deemed necessary over & above as provided in item A1.
2. Removal of damaged, unserviceable or non critical wall, pillar portions.
3. Reforming & Making of Pillar & Wall system, similar to original, in Brick Masonry & Lime Mortar.
4. Making Plaster/Rendering to bring original shape.
5. Providing Preservative Treatment.

H. ORIGINAL TERRACOTTA CLADDING

1. Cleaning of the Terracotta facia/Tiles.
2. Biocide Treatment of Terracotta.
3. Consolidation of Tile Backing by micro -Injection, if & as feasible.
4. Consolidation of core behind Tile & Tile backing mortar, as feasible.
5. Mending of the broken edges/corners, cracks in Terracotta Tiles, if & as deemed necessary, as per Conservation Philosophy adopted.
6. Impregnation Consolidation of Terracotta Tiles/Facia Bricks.
7. Preservative Treatment of Terracotta, as deemed necessary.



J. OTHER STRUCTURAL RESTORATION MEASURES

1. Restoration of Gaps, Cracks due to Tree roof along with Restoration of Wall system.
2. Providing additional Structural System, if deemed necessary, by Anchoring, Straping &/or Space Diaphragm, to ensure long term functional behaviour & durability of the structure - along with Restoration of Wall Roof System.
3. Restoration of Front Terrace with items similar to Restoration of Foundation/ Plinth.
4. Restoration &/or Remaking of Flooring.

I. NEW TERRACOTTA CLADDING

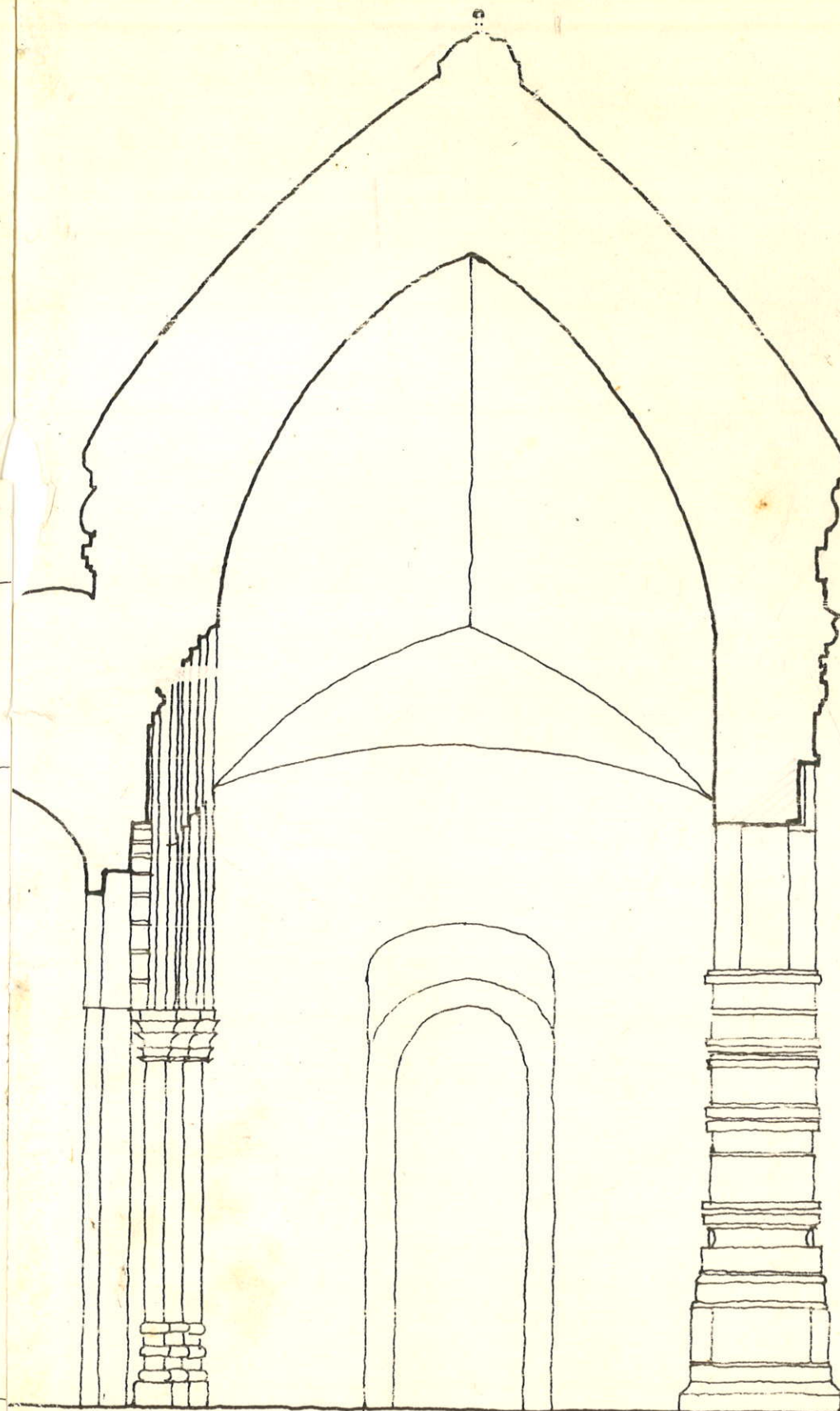
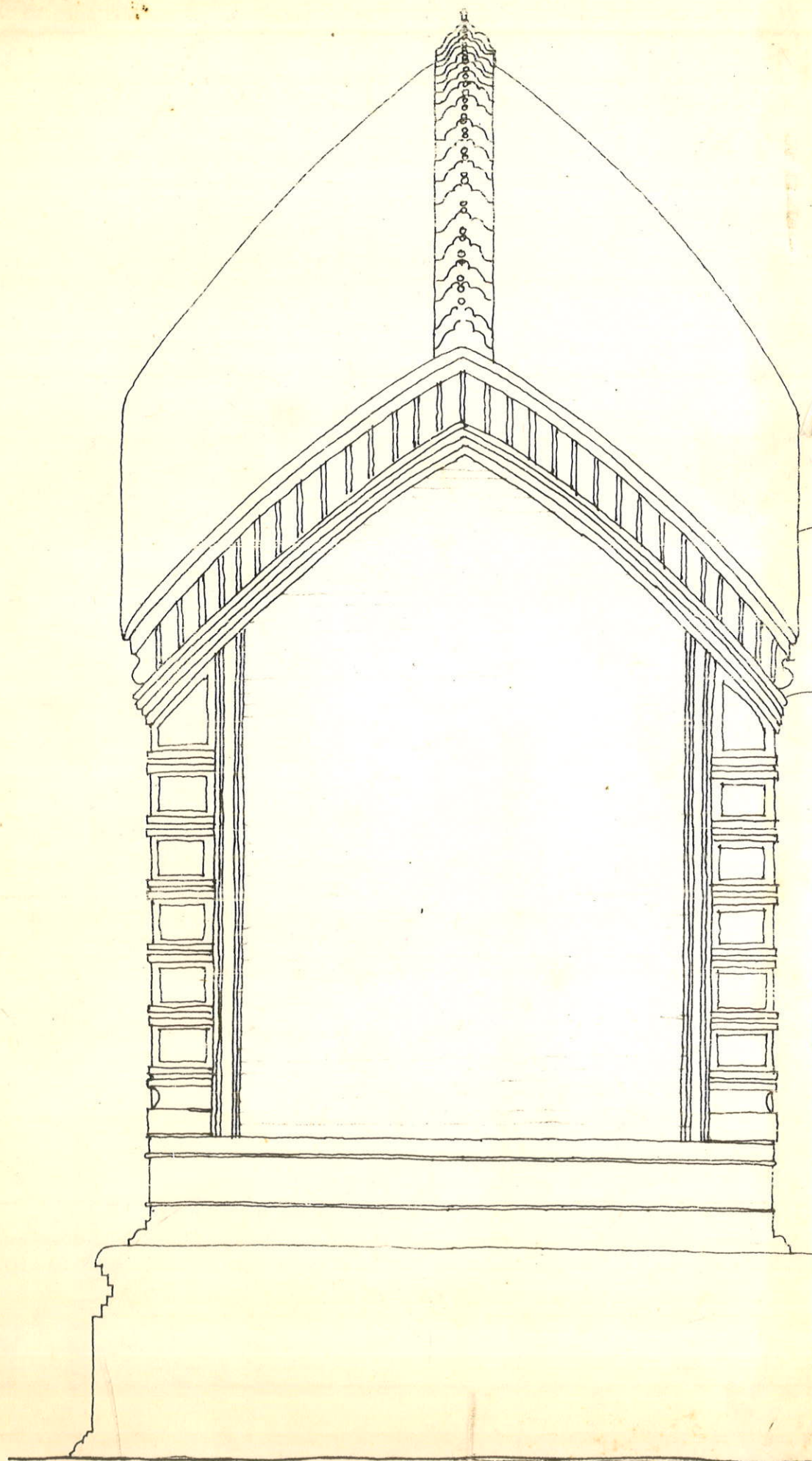
If it is decided on general consensus, to remaker & fix new Terracotta Tiles.

1. Reconstruction & Design on paper the size, shape, design of the original ornamental/relief Tiles, individual Tile locations and all relevant critical parameters.
2. Making Mould design & Moulds.
3. Selection of Terracotta Clay Mix to match the characteristics & appearance of original Tiles.
4. Test Firing the Tiles & checking dimensional accuracy, tolerance, colour & texture for Quality Control.
5. Manufacturing respective Tiles in requisite number.
6. Fixing new Tiles in proper line, level & dimension with Lime Mortar backing.
7. Providing a Preservative Treatment on New Tile.

TEMPLE ADJOINING SPACE

1. Planning & making appropriate raising of the adjoining ground specially in western side.
2. Making appropriate drainage arrangement/system for surcharge water in monsoon.
3. Landscaping of the protected zone.
4. Involving local villagers in every stage of work and policy decision including further protection & maintenance.
5. Initiation & promotion of local festivals, crafts, tourist facilities etc. involving local villagers.
6. Documentation of entire Restoration work.





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