

# THAME VALLEY REDEVELOPMENT

AN INTEGRATED APPROACH TOWARDS POST EARTHQUAKE  
CONSTRUCTION AND RURAL CAPACITY BUILDING.

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**PROJECT LEAD**

Thame Sherpa Heritage Fund (TSHF)  
NGO, Nepal  
[www.thamesherpafund.org](http://www.thamesherpafund.org)

**DESIGN LEAD**

TEN  
NGO, Zurich  
[www.ten.as](http://www.ten.as)

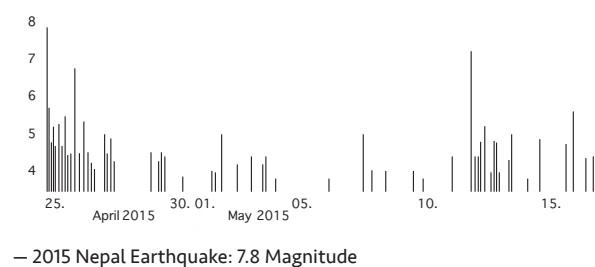
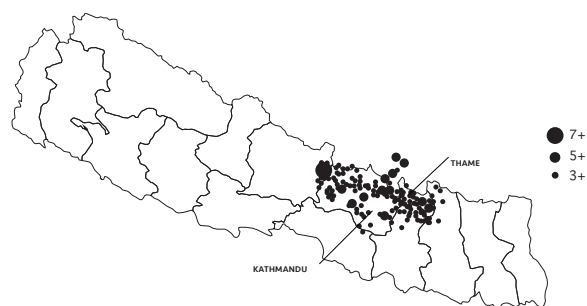
# THAME VALLEY REDEVELOPMENT

On April 25, 2015, the Thame Valley was afflicted by a series of earthquakes that have decimated the built environment and placed the livelihood systems of local residents under extreme duress.

Due to the scale of the destruction and the remoteness of the valley, there is an immediate need for reconstruction and the implementation of a development strategy derived from local knowledge and resources.

The Thame Valley Redevelopment is an interdisciplinary development project taken up by design research group TEN (Zurich), Thame Sherpa Heritage Fund (Nepal & US) and the local Sherpa community leadership. It is supported by research guidance from the Swiss Federal Institute of Technology (ETH, Zurich).

Four main research components make up the focus of the project: A redevelopment and construction methodology based on design research, participatory planning, appropriate materials research, and the development of earthquake resilient construction systems.



— Thame Valley 2015

# TEAM

## THAME SHERPA HERITAGE FUND

The fund's mission is to support the rebuilding and development of the Thame Valley community in a locally collaborative, culturally sensitive, sustainable, and equitable manner in order to increase community resilience in the long term.

We expect to translate our goals into strategy as well as to graduate from emergency relief to the implementation of medium- and long-term goals starting in 2015. Thame Sherpa Heritage Fund seeks to contribute:

Short-term: Immediate relief through the funding and delivery of materials for temporary shelter, and other supplies based on formal needs assessment.

Medium-term: Building an operationally and financially sound platform (solicitation, formulation and assessment of proposals) for reconstruction and development with grassroots support.

Long-term: Achieve higher standards of safety and quality of life in Thame Valley through the informed reconstruction of village buildings and monuments of cultural heritage.

## TEN

TEN is an association of researchers, architects, designers, writers and makers from leading international research institutions that seeks to develop interdependent and collaborative projects across the broad spectrum of cultural production.

TEN practices its ethos through diverse creative collaborations with specialized research departments, civil society, local governments, and community representatives, that are aimed at addressing cultural, livelihood and structural deficits.

TEN strives to both support, produce and influence the field of design thinking, applied research, responsive development, and contemporary teaching culture.

TEN is a non-profit organization in accordance with the Swiss Civil Code.

## RESEARCH GUIDANCE

U-TT Chair of Architecture and Urban Design, ETH Zurich

Chair of Structural Dynamics and Earthquake Engineering, ETH Zurich

Chair of Sustainable Construction, ETH Zurich



# NOTES ON SUSTAINABILITY

## REVISIT, RESTORE & REINFORCE THE VERNACULAR.

Thame Valley Redevelopment is a collective effort of designers, makers, civil society, and local leaders to help conserve the unique ways of Sherpa lifestyle and architecture while accommodating contemporary aspirations and challenges alike.

While the design builds upon traditional ways of construction (unreinforced stone masonry with timber structures), it aims to address challenges like the ban on harvesting structural timber (beams and posts), the introduction of new functional types (lodges and non-religious community buildings), the high seismic threat from building on glacial lake beds and the extremely high cost of importing construction materials. Local artists and monks are consulted to assist with the architectonic expression of the buildings and to try and revisit endangered art forms through public architecture.

## PUBLIC BUILDING AS KNOWLEDGE REPOSITORY

Traditional ways of knowledge transfer have failed to keep pace with the rapidly changing social, environmental and economic parameters in the Thame Valley. The Thame school and monk's dormitory – prioritised in consultation with residents from across the valley – aim to showcase design innovations for earthquake safer and contextually appropriate household design through community buildings.

To ensure public ownership and continuous engagement during the process, TEN have organised on-site public workshops that have aimed to explain earthquake behaviour and impact on the built environment, built an off-site 1:1 prototype to help local volunteers understand drawings by means of photos and videos and have collaborated with researchers who specialize in architectural documentation to record and reproduce project findings.

## PRIORITIZING RESOURCES: NATURE, MATERIAL, LABOUR, LAND, FUNDS

To ensure long lasting influence, the Thame Valley Redevelopment aims at:

- Empowering local leadership with strategic rural design guidelines for future development. In the process, giving them tools to channel incoming donations away from alien interventions and towards preserving Sherpa Architecture.
- Replacing traditional timber super-structures with a network of smaller timber elements (for ease of transport) to reinforce prevalent stone masonry.
- Host local workshops and training sessions to propagate the findings from the research project.

# THAME MONKS DORMITORY



— Monks Dormitory Visualisation

The 300 year old Thame Monastery is one of the most important cultural institutions in the region. The earthquake inflicted critical damage to several of its structures.

The Monks Dormitory was unanimously selected by the monastery committee and the Sherpa community of Thame Valley as a redevelopment priority due to its integral role in the daily workings of the Monastery.

The structure is to be rebuilt on the existing dormitory footprint, and include 10 private quarters for sleeping and praying. The redevelopment encloses the former external corridor into the building volume and adds room entrance sequences and a shared wash room.



— Monks Dormitory construction progress September 2017



## SITE PREPARATION

The retaining wall behind the building has been rebuilt and dormitory foundations were plastered and lined with waterproofing agent.





## CONSTRUCTION SYSTEM

A series of timber frames have been installed at corners and junctions within the masonry. These are then connected to the truss system with vertical interior timber batons and to each other externally with twisted galvanized wire to create a network of tensile members to resist wall de-lamination.



## STABALISED MUD MORTAR

To avoid disintegration of masonry during an earthquake and seal the building against wind and rain TEN introduced the use of stabilized mud mortar (local mud mixed with 10% lime by volume). An incremental change to local construction that reflects the key project agenda of “achieving possible replicability of innovation for household construction”.



## CONSTRUCTION JOINERY AND FRAMING

A system of interlocking timber joints is implemented to avoid splitting of timber during an earthquake. Nails are replaced by screws to ensure further integrity of structure. Special U-nails and twisted galvanised wire were prepared on site to achieve a low-cost yet robust structural network.





## MODERN COMFORT

TEN are studying the dying craft of local yak-wool carpet making with the intention to introduce these as weather barrier at the doors and windows. Double panel windows are introduced to achieve a low cost yet improved solution for avoiding heat loss at windows.

Masonry is to be lined with glass-wool insulation on the interior, covered with plywood panels.



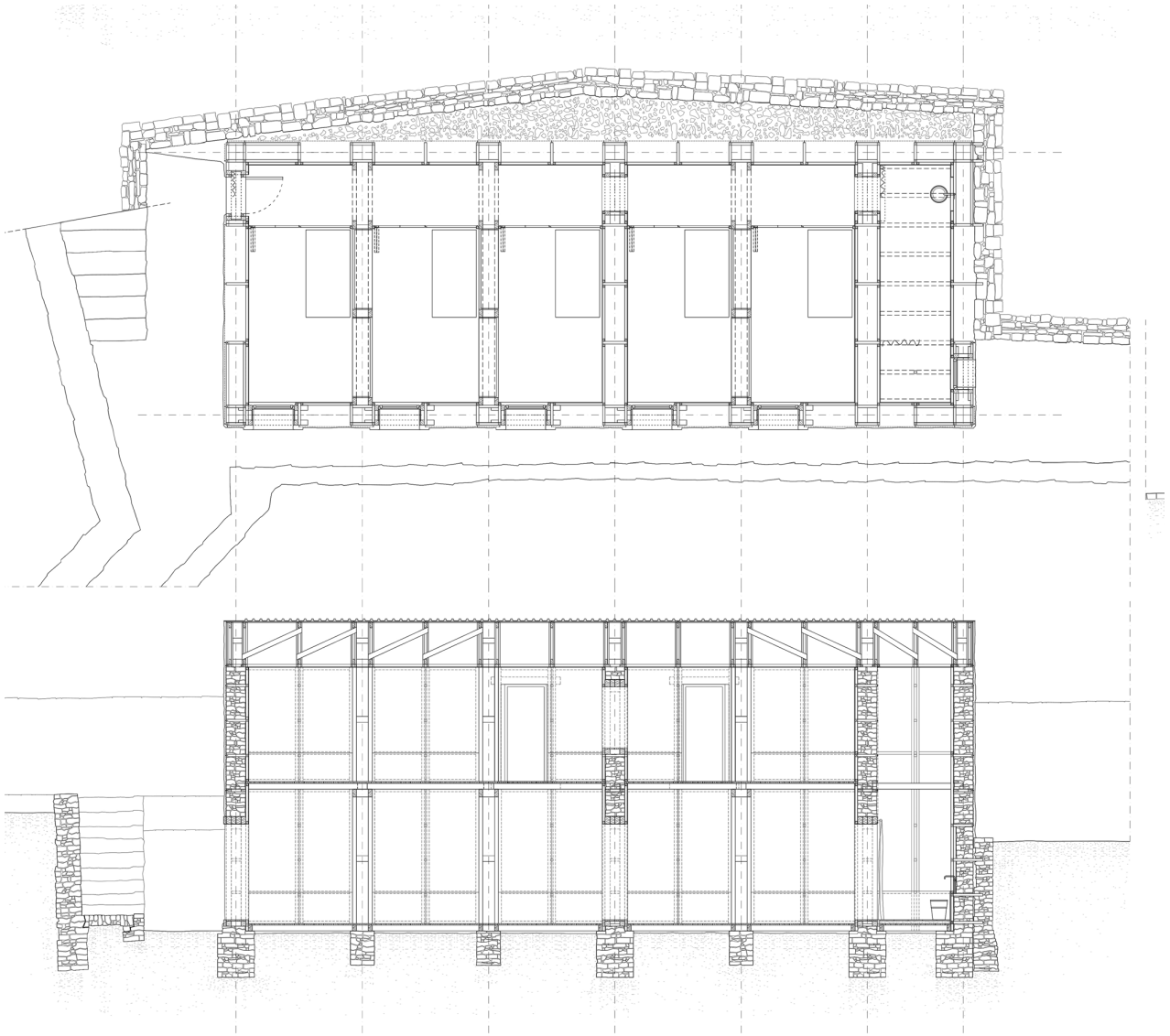


## DESIGN AND TYPOLOGY

Each room in the dormitory has a set of built-in alters and a small kitchenette. This is designed to fit between the timber partition to achieve clear room space. The entry door to the rooms align with the windows overlooking the valley, achieving a heightened sense of arrival. A toilet/wash room is included on each floor to provide improved facilities in the dormitory.



— Monks Dormitory Visualisation



— Monks Dormitory first floor plan and section

## THAME PRIMARY SCHOOL

Before the earthquake, the school provided the only means of primary education for 42 students from the Thame Valley. The complex consisted of five detached stone masonry buildings adjoined by a levelled play-field. Due to poor sub-soil and construction quality, the buildings were completely demolished or damaged beyond repair.

The vision for the new school is to provide students and teachers with a safe and engaging environment for learning while offering additional facilities for communal and external use.

The redesign offers the opportunity to build spatial qualities that respond to the contemporary program of the school including; adding a central kitchen for hot meals and to improve student dietary habits, adding a dormitory to cater for students who would otherwise leave the valley for boarding schools.

TEN is currently re-working on finalizing the master plan for Thame school. The aim is to best integrate the new classrooms built by Himalayan Trust and to translate the lessons learnt from the ongoing construction of Monk's Hostel at Thame Gompa. However, the design shared here can be used to understand the proposed scale and components of the school.



— Aerial from South



## **SCHOOL BUILDING PROGRAM**

### **1. STUDENTS DORMITORY**

A student dormitory for students from nearby villages is added to the school programme to reverse the trend of student migration to boarding schools outside Thame valley (Namche or Kathmandu). The dormitory can also double as a lodge during the summer school vacation, and thus provide a source of income generation for the school committee.

### **2. TEACHERS QUARTERS**

The teachers quarter is designed to host 4 teachers in two rooms and an attached lounge + toilet.

### **3. MULTI-PURPOSE HALL**

The hall is designed to provide students with an indoor gathering space for events, afternoon meals, assembly and community gatherings. It is strategically located as a threshold between the courtyard and the play-field creating a multi layered system of indoor and outdoor collective spaces.

### **4. KITCHEN FACILITIES AND INFRASTRUCTURE (STORAGE / DINING)**

A kitchen is added to support the dormitory and also to create an opportunity to improve the dietary habits of students and provide them with hot meals at school.

### **5. OFFICE AND LIBRARY**

An office and staff meeting room is located at the entrance and also as a pivot between classrooms and multi purpose hall, to help teachers efficiently coordinate the school proceedings.

### **6. GREEN HOUSE / AGRICULTURAL PROGRAM E**

**A greenhouse is proposed to introduce new ways of farming in the village while providing fresh produce for the kitchen and help students regain familiarity with the culture of cultivation.**

### **7. FURNITURE (CLASSROOM + RESIDENCE + DINNING)**

An extended furniture design assignment is extremely important to complete the architectural project by reinforcing it with final design interventions in comfort, ergonomic usability and cultural expression.

### **8. OPERATIONS (KITCHEN + DORMITORY)**

New programmatic as well as spatial interventions require both, local skill set development and economic investment. Key areas of new operations include, kitchen and cooking management, farming strategy, dorm care taker(s) and quality control for all ancillary functions.

## SCHOOL BUILDING BUDGET FORCAST

CE Constructions, Kathmandu was engaged to prepare an estimate of previous design for Thame school. Although, the classrooms have been built by Himalayan Trust, the modular nature of previous design from TEN could be considered consistent in terms of it per sq. m. cost. This would help estimate the overall budget and its breakdown for the future project.

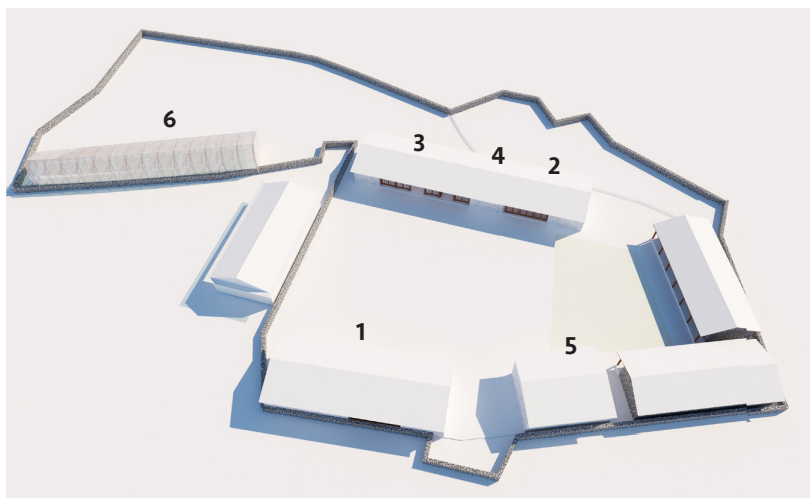
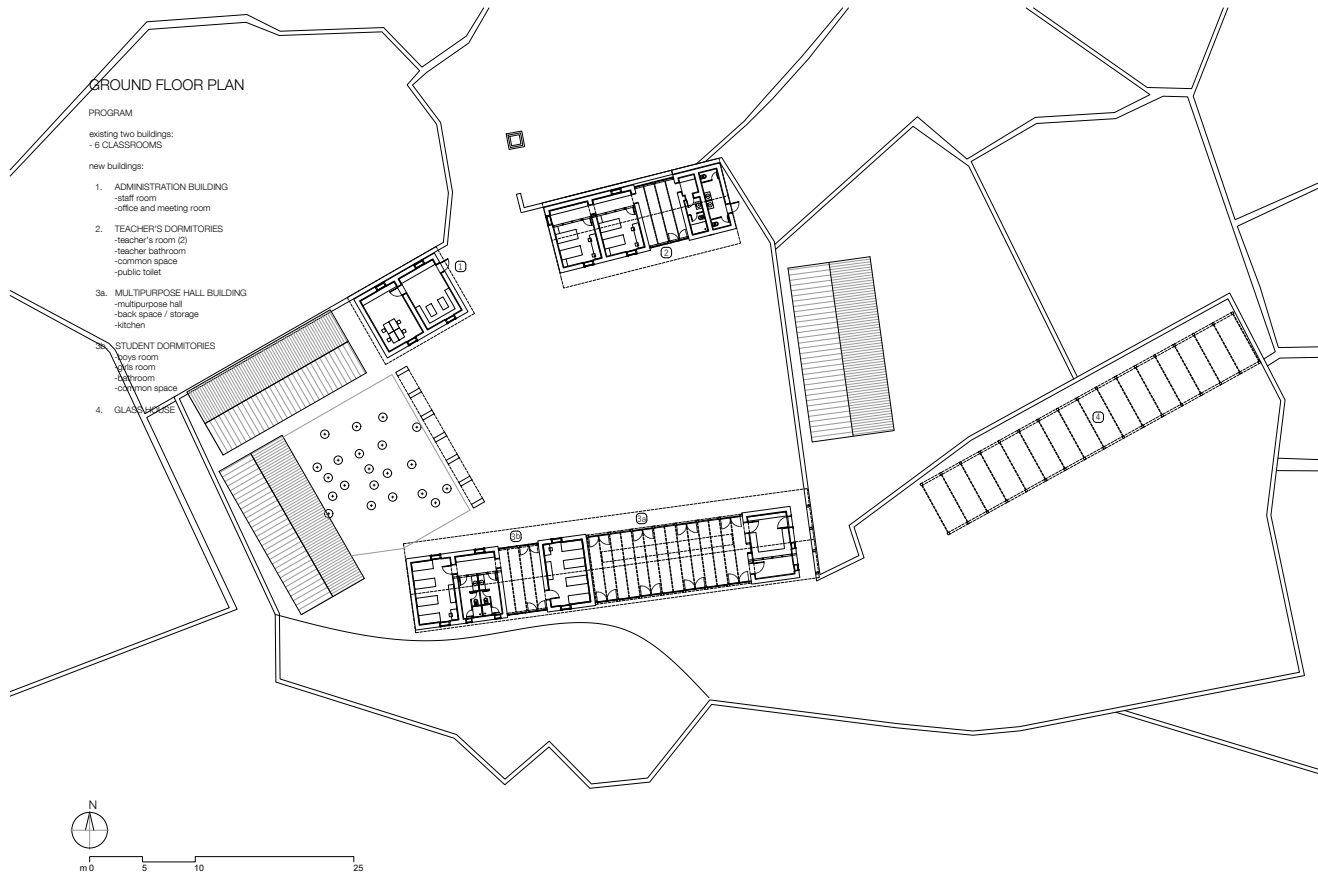
Estimated base cost for construction = 875\$ per sq.m. Variation to this base price contingent on building complexity.

DESIGN DEVELOPMENT, DOCUMENTATION AND SITE SUPERVISION COSTS = 10% OF TOTAL COST

MODULE	AREA (m2)	m2 COST	COST ESTIMATION
1 STUDENT DORMITORY	150	875	131250
2 TEACHERS QUARTER	60	875	52500
3 MULTIPURPOSE HALL	100	950	95000
4 KITCHEN + STORE + SANITATION	60	875	52500
5 OFFICE + MEETING HALL	60	875	52500
6 GREENHOUSE + STARTER PROGRAM	80	700	56000
7 FURNITURE (SCHOOL + RESIDENCE)	-	-	T.B.D
8 OPERATIONS	-	-	T.B.D
CONSTRUCTION TOTAL (1-6)			439750
DESIGN DEVEOLPMENT + DOCUMENTATION + SUPERVISION			43975
TOTAL			483725

## SCHEME A

- Distribution of volumes framing the sports field and garden in one large field.
- Split between main function of school and dormitory (admin could be placed at the entrance)
- All buildings placed along E-W axis
- Hall facing on to sports field

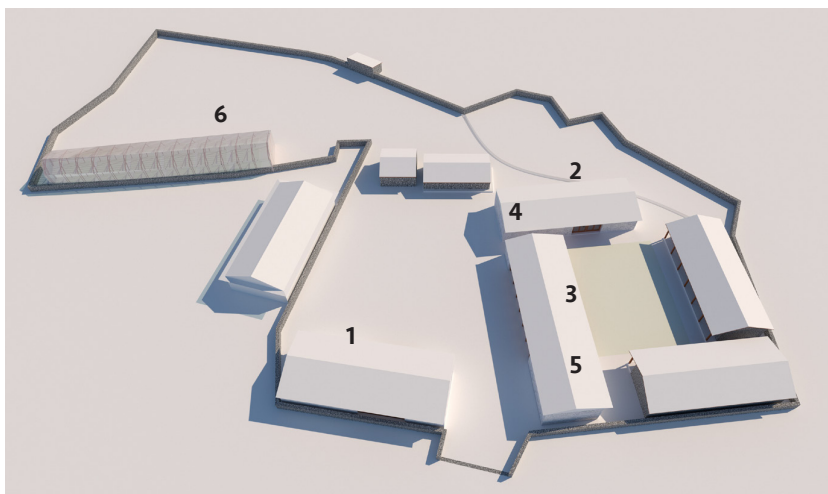
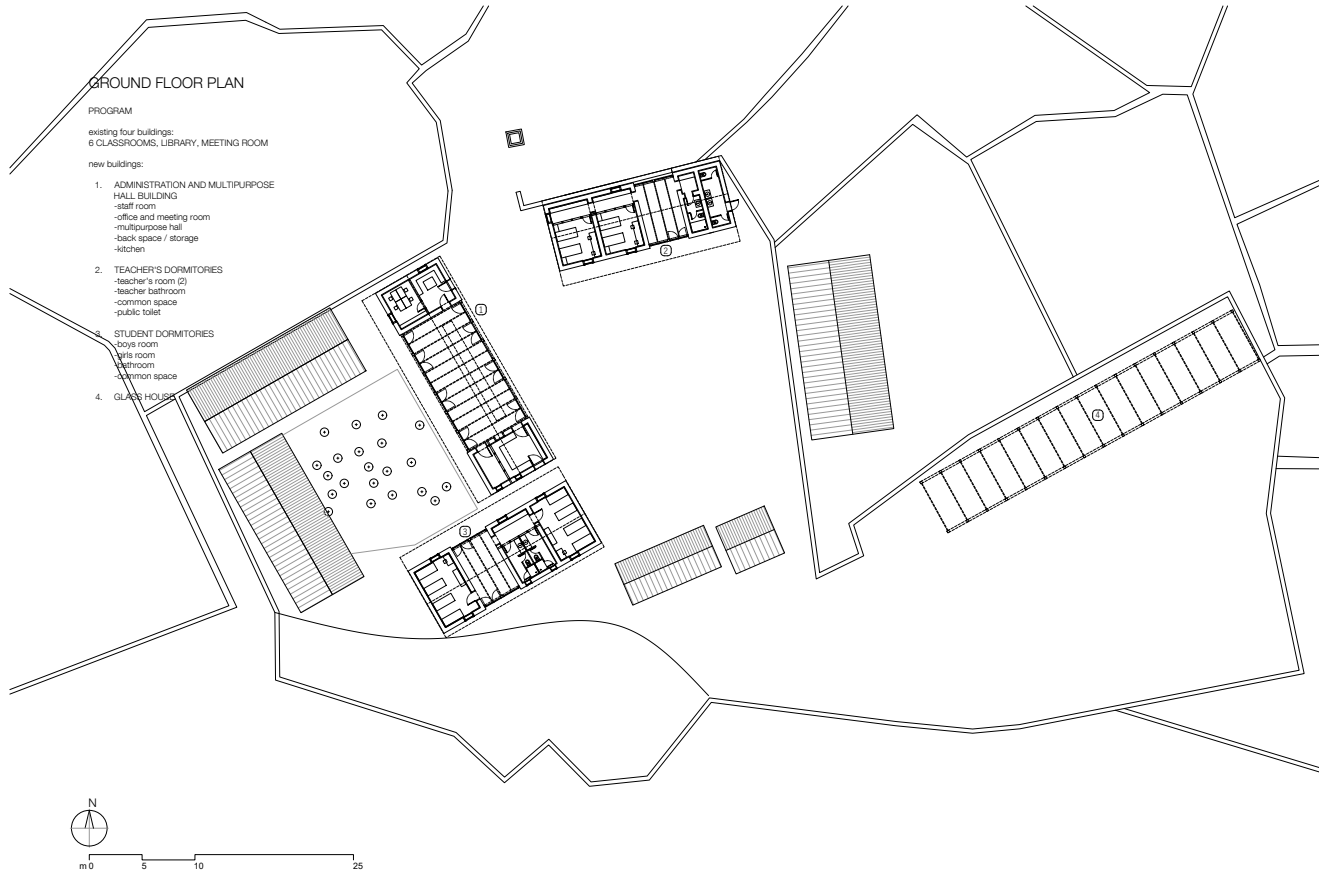


1. Student dorm
2. Teacher's quarter
3. Multi purpose hall
4. Kitchen + Storage
5. Office + library
6. Greenhouse
7. Furniture (classroom + residence + dinning)
8. Operations (kitchen + dormitory)

— Aerial from South

## SCHEME B

- Distribution of volumes along the sports field and garden.
- Split between main function of school and dormitory (admin could be placed at the entrance)
- All buildings placed along E-W axis
- Hall facing on to sports field



1. Student dorm
2. Teacher's quarter
3. Multi purpose hall
4. Kitchen + Storage
5. Office + library
6. Greenhouse
7. Furniture (classroom + residence + dining)
8. Operations (kitchen + dormitory)

— Aerial from South





— Student classroom intermediary spaces



— Multi-purpose hall interior



— School Scheme A visualisation

## ANNEX A



— Image courtesy: [apasherpaoundation.org](http://apasherpaoundation.org)



— Image courtesy: [www.thame.net](http://www.thame.net)





— Image courtesy: [apasherpafoundation.org](http://apasherpafoundation.org)



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## ANNEX B





**THANK YOU!**

We are seeking like-minded partners to support the project in its quest to combine local know-how with international expertise to develop novel, contextually appropriate building techniques and methods for sustainable construction. The approach outlined in this brochure will offer immediate impact towards establishing a renewed construction knowledge base in Thame Valley and provide a lasting framework for a redevelopment determined by its unique cultural legacy.

We consider, construction of the student dormitory and other support facilities at Thame school as a key step in this direction and are very keen to push the design and research assignment forward by engaging ourselves in construction and operation of the same.

We look forward to discussing support opportunities with you and

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