UNIVERSIDADE DE ÉVORA
ESCOLA DE ARTES
DEPARTAMENTO DE ARQUITECTURA

Vihara Architecture:
Defining the existential foothold of VIII century Buddhist monastery "Somapura Mahavihara" of ancient Bengal

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Professor Doutor Filipe Themudo Barata
Professor Sajid-bin-doza

Mestrado Integrado em Arquitetura
Dissertação 2014/2015

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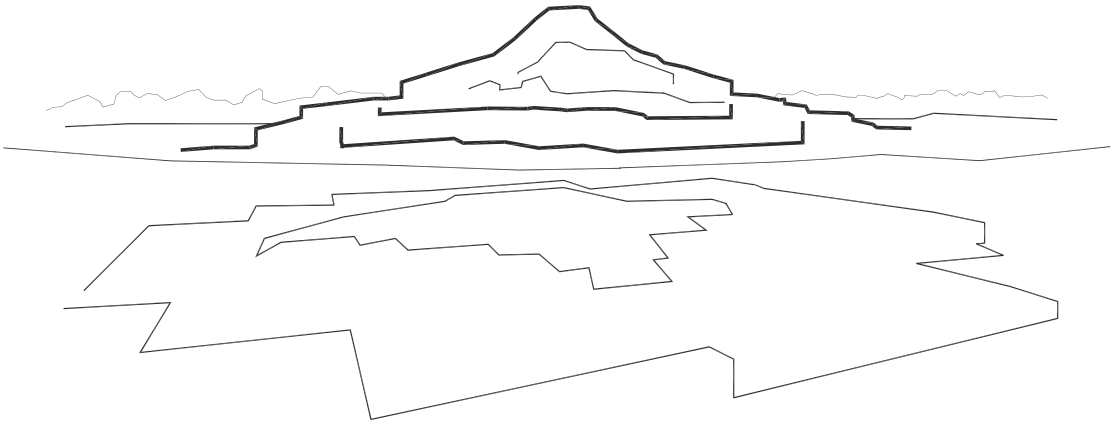

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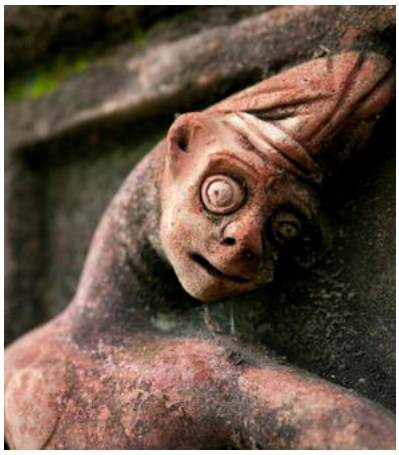
My work dedicated to my parents and Luís Ferro for their constant support and ultimate encouragement.

Mode of language "English"

Granted Emma-West Erasmus Mundus scholarship for M11, later M22; my journey for "Integrated Masters degree in Architecture" started with a promise to be in "English" medium of study, by the scholarship program as the common International language.

However, I was the first student challenging myself with the "Portuguese teaching mode" of UÉvora, to complete "Integrated Masters Degree in Architecture" with language difficulty.

It was only possible due to severe patience, mutual understanding and support from my Professors and colleagues of UÉvora.



'' When we treat architecture analytically, we miss the concrete environmental character, that is, the very quality which is the object of man´s identification, and which may give him a sense of existential foothold.'' [1]

[1] *Norberg-Schulz C. Genius Loci: towards a phenomenology of Architecture.* Academy Editions, London. 1980. pp-05.

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Abstract

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Figure 01
Terracotta plaque of 'Somapura Mahavihara' (770 AD)
© Tamanna Ahmed photography 2014.

Lost in history, the ruin of 'Somapura Mahavihara' was not recognized separated from its birthplace, i.e. nature, for more than 700 years. Yet, within its silent presence, the monument dominated the name of the region: 'Paharpur' (land of hillock), according to its appearance surrounds by its flat land topography.

Discovered in 1919, the single largest Buddhist Vihara (monastery) of ancient Bengal came into light, pronouncing the flourishing minute of Buddhist architecture, once dominant religious force of the subcontinent. The earliest historical monumental architecture of greater Asia, had long been deriving itself from the Buddhist monastic architecture as early as VI century BC. In line of history, the discovery of 'Somapura Mahavihara' contributed attesting the sensitivities of a highly sophisticated architectonic typology of Vihara Architecture in the land of ancient Bengal. The recovery of 'Somapura Mahavihara' was not only from its cradle of nature, but also from its remarkable existence imprinted in the reign of Pala dynasty (750 - 1155 AD) announcing the existential foothold of man in his nature.

The existential foothold of 'Somapura Mahavihara' comprises the factors, responsible in shaping the anchorage of the monument since the birth of Vihara architecture, as early as 530 BC. These factors not only denote the building technology in response to its environment but also the amalgamation of belief, upon which the dwellers transformed the site as a place announcing their existence on earth.

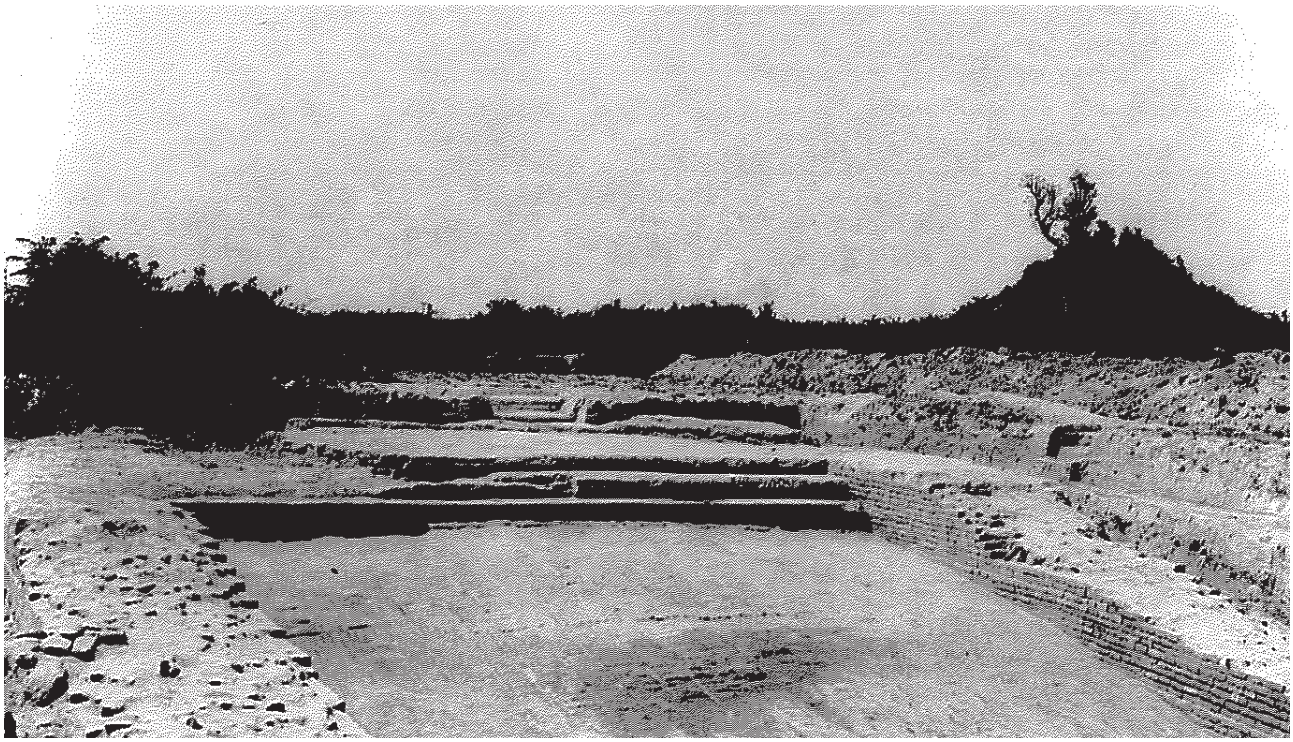


Figure 02
Glass-plate image of 'Somapura Mahavihara' (770 AD)
© Archaeology Department, Govt. of Bangladesh, 1930.

This research paper aims at exploring the existential foothold of 'Somapura Mahavihara', in terms of its
territorial, functional, structural, social, cultural, religious symbolic hierarchies of human achievement while clarifying the architectonic typology that shaped 'Somapura Mahavihara' through evolution process of 'Vihara Architecture'.

This understanding intends to combine the archaeological knowledge with comparative architectural analysis of contemporary Viharas of ancient Bengal, to define the singularity of 'Somapura Mahavihara'. In consequence, the glorious past of 'Somapura Mahavihara' is intended to portray through identifying the relation of religious and functional rationalism with the connotation of art, architecture and belief moulded within natural forces, as one complete entity.

Keywords: Buddhist Architecture, Vihara Architecture, Pala dynasty, ancient Bengal.

Resumo

Título
Vihara Arquitetura: Definindo a posição existencial do século VIII Budista mosteiro ''Somapura Mahavihara'' de Bengala antiga.

Perdidas na História, as ruínas de 'Somapura Mahavihara' foram confundidas com uma montanha durante mais de setecentos anos. Contudo, no seu silêncio presente, o monumento marcou a toponímia da região; 'Paharpur' significa 'a terra do outeiro', evidenciando a singularidade deste monumento numa região dominada por uma extensa planície.

Em 1919, foi descoberto o maior mosteiro budista da antiga região de Bengal, demonstrando a prosperidade da arquitectura budista. Temporalmente, a descoberta de 'Somapura Mahavihara' contribuiu para atestar a evolução e a sofisticação da tipologia arquitectónica denominada 'Arquitectura Vihara', existente na antiga região de Bengal.

A noção de pegada existencial de 'Somapura Mahavihara' compreende os factores responsáveis por moldar a ancoragem do monumento ao lugar em que se insere desde o início da arquitectura Vihara, que remonta a 530 a.C. Estes factores evidenciam a tecnologia construtiva empregue para responder ao ambiente envolvente mas também a evolução da religião, factores estes que os monges construtores consideraram ao transformar o lugar e anunciar a sua existência na Terra.

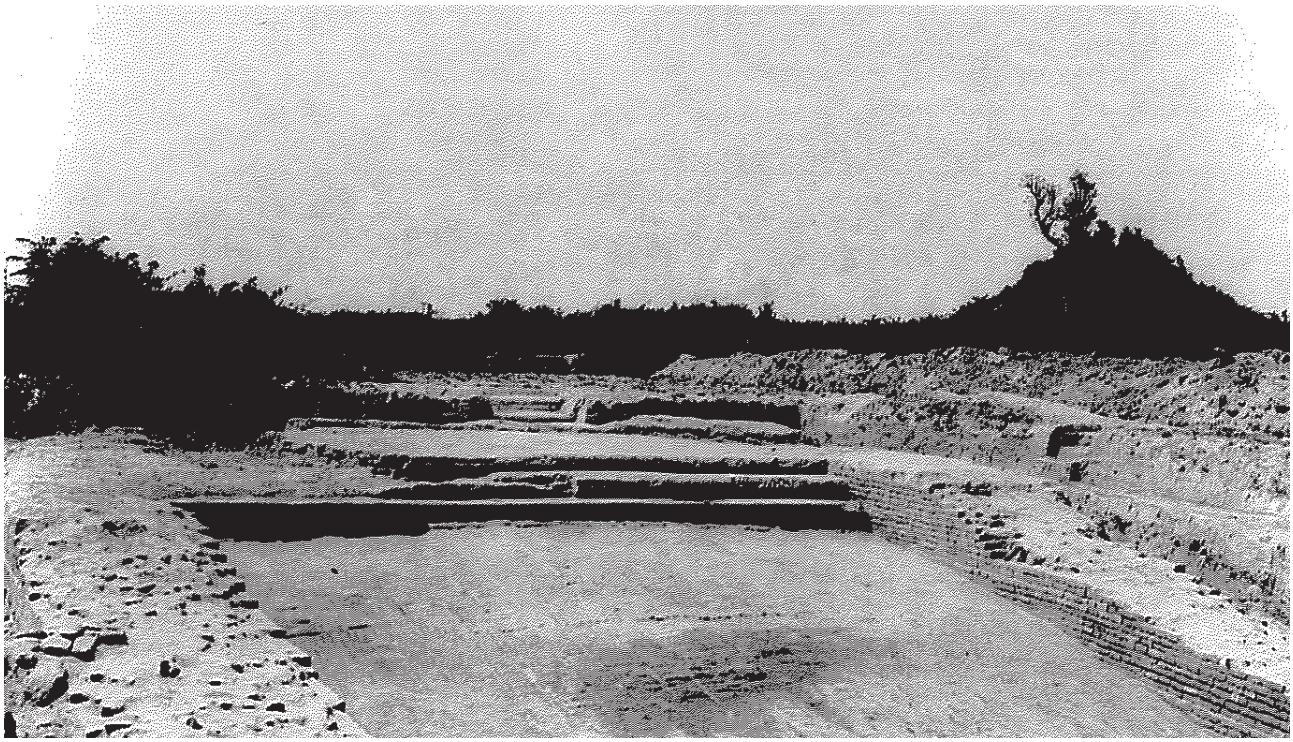


Figura 02
imagem Glass-prato de 'Somapura Mahavihara' (770 AD)
© Departamento de Arqueologia, Governo do Bangladesh de 1930.

Esta investigação tem por objectivo explorar a noção de pegada existencial de 'Somapura Mahavihara', nas suas dimensões territoriais, funcionais, estruturais, sociais, culturais e nas hierarquias simbólicas das realizações humanas para clarificar a tipologia arquitectónica que deu forma a 'Somapura Mahavihara' durante a evolução da arquitectura Vihara.

Este entendimento pretende combinar/cruzar o conhecimento arqueológico com estudos arquitectónicos comparativos de Viharas na antiga região de Bengal, com o objectivo de definir a singularidade de 'Somapura Mahavihara'. Neste estudo estudar-se-á também o confronto entre a dimensão religiosa e a artística (divino vs. humano), integrados na arquitectura de 'Somapura Mahavihara' em perfeita harmonia.

Part I Chapter 01 METHODOLOGICAL APPROACH

1.1 Object

The term 'Vihara Architecture' denotes the house for buddhist monks, usually residential educational institution for Buddhists. Its not only residential education institute but combined with religious practice too. Usually Temples are a part of the viharas.

To Determine the evolution of Vihara architecture since 530 BC, more than 50 Viharas have been taken into consideration to shed light on their territorial foothold with architectonic adaptation over time & space. Its a situation that has been considered as the first object to determine the topographical typology 'Somapura Mahavihara' had been adopted over time through evolution process since 530 BC.

'Somapura Mahavihara' is the major object of this research paper, understanding which relevant situations have been considered. 'Somapura Mahavihara' is the largest single Buddhist Vihara that was situated in the middle way between Pundranagar (Mahasthangar), the ancient capital of Pundrabardhana and the secondary capital Kotivarsa of ancient Bengal. Presently its geographical location is 282km North-west from the capital city Dhaka and to the North-western part of Bangladesh in the district of Naogaon, village Paharpur.

Approaching from the north through the majestic gateway, the quadrangular complex (218m X 218m) contains 177 monastic cells (each 4.26m X 4.11m) all around it. Almost to the centre of the complex stands the gigantic Temple that echoes the firm belief of the monastery, living in search of own salvation, enlightenment.

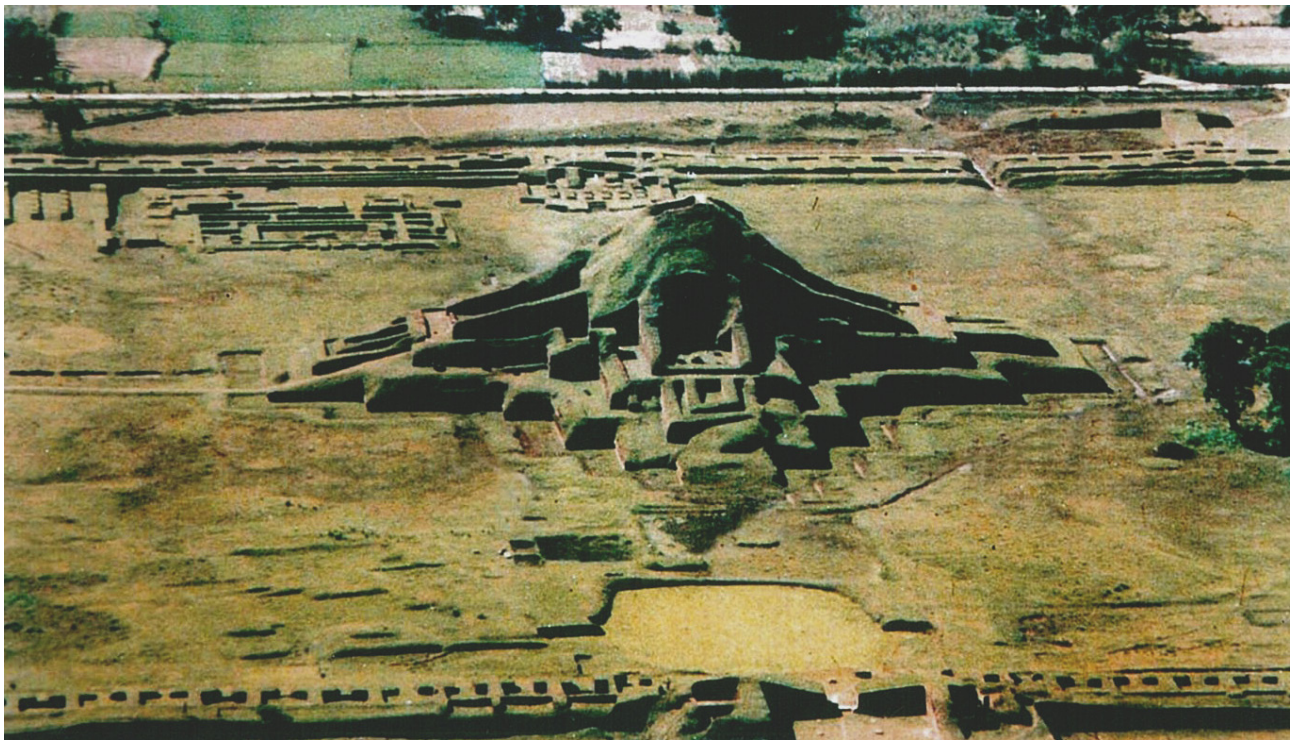


Figure 03
Aerial photograph of 'Somapura Mahavihara' (770 AD)
© Archaeology Department, Govt. of Bangladesh.

There remain subsidiary functional forms (library, kitchen, refectory, well, masonry drain etc.), votive stupas and other forms, functioning as a whole, beneath the sky of the vast complex. The monk cells, subsidiary functions with the proximate central Temple echoes the monk society of ancient Bengal with the connotation of knowledge with religion. The art and architecture it reflects are more secular in nature that makes the built form timeless in terms of its vitality.

1.2 State of Art

The evolution of Vihara architecture to define the architectonic typology that define 'Somapura Mahavihara' was never subjected to academic investigation. The major studies had been subjected to the central gigantic temple of the complex. The functional correlation with the main temple had been enlightened through significant archaeologists and by UNESCO, the 'Somapura Mahavihara', being an UNESCO Heritage monument since 1985. Nevertheless, the pertinent works that shed light over Vihara architecture of 'Somapura Mahavihara' are:

• The research of Dr. Ali Naqi entitled '*Vertical reconstruction of Paharpur vihara',* is specifically concerned with the proximate formation of the main temple, while pointed descriptive assumptions over the Vihara part. This part has been assumed with functional rationalism and construction elements only. Formal spatial analysis of the Vihara Architecture with spatial planning had not been stated. The analysis of Vihara architecture in comparison with other Viharas of significance has not been considered significantly.

• Le Huu Phuoc in his book *'Buddhist Architecture'* (2010) reflects the Architectural elements of Buddhist monuments & worldwide evolution of Buddhist architecture. There remain descriptive detail about 'Somapura Mahavihara' which does not specifically concerned on its singularity and similarity through evolution process.

• Significant archaeologists as such K.N. Dikshit, Buchanan Hamilton, Alexander Cunningham, Nalinikanto Bhattasheel, Nazimuddin Ahmed, AKM Shamsul haq, Dr. Enamul Haq, Shafiqul Alam and others play vital role with archaeological studies of 'Somapura Mahavihara', concentrated mainly on the gigantic temple it has. The work so far accomplished are mostly on Archaeological research, hence there remain vast source on the descriptive information of 'Somapura Mahavihara', for further analysis.

• In the study entitled *'Form and morphology of Paharpur Vihara: A conjectural virtual reconstruction'* of Md. Ali Naqi and Falguni Mallick; the missing finial of the Main temple has been explored in detail while the existential foothold of 'Somapura Mahavihara' complex has not been explored in depth. The conjectural virtual reconstruction was proposed of the missing super structure of the Main temple with probable form structure. However, it focuses on the missing part of the Main Temple structure, rather than the typology of Vihara Architecture.

The singularity of Somapura Mahavihara, while analyzing the similarity with other Viharas has not been investigated in terms of its Territorial, Functional & Structural foothold & evolution over time. The main goal of this research paper follow this scope that the previous studies never subjected to reinforce.

From the grand entrance, till the daily life practices of the monk in the residential educational institute i.e. Vihara; enhancing knowledge with religious ambguity is subjected to shed light in this research paper to determine the Existential foothold of this magnificent piece of Vihara Architecture. To accomplish this goal, the following major books had been triggered to begin the research.

• Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture.* (1980).

This book has been the major inspiration to think about the existential foothold of architectural creation that plays significant role in human life. The author indeed made to justify the existential foothold of human being on earth and Architecture as a media to reflect that sense of existence. This book is subjected to study to understand the Buddhist architecture that has always been a reflector of the time, culture, territory, society connoted with firm Religious values.

Figure 04
Black stone image of 'Somapura Mahavihara' (770 AD)

source: Archaeology Museum, Naogaon, Bangladesh.
© Tamanna Ahmed photography, 2014.

• Dikshit K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* (1938).

The author is one of the remarkable Archaeologist that worked on the excavation of the Somapura Mahavihara since 1934 AD. The archaeological evidences are significant to discover the unknown through architectural analysis of the monument. Its a must to relate the Archaeological data with Architectural analysis to shed light in determining the firm existential foothold this monument in ruin proposes.

• Van der laan,D.H. *Architectonic Space.* (2001).

Dom Hans Van Der Laan being an Architect, theorist and a monk, is an inspiring eye to look into as to understand the connotation of religious symbolism & functionalism with architecture. Its an inspiring book to study in better understanding of space perception.

• Phuoc,Le Huu. *Buddhist Architecture.* (2010).

This book is one of the latest research about Buddhist architecture specifically, that describes about the transformation of Buddhist Architecture worldwide. It shed light over the Viharas of ancient Bengal through descriptive formation while focusing on Architectural elements. Its an important book to comprehend the Buddhist values in Architecture through out the history of evolution; in this research Vihara architecture part will be filtered to commence the specific goal.

• Brown, Percy. *Indian Architecture: Hindu and Buddhist Period. (*1942).

This book is one of the oldest record of Hindu & Buddhist architectural information. It has the detail descriptive information about the flourish of Buddhism in the Indian subcontinent within different dynasties. This book is been subjected to study the ancient form of Buddhist architecture with significant drawings it offers.

• Alam A.K.M. Shamsul. *Mainamati.* (1976).

This book describes about the Mainamati hill where the Buddhist Viharas are largest in number in terms of one single place in Bangladesh, dated 6th c. AD to 13th c.AD. This book follows the historical & archaeological information of some of these Viharas which are subjected to study to compare with 'Somapura Mahavihara' of ancient Bengal.

• Rudofsky Bernard. *Architecture without Architects.* (1964).

How functional rationalism can offer architecture of excellence while serving the users need although not build by the professionals by definition. The VIII century Vihara that is the object of study echoes the parallel sense of architecture that offers functional and aesthetic solution to one living entity while moulding itself with the forces of nature.

• Holl Steven,Pallasmaa J. & Pérez-Gomez *A. Question of Perception: Phenomenology of Architecture.* (2006).

The significance of sensory experience in perception of space has been taken into account in depth in this book, which has been considered to understand better the structural and materialistic innovation of the monument, while engaging the dwellers within.

• Alam Md.Shafiqul. *Proceedings of the International seminar on elaboration of Heritage sites and its environment 20-25 March, 2004.* (2004).

This International seminar published the ongoing research works concentrated on 'Somapura Mahavihara', that is a important source to study the dialogues among relevant researchers in one single platform. It as well focus on various ongoing problems that the monument is facing in order to safeguard its heritage value.

• Ahmed Nazimuddin. *Discover the monuments of Bangladesh. (1*984).

This author being the former Director of Archaeology department of Bangladesh, has pointed out the descriptive information of Buddhist monuments since ancient Bengal, in the present Bangladesh context. These Buddhist monuments has been documented with the history of cultural and religious aspects that shape these Religious monuments in different dynasties. This book also offers the significant locations of Buddhist monuments all over the country with maps as well the chronological timeline of Buddhist dynasties in respect to the worldwide events.

In light of all these references of knowledge accumulated with other significant sources mentioned in the bibliography, the research paper aims at defining the existential foothold of 'Somapura Mahavihara' of ancient Bengal.

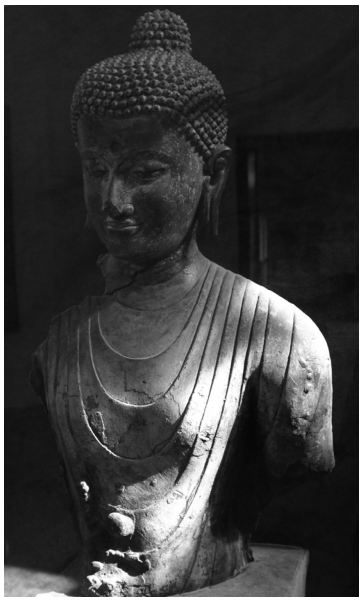


Figure 05
Stone Buddha sculpture of 'Somapura Mahavihara' (770 AD)

source: Archaeology Museum, Naogaon, Bangladesh.

1.3 Objectives and Methodology

The Research generated with particular interest on Religious Architecture, to explore the Functional rationalism enhanced by the Religious symbolism & code of living as one complete entity. This entity is further examined through identifying the existential foothold that establishes the basic relationship of man with his surrounding nature through creation of a meaningful Architecture adhere to the belief of the dwellers.

Vihara architecture shares two major parts: Religious and Functional. The Religious Vihara part stands for Temple, Stupa etc., while the Functional part stands for the living cells of the monks with subsidiary functions to comply the basic needs of living. In 'Somapura Mahavihara', the main Temple as the major Religious structure of the establishment, had been studied previously in many references; while the relationship of the functional and Religious parts had never been subjected in depth study, to understand the formation of the Vihara part itself. To define this complex relationship of Religious and Functional parts of Vihara Architecture, and to define the existential foothold of the largest single Buddhist Vihara of ancient Bengal, i.e. 'Somapura Mahavihara', this research paper intends the following objectives:

1. Study more than 30 Viharas of ancient Bengal in order to:
(a) Understand the evolution of architectonic typology associated to Vihara architecture, until it reached to 'Somapura Mahavihara';

(b) Clarify the responsible elements in shaping the specific architectonic typology of 'Somapura Mahavihara', through evolution process of Vihara architecture.

2. Analyze the relationship of Religious symbolism with Functional rationalism by comparative study of Vihara architecture, in order to:
(a) Determine Buddhist values in shaping the architecture of 'Somapura Mahavihara';
(b) Clarify the specific elements that provide singularity of 'Somapura Mahavihara';
(c) Integrate the Archaeological knowledge with Architectural analysis to initiate hypotheses in clarifying the spatial formation of 'Somapura Mahavihara'.

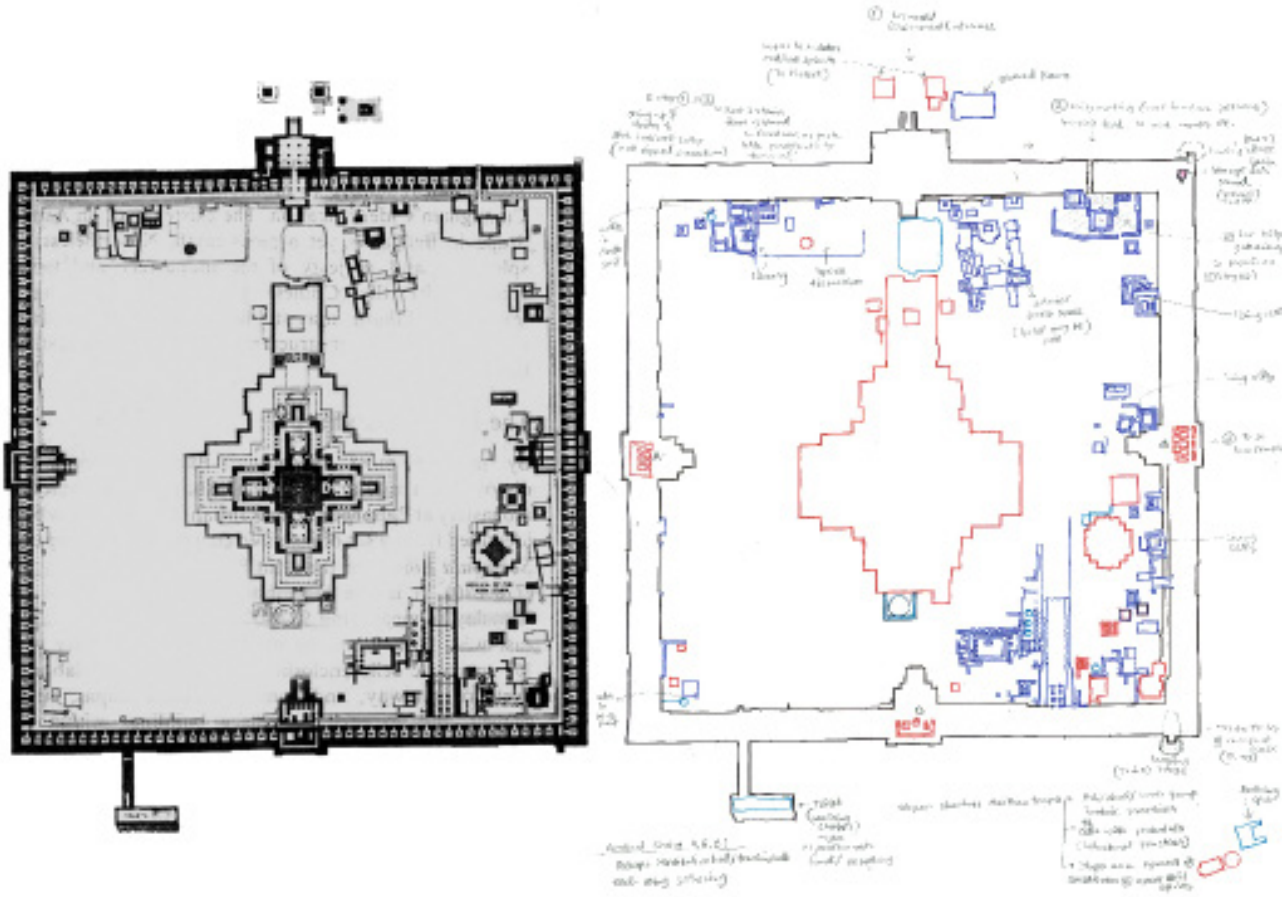
The **methodology** in accomplishing these objectives are:
1. Study of Spatial Foothold
More than 30 Viharas has been designated (530 BC to 1220 AD) through:
(a) Aerial image, to define:
• approach to the monument with topographical definition;
• scale of each monument determining the evolutionary changes in its specific context;
• orientation and spatial organization with hierarchies of major functions.
(b) Old photographs, Maps, Drawings, Texts to clarify:
• location of the monument in historical context;
• socio-cultural, political background in defining their significance.
(c) Production of drawings to analyze:
• singularity of each monument in terms of their location, orientation, approach, scale and over all spatial organization to clarify the responsible elements in shaping the specific architectonic typology of 'Somapura Mahavihara'.

2. Study of Functional and Structural Foothold
(a) Plan collected from the Department of Archaeology, Bangladesh; to understand:
• layers of zoning, circulation, functional uses, rituals/daily use, day-night activities, and visitor residents use pattern with specific spatial organization;
• functioning of the monument in terms of utilities;
• scale of each monument to determine the evolutionary changes over time adopting to its particular cotext.

(b) Old photographs, Maps, Texts, Paintings; to clarify:
• Buddhism in shaping the Vihara Architecture;
• functional & structural adaptation in terms of social, cultural, political & spatial hierarchies;
• clarify the numerology of design decisions with the doctrine of Buddhism and functional rationalism.

(c) Site visits, interviews and collaboration of knowledge with relevant archives, research centre (UNESCO, Asiatic Society, Bengal Art Institute, CIDEHUS) to define:
• acquire authenticity of the relevant research;
• consultation of bibliography of significance;
• platform to combine and share the research outcome internationally.

(d) Production of Drawings (schematic, illustrations, diagrams, sketches, collages, layering) to:
• define the functional and structural foothold to specify their similarities and thus identifying the singularity of 'Somapura Mahavihara';
• create hypotheses combining comparative architectural analysis with archaeological reports and evidences.



Part I Chapter 02 VIHARA ARCHITECTURE

2.1 Architecture defined by Buddhism

Buddhism sprawled in south of Nepal, more than 2500 years ago, with a message of searching for enlightenment through simplistic approach of living. The founder of Buddhism Siddhartha Gautama (567-487 BC) although descendent from a royal family (of Sakya Republic, Nepal), himself oppose the luxuries of life in search of enlightenment in simplistic approach of living.

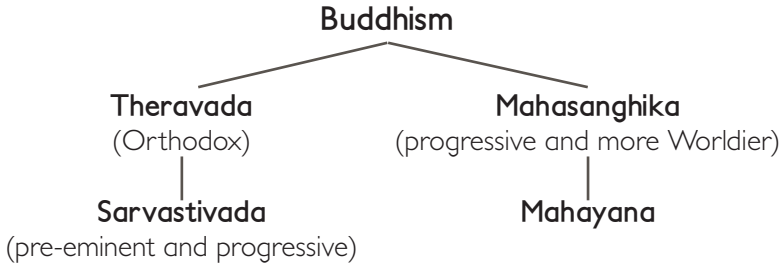
According to his teachings,
''All compound things are inherently impermanent; strive diligently for your own salvation. ''[2]

It is believed by Buddhism to adhere own-self within nature, understanding ones inner strength and weakness by submitting own entity in the world of emptiness through meditation, which is believed to be the generator of all beings; in search of own salvations.

The architecture sprawled from this core concept of man's existence on earth through simplistic approach of living, can be referred as Buddhist Architecture. It shaped itself through evolution process within codes of Buddhist doctrine. In its history of evolution, two major schools of thoughts flanked referred as *Hinayana Buddhism* and *Mahayana Buddhism*. One of the major differences of these two schools of thought, is the Idol worship of Buddha, that is reflected in the architecture it proposes as well. The following schematic clarifies the major school of thought in doctrine of Buddhism.

Fig 06
Analysis of Religious and Functional parts of 'Somapura Mahavihara' (770 AD)
source: AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p.56.
© Tamanna Ahmed drawing, 201.

[2] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.20.



Sarvastivada + Mahasanghika = Mahayana school of thought
Theravada = Hinayana school of thought

Fig 07
Doctrine of Buddhism

source: Le Huu Phuoc, 2010
© Tamanna Ahmed drawing, 2014

"Seravastica was presumably the sect that authorised the creation of first Buddha image."*[3]

Hence, in Mahayana Buddhism , Architecture differs from that of Hinayana Buddhism to some extent, significantly in terms of space organization. However, in general, Buddhist architecture complies with following religious structures within all of its 18 different schools of thoughts since history.

- Stupa
- Temple
- Vihara

The most common religious structure of Buddhism, the Stupa is originated as prehistoric burial mounds at the base of which important personages are interred. It can be relic, object, commemorative, symbolic or votive, by type. As such, *"The earliest form of stupa was circular in plan with a squat, slightly hemispherical dome set on a low plinth…"*[4]

The second category, the Temple refer to a place of worship or remark of memory. It can be with or without idol. Presence of Idol in some sectors of Buddhism is not to worship it, but as a remembrance of the teachings of Buddha. And the third religious structure, the Vihara refer to a house of living for the Buddhist monks, with functional means of subsistence. With time, the Vihara had been evolved in more complex composition while the stupa & temple got combined in a single building typology, at the same time.

* seravastica: the knowledge of Sarvastivada order of Buddhism

[3] Phuoc, Le Huu. *Buddhist Architecture*. Grafikol. United states of America, 2010. p.20.

[4] Ahmed, Nazimuddin. *Discover the monuments of Bangladesh*. The University Press Limited. Dhaka. 1984. p.47.

According to Buddhism, the monks go out for preaching during 9 months of the year, and stay at one place during 3months of Rainy season, known as 'Vassa' or 'Rain Retreat'. The building typology generated through this ritual proposing the way of living of the monks during Rainy season is the generator of building typology, that can be referred as 'Vihara'. The first known Vihara was patronized by the king of Magdhi (Bimbisara) of India in 531 BC called 'Veluvanarama' (originally a royal park or garden)[5]

The major architectural features it complies were:
• Bamboo groove enclosed by highway with main gateway and towers;
• A large water reservoir, for service & hygiene;
• Two stupas- at the gate of the Vihara entrance.

The concept of Vihara can be well defined by Nazim uddin, *''The monasteries in early days of Buddhism were merely a garden retreat where a number of irregularly grouped buildings were to be found for the accommodation of monks who congregated there during rainy season. Usually these were sited in secluded surroundings…but within walking and begging distance of the city in which the monks primarily depended for their living.''*[6]

With the development of different schools of thought within Buddhism, the definition of ''Vihara'' had been evolved in more complex form and it is interesting to notice that the founder of Buddhism, Buddha himself permitted certain building typology and material, coherent to the belief of Buddhism.[7]

These materials are:
Brick, Stone, Stucco, Grass, Leaves, Timber.

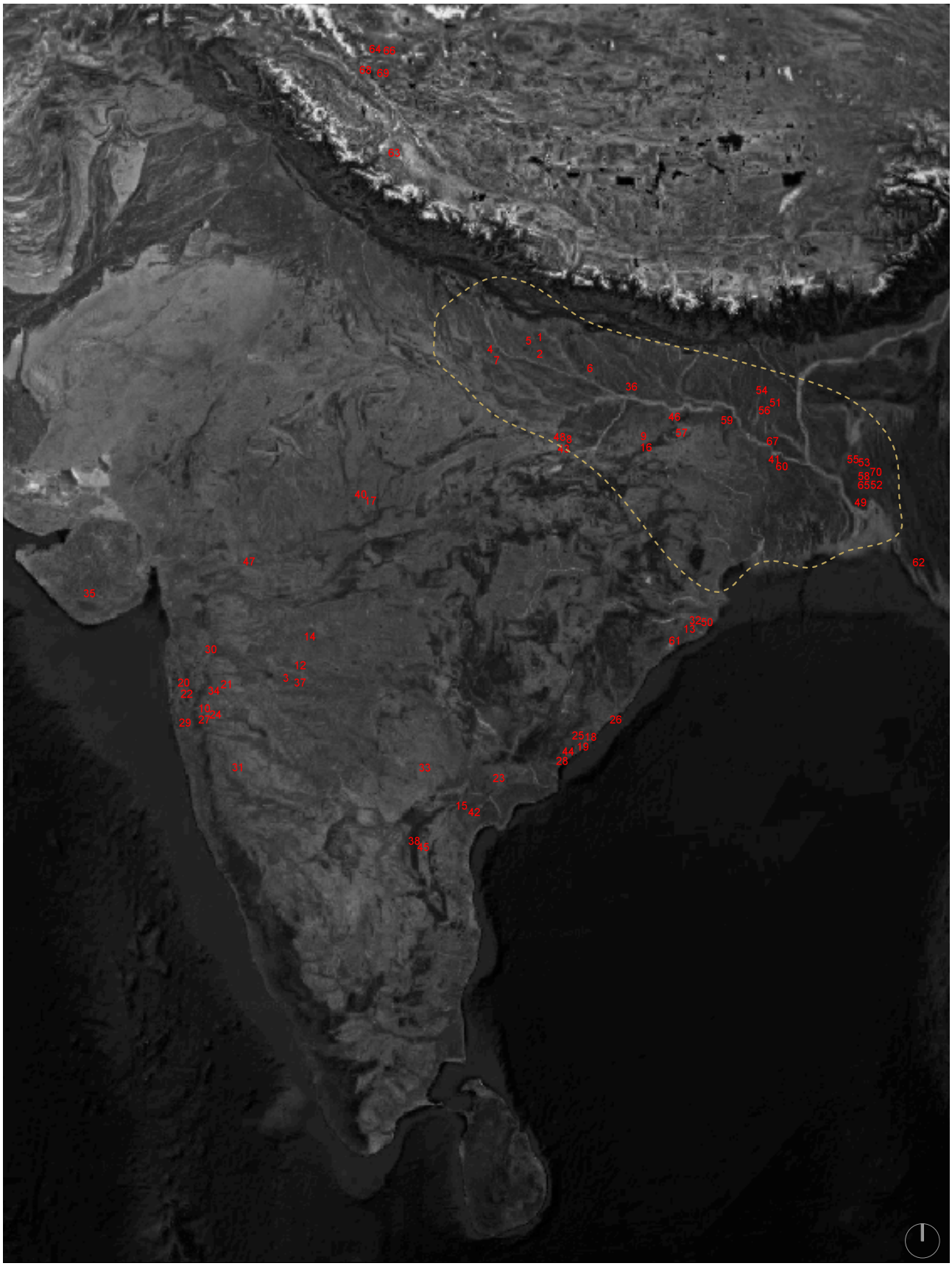
And the building typologies:
• Vihara (private residence);
• Addhyayoga (place for yoga);
• Pasada (mansion more than two stories);
• Hammiya (pillared pavillion);
• Guha (rock-hewn cave).

However, within 1200 years of time frame, 'Somapura Mahavihara' carries the values of these building codes as declared by Buddha himself. Throughout time, with more developed and complex school of thought referred as 'Mahayana Vajrayana Buddhism', the architecture of 'Somapura Mahavihara' had been evolved in search of enlightenment.

5 Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.48.

6 Ahmed, Nazimuddin. *Discover the monuments of Bangladesh.* The University Press Limited. Dhaka. 1984. p.48.

7 Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.48.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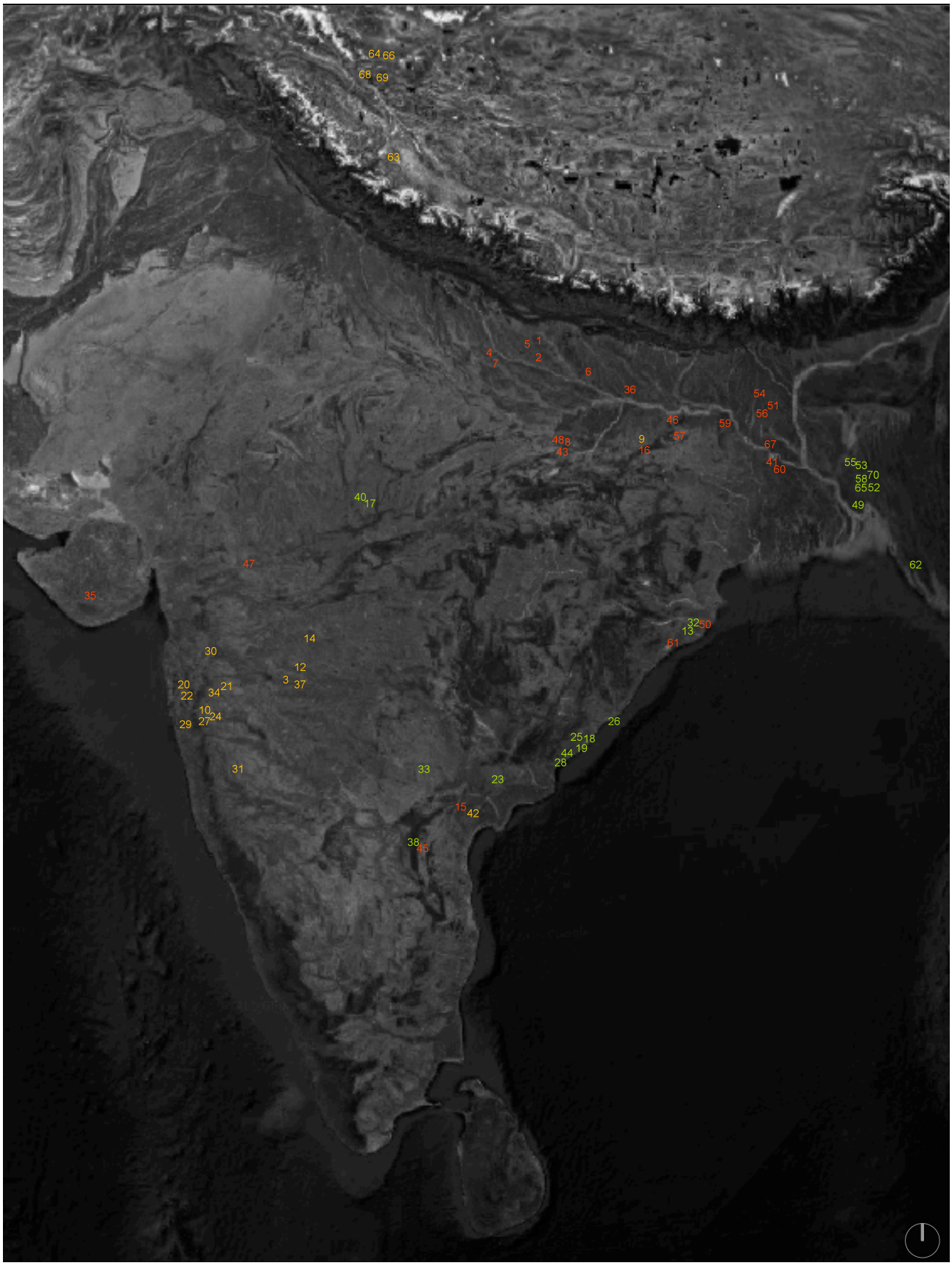
2.2 Viharas of ancient Bengal

Fig 08 (adjacent page)
Location of considered Viharas of ancient bengal (530 BC - 1220 AD)

source: satellite image, Google Earth 2014;
www.monastic-asia.wikidot.com
© Tamanna Ahmed drawing, 2014.

01	Kapila Vastu monastery,NP	530 BC
02	Piprahwa monastery, IN	530 BC
03	Ellora cave monastery, IN	530 BC
04	Sravasti monastery, IN	500 BC
05	Granwaria monastery, IN	500 BC
06	Kushinara monastery, IN	400 BC
07	Jetavan monastery, IN	400 BC
08	Sarnath monastery, IN	400 BC
09	Barbar cave monastery, IN	322 BC
10	Bhaja cave monastery, IN	300 BC
12	Pithalkhora cave monastery,IN	250 BC
13	Lalitgiri monastery, IN	200 BC
14	Ajanta cave monastery, IN	200 BC
15	Amaravati monastic cluster,IN	200 BC
16	Mahabodhi Temple, IN	3rd c. BC
17	Sanchi Stupa & monastery, IN	3rd c. BC
18	Pavuralakonda monastery, IN	3rd c. BC
19	Bavikonda monastery, IN	3rd c. BC
20	Mahakali cave monastery, IN	3rd c. BC
21	Tuljalena cave monastery, IN	100 BC
22	Kanheri cave monastery, IN	100 BC
23	Guntupalle monastery, IN	2nd c. BC
24	Karla cave monastery, IN	2nd c. BC
25	Thotlakonda monastic cluster, IN	2nd c. BC
26	Salihundam monastery, IN	2nd c. BC
27	Bedse cave monastery, IN	1st c. BC
28	Kotturu monastery, IN	1st c. BC
29	KudaMandad cave monastery,IN	1st c. BC
30	Pandavleni cave monastery, IN	1st c. BC
31	Karad cave monastery, IN	1st c. BC
32	Udaygiri monastery, IN	1st c. BC
33	Phanigiri monastery, IN	1st c. BC
34	Lenyadri cave monastery, IN	1st c. BC
35	Khapra kodiya monastery,IN	1st c. BC
36	Kesaria Buddhist Stupa, IN	200 AD
37	Aurangabad cave monastery ,IN	200 AD
38	Nagarjuna kunda monastery, IN	200 AD
40	Satdhara monastery, IN	300 AD
41	Biharail monastery, BD	320 AD
42	Undavalli cave monastery, IN	4th c. AD
43	Chaukhandi monastery,IN	4th c. AD
44	Bajjannakonda monastery, IN	4th c. AD
45	Anupu monastery, IN	4th c. AD
46	Nalanda Mahavihara, IN	400 AD
47	Bagh cave monastery, IN	5th c. AD
48	Dhamek stupa, IN (1st sermon)	500 AD
49	Rupban Mura, BD	6th c. AD
50	Ratnagiri monastery, IN	6th c. AD
51	Vasu Bihara, BD	650 AD
52	Kutila Mura, BD	7th c. AD
53	Itakhola Mura, BD	7th c. AD
54	Sitakot Bihara, BD	7th c. AD
55	Ananda Bihara, BD	7th c. AD
56	Somapura Mahavihara, BD	770 AD
57	Odantapuri monastery, IN	8th c. AD
58	Salbon Bihara, BD	8th c. AD
59	Vikramshila Mahavihara, IN	780 AD
60	Halud Bihara, BD	8th c. AD
61	Arghyakavarati monastery, IN	800 AD
62	Pandit monastery, BD	900 AD
63	Tabo monastery, IN	996 AD
64	Alchi monastery, IN	958 AD
65	Charpatra Mura, BD	1000 AD
66	Hemis monastery, IN	1000 AD
67	Jagaddal Bihara, BD	1082 AD
68	Zongkhul monastery, IN	1100 AD
69	Phugtal monastery, IN	12th c. AD
70	Bhoja Bihara, BD	1220 AD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One of the primary Viharas of Ancient Bengal was where Buddha himself spent 19 Vassavasas, meaning 'Rain Retreat' seasons, namely Jetavanarama which had following features:[8]
• grand garden with boundary wall and a gateway;
• within the boundary walls, the dwelling rooms (vihara) & cells (parivena);
• detached buildings: conference rooms, guest halls for laity, meeting hall for ceremonies and discussions;
• subsidiary functions: service halls (kitchen & refectory), gated chambers, fireplace halls, cloister for walking meditation, bathing rooms, sheds, pavilions, well-house, store rooms, closets etc.

Later, when begging was not a necessity - strong, regular, walled, independent and self-contained monasteries were erected with royal patronage. 'Somapura Mahavihara' had been one of the finest example of such typology of Vihara architecture.

To shed light over the evolution process of Vihara Architecture, more than 30 Viharas of Ancient Bengal within the time frame of 530 BC - 1200 AD, have been chosen; among 70 Viharas primarily located dependent on their availability of resources. Among these Viharas, the Pala dynasty (770 AD - 1155 AD) gave birth to the second largest single Vihara of ancient Bengal, i.e. Somapura Mahavihara, which was planned within a strong networking system with other subsequent viharas.

On mapping these Viharas, it is evident that, the Vihara Architecture evolve through three major categories: cave, mound and flat land Vihara. Among these topographical location of Viharas, 'Somapura Mahavihara' represents flatland typology evolved over 1200 years within the evolution process of Vihara Architecture. Nevertheless, the study of all these topographical categories is a must to understand the major features that shaped 'Somapura Mahavihara', within this process.

Fig 09 (adjacent page)
Topographical typology of Viharas in consideration.

source: satellite image, Google Earth 2014;
www.monastic-asia.wikidot.com

Legend
- Cave
- Mound
- Flat land

[8] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.48.

Cave Typology Monastery

Mound Typology Monastery

Flat land Typology Monastery

According to Lee H. Phuoc, different Viharas of Buddhist Architecture can be determined by eight categories, where one example can fits to more than one category. These are as follows:[9]

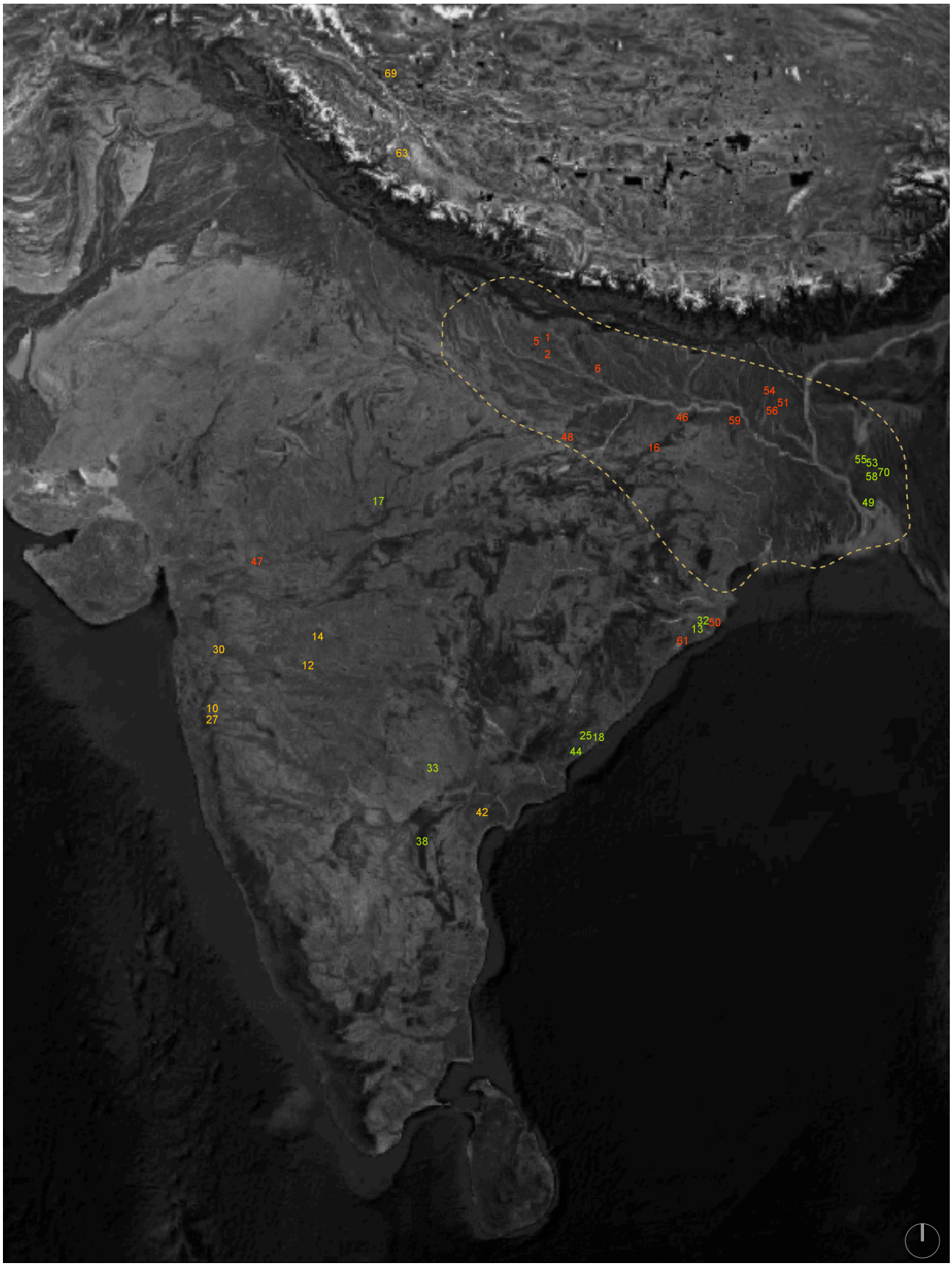
1. Communal monastery without stupa;
2. Organic or unplanned monastery centring major stupa;
3. Rock-hewn cave monastery;
4. Quadrangular monastery with viharas
(Takht - i - bahi, Pakistan; Nalanda Mahavihara, India ; Somapura Mahavihara, Bangladesh);
5. Monastic university or Mahavihara denoted to religious, scholastic pursuits of Theravada,
Mahayana, Vajrayana subjects (Nalanda Mahavihara, India ; Somapura Mahavihara, Bangladesh);
6. Monastery with separate Precincts for the Viharas and worshippers;
7. Monastery with a centrally sacred Precinct with several functional structures (Somapura Mahavihara, Bangladesh);
8. Fortress or hilltop monasteries.

According to these categories, based on their spatial organization, Somapura Mahavihara fits in three of these definitions, corresponding the numbers pf 4, 5 and 7.

Fig 10 (adjacent page)
Topographical typology of Viharas in consideration.

source: satellite image, Google Earth 2014;
www.banglapedia.org ;
www.monastic-asia.wikidot.com

[9] Phuoc,Le Huu. *Buddhist Architecture*. Grafikol. United states of America, 2010. p.46.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Part II Chapter 01 COMPARATIVE ANALYSIS OF VIHARAS

1.1 Objects of comparison

'Somapura Mahavihara' achieved its specific architectonic typology through evolution process (530 BC - 1220 AD) of three different topographical categories of Viharas. Among these 70 Viharas, 35 significant Viharas has been considered for further analysis depending on their availability of data as well territorial influence of Pala Dynasty; which was the cradle of 'Somapura Mahavihara'. These 35 Viharas has been considered to portray the architectonic typology of 'Somapura mahavihara' through evolution process and to define its similarities while identifying the singularity determining the existential foothold it proposes in Vihara Architecture.

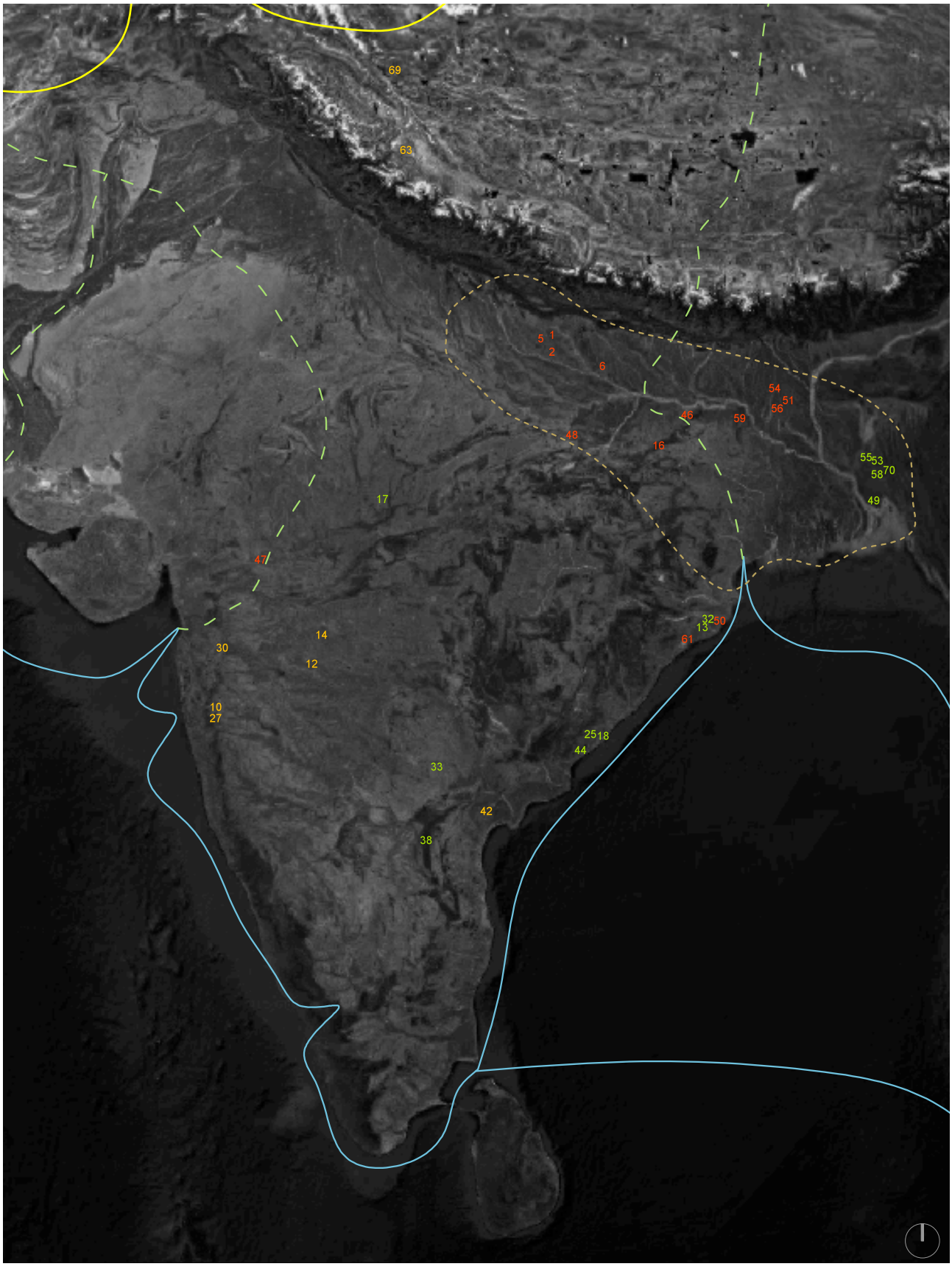
It is interesting to note that, the viharas of Pala dynasty were inserted within a firm networking system of water routes. While the other Viharas of several dynasties can well be identified vastly influenced by water routes and sea location. In different context with the prevailing socio-political adaptation and development in thoughts of Buddhism, these Viharas as well remark significant changes in their planning, approach and typologies.
To determine the singularity of 'Somapura mahavihara' further in depth study of elemental comparison has been considered among subsequesnt viharas, mostly of Pala dynasty. All these Viharas not only assist defining the identity of 'Somapura mahavihara', but also to generate hypotheses in constructing the glorious past of the monument while defining the existential foothold it
pronouced.

01	Kapila Vastu monastery,NP	530 BC
02	Piprahwa monastery, IN	530 BC
05	Granwaria monastery, IN	500 BC
06	Kushinara monastery, IN	400 BC
10	Bhaja cave monastery, IN	300 BC
12	Pithalkhora cave monastery,IN	250 BC
13	Lalitgiri monastery, IN	200 BC
14	Ajanta cave monastery, IN	200 BC
16	Mahabodhi Temple, IN	3rd c. BC
17	Sanchi Stupa & monastery, IN	3rd c. BC
18	Pavuralakonda monastery, IN	3rd c. BC
25	Thotlakonda monastic cluster, IN	2nd c. BC
27	Bedse cave monastery, IN	1st c. BC
30	Pandavleni cave monastery, IN	1st c. BC
32	Udaygiri monastery, IN	1st c. BC
33	Phanigiri monastery, IN	1st c. BC
38	Nagarjuna kunda monastery, IN	200 AD
42	Undavalli cave monastery, IN	4th c. AD
44	Bajjannakonda monastery, IN	4th c. AD
46	Nalanda Mahavihara, IN	400 AD
47	Bagh cave monastery, IN	5th c. AD
48	Dhamek stupa, IN (1st sermon)	500 AD
49	Rupban Mura, BD	6th c. AD
50	Ratnagiri monastery, IN	6th c. AD
51	Vasu Bihara, BD	650 AD
53	Itakhola Mura, BD	7th c. AD
54	Sitakot Bihara, BD	7th c. AD
55	Ananda Bihara, BD	7th c. AD
56	Somapura Mahavihara, BD	770 AD
58	Salbon Bihara, BD	8th c. AD
59	Vikramshila Mahavihara, IN	780 AD
61	Arghyakavarati monastery, IN	800 AD
63	Tabo monastery, IN	996 AD
69	Phugtal monastery, IN	12th c. AD
70	Bhoja Bihara, BD	1220 AD

Legend
Cave Mound Flat land

Fig 11 (adjacent page)
Topographical location of selected 35 Viharas of ancient Bengal with domain of Pala Dynasty (750AD - 1155AD).

source: satellite image, Google Earth 2014;
www.monastic-asia.wikidot.com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1.2 Spatial Organization

To determine the contextual relation of considered Viharas of ancient Bengal, their relationship with the topography, i.e the routes, rivers, hills are significant to consider. With the major communication route of riverine ancient Bengal- the water route, the historical silk route emerged in defining the efficient links of water and roadways; that enhanced in locating the Viharas of ancient Bengal.

The adjacent map portrays the contextual location of selected Viharas amidst the major routes of the region.

Fig 12 (adjacent page)
Topographical location of selected 35 Viharas of ancient Bengal with domain of Pala Dynasty (750AD - 1155AD)

source: satellite image, Google Earth 2014;
www.monastic-asia.wikidot.com

Legend
- Cave
- Mound
- Flat land
- Silk route
- Water route
- Land route


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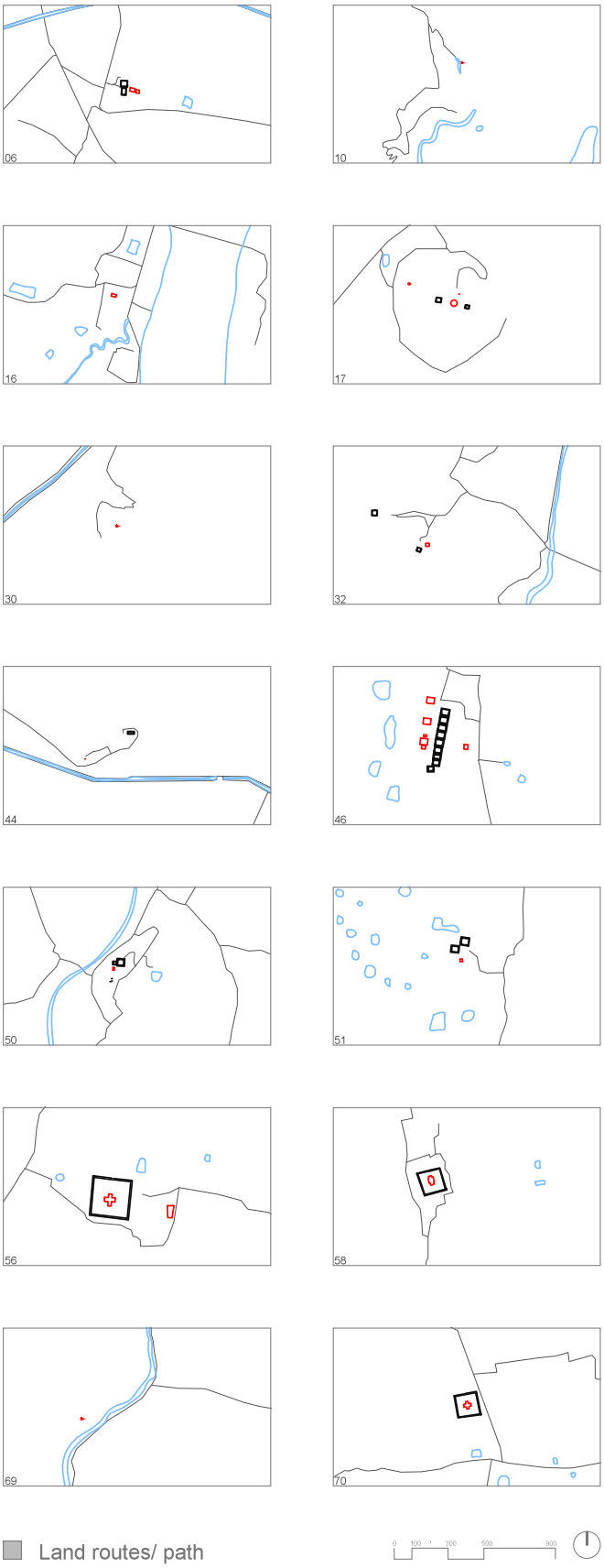
Monastic structure
Religious structures
Water routes/ body



It is evident that, these routes together established a strong networking system, as to control the territory enhancing the firm socio-cultural-political and religious hierarchies of the region. The following study enhances the understanding of orientation, scale and formal expression of these Viharas within their various contextual setting, carrying the remark of Vihara architecture.

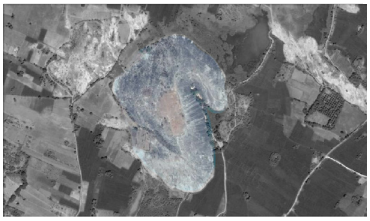
Water as a generator of life echoes strongly within the setting of these Viharas. The seclusion of these Viharas can be seen as enhanced by choosing secluded topographical setting; which can be identified through the Viharas, corresponding no. 17, 18, 33, 38, 44, 50, 61, 69. It is also noteworthy that, majority of these Viharas were approached through the East side. The orientation of the Viharas and temples/stupas had been as such, that the east has always been prioritized. Its because the 1st light of the day had always been considered sacred enhancing the spirituality within the deep niches of the temples, which is the east side.

Also, The religious structures: temples, stupas; stays closer to the entrance in more public zone, while the living quarters (Viharas) stays more interior with a sense of privacy within the private zone. The routes to enter in these establishments are often indirect and delayed intentionally to seclude from the surroundings, keeping in mind while choosing the site as well.
The scale of these Viharas are significant to notice, with major changes since the royal patronage started financing these buildings as a symbol of Political power and pride. More security within the introvert planning started to emerge in these evolution process in Vihara Architecture.

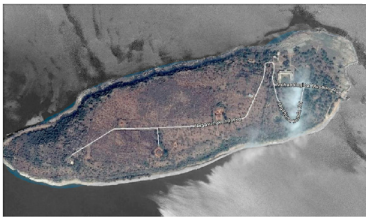
Fig 13
Topographical and spatial definition of selected 35 Viharas.

source: satellite image, Google Earth 2014;
www.monastic-asia.wikidot.com

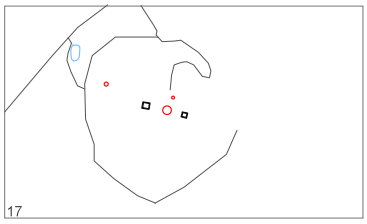
3rd c.BC Sanchi stupa and Vihara

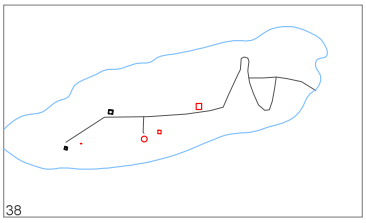


1st c.BC Phanigiri Vihara

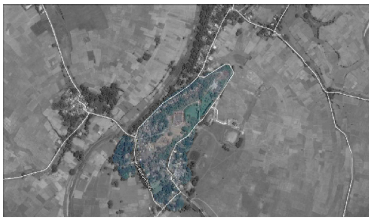


200 AD Nagarjunakunda Vihara



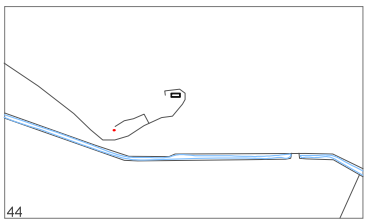


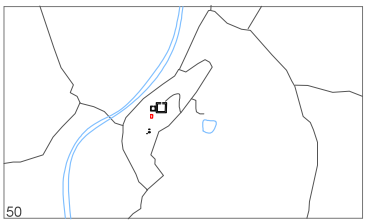
4th c.AD Bajjanakonda Vihara

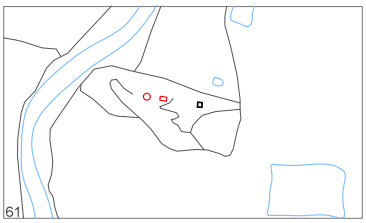


6th c.Ad Ratnagiri Vihara

800 AD Arghyakavarati Vihara







Monastic structure Religious structures Water routes Land routes

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As noted by Nazimuddin,

'' They were symmetrically planned, quadrangular and massively built independent monasteries with a well protected single gateway complex, comparable to a defensive fortress, rather than a religious establishment. ''[10]

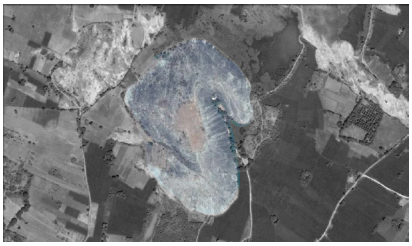
While in the beginning, the seclusion in some of these major Viharas were achieved through topographical segregation; in much later phase, this sense of seclusion even in flat lands, can be identified through an introvert enclosed complex with a single entrance, alike 'Somapura Mahavihara'.

Fig 14 (adjacent page)
Topographical influence in formal expression of Viharas.

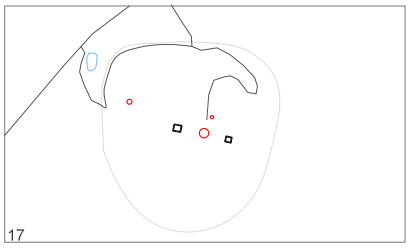
source: satellite image, Google Earth 2014;
www.monastic-asia.wikidot.com
© Tamanna Ahmed drawing, 2015.

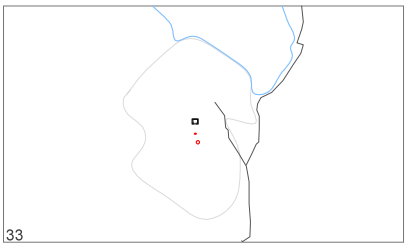
[10] Ahmed, Nazimuddin. *Discover the monuments of Bangladesh.* The University Press Limited. Dhaka. 1984. p.49.

3rd c.BC Sanchi stupa and Vihara



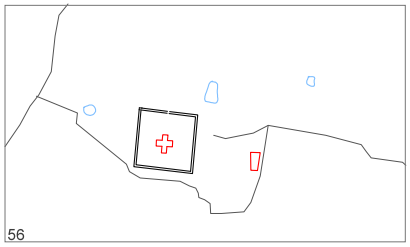
1st c.BC Phanigiri Vihara

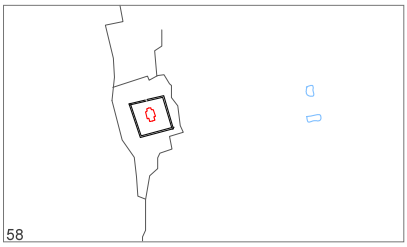


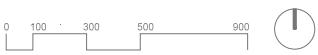


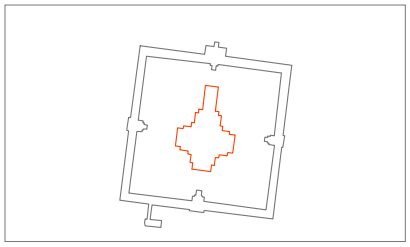
770 AD Somapura Mahavihara

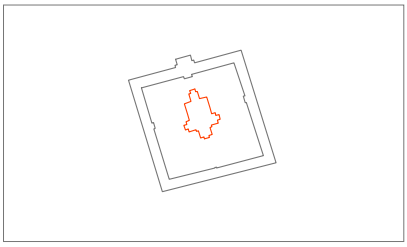
8th c.AD Salbon Vihara











Monastic structure Religious structures

The indirect entrances of these Viharas were as well supported by their topographical definition in locating their forms. In early phases of Vihara architecture, the location of Viharas in isolated higher altitudes within its topography ensured the sacredness and higher power, which in much later phase had been transferred in flat land Viharas, through indirect means of stairs towards its grand single entrances; as 'Somapura Mahavihara' (770 AD).

Fig 15 (adjacent page)
Comparative analysis of Entrance approach - 01

source: satellite image, Google Earth 2014;
www.monastic-asia.wikidot.com

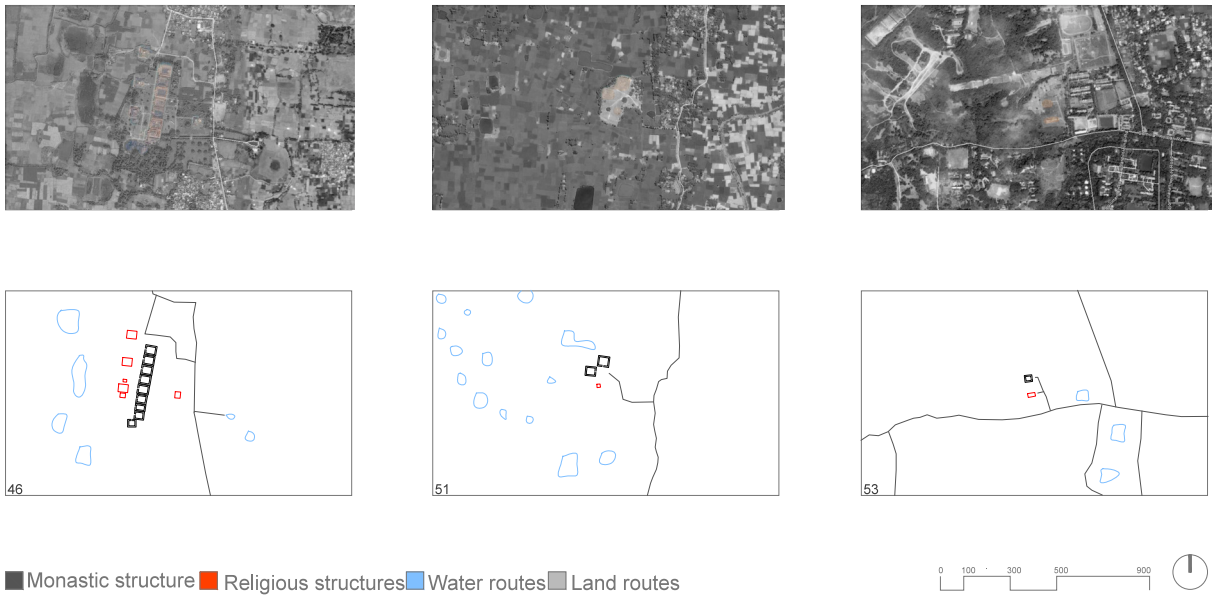


Fig 16
Comparative analysis of Entrance approach - 02.

source: satellite image, Google Earth 2014;
www.monastic-asia.wikidot.com
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However, it is noticed that, this character of translating the highness of the complex by means of built stairs are more prominent where the Vihara is combined with the religious structure. As seen, the following viharas, where the religion forms are separated from that of Vihara part, the total complex has been considered in a prior location, rather means of built stairs for each separately.

In terms of the entrance orientation of the building, it is noticed that the closer their location to the north-eastern part of ancient Bengal, the more they started following the North--South axis maintaining the importance of 1st light of the day on its eastern sides.

The study of vernacular settlement pattern of the region, further determines the significance of north-south orientation of the built forms for climatic considerations. In such planning, the courtyard plays significant role in terms of symbolic value as an introverted, private and intimate open-to-sky space synthesising the culture, climate and nature altogether.

The courtyard is a symbol of regional and vernacular architectural identity since history, with following functions:
• north-south axial planning with indirect entry from the corner points;
• verandah as buffer zone between living quarters and courtyard, introverted towards interior;
• maximizing cross-ventilation by drawing air within the

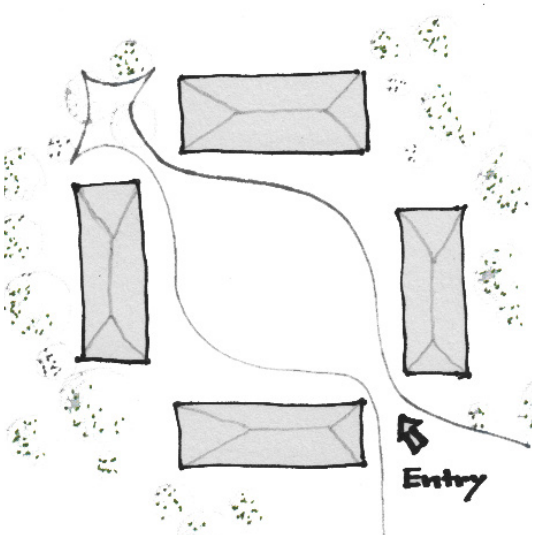


Fig 17
Vernacular homestead pattern of rural Bengal.
© Tamanna Ahmed drawing, 2015.

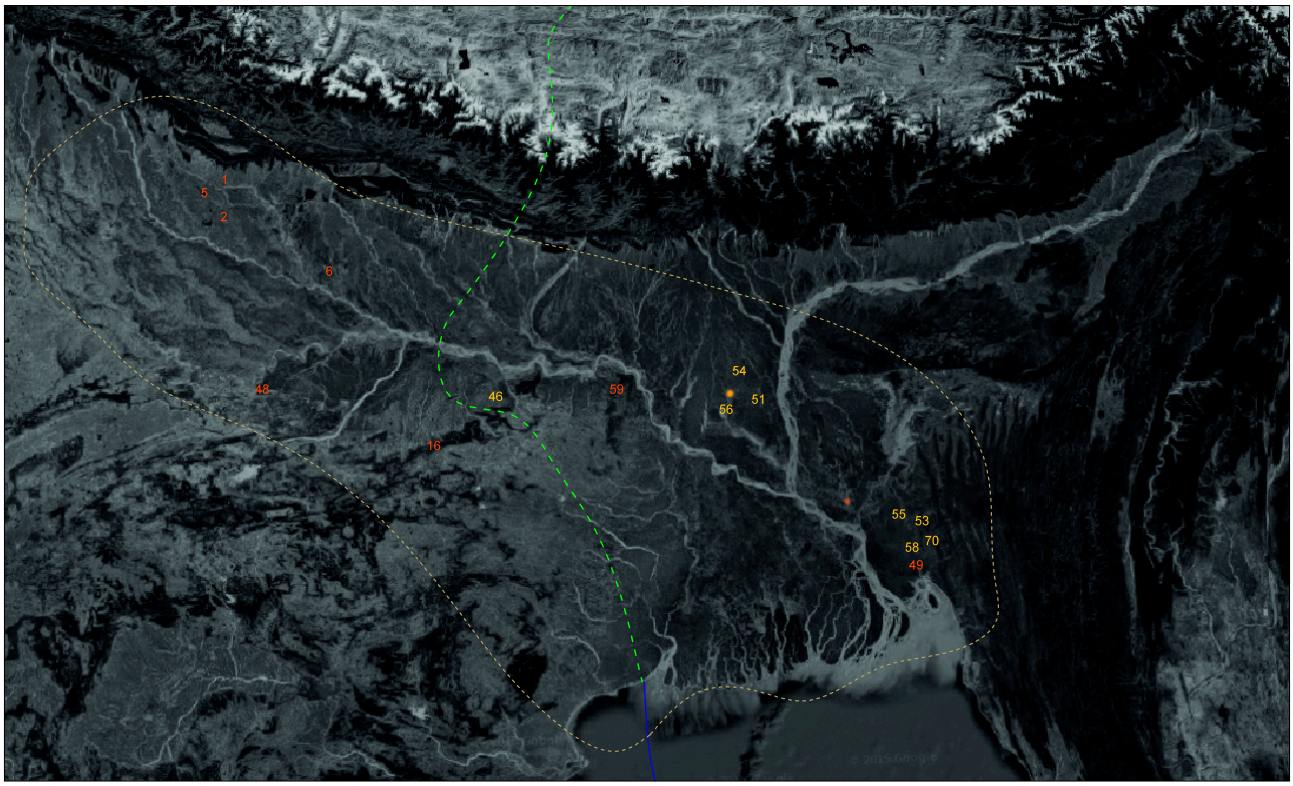
courtyard to distribute the air in context of the humid climate, assuring thermal comfort;
• surrounded by trees, bamboo mats etc for sound buffering and privacy;
• open-to-sky private area with social events, household chores etc.

It is interesting to trace the similar orienttion of rural settlement pattern with the orientation of Vihara architecture in ancient Bengal. This view as well is prominent in Chinese cosmologies that determine the settlement pattern and influence the
orientation of Buddhist monastic temples as well.

As Emily Lyle noted,
'' Therefore, from a bird's eye view it appears that traditional Chinese cosmological views are dominant in the overall structure and the temple is devoid of specifically Buddha influence. ''[11]

Hence, the vernacular settlement pattern of the region were a vital force in orienting these Viharas, since its the reflection of the climatic adaptation through efficient building orientation.

[11] Lyle, Emily. *Sacred Architecture in the tradition of India, China , Judaism and Islam*. Edinburg University Press. 1992. p.71.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1.3 Formal expression

'Somapura Mahavihara' inherited certain features evolved through the evolution process of Vihara architecture within a time frame of 530 BC to 770 AD.

Apart from the formal expression regarding scale, orientation, approach and religious-secular building typology within the selected Viharas, the elements responsible in this process providing identity to this remarkable achievement of Pala dynasty (750 AD - 1155 AD) is an important search of this research.

In this connection, several Viharas of conventional time period has been selected, based on their availability of resources; as highlighted in the adjacent map.

Fig 18 (adjacent page)
Topographical location of selected Viharas of ancient Bengal with domain of Pala Dynasty (750AD - 1155AD)

source: satellite image, Google Earth 2014;
www.monastic-asia.wikidot.com
© Tamanna Ahmed drawing, 2015.

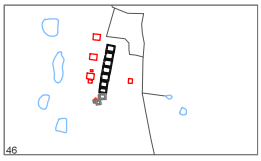
- Selected 8 Viharas
- Other viharas
- Water route
- Land route

46	Nalanda Mahavihara, IN	400 AD
51	Vasu Bihara, BD	650 AD
53	Itakhola Mura, BD	7th c. AD
54	Sitakot Bihara, BD	7th c. AD
55	Ananda Bihara, BD	7th c. AD
56	Somapura Mahavihara, BD	770 AD
58	Salbon Bihara, BD	8th c. AD
70	Bhoja Bihara, BD	1220 AD

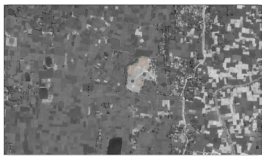
location

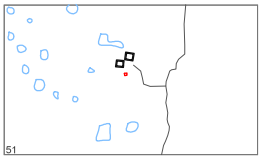
building to context

400 AD Nalanda Mahavihara

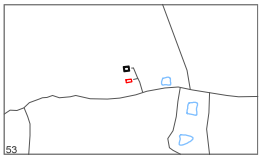


650 AD Vasu Vihara

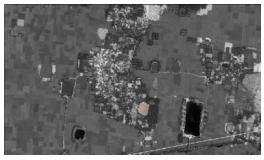


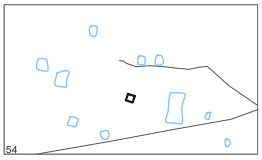


7th c.AD Itakhola Vihara

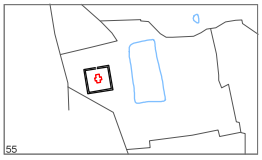


7th c.AD Sitakot Vihara

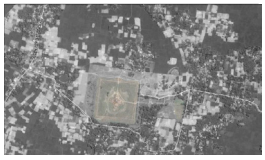


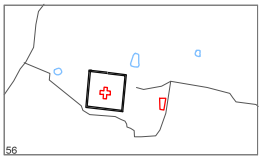


7th c.AD Ananda Vihara

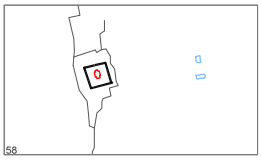


770 AD Somapura Mahavihara

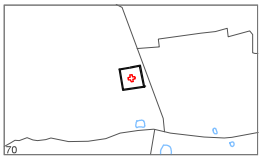


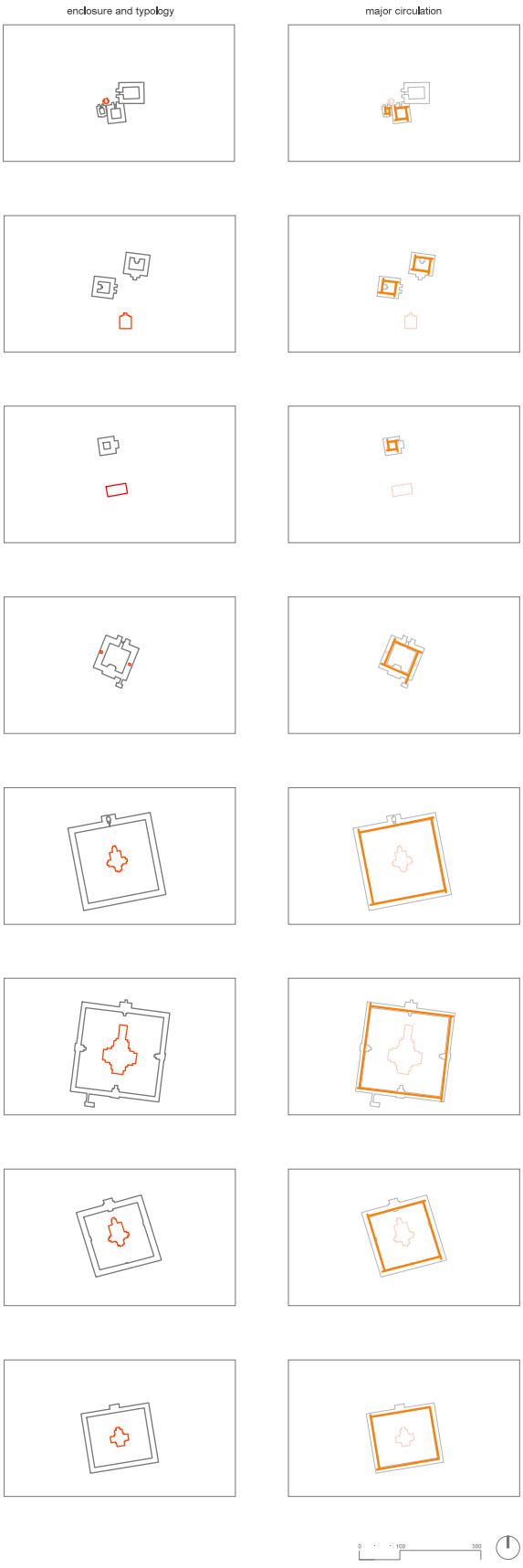


8th c.AD Salbon Vihara



1220 AD Bhoja Vihara





The selected Viharas of comparison are mostly situated in present Bangladesh, since these Viharas are adopted with the vernacular architecture of the region according to the similar climate they were subjected to. The adjacent comparison provides understanding in their formal expression and spatial organization.

Regarding the spatial organization, these Viharas mostly reflect the vernacular formal expression of the region adopted with climatic factors. The comparative study of these Viharas thus enhance the attempt of contexual foothold.

In this comparative study, it is also noteworthy that, 'Somapura Mahavihara' was one of the greatest achievement of Vihara architecture as pronounced by its grandness in scale and functional richness.

Fig 19 Comparative study of selected Viharas with 'Somapura Mahavihara' (770 AD).

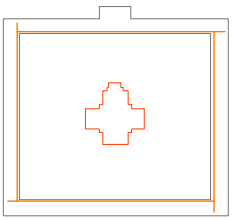
source: satellite image, Google Earth 2014; www.monastic-asia.wikidot.com

Wheel - of - Law

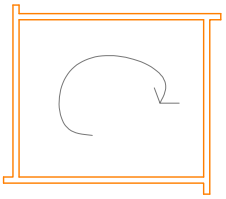
Nalanda Sealing

Somapura sealing

Mandala



Pin-wheel corridor



clock-wise rotation

By comparing these Viharas, it is noticed that, the allocation of the Temple echoes the significance of 1st light of the day, while the Vihara part orient itself according to the Temple. In combined form of Temple & Vihara, with a courtyard in the middle, the spatial organisation vividly represent the vernacular settlement pattern of the region, with the significance of North-South axis and the courtyard.

The pinwheel pattern of the corridor, as noticed in all these compared Viharas, has a significant meaning which is a marriage between Religious symbolism and functional rationalism; within the belief of 'Vajrayana Mahayana Buddhism'.

As quoted,
'' Symbolism is a very important component of the Vajrayana and in the process of enlightenment.''[12]

'' Another important icon in Vajrayana religious symbolisms is the Mandala (circle)… a Mandala is often depicted as a circle or set of circles circumscribed inside a square having four gates on the four sides. ''[13]

The pinwheel pattern echoes the clock - wise rotation which as well is the direction of the 'Dharmachakra' or 'wheel of law' , while the total spatial organization with four gates at four cardinal points depicts the symbolic meaning of the 'Mandala', synthesizing the sacred Symbol within Functional rationalism of the establishment.

Fig 20 (adjacent page)
Symbols of Buddhism in planning Viharas.

source: Archaeology museum, Naogaon, Bangladesh; www.victoriaprehn.com

[12] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.23.

[13] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.24.

The 'wheel of law' is the eight-fold path for cessation of suffering believed in Buddhism, symbol of which has been found in different significant archaeological evidences from these Viharas of consideration.

According to the archaeological evidence as found in room-2 of 'Somapura Mahavihara',
'' These sealings show a representation of the Buddhist wheel-of-law flanked by two deer in the upper register and the legend in the lower. ''[14]

And one of the black stone relief as found in 'Somapura Mahavihara',
'' One represents Buddha seated on a long-stemmed lotus, turning the 'wheel-of-law' surrounded by a host of other Buddhist Gods… ''[15]

The stamped terracotta seals found in 'Vasu Vihara' remarks,
''… often bearing the Dharmachakra (wheel-of-law) with two seated deers on either side. ''[16]

According to the copper plate inscription found in 'Nalanda Mahavihara',
''… bearing an emblem, Dharmachakra (wheel-of-law), flanked by two gazelles, which is the insignia of Nalanda.''[17]

General observation of the Viharas of ancient Bengal can well be remarked by Sir Banister Fletcher,
'' Capitals were usually bell-shaped and crowned with animal supporters bearing the Buddhist Chakra : the wheel-of-law.''[18]

[14] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.20.

[15] Ahmed, Nazimuddin. *Discover the monuments of Bangladesh.* The University Press Limited. Dhaka. 1984. p.77.

[16] Ahmed, Nazimuddin. *Discover the monuments of Bangladesh.* The University Press Limited. Dhaka. 1984. p.55.

[17] Thakur, Upendra. *Buddhist Cities in Early India.* Sandeep Prakashan. Delhi. 1995. p.88.

[18] Musgrove,John. *Sir Banister Fletcher's a history of Architecture (19th edition).* CBS Publishers & Distributers. Delhi. 1987. p.764.

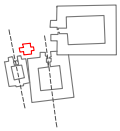
These observations remark the significance of wheel-of-law according to the doctrine and practise of Buddhism. The reason behind the pin-wheel-pattern circulation with its building organization not only reflect the vernacular settlement pattern, but also significantly combines the sacred Symbolism of Buddhism.

These amalgamation of different dimensions in 'Somapura Mahavihara' is interesting that echo the firm belief of the dwellers while solving the functionality of the edifice. Its not a mere resemblance of symbolism but a marriage between functional rationalism and religious symbolism, synthesizing the vernacularism to pronounce its existential foothold.

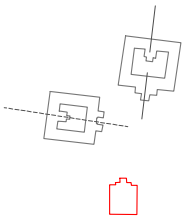
'' Dwelling therefore implies something more than 'shelter'. It implies that the spaces where life occurs are places, in the true sense of the world. ''[19]

To portray the singularity of 'Somapura Mahavihara', further analysis of selected Viharas, has been organised by elemental analysis in order for a clear understanding of the formation of 'Somapura Mahavihara' of VIII century AD, in the following sub-chapters.

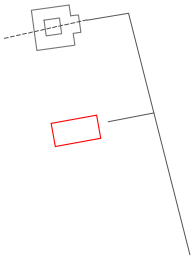
[19] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture.* Academy Editions, London. 1980. p.05.



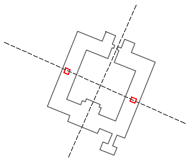
400 AD Nalanda Mahavihara (partial)



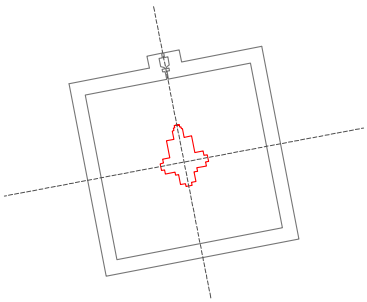
650 AD Vasu Vihara



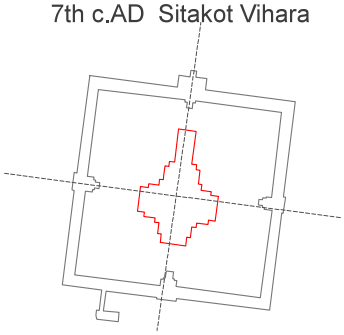
7th c.AD Itakhola Vihara



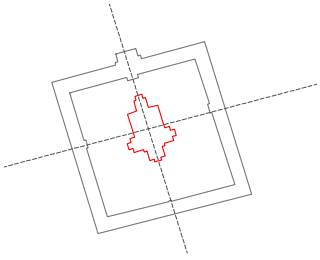
7th c.AD Sitakot Vihara



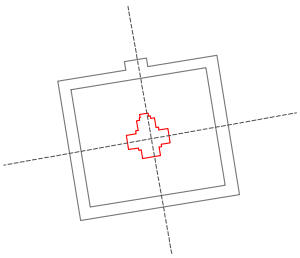
7th c.AD Ananda Vihara



770 AD Somapura Mahavihara



8th c.AD Salbon Vihara



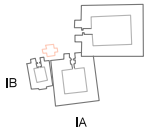
1220 AD Bhoja Vihara

1.3.1 Enclosure

Enclosure of these Viharas are formed by the multiplied formation of single cell units. These enclosures vary in their size depending on the number of cells & offered facilities. Understanding their mass with symmetry/balance refer to their relationships of a real or implied axis.

Fig 21 (adjacent page)
Massing and Symmetry of selected Viharas.

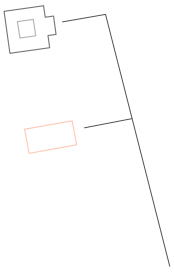
source: Archaeology Dept., Govt. of Bangladesh.
AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p.52,56.
ALAM, Shamsul (1976), *Mainamati,* Dhaka: Department of Archaeology and Museum - Bangladesh Government. p.35.
PHUOC, Le Huu (2010), *Buddhist Architecture*, United States: Grafikol. p.63.
RAHMAN, Habibur (1992), *Itakhola Bihar*, Comilla: Department of Archeology, Bangladesh Government. p.27,30.



IA = 43.83 X 43.83

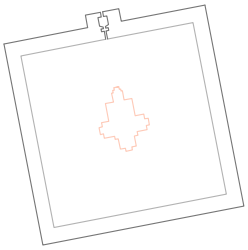
IB = 21.65 X 30.49

400 AD Nalanda Mahavihara (partial)



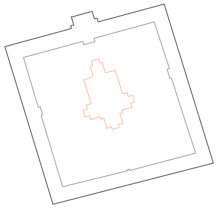
39.67 X 39.67

7th c.AD Itakhola Vihara



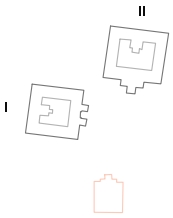
198 X 198

7th c.AD Ananda Vihara



167.60 X 167.60

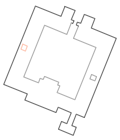
8th c.AD Salbon Vihara



I = 148.13 X 139

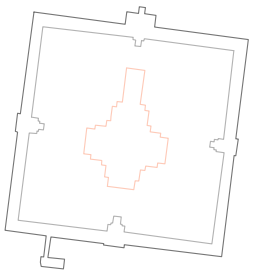
II = 56.40 X 49.10

650 AD Vasu Vihara



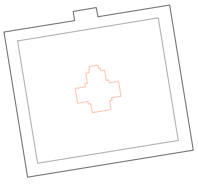
64.11 X 65.23

7th c.AD Sitakot Vihara



218 X 218

770 AD Somapura Mahavihara



137.20 X 137.20

1220 AD Bhoja Vihara

It is evident that, these Viharas mostly are quadrangular in shape, while the symmetry provides a sense of balance in their formation of planning. The strict axial planning of these Viharas in later periods echoes the balanced religious symbol 'Mandala' of Buddhism. The significance of centre, had been synthesized by the location of the Temple, while emphasizing the axis through their planning of functional elements.

In symbolic meaning, to dwell in centre within axial planning, embodies micro-cosmic relation to man on earth, as enhanced in these viharas.

'' To confirm to tradition is to keep faith with the origin, and for that very reason it is to be situated at the centre; it is to dwell in the primordial purity and in the universal norm.''[20]

Fig 22 (adjacent page)
Geometry and Proportion of selected Viharas.

source: Archaeology Dept., Govt. of Bangladesh.
AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p.52,56.
ALAM, Shamsul (1976), *Mainamati;* Dhaka: Department of Archaeology and Museum - Bangladesh Government. p.35.
PHUOC, Le Huu (2010), *Buddhist Architecture*, United States: Grafikol. p.63.
RAHMAN, Habibur (1992), *Itakhola Bihar*; Comilla: Department of Archeology, Bangladesh Government. p.27,30.

[20] Schuou, Frithjof. *Light of the Ancient Worlds.* Prennial Books,London. 1965. p.07.

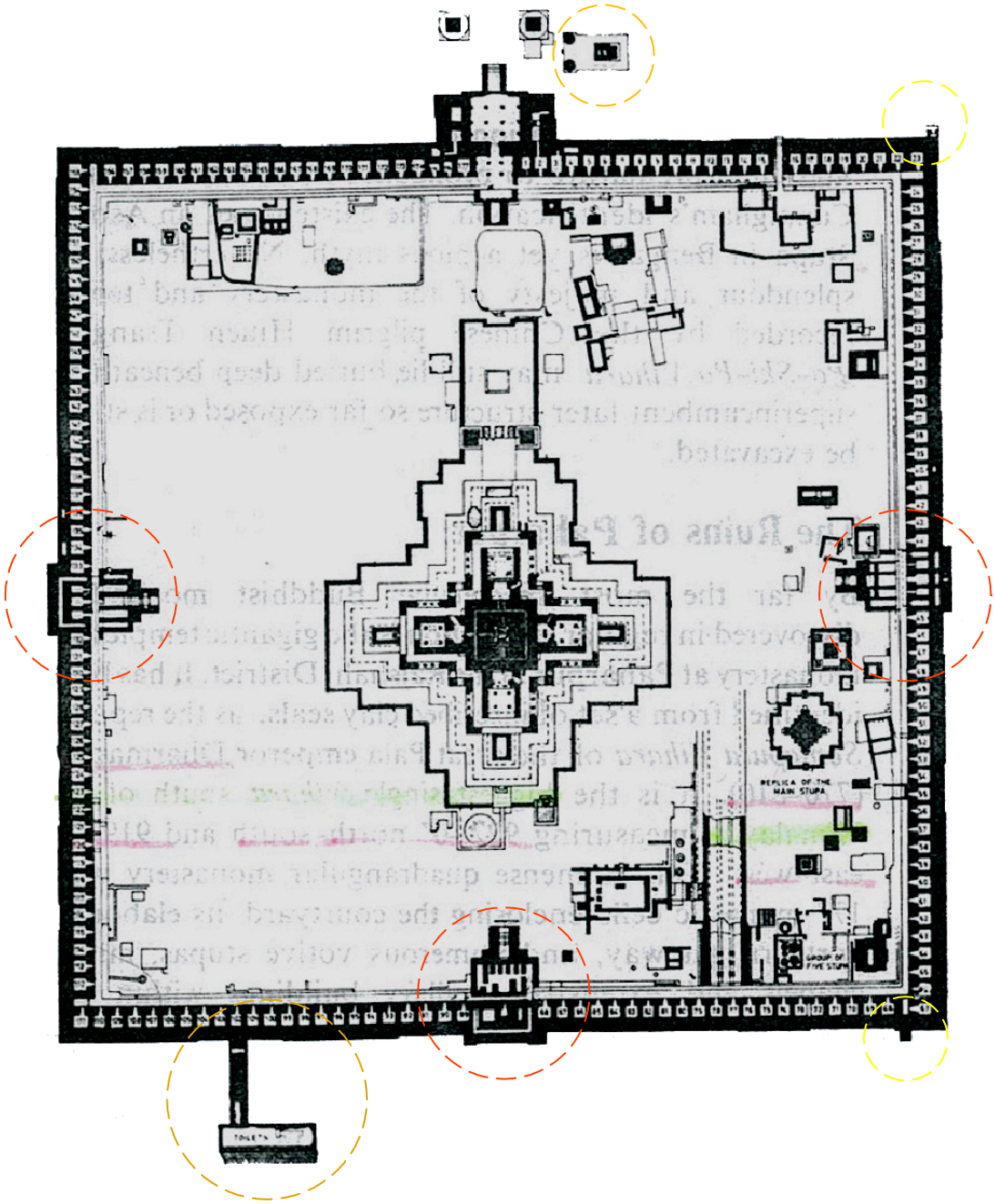


Image shrine entrance outer room corner stage toilet structure

0 25 75

It is observed that, in all of these Viharas, the square is the Parti; meaning the generator of the total form; that plays the significant role in formation of Viharas being the possible efficient building form of a circle, to incorporate living.

The sense of circle in 'wheel-of-law' and 'Mandala' thus merge into one solution of efficient built form in these Viharas. The datum of these enclosures can well be observed is the Toilet, as in 'Somapura Mahavihara' & 'Sitakot Vihara' on the south part of the establishment.It resemblance the location of toilet in vernacular settlement pattern, often outside the main structure. The presence of toilet in these Viharas thus remark the sense of hygiene and organized planning of their total establishment.

The comparative study of enclosure defines certain singular features of 'Somapura Mahavihara' as portrayed in the adjacent schematic.

The special structural addition on both the north & south outer enclosure wall in 'Somapura Mahavihara', has been identified in archaeological reports by K.N. Dikshit as,

'' … to the north of rampart wall and in a line with the eastern wall appears a rectangular structure of bricks laid on edge, as in a landing stage …. A similar passage has been found at the southeastern corner of the monastery removed 34' (approx. 10.37m) from the south-east corner, where the steps of the passage are quite clear. ''[21]

Fig 23 (adjacent page)
Singular features in enclosure of 'Somapura Mahavihara'.

source: AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p.56.

[21] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55*. Dept. of Archaeology Govt. of India. Delhi. 1938. p.23.

Also, *'' In the verandah to the east of the southern row of cells we find a flight of steps 3'4'' (approx. 1.07m) wide which provided access to the top of the rampart wall. On the other side of the wall there is a landing 11'-6''(approx. 3.51m) wide, standing against the exterior face of the wall. ''*[22]

According to the archaeological evidence, it is clear that the rampart wall was accessible through the corner towers. The probable assumption of its function can be guarding the monastic settlement.

As about the 'Nalanda Mahavihara' of same dynasty, it refers, *'' The fortress like constructions of these immense monasteries could also be for defensive purposes and places of refuge in the time of war and, government soldiers reportedly guarded these monasteries. ''*[23]

And in general the monasteries of Pala period refers, *'' Structurally the Pala period was the most important. Massive walls, large residential buildings, a lotus-shaped kunda or temple-pit with four stone pillar bases around it, and a strong defensive wall with bastions, were its major structural features. ''*[24]

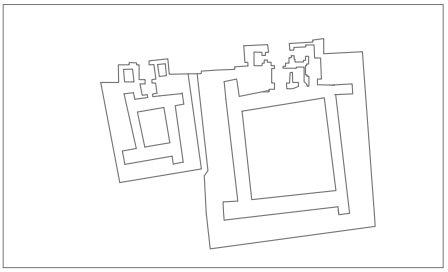
All these references formulate the assumption of guarding the total establishment climbing in top of the rampart wall (almost 0.41m in depth), through those corner towers, as well for maintenance purposes.

Fig 24 (adjacent page)
Looking from the main Temple to the main entrance of 'Somapura Mahavihara' (770 AD).

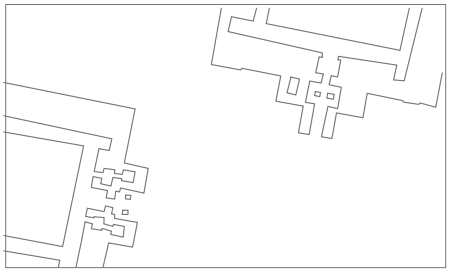
[22] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.28.

[23] Dutt, Sukumar. *Buddhist Monks and Monasteries of India: their history and contribution to Indian culture.* George Allen and Unwin Ltd. London.1962. p.357.

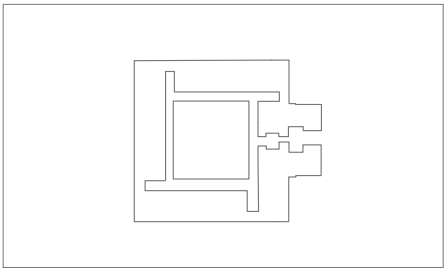
[24] Chakrabarti, Dilip K. *Archaeological Geography of the Ganga Plain.* Permanent Black. Delhi. 2001. p.91-92.



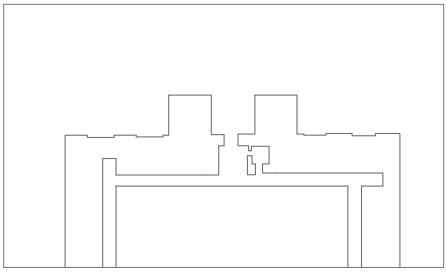
400 AD Nalanda Mahavihara (partial)



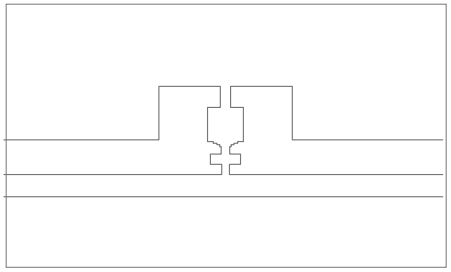
650 AD Vasu Vihara



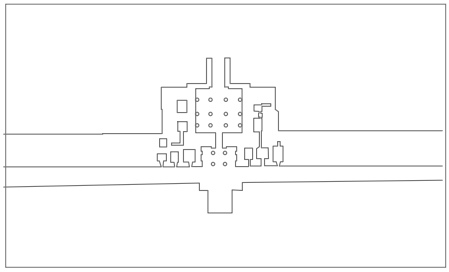
7th c.AD Itakhola Vihara



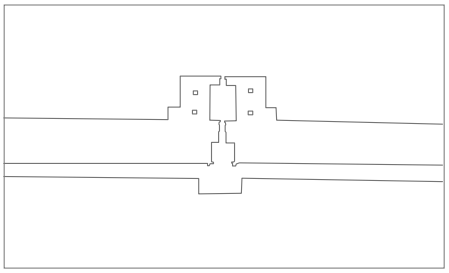
7th c.AD Sitakot Vihara



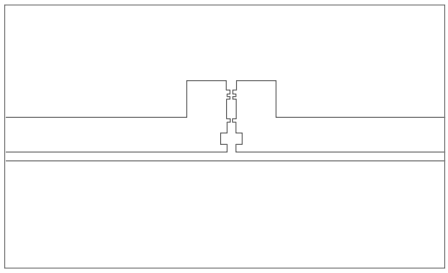
7th c.AD Ananda Vihara



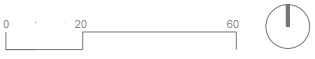
770 AD Somapura Mahavihara



8th c.AD Salbon Vihara



1220 AD Bhoja Vihara



1.3.2 Entrance

Entrance of these viharas were the most significant threshold that connects the outside world with the inside world of enlightenment. In comparative studies of these Viharas, it is evident that mostly they had one main entrance, whereas in 'Somapura Mahavihara', other than the main entrance, two subsidiary entrances had been found. In 'Somapura Mahavihara', the main entrance is flanked by two stupas, believed to eliminate the evil spirits or guarding the establishment spiritually. These kind of structures i.e. votive stupas can as well be found in other viharas within various locations.

There remain another structure on the north-east of the main entrance, which is referred by archaeologist K.N. Dikshit as, *" …outside the enclosure one of which on the east probably served as a waiting hall or accommodated the guards of the establishment. Others, such as the two circular structures standing on a square base flanking the staircase were votive in character. "*[25]

The presence of guard room close to the main entrance and the corner tower in northeast side of the enclosure can well be understood with the purpose of guarding the edifice of significance. Hence it is probable that the structure was for the guards with a waiting hall for the visitors, pilgrims to enter into this significant establishment of Pala dynasty. The main entrance of 'Somapura Mahavihara' through pillared hall-rooms after a flight of steps, provides an indirect approach through level change; which resemblance the topographical seclusion through higher altitudes in older context. Through the comparative study, the spatial formation of the Entrance can well be understood.

Fig 25 (adjacent page)
comparative analysis of entrances of selected Viharas.

source: Archaeology Dept., Govt. of Bangladesh.
AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p.52,56.
ALAM, Shamsul (1976), *Mainamati,* Dhaka: Department of Archaeology and Museum - Bangladesh Government. p.35.
PHUOC, Le Huu (2010), *Buddhist Architecture*, United States: Grafikol. p.63.
RAHMAN, Habibur (1992), *Itakhola Bihar*; Comilla: Department of Archeology, Bangladesh Government. p.27,30.
© Tamanna Ahmed drawing, 2015.

[25] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55*. Dept. of Archaeology Govt. of India. Delhi. 1938. p.18.

It is evident that, the entrances were organized through two hall-rooms, sometimes pillared or not, as a space of preparation within the threshold. Being grand in scale, the entrance of 'Somapura Mahavihara' shows more complexity than that of the other compared ones.

In most cases, the entrance is flanked by two rooms on both sides that is connected with interior cells, rather to the entrance hall room. It can therefore be assumed that these rooms were guard rooms or control rooms through window/small openings for visual connection to the entrance hall, while the guard/controller sleeps in the adjacent cells.

According to Hsuan-tsang about Nalanda Mahavihara,
'' If men of other quarter desire to enter and take part in the discussions, the keeper of the gate proposes some hard questions; many are unable to answer and retire. One must have studied deeply both the old and new (books) before getting admission. ''[26]

This referred the entrance flanked with rooms of keepers that take the test of the monk before entering from one quarter to another as it was a university, a place of education and discussion. In other Viharas, similar rooms have been found on entrance. In 'Itakhola Vihara' it is mentioned that,
'' For the sake of defence, the rear wall had been with such thickness, while through a single entrance with guardrooms, the total establishment had been protected. ''[27]

[26] Dutt, Sukumar. *Buddhist Monks and Monasteries of India: their history and contribution to Indian culture*. George Allen and Unwin Ltd. London.1962. p.332.

[27] Rahman, Habibur. *Itakhola Bihar*. Dept. of archaeology, Govt. of Bangladesh. Comilla. 1992. p.32
(translated by the author)

While about the Salbon Vihara, the assumption refers, *''The entrance hall is flanked on both sides by two guard rooms (?) followed by the monastic cells.''*[28]

All these references support the existence of guard rooms or control rooms in the entrance, as a part of defensive system of the total edifice. The archaeological report of 'Somapura Mahavihara' referred,
''… the cells situated immediately to the east side of the outer hall of the gateway…was probably used as an office or strong room by the head or elder of the Mahavihara. The main passage to this room, which was originally through room 2, was 4'(approx. 1.22m) wide…. In the east wall of this room was a recessed opening probably serving as a window.''[29]

It seems that the important monks was in need of visual connection with the guard room outside as situated on the north-west side of the main entrance. It is noteworthy that, the same room was made of thick plaster by strong Surkhe (powdered brick, brick chips and lime) not met elsewhere in the total establishment of 'Somapura Mahavihara', where the richest antiquities had so far been recovered.[30]

About the similar cell on the west of the main entrance adjacent to cell no.176, 177; it is to mention that, ''…the complex of the rooms 176 and 177, which corresponds to the important office room behind room 2, is not quite clear.''[31]

[28] Alam,A.K.M. Shamsul. *Mainamati.* Dept. of archaeology, Govt. of Bangladesh.Dhaka.1976. p.34.

[29] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.19.

[30] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.19.

[31] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.36.


Nagaon - Joypur Rd
1
2
3

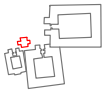
No connection to the main entrance, rather connection with the interior of cells, further clarify the possibility of the guard room outside the main entrance of the edifice, as well sleeping quarter for them. Therefore, the entrance hall of 'Somapura Mahavihara' was not flanked by guard rooms as seen in other Viharas, rather by a separate structure outside the main entrance to guard this vast establishment.

It is noteworthy that, 'Somapura Mahavihara' had two other entrances more private in nature; which has not been commonly found in other Viharas of the region. The second entrance on the north-western side and the third entrance built in later phase (similar to the Tara Temple (10th - 12thc. AD)) provided functioning of the establishment within its life span of around 400 years.

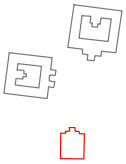
These entrances provide singularity to 'Somapura Mahavihara', while responding to the demanded rituals in daily life of the vast Buddhist community dwelling in the reign of Pala dynasty in the land of ancient Bengal.

Fig 26 (adjacent page)
schematic of 'Somapura Mahavihara' Entrances.

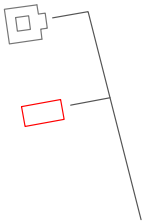
source: satellite image, Google Earth 2014;
AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p.56.



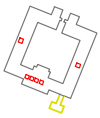
400 AD Nalanda Mahavihara (partial)



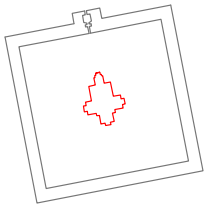
650 AD Vasu Vihara



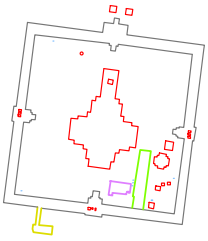
7th c.AD Itakhola Vihara



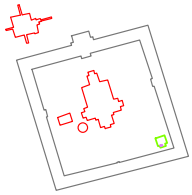
7th c.AD Sitakot Vihara



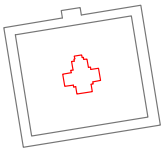
7th c.AD Ananda Vihara



770 AD Somapura Mahavihara



8th c.AD Salbon Vihara



1220 AD Bhoja Vihara

enclosure religious structures Dining Kitchen Toilet Water body Path

0 100 300

1.3.3 Zoning and Circulation

The zoning of different functions within the quadrangular enclosure of these Viharas echoes the belief of the dwellers merged with their functional rationalism.

The space definition through zoning of selected Viharas are highlighted in the adjacent page.

Fig 27 (adjacent page)
Zoning of selected Viharas.

source: Archaeology Dept., Govt. of Bangladesh.
AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p.52,56.
ALAM, Shamsul (1976), *Mainamati,* Dhaka: Department of Archaeology and Museum - Bangladesh Government. p.35.
PHUOC, Le Huu (2010), *Buddhist Architecture*, United States: Grafikol. p.63.
RAHMAN, Habibur (1992), *Itakhola Bihar*, Comilla: Department of Archeology, Bangladesh Government. p.27,30.

Wheel - of - Law

Mandala

Pin-wheel corridor

Axial planning of
'Somapura Mahavihara', 770AD

It is evident that the courtyard was the heart of these establishments, enhancing the daily activities within the code of Buddhism. This framed space provides a sense of interior open space connoting the outside cosmological world with the interior world of enlightenment.

In 'Somapura Mahavihara', it is interesting to note that, the religious structure through evolution process, adopted its location in the proximate center, determining the axis along with the cardinal points through symbolic gateways (except that of north) of the total establishment. This transformation denotes the 2D Mandala, into 3D Vihara structure dwelled by the firm believers of Buddhism.

This space definition is a marriage between religious symbolism and functional rationalism achieved through the evolution process of Vihara architecture and gave birth to 'Somapura Mahavihara', which had been an example for further Viharas such as Bordubur, Indonesia; Angkorwat, Combodia; Ananda Vihara, Burma and many more.

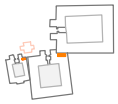
The circulation of these Viharas were planned carefully to provide efficiency into their usages, both in horizontal and vertical. About the vertical circulation and functional zoning of 'Nalanda Mahavihara', it is to note that,

'' Stairs were provided at the four corners and drains were buried beneath the courtyard floor to discharge water to the back of the Viharas; image chapels, wells and hearths were also built in the courtyard while meditation cells, built-in--beds, and niched were also provided in some of the cells.''[32]

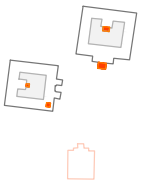
Fig 28 (adjacent page)
space definition remarks the Buddhist Religious symbolisms.

source: Archaeology museum, Naogaon, Bangladesh; www.victoriaprehn.com.
© Tamanna Ahmed drawing, 2015.

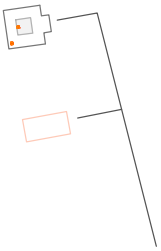
[32] Phuoc,Le Huu. *Buddhist Architecture*. Grafikol. United states of America, 2010. p.62.



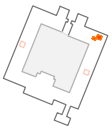
400 AD Nalanda Mahavihara (partial)



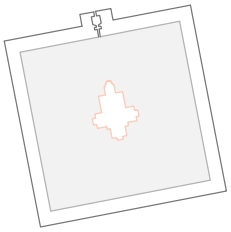
650 AD Vasu Vihara



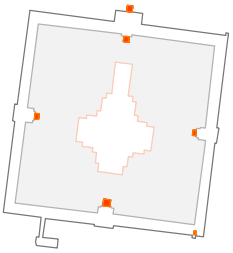
7th c.AD Itakhola Vihara



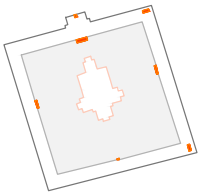
7th c.AD Sitakot Vihara



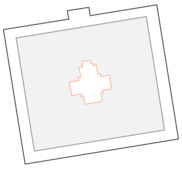
7th c.AD Ananda Vihara



770 AD Somapura Mahavihara



8th c.AD Salbon Vihara



1220 AD Bhoja Vihara

enclosure religious structure courtyard vertical circulation

As 'Nalanda Mahavihara' had different construction phases, Vihara 1A and IB has been taken for comparative study, since it is assumed to be the earliest Vihara of the total establishment, orientates towards the north where the original entrance was likely been located.[33]

The stairs in four corners of 'Nalanda Mahavihara' indicates multi-storied Vihara structure, which had been assured by I-tsing,
'' All these buildings are of brick; they are three stories high, each story being more than 10' (approx. 3.05m) high. ''[34]

The frequency of the stairs in these Viharas indicates the possibility of vertical circulation within them, which is the parameter to determine the storeys of these Viharas. The adjacent schematic represents the existed vertical circulation of the selected Viharas.

Through the comparative study of vertical circulation, it is evident that, the enclosures with four corner staircases had the probability of multi-storeys built form, as been confirmed in 'Nalanda Mahavihara'. In 'Salbon Vihara',about the corner staircases,
'' … only 107 were actually available for monks, the four pair of cells in the corners being occupied by brick staircases. ''[35]

And, *'' The arrangement of the corner staircases in any case appears to be too elaborately made to provide the access to the roof only. ''*[36]

However, on analyzing the phases of Salbon Vihara, it is evident that these corner staircases were inserted only on later phases; Period III (among total phase of Period IV), that has been mentioned in its archaeological report, *'' Ante-chambers were added in the back walls of some cells, brick platforms were placed on the floors and staircase were constructed i the corner rooms.''*[37]

Fig 29 (adjacent page)
Vertical circulation of selected Viharas.

source: Archaeology Dept., Govt. of Bangladesh.
AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p.52,56.
ALAM, Shamsul (1976), *Mainamati,* Dhaka: Department of Archaeology and Museum - Bangladesh Government. p.35.
PHUOC, Le Huu (2010), *Buddhist Architecture*, United States: Grafikol. p.63.
RAHMAN, Habibur (1992), *Itakhola Bihar*, Comilla: Department of Archeology, Bangladesh Government. p.27,30.

[33] Phuoc,Le Huu. *Buddhist Architecture*. Grafikol. United states of America, 2010. p.62.

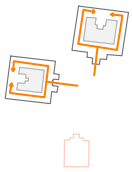
[34] Phuoc,Le Huu. *Buddhist Architecture*. Grafikol. United states of America, 2010. p.65.

[35] Musgrove,John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.45.

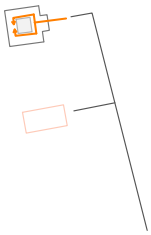
[36] Musgrove,John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.46.

[37] Alam,A.K.M. Shamsul. *Mainamati.* Dept. of archaeology, Govt. of Bangladesh.Dhaka.1976. p.37.

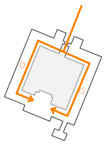
400 AD Nalanda Mahavihara (partial)



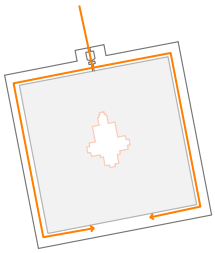
650 AD Vasu Vihara



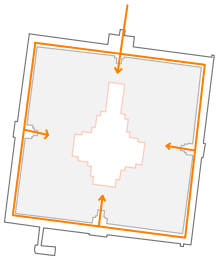
7th c.AD Itakhola Vihara



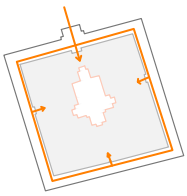
7th c.AD Sitakot Vihara



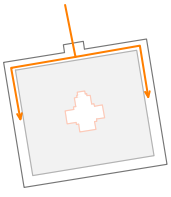
7th c.AD Ananda Vihara



770 AD Somapura Mahavihara



8th c.AD Salbon Vihara



1220 AD Bhoja Vihara

Hence, these indicate that the function of corner stairs were to climb the rampart wall in order to strengthen the defensive system of the total establishment as well for the maintenance purpose. The possibilities of additional storeys in later phases can not be eliminated as well.

In light of these comparative study, 'Somapura Mahavihara' can be assumed as single storey, as it provides only one vertical staircase in its south-eastern corner, as assumed by the archaeological report, *'' In the verandah to the east of the southern rows of cells we find a flight of steps 3'-4'' (approx. 1.02m) wide which provide access to the top of the rampart wall. ''*[38]

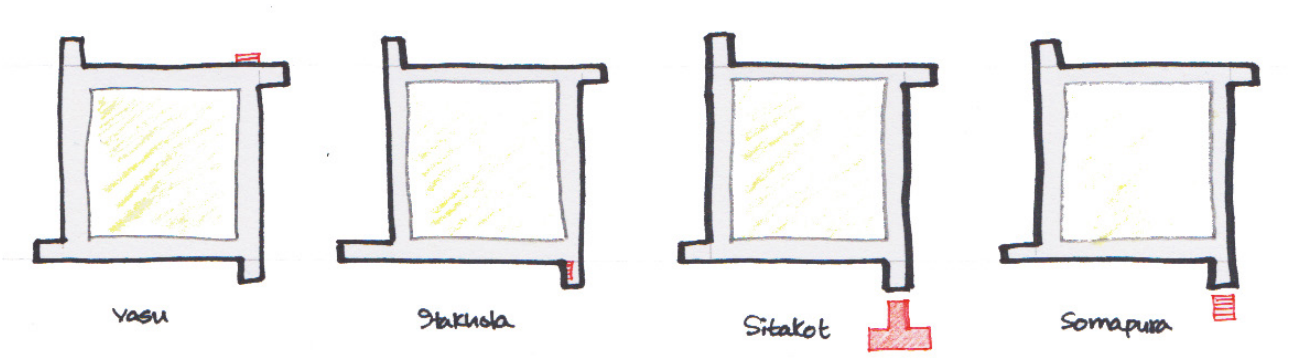
Within its vast complex, trace of one corner stair from the common circulation space, clearly indicates the single story establishment of 'Somapura Mahavihara', and thus the element 'vertical circulation' participates in tracing the disappearing archaeological information.

It is interesting to note that, the access from the verandah to the central Temple is provided by vertical stairs in cardinal points to mark the axis prominently. Here the threshold from interior to the courtyard as well echoes the marriage of functionality with religious symbolism enhancing its axiality through space experience.

Fig 30 (adjacent page)
Comparative study of horizontal circulation.

source: Archaeology Dept., Govt. of Bangladesh.
AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p.52,56.
ALAM, Shamsul (1976), *Mainamati;* Dhaka: Department of Archaeology and Museum - Bangladesh Government. p.35.
PHUOC, Le Huu (2010), *Buddhist Architecture*, United States: Grafikol. p.63.
RAHMAN, Habibur (1992), *Itakhola Bihar*; Comilla: Department of Archeology, Bangladesh Government. p.27,30.

[38] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55*. Dept. of Archaeology Govt. of India. Delhi. 1938. p.28.


Vasu
Stakuola
Sitakot
Somapura

It is noticed that, the Viharas without central temple, has similar horizontal circulation. After entrance, the circulation continues until one reach to the opposite side of the entrance location to get the flight of stairs climbing down the central courtyard. This way, the vertical circulation enhances the symmetry of the total spatial organization.

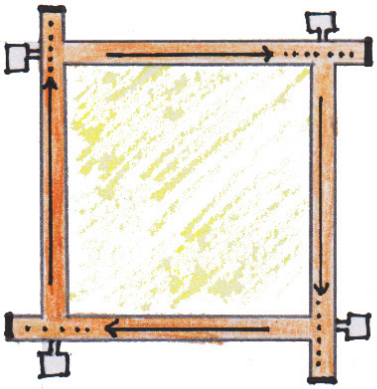
In contrary, the Viharas with proximate central Temple offers a strong axial planning combining the temple in the middle of the axis with vertical access from four cardinal points to its centre.

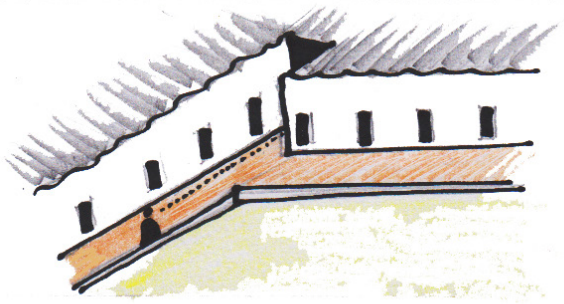
Mostly, the subsidiary functions remain to the opposite side of the main entrance of these viharas, as seen in 'Somapura Mahavihara' and 'Salbon Vihara ', preferably to provide privacy far from the public zone.
The circulation to use, in these Viharas, are through the verandah, arround the courtyard that provide access to the cells. This is the very basic circulation pattern in Vihara Architecture combining the interior and exterior parts visually, while the verandah being used as a buffer zone in-between the semi-public to private zone regarding heat loss in hot dry climate.

It is interesting to relate the circulation space of these Viharas with the space they generate in the corner points. As this circulation through the verandah symbolises Dharmachakra or 'the wheel-of-law' by pin-wheel-pattern, the corner extensions are well utilized to provide efficiency, as well to accommodate common functions like stair, storage etc.

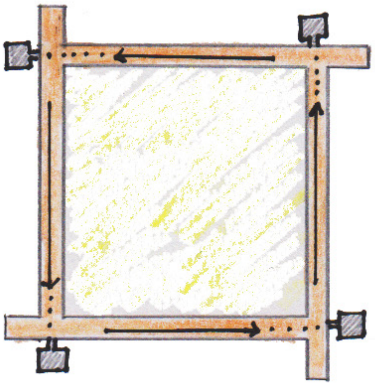
The adjacent study of spatial organization enhance the understanding of this duality, where Functional rationalism converge with Religious symbolism within the studied Viharas of ancient Bengal.

Fig 31 (adjacent page)
Religious symbolism with functional rationalism.





clockwise



anti-clockwise

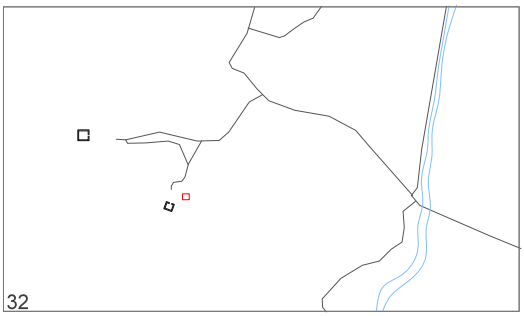
It is noticed that, the pin-wheel-pattern corridor solving the entrance to additional cells is in clock-wise rotation. One who travel in this direction always find an empty space in each arm of the quadrangular complex, that breaks the monotony, emphasizes a direction and enhance the clock-wise rotation combining the significance of 'Dharmachakra' through enriching the space experience, while accomodating common functions in some cases.

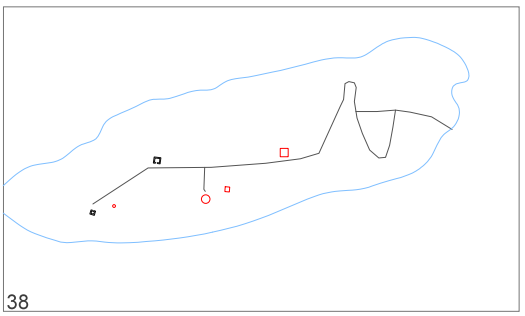
Hence, through the space organization of the cell locations, it encourages experiencing the circulation space in clock-wise direction which offers religious coherence in space experience while providing visual balance by hindrance in monotony. The darkness as born in each of the extended arm of the pin-wheel circulation path further enhance the direction of clock-wise circulation, in contrast to the luminous courtyard. Thus the religious symbolism converge with efficient functionalism providing quality space and meaning to the belief of the dwellers through spatial organization of these Viharas of significance.

Fig 32 (adjacent page)
Analysis of circulation pattern of selected Viharas.

1st c.BC Udaygiri Vihara

200 AD Nagarjunakunda Vihara





1.3.4 Cells

" The earliest type of monastic residence was a single free-standing cell, certain features of which were regulated by Vinaya or code of discipline…. In the next stage of evolution, two or three cells were joined together in a row, as at Udaygiri and Khandagiri (2nd or 1st century B.C.) "[39]

The cell is the basic unit that gave birth to the enclosure - the basis of Vihara Architecture in passage of time. A cell offers a single unit space for the monk/monks to meditate and contemplate. In this connection, cell is the most important element of Vihara Architecture that repeat to form the entire enclosure of the quadrangular Vihara surrounding a courtyard.

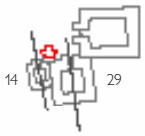
" Monastery 'G' at Taxila and that at Nagarjunakunda are the earliest known free-standing quadrangular monasteries…. Perhaps the most typical is the quadrangular monastery at Takht-i-Bahi (2nd c.BC - 2nd c. AD). "[40]

Fig 33 (adjacent page)
Spatial organization of Udaygiri Vihara and Nagarjunakunda Vihara.

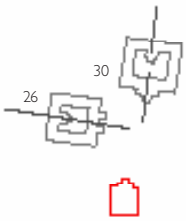
source: satellite image, Google Earth 2014; www.monastic-asia.wikidot.com
© Tamanna Ahmed drawing, 2015.

[39] Musgrove,John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.761.

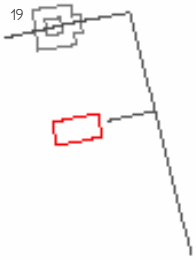
[40] Musgrove,John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.761-762.



400 AD Nalanda Mahavihara (partial)

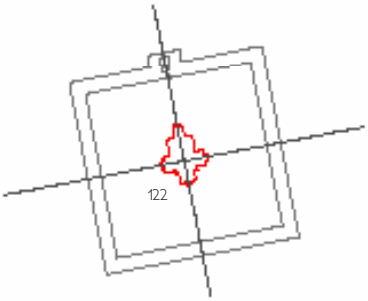


650 AD Vasu Vihara

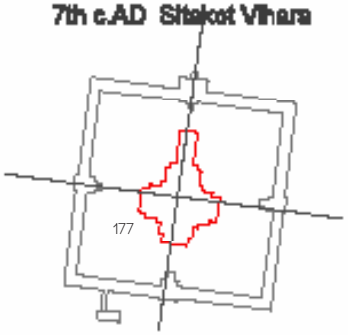


7th c.AD Itakhola Vihara

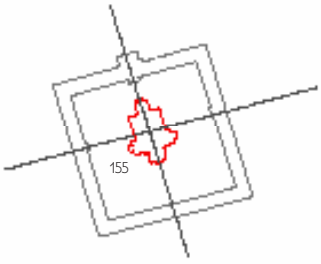
7th c.AD Sitakot Vihara



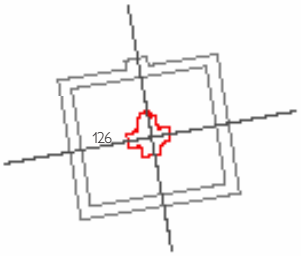
7th c.AD Ananda Vihara



770 AD Somapura Mahavihara



8th c.AD Salbon Vihara



1220 AD Bhoja Vihara

To understand this significant element of Vihara architecture selected Viharas have been analyzed for a clear understanding of their cell configuration within their spatial establishment.

It is interesting to note that, the number of cells of each Vihara were calculated precisely in order to form the quadrangular enclosure. The type of cells generated dependent on the number of users and their adaptation to these spaces over time.

It is noticed that, the marking of axis in cardinal points of 'Somapura Mahavihara' had been emphasized through extended exterior wall feature, not commonly seen in other viharas, hence can be identified as another unique feature. These cardinal point with image shrines, marks the significance of axial planning of 'Somapura Mahavihara' as well by locating the Temple in its proximate center.

In 'Somapura Mahavihara', 92 cells among 177, were found with ornamental pedestals which are believed to be from later period, used as private worship places for the monks, rather as sleeping unit.

In the same time period the Tara temple, located around 300m east of 'Somapura Mahavihara', is believed to be constructed. These indicate the extension and alteration in religious practice witjin the different time period of its establishment.

Fig 34 (adjacent page)
Numerology and typical dimension of cells.

source: Archaeology Dept., Govt. of Bangladesh.
AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p.52,56.
ALAM, Shamsul (1976), *Mainamati,* Dhaka: Department of Archaeology and Museum - Bangladesh Government. p.35.
PHUOC, Le Huu (2010), *Buddhist Architecture*, United States: Grafikol. p.63.
RAHMAN, Habibur (1992), *Itakhola Bihar*, Comilla: Department of Archeology, Bangladesh Government. p.27,30.

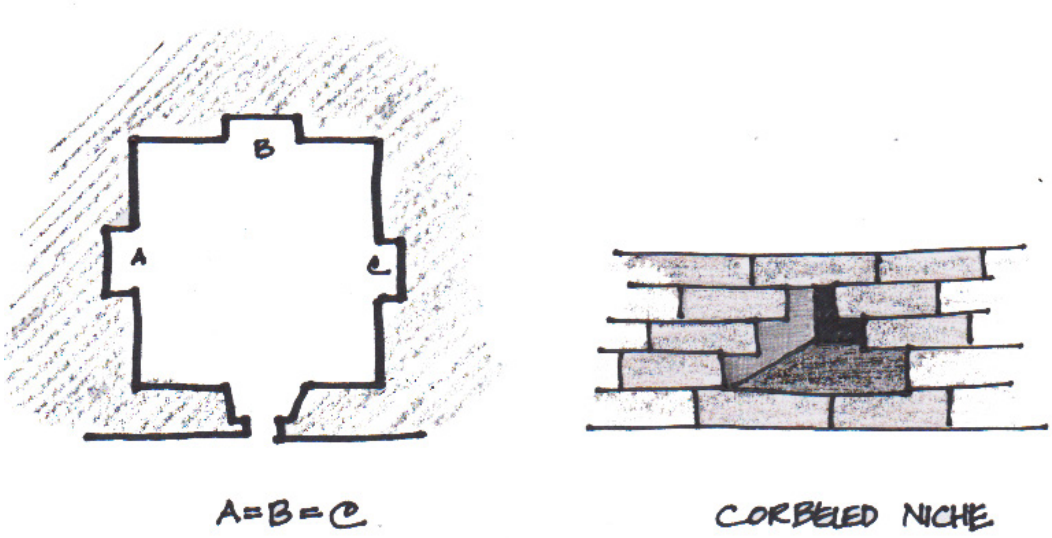


Fig 35
Space organization of cell unit of 'Sitakot vihara' and the niche configuration according to Archaeological data.
© Tamanna Ahmed drawing, 2015.

'' About the end of the 10th century or beginning of the 11th century…in the monastic cells where a number of ornamental pedestals seem to have been installed and the shrine of Tara in the 'Satyapir Bhita', numerous votive stupas were constructed. ''[41]

It is noticeable that, despite the size of the Vihara enclosure, the size of its single unit i.e. Cell, remains similar to comply the living facilities.

This dimension of cell as well shows the significance of square form that is echoed to the entire enclosure forming quadrangular shape as a whole. Hence, the single unit of square form is carefully planned to form the quadrangular enclosure of the intended Vihara. Moreover, the space definition of the cells in each Viharas, offer some variations depending on their usages.

To shed light on further detail of the cell configuration of these Viharas, the archaeological evidences have been analyzed to portray their structural configuration.

About further detail of the cell unit of 'Nalanda Mahavihara' (V century AD), the archaeological report refers,
'' Although the doors are high, they are made as a single swinging door… ''[42]

[41] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55*. Dept. of ArchaeologyGovt. of India. Delhi. 1938. p.06.

[42] Phuoc,Le Huu. *Buddhist Architecture*. Grafikol. United states of America, 2010. p.65.

Fig 36
Niche in the main Temple of 'Somapura Mahavihara'(770 AD)
© Tamanna Ahmed photography, 2014.

'' The doors, windows and low walls are painted profusely; the monk's cells (viharas) are ornamental on the inside and plain on the outside. ''[43]

'' At the back is a window which goes up to the edge of the roof. ''[44]

'' We came across in all 300cells…seems to have accommodated 1200 monks or students on the hypotheses of two persons per cell. ''[45]

These information portray the combination of art with architecture within the cell units, while the purpose was not seclusion, rather sharing among the monks in the journey of enlightenment.

The space organization of the cells of 'Vasu Vihara', 'Itakhola Vihara', 'Ananda Vihara' and 'Bhoja Vihara' evidently provide no window with a single door; which is the most common feature of Vihara Architecture. *'' Each cell has a central doorway and…uniformly provided with corbeled niches on the 3 side walls. ''*[46]

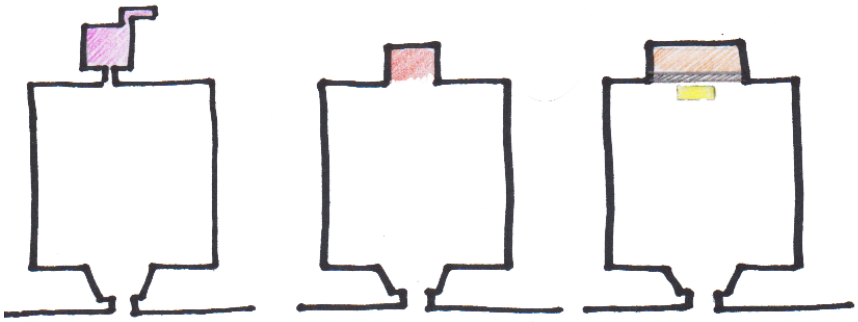
These niches perhaps be used to keep the daily necessary objects such as - candle/oil lamp to lighten up the room at dark, votive images, books etc, since the monks had limited objects to use.

[43] Phuoc,Le Huu. *Buddhist Architecture*. Grafikol. United states of America, 2010. p.65.

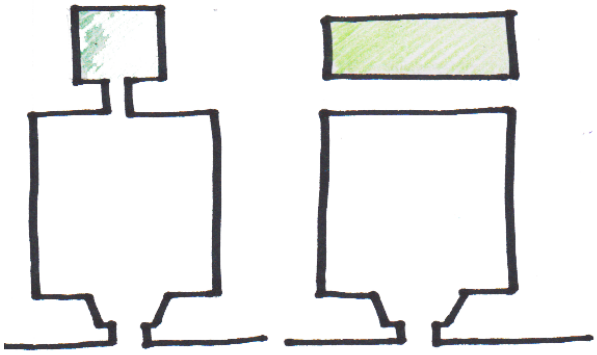
[44] Phuoc,Le Huu. *Buddhist Architecture*. Grafikol. United states of America, 2010. p.65.

[45] Thakur, Upendra. *Buddhist Cities in Early India*. Sandeep Prakashan. Delhi. 1995. p.96.

[46] Ahmed, Nazimuddin. *Discover the monuments of Bangladesh*. The University Press Limited. Dhaka. 1984. p.81.

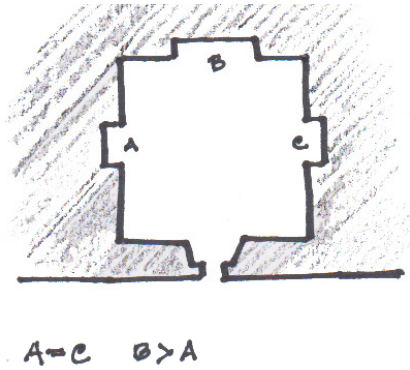


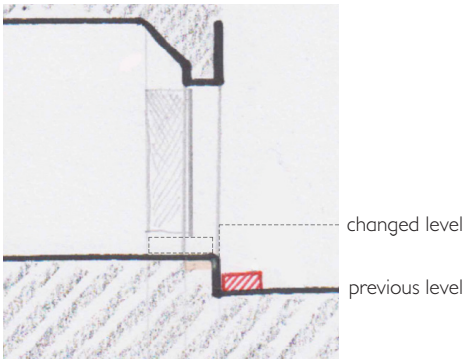
CELL. 2 CELL. 3 CELL. 4



cell. 40 cell. 136

RICHEST ANTIQUITIES FOUND
LOFT
ANTE-ROOM
STONE THRESHOLD
STONE STEP
CONNECTED ROOM
LOW VAULTED CHAMBER





The archaeological data of 'Salbon Vihara' suggests, *'' The cells were originally provided with three, and sometimes also four, corralled niches in the inner walls…. they were primarily meant for keeping votive images and oil lamps….Each of the cells was originally provided with a brick-built threshold, wooden door frame, paved door passage and floor. An inner brick step was later added when the level of the threshold rose. ''*[47]

It is evident that, the door stands before the passageway of each cell unit since it is clearly mentioned about the inner brick-step, that was installed in later phase when the level of threshold changed. It is to note that, the change in level of threshold occurs mostly due to the maintenance of the common verandah, in this case as well other parts of these Viharas since they were built for a long span of time, for example 'Somapura Mahavihara' functioned over 400years.

In 'Somapura Mahavihara', the space definition of cell units have been noticed in different variations as portrayed in figure 37 of the adjacent page.

According to the archaeological report,
'' In the back or ante-rooms, which were generally at a higher level than the main room, it was necessary to provide stone slabs as steps….In room 136, the existence of a low vaulted chamber 14' (approx. 4.27m) in length is clear in the back room….the chases in the wall at the springing of the vault may have been made for some wood work. ''[50]

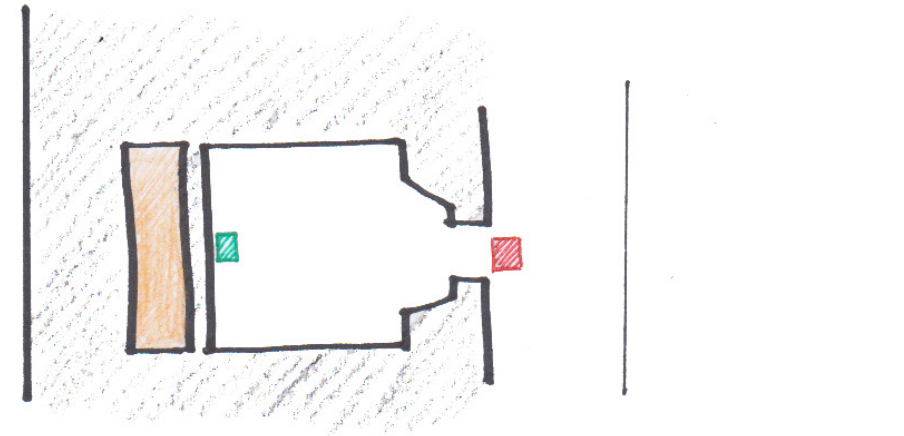
Fig 37 (adjacent page)
Space organization of different cell unit of Somapura Mahavihara[49]
© Tamanna Ahmed drawing, 2015.

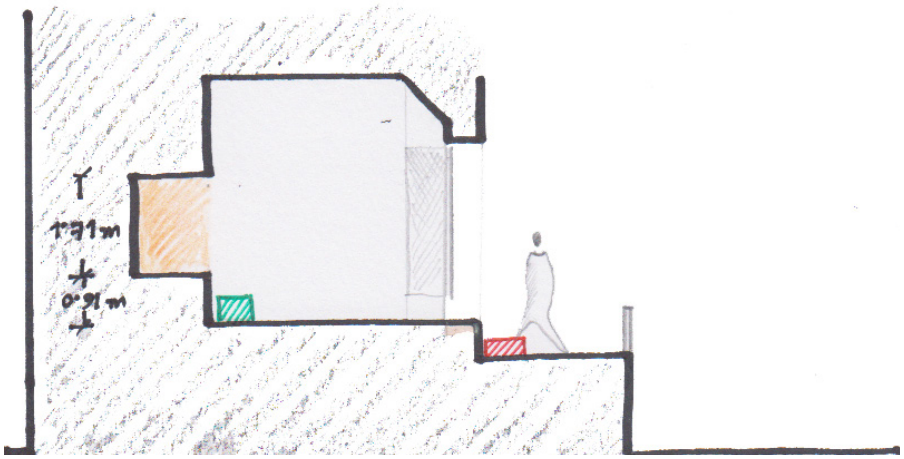
Fig 38
Space organisation of cell unit of Salbon Vihara[48]
© Tamanna Ahmed drawing, 2015.

[47] Musgrove, John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.46.

[48] Musgrove, John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.46.

[49] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55*. Dept. of Archaeology. Govt. of India. Delhi. 1938. p.20-21.





STONE THRESHOLD
STONE STEP
ANTE-ROOM
STONE STEP

The level change between common verandah and the cell unit can as well be assumed from another archaeological report as, *'' …the contemporary level of the verandah was lower so as to necessitate the presence of a stone-step in front of room 133. ''*[52]

About the doors of these cells according to K.N. Dikshit, *'' …the doorway renovated at a higher level in burnt brick masonry with inward splayed doorjambs showing for resting the door-leaves, as in the regular door opening of this period. ''*[53]

The door - leaves indicate double-swing door inward and the renovation in rising the floor level of the doorway indicates that, the doors itself were situated in higher level from the floor,hence made it possible to rise the level of the doorway. In 'Nalanda Mahavihara' similar indications has been found, *'' Although the doors are high, they are made as a single swinging door ; ''*[54]

The archaeological evidence of 'Salbon vihara' echoes the similar situation,
'' Each of the cells was originally provided with a brick-built threshold….An inner brick-step was later added when the level of the threshold rose. ''[55]

According to all these comparison through archaeological evidences[56], the space organization of cell units of 'Somapura Mahavihara' can be assumed as,

No windows, single entrance with double swing door at a higher level; cells interior mostly with niches, ante-room, lofts etc. and with system of drainage. These drainage system inside the cells indicate the need of ablution for the preparation of mass prayer or personal seek for contemplation.

It is to note that, among 177 cells of the entire enclosure, 92 of them were found with pedestals in later phase, which indicates personal prayer space of the monks provided with drainage system of ablution.

Fig 39 (adjacent page)
Hypotheses of space organization of Cell. 145[51]
© Tamanna Ahmed drawing, 2015.

[50] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.33-34.

[51] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.33.

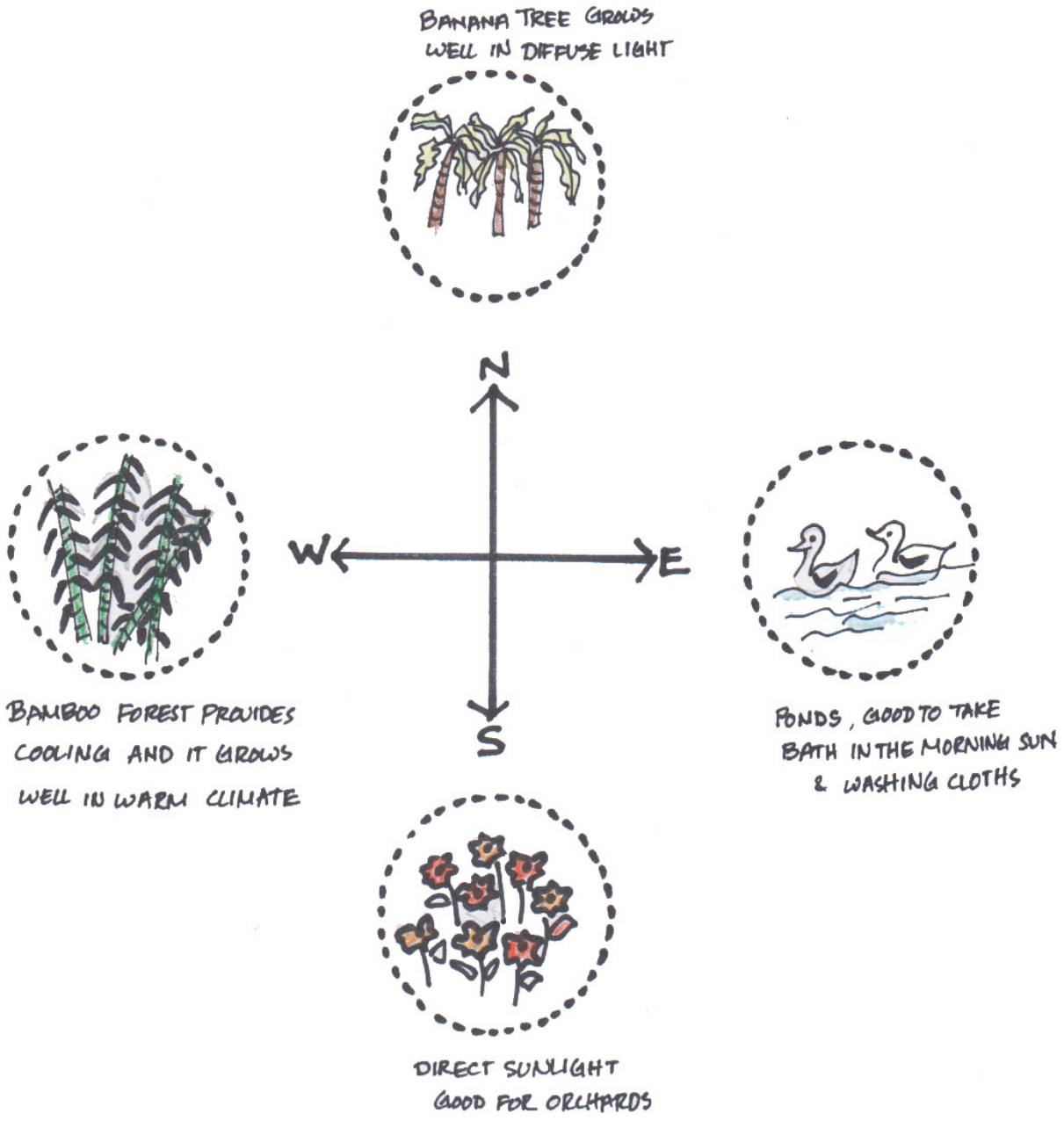
[52] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.34.

[53] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.22.

[54] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.65.

[55] Musgrove,John. *Sir Banister Fletcher's a history of Architecture (19th edition).* CBS Publishers & Distributers. Delhi. 1987. p.46.

[56] Alam, A.K.M.Shamsul. *Barendra Oncholer Itihash.* Shompadona Parishod. Rajshahi. p.366. (translated by the author)


BANANA TREE GROWS WELL IN DIFFUSE LIGHT
N
W
E
S
BAMBOO FOREST PROVIDES COOLING AND IT GROWS WELL IN WARM CLIMATE
PONDS, GOOD TO TAKE BATH IN THE MORNING SUN & WASHING CLOTHS
DIRECT SUNLIGHT GOOD FOR ORCHARDS

1.3.5 Climatic Consideration

It has been identified that, the orientation of the Viharas converge with that of the vernacular settlement pattern of the region to comply itself with the climatic factors.

Here again, the religious symbolism 'Mandala' converge with the vernacularism, shaping the dimensions of Vihara Architecture. The rural popular proverb known as 'Khonar Bochon' defining the planning of efficient housing can be mentioned here:

'' As 'Khonar Bochon' (popular proverb) describes such an ideal dwelling as having, 'Ducks to the east/ Bamboo to the west/ Banana to the North/ Open to the south,' that is a pond towards the east of the house, and orchards and gardens around. This has been the perennial image of the Bangali landscape…land, water, garden and building become part of an inseparable architectural whole. ''[57]

Fig 40 (adjacent page)
Portraying the ''khanar bachan'' from text to drawing.
© Tamanna Ahmed drawing, 2015.

[57] Ashraf,K. *Pundranagar to Sher- e- Bangla Nagar: Architecture in Bangladesh.* Chetana Sthapatya Unnayan Society. Dhaka. 1997. p.22

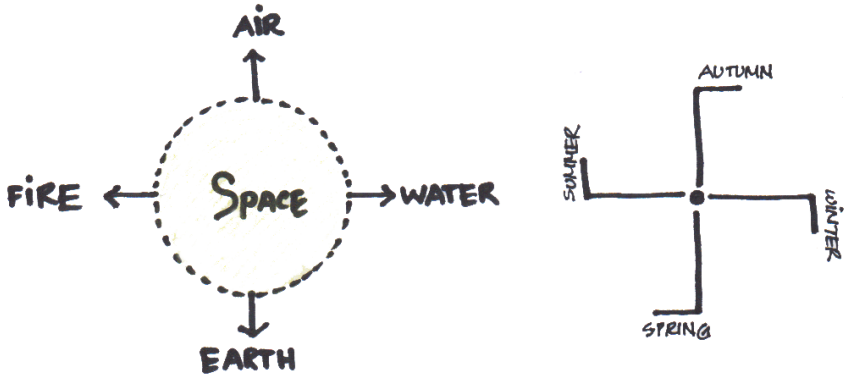


Fig 41
Mandala meanings by the doctrine of Vajrayana Buddhism
information source: en.wikipedia.org/wiki/Five_Dhyani_Buddhas
© Tamanna Ahmed drawing, 2015.

In this connection, it is also important to understand the 'Mandala' of 'Vajrayana Mahayana' which as well participated in decision making regarding the planning of these Viharas.

The marriage between these two dimensions; vernacularism with religious symbolism, is interesting in deciding the building orientation and planning of Vihara Architecture in ancient Bengal, which in other words indicates contexual approach by the builders of Pala dynasty (750AD - 1155AD).

It is evident that, North is the most shaded region where the entry occurs in most of the Viharas, while the south-east remarks the bathing place where the morning sun can best be utilized with strong wind flow.

The west as described the warmest part kept completely closed while the east offers the place of worship (in Somapura Mahavihara, the location of major religious structures, one in the east side with the later connection of Tara Temple).

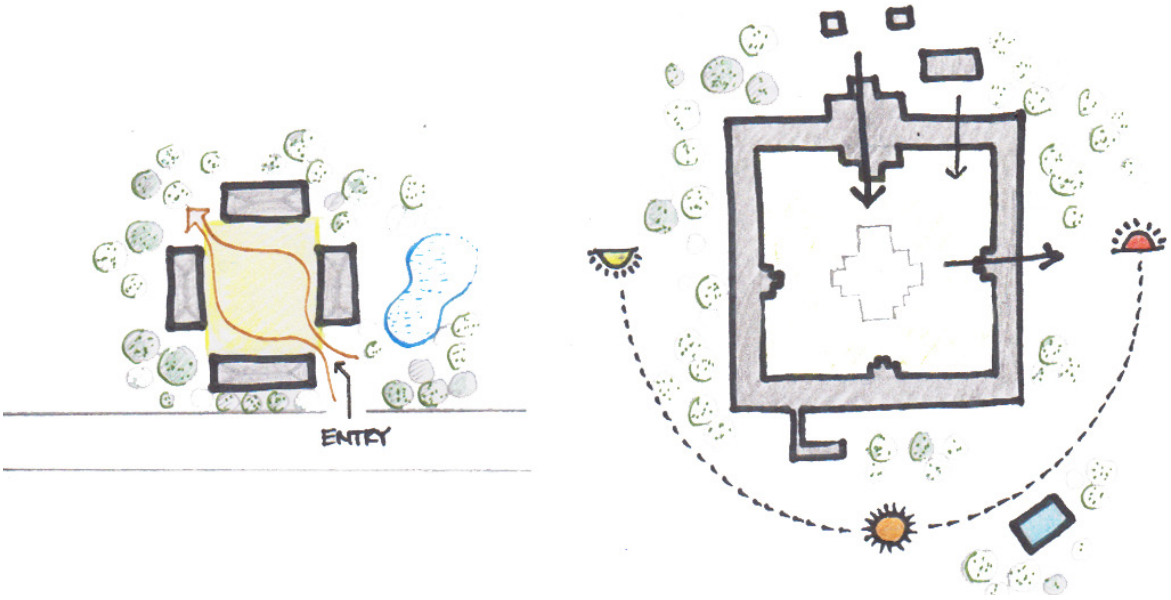


Fig 42
Climatic orientation of vernacular homestaed of Bangladesh and Somapura Mahavihara (770 AD)
© Tamanna Ahmed drawing, 2015.

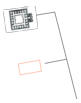
To comply itself with the climatic factors, the building act as a modifier where the structure and the material are the reflection of it. The material of selected Viharas is mostly the burnt brick, as Bengal was rich in alluvial soil rich in plasticity and suitable for the construction of fine brick, specifically burnt.

The massive Brick built enclosure of these Viharas enhance protecting the building from heat gain, while the continuous verandah surrounding the inner courtyard act as buffer zone, making the building comfortable for living.

In 'Somapura Mahavihara' , the enclosure with 177 cells altogether form the enclosure which is separated from that of the subsidiary structures of the inner courtyard. The cell, most important unit of Vihara Architecture, is a reflector of the climatic adaptation of the edifice built by particular structural and material composition.

400 AD Nalanda Mahavihara (partial)

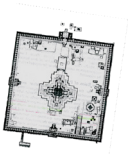
650 AD Vasu Vihara



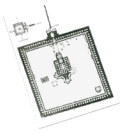
7th c.AD Itakhola Vihara

7th c.AD Sitakot Vihara

7th c.AD Ananda Vihara



770 AD Somapura Mahavihara



8th c.AD Salbon Vihara

1220 AD Bhoja Vihara

1.4 Structure and Material

The formation of the Viharas reflect their climatic adaptation, where the structure supports to achieve their intended form. Structure in other words, is a result of combining climatic factors with available material to provide sustainability to the edifice. To understand the basic structure system of these Viharas, it is equally significant to understand the material associated with them. Adjacent drawing shows the basic structural system of studied Viharas.

Fig 43 (adjacent page)
Basic structure of the selected Viharas of ancient Bengal.

source: Archaeology Dept., Govt. of Bangladesh.
AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p.52,56.
ALAM, Shamsul (1976), *Mainamati,* Dhaka: Department of Archaeology and Museum - Bangladesh Government. p.35.
PHUOC, Le Huu (2010), *Buddhist Architecture*, United States: Grafikol. p.63.
RAHMAN, Habibur (1992), *Itakhola Bihar*, Comilla: Department of Archeology, Bangladesh Government. p.27,30.

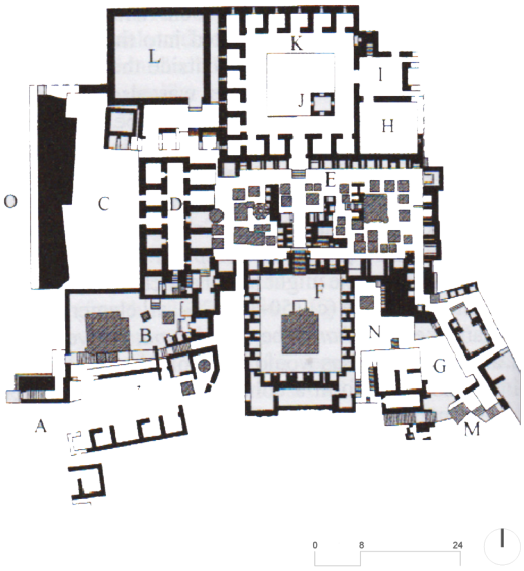


Fig 44
Plan of Takht-i-Bahi, Pakistan

Burnt Brick, as the major building material of these Viharas, was combined with other local material to form their structure, such as - wood, straw, bamboo, thatch, mud etc. Stone can as well be found in Columns, steps, pedestals, door sills which has two assumptions.

One is that, the stones were taken from the previous built forms (as Bengal had scarcity of stone since history). And the second, the stones were imported from Rajmahal, Bihar for making of idols (as found in 'Somapura Mahavihara', 'Salbon Vihara' etc.), while the remaining were used for construction purposes.

In 'Somapura Mahavihara', there has been archaeological evidences and reports on the formation of the floors, walls, doors, windows to some extent, but the pattern of roof is a debatable issue which needs clarification in light of other conventional Viharas of ancient Bengal.

In this connection, to mention the formation of 'Takht-i-Bahi' (2nd c.BC - 2nd c.AD) as,
'' Perhaps the most typical is the quadrangular monastery at Takht-i-Bahi (2nd c. BC - 2nd c. AD)… All roofs have disappeared- they were of wood and thatch, or tile- as has most of the painted stucco with which the masonry was originally faced. ''[58]
In another reference, the roof has been mentioned Flat, made of mud; with Viharas of two storeys having verandahs with timber pillars.[59]

[58] Musgrove,John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.761-762.

[59] Phuoc,Le Huu. *Buddhist Architecture*. Grafikol. United states of America, 2010. p.57.

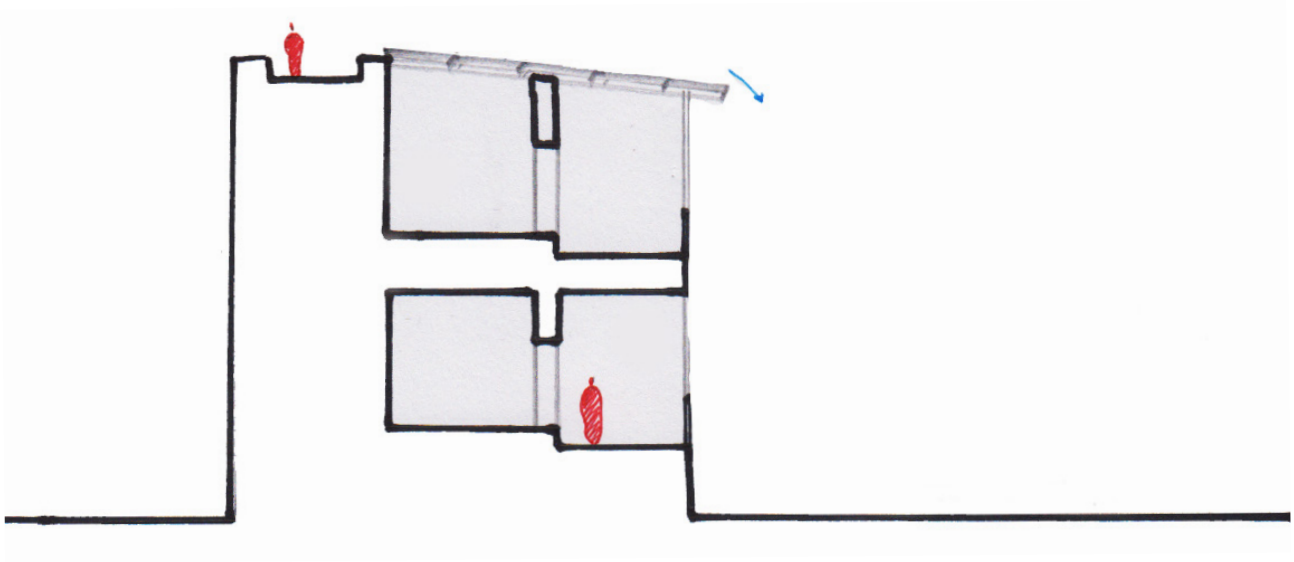


Fig 45
Hypotheses of the roof structure of 'Nalanda Mahavihara' based on Archaeological data and findings.
© Tamanna Ahmed drawing, 2015.

Advancing further in time, according to the archaeological report of 'Nalanda Mahavihara' (5th c. AD - 13th c. AD),
" The roofs were probably flat and might be covered with several layers of brick-and-mud, but they could be pitched and covered with tiles due to the high rain volume in Bihar. "[60]

As well, *" There are no less than eight (Viharas) Temples like this. On top of all of them there is a flat terrace where one can walk....They all have flat terraces on top where people can come and go. "*[61]

With the heavy rainfall of the region of Nalanda Mahavihara, it is more likely that the roofs were pitched with tiles , although the mentioning of terrace in top of them can be assumed in top of the thick Vihara enclosure walls modified as Terrace, that were linked with adjacent viharas.

In 'Somapura Mahavihara', not as terrace but to climb up the enclosure wall, the stair has been found, preferably for guarding and maintenance purpose

About the pattern of roofing system of other conventional Viharas of ancient Bengal, Dilip Chakrabarti mentioned,
" The Gupta period here showed well-rammed floors of brick-bats and brick dust mixed with lime, shoddily built small structures, the use of tiles on roofs and a deep pit which was perhaps used for depositing used remains of Puja or worship in a Temple. "[62]

[60] Phuoc,Le Huu. Buddhist Architecture. Grafikol. United states of America, 2010. p.63.

[61] Phuoc,Le Huu. Buddhist Architecture. Grafikol. United states of America, 2010. p.65-66.

[62] Chakrabarti, Dilip. *Archaeological Geography of the Ganga Plain.* Permanent Black. Delhi. 2001. p.91.

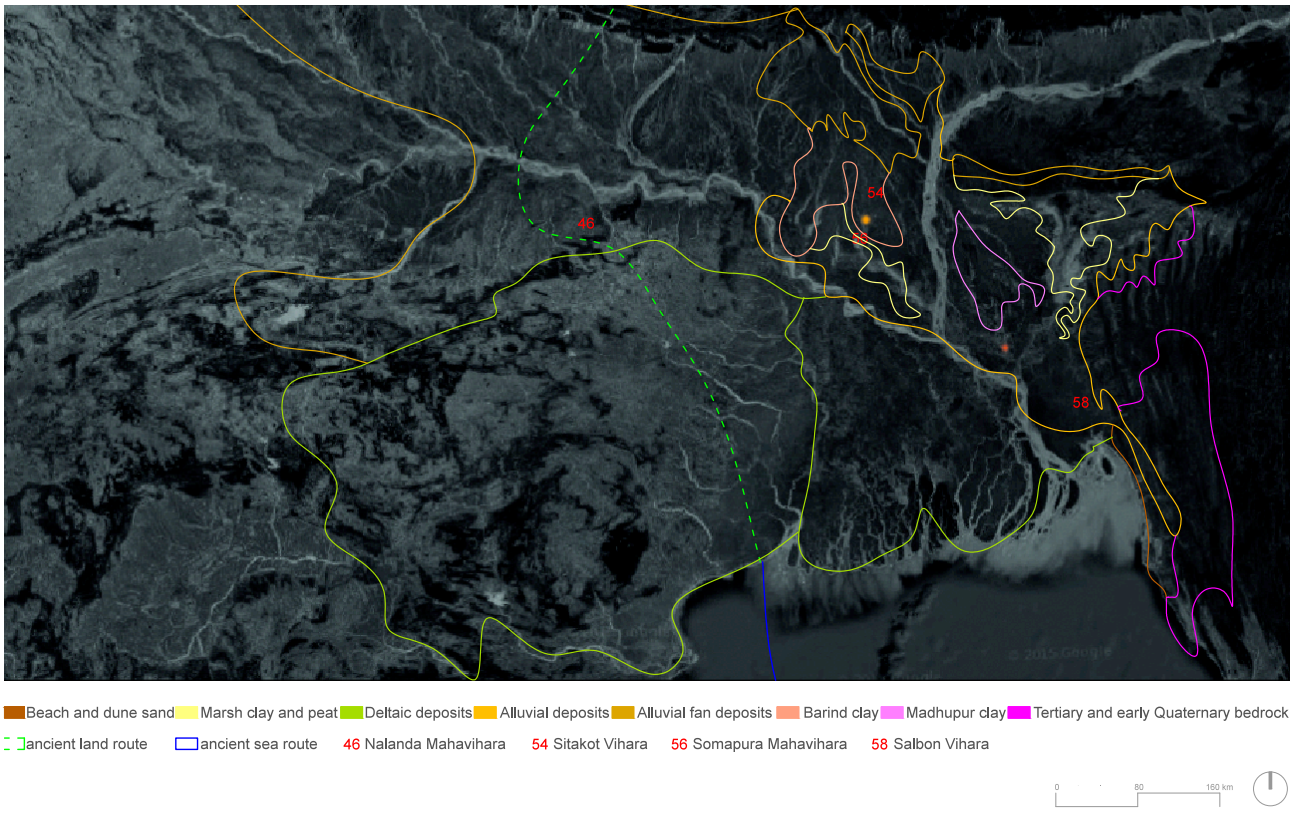


Fig 46
Geology of Bengal and location of considered Viharas.

source: satellite image, Google Earth 2014;
www.geobangla.wordpress.com
© Tamanna Ahmed drawing, 2015.

Analyzing further ahead, the Sitakot Vihara (7th c.AD) in north-eastern part of ancient Bengal, remarks through its archaeological report that,
" The monastery was probably roofed over a lime-surkhe concrete slab which was supported by the wooden beams and rafters, and secured in position with iron clamps and nails. "[63]

And the 'Salbon Vihara' of early 8th c.AD, situated on the south-eastern part of ancient Bengal indicates,
" There is clear evidence to show that the roof of the monastery was constructed of heavy batten brick-concrete resting on huge wooden beams. "[64]

To understand the variation of roofing system of these Viharas, it is important to identify their geological location, to define the material extracted from the context to comply with certain structural solutions.

[63] Ahmed, Nazimuddin. *Discover the monuments of Bangladesh.* The University Press Limited. Dhaka. 1984. p.81.

[64] Musgrove,John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.46.

However, it is evident that, whether supported by roof tiles or batten brick concrete slab, the roofing system was supported by wooden rafters in all of these Viharas according to archaeological evidences.

The geology of the region echoes the suitability for constructing the roofing tiles as it refers the quality of raw material for such building element. The hot-dry climate where 'Somapura Mahavihara' is situated is suitable for producing roof tiles of pitched roofing system, competent with the short but heavy rainfall of the region. According to the archaeologist KN Dikshit, the ashes of Palm wood was found to the extension of room no.2 which indicates the wooden rafters of the roof.[65]

As well, *'' Above the floor of room 133, a number of charcoal pieces were found scattered all around….It is possible that these were the charred remains of the rafters employed in the roof. ''*[66]

However, these evidences indicates the existence of pitched roofing system in 'Somapura Mahavihara',
whether by roof tiles or batten brick, as the rain water drainage being mentioned inward by archaeologist KN Dikshit, *'' …the drain slopes inward from the masonry walls…the water was in the end carried to a point inside the compound somewhere in the North, where it has already been assumed that there was a masonry tank or a pool of some sort.''*[67]

[65] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.19.

[66] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.34.

[67] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.29.

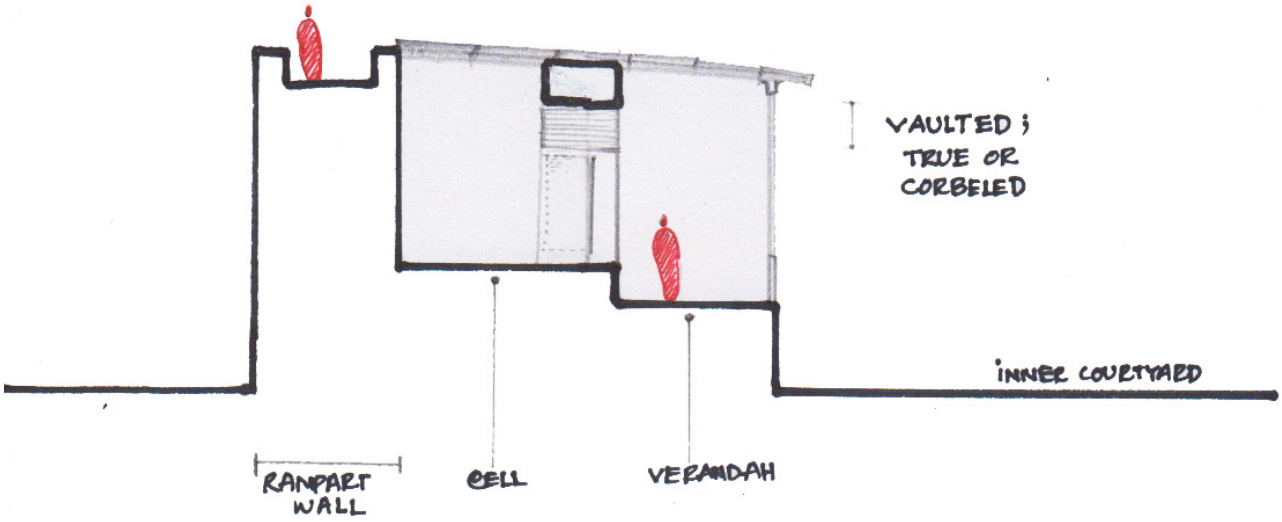


Fig 47
Hypotheses of Cell roofing system of 'Somapura Mahavihara' from Archaeological data.
© Tamanna Ahmed drawing, 2015.

The probability of roof tiles although supported by geological context can not be emphasized as no evidence of roof tiles being found from the site of 'Somapura Mahavihara'. The closest in location and timeline of 'Somapura Mahavihara', the 'Sitakot Vihara', as well shows 'brick batten concrete slab over wooden rafters' with pitched roof , enhance similar roofing pattern for 'Somapura Mahavihara'.

According to the archaeological evidences of 'Salbon Vihara' (8th c.AD), which has the typical cell unit pattern of Vihara Architecture,
''There does not seem to have any arrangement for admitting light and air except through the doors of the cells opening to the verandah.''[68]

Such space organization of door, as the only opening for each cell unit, is a common feature of majority Viharas of ancient Bengal.

In hot dry climate (as the location of 'Somapura Mahavihara') or hot humid climate, this solution of ventilation is more reasonable considering security and hot air transition into cooler air through the verandah and the long door passage of the cell unit, confirming comfortable environment inside the cells.

In such manner, the passageway of the cell unit can be assumed as vaulted either corbel or true vault system, that would allow the entrance of air and light allowance from above the door of each cell unit.

[68] Musgrove,John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.46.

The structural formation of these passagewa-ys of the cell units can be assumed throu-gh comparative studies of other Viharas of the era.

Highlighting the archaeological report of structures as fou-nd in the west-north corner of 'Somapura Mahavihara', *'' Almost in the middle within the enclosed area, remains a three-room structure and a large permanent well. The upper part of the structure is built in corbel system. ''*[69]

In another reference about the roofing system of 'Somapura Mahavihara' ,
'' The early building housing free-standing images had brick--walls and timber roofs but after the eight century image hou-ses were usually vaulted, as at Paharpur, Polonnaruwa and Nalanda.''[70]

And by Archaeologist KN Dikshit,
'' It is therefore clear that, the builders of Paharpur ('So-mapura Mahavihara') prefer to employ the trabeated arch in spanning short distances as in drains, niches, small passages etc, they could employ the true vault when fa-ced with the problem of spanning longer distances. ''[71]

Thus it is evident that, the possible structural solution of the passage ways were dependent on their span and dimension.

[69] Alam, A.K.M.Shamsul. *Barendra Oncholer Itihash.* Shompa-dona Parishod. Rajshahi. p.371.
(translated by the author)

[70] Musgrove,John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers &Distributers. Delhi. 1987. p.756.

[71] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.30.

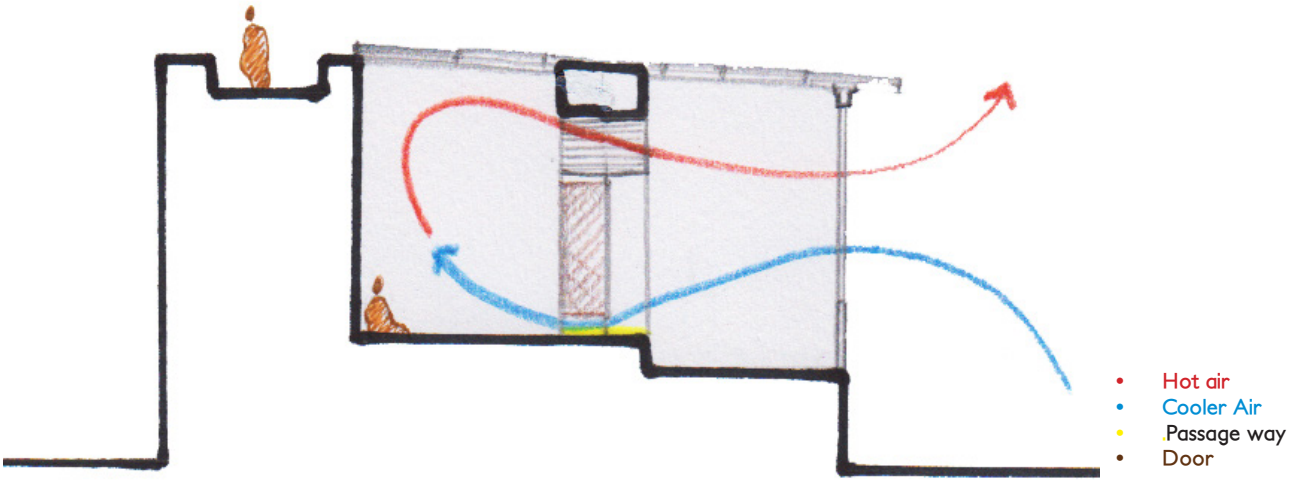


Fig 48
Hypotheses of cell unit ventilation of 'Somapura Mahavihara' from Archaeological references.
© Tamanna Ahmed drawing, 2015.

According to the structural compatibility, the non-parallel doorways were preferably roofed by corbel or trabeated arch system, while the parallel doorways perhaps were roofed by true vault system, since the material in both cases were burnt bricks. In such manner, the ventilation must had been established through the only opening, i.e. the door, of these cell units, through a system as shown in the figure 48.

Through this system of ventilation, the central courtyard must had played vital role in distributing light, air and energy throughout the cell units, as the heart of the total establishment.

Supporting such hierarchy system, another archaeological remain from room.88 of 'Somapura Mahavihara' remarks, *'' A stone lintel appears…underneath the stone, forming the door-sill here. ''*[72]

[72] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.28.

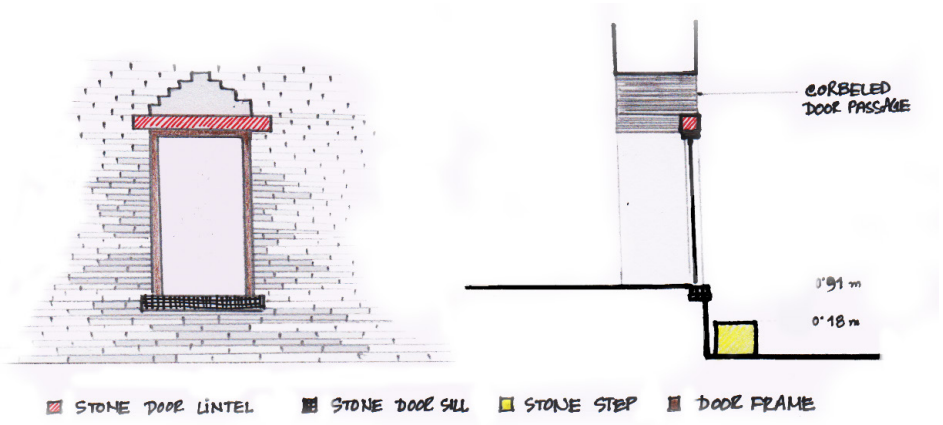


Fig 49
Hypotheses of each cell entrance of Somapura Mahavihara, from Archaeological references and data analysis.
© Tamanna Ahmed drawing, 2015.

Between room.87 and 88 of 'Somapura Mahavihara', the archaeological evidence remarks that the verandah level was atleast 2' (approx. 0.61 m) below the stone door sill.[73]

As well, *" ... the contemporary level of the verandah was lower as to necessitate the presence of a stone-step in front of room.133. "*[74]

And, from the stair of East central block, towards the innercourtyard the archaeological report remarks, *" The tread of the steps 18"(approx. 0.46m) wide and the rise about 7"(approx. 0.18m) in height. "*[75]

With the existence of stone lintel and door frame with other provided information by archaeological report regarding the entrance of cell unit no. 87, 88 and 133, the system of all other cell unit can be assumed, since the cell units are assumed to be built by similar system.

Figure 49 is derived through the archeological data and evidences as found in 'Somapura Mahavihara'.

Apart from the level change of the verandah, with the passageways, they were provided by niches in longer dimensions as the evidence of 'Salbon Vihara' remarks,
" ...alcoves or ante-chambers in the back walls and niches in the door passages. "[76]

[73] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.28.

[74] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.34.

[75] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.24.

[76] Musgrove,John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.49.

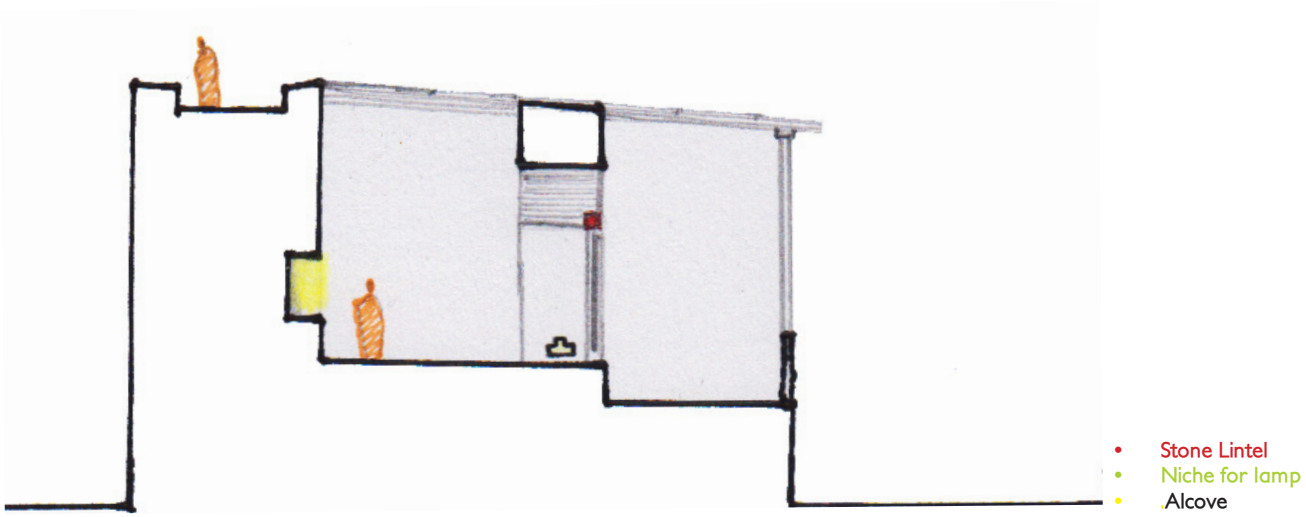


Fig 50
Hypotheses of space Cell unit Interior of Somapura Mahavihara, drawn by Archaeological data analysis.
© Tamanna Ahmed drawing, 2015.

These niches were preferably used for lighting up the spaces in dark, while the alcoves were used for keeping books, utensils etc. The space organization of typical cell unit can be stimulated as shown in figure 50.

Such simplistic way of living was indeed reflected within the space organization of typical cell unit of these Viharas. The excavation of 'Somapura Mahavihara' provides further detail information, as such-
'' Room.96 was broken through for the construction of a drain and shows clearly the cross-sections of the wall and floor of the monastery. ''[77]

The floor of the steps in front of the east central block of 'Somapura Mahavihara' was discovered originally built of concrete and later covered by stone blocks, at-least last 5-6 steps.[78]

In room.46, the evidence remarks,
'' ... the particularly thick concrete floor over it shows distinct traces of lime mixed with the concrete which has given it its present hardness. ''[79]

[77] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.30.

[78] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.24.

[79] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.25.

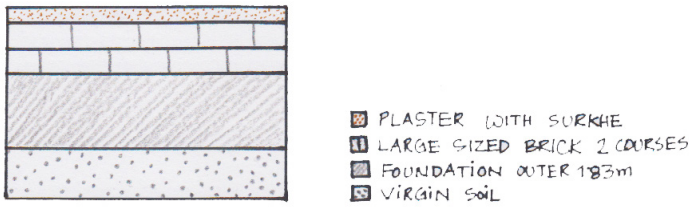


Fig 51
Room.96 different layers of floor of Somapura Mahavihara, drawn according to Archaeological references.
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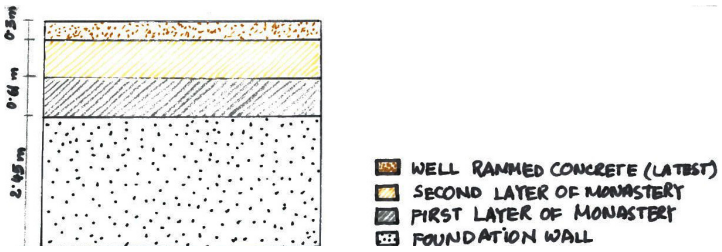


Fig 52
Floor section of Salbon Vihara (Period III : 8th c.AD) drawn according to Archaeological references.
© Tamanna Ahmed drawing, 2015.

These reports indicates the concrete flooring of the total establishment including the cells, verandah, stairs as one whole complex.

The formation of this concrete floor can well be understood from 'Period II'(8th c. AD) floor section of 'Salbon Vihara' (8th c.AD), located south-eastern part of ancient Bengal.

" The original floor was solidly built with two courses of large-sized bricks plastered over with a thick coat of Surkhe (powdered and crushed bricks mixed with lime), "[80]

[80] Musgrove,John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.48.

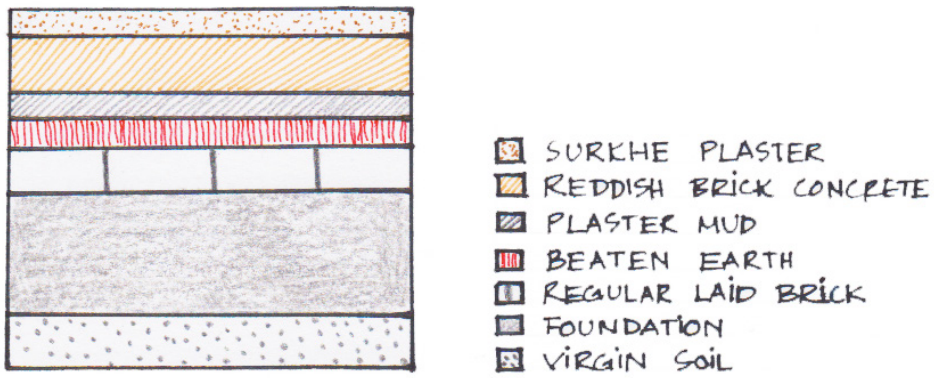


Fig 53
Floor section of central Temple of Salbon Vihara (Period I & II) drawn according to Archaeological data.
© Tamanna Ahmed drawing, 2015.

The floor layer of the Temple of 'Salbon Vihara' as well indicates the plastering with "Surkhe" (powdered brick+-crushed brick+lime), as discovered in 'Period I'(7th c. AD) and 'Period II' (late 7th c. AD), when no traces of monastic establishment was found in the complex.[81]

These layers of floor is translated in figure 53, following the descriptive report of archaeological findings.[82]

It is evident that, lime was an important floor finishing material as well providing water proofing property of the floors, as can behighlighted through the comparative studies of these Viharas.

Mud mortar was used as to join the bricks as remarked in 'Nalanda Mahavihara' (5th c. AD - 13th c. AD),
" These Viharas of probable several storeys were constructed of brick laid in mud mortar and their interior surfaces were originally covered with plaster and might be painted exquisite murals, polychrome or gilded."[83]

It is interesting to note that, through the description of pilgrim I-tsing, the brick mixture process of floors of 'Nalanda Mahavihara' can be referred in sequence process[84] :

1. Brick fragment(size of peach/mango) + sticky paste ——> crust to some consistency;
2. Residue of Hemp fibre + Oil ——> keep it moist for three days;

[81] Musgrove,John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.42.

[82] Musgrove,John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.42.

[83] Phuoc,Le Huu. *Buddhist Architecture*. Grafikol. United states of America, 2010. p.63.

[84] Phuoc,Le Huu. *Buddhist Architecture*. Grafikol. United states of America, 2010. p.65.

Fig 54
Brick enclosure wall of 'Somapura Mahavihara' (770 AD).
© Tamanna Ahmed photography, 2014.

3. Mix mixture.2 with mixture.1 + cover in green grass —-> three days to keep it dry;
4. Dried surface ——> rubbed with polished stone;
5. Finished Floor —-> sprinkle with red earth or substance similar to sandal wood;
6. Final layer : smoothen with a greasy mixture.

However, such long process was responsible in providing durability of these floors of the Viharas, as mentioned by I-tsing,
" …it will withstand the trampling of feet over a period of ten-twenty years without suffering any damages…they cover the precinct walls with whitewash. "[85]

Through comparative study, the constitution of floor, wall and cell units of 'Somapura Mahavihara' can well be assumed since they belong to similar typology and timeline. These reflect the sustainability of 'Somapura Mahavihara' with a lifespan of more than 400 years, adopting methods coherent to nature, with contexual building materials.

The limitation of material and structural complexities gave birth to a more sustainable architecture of Vihara typology as echoed through 'Somapura Mahavihara', amalgamate with the surrounding nature pronouncing the human relation on earth.

[85] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.65.

" The timeless task of architecture is to create embodied existential metaphors that concretize and structure man's being in the world. "[86]

[86] Holl Steven,Pallasmaa J. & Pérez-Gomez *A. Question of Perception: Phenomenology of Architecture.* William Stout publishers, San Francisco. 2006. p.37.

[87] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture.* Academy Editions, London. 1980. p.05.

[88] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture.* Academy Editions, London. 1980. p.170.

[89] Norberg-Schulz C. Genius Loci: towards a phenomenology of Architecture. Academy Editions, London. 1980. p.166.

[90] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture.* Academy Editions, London. 1980. p.50.

Part II Chapter 02 EXISTENTIAL FOOTHOLD OF 'SOMAPURA MAHAVIHARA'

2.1 Introduction

This existential metaphors created by architecture, announce the basic relationship of man with his nature, which is referred as existential foothold . To define existential foothold of a edifice is to define the factors that participate to shape it into one entity within its existing contextual forces.

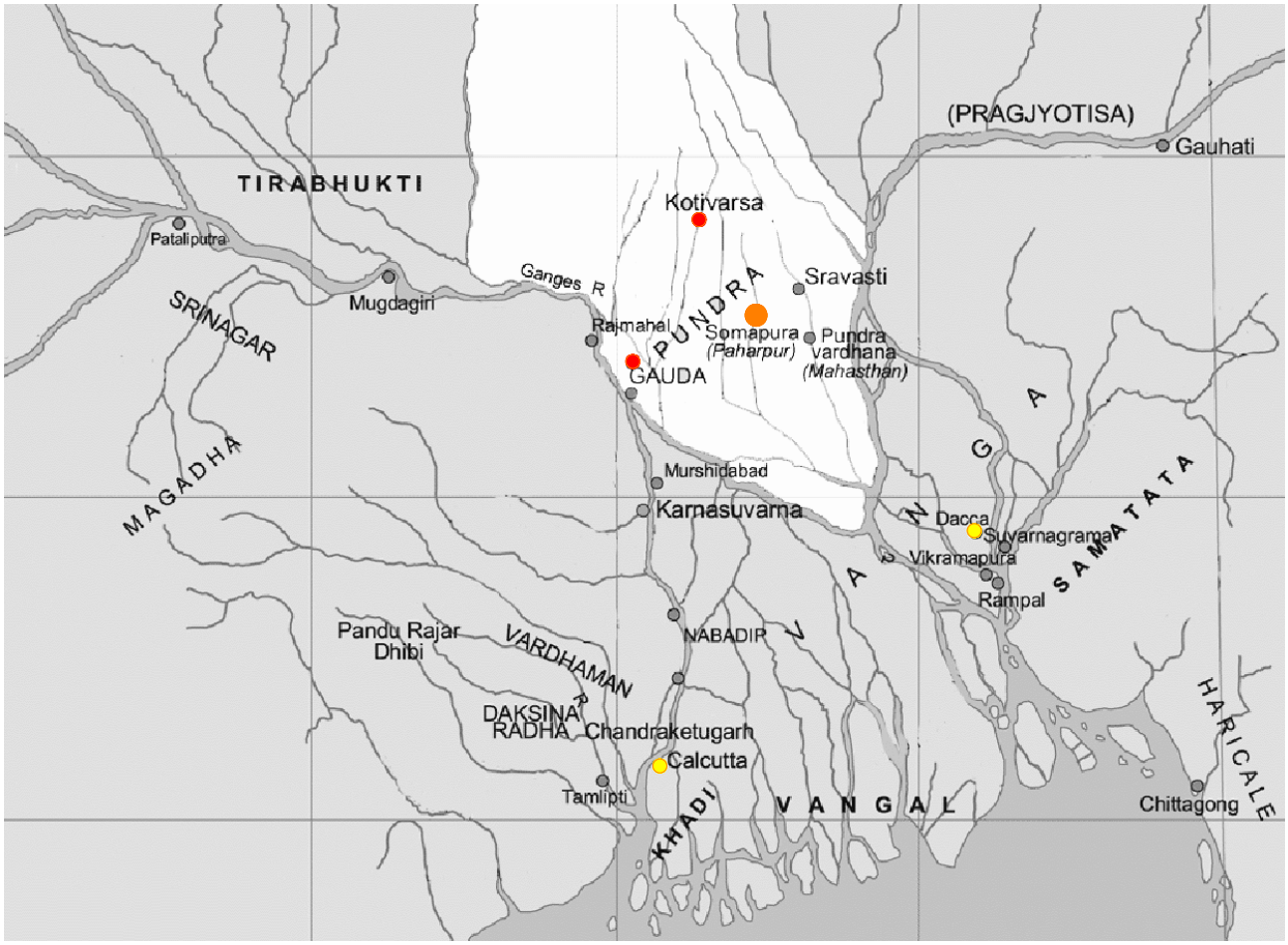
'' When we treat architecture analytically, we miss the concrete environmental character, that is, the very quality which is the object of man's identification, and which may give him a sense of existential foothold. ''[87]

Man remark his identification through building places in nature, that reflect his understanding of the natural environment and his existential situation in general.
'' Through building man gives meanings concrete presence, and he gathers buildings to visualize and symbolize his form of life as a totality. ''[88]
'' In general 'meaning' is a psychic function. It depends on identification, and implies a sense of belonging. ''[89]

To define the 'sense of belonging' of 'Somapura Mahavihara', the evolution process of Vihara architecture, comparative analysis has been carried out in search of a clear understanding of the identical values it represents. These values are the combined form of historical, political, socio-cultural, religious, architectural and artistic hierarchies that shape the edifice announcing its existence of the era.
Existential foothold therefore is nothing but a search to define the anchorage of 'Somapura Mahavihara' in its context within the journey and celebration of life.

'' The man-made environment where he lives is not a mere practical tool or the result of arbitrary happenings, it has structure and embodies meanings. These meanings and structures are reflection of man's understanding of the natural environment and his existential situation in general. ''[90]

To define the existential foothold in this reasearch, is to define the interpretation of natural understanding through 'Somapura Mahavihara', by combining and translating the knowledge of archaeological evidences and datas with architectural analysis.


(PRAGJYOTISA)
Gauhati
TIRABHUKTI
Kotivarsa
Pataliputra
Ganges R
Sravasti
Mugdagiri
SRINAGAR
PUNDRA
Rajmahal
Somapura
(Paharpur)
Pundra
vardhana
(Mahasthan)
GAUDA
MAGADHA
Murshidabad
Karnasuvarna
Dacca
Suvarnagrama
Vikramapura
Rampal
SAMATATA
Pandu Rajar
Dhibi
VARDHAMAN
NABADIP
DAKSINA
RADHA
Chandraketugarh
Calcutta
Tamlipti
KHADI
VANGAL
Chittagong
HARICALE
0
50
100
200
600 Km

2.2 Contexual singularity

'Somapura Mahavihara' being settled in the region of largest delta of the world, had been subjected to riverine context.

It was anchored in one of the main natural divisions of early historic period, enclosed roughly between the rivers 'Padma' & 'Brahmaputra' within the most important political division 'Pundrabardhana' province of which 'Varendra' was a renowned district in the context of ancient Bengal.[91]

The following map shows this distinct location of 'Somapura Mahavihara', which was as well situated on the middle way of the capital 'Pundranagar' and second capital 'kotivarsa' of 'Pundravardana' province,[92] playing vital political role through its territorial location in ancient Bengal.

The phase when the Bengal landscape was studded with stupas and temples denotes a moment of consciousness, pointing the transition from unconscious architecture to a more conscious and monumental construction. This resulted through more consolidated political and social structure in the substantial reign of Pala dynasty (750AD - 1155AD) with flourishing achievement of art & architecture.

Fig 55 (adjacent page)
Location of Somapura Mahavihara in ancient Bengal.

source: http://shopnobaz.com.
© Tamanna Ahmed drawing, 2015.

[91] Ahmed, Nazimuddin. *Discover the monuments of Bangladesh.* The University Press Limited. Dhaka. 1984. p.14.

[92] Alam,M.S. *Paharpur and Bagerhat : Two World cultural Heritage sites of Bangladesh.* Dept. of archaeology, Govt. of Bangladesh & UNESCO. Dhaka. 2004. p.01.

'' ...Chinese buddhist pilgrims visiting Bengal between the 5th & 7th centuries testify to the existence of a large number of cities, fortified palaces, temples, monasteries and stupas-with the slplendour of such structures being described as 'high as mountain peaks' or as 'obstructing the very course of the sun with its lofty and imposing towers capped by golden kalasas.' ''[93]

'Somapura Mahavihara', is a representative example of that glorious period remarking a stage in the reputed journey of Buddha from Jetavan to 'Pundravardana', where Asoka may have erected a stupa, as well.[94]

The historical background remarks the building of 'Somapura Mahavihara' by the 2nd king of Pala dynasty 'Dharmapala'(770 AD - 810 AD) who patronized many educational with religious Buddhist institutions, son of whom 'Devapala' (810 AD - 850 AD) continued to contribute in building through the extended territory of a greater extent.[95]

These historical context remarks the strong background of 'Somapura Mahavihara', upon which the anchorage of the monument was established. As to mention, *'' Man does not obviously only build nature, but also builds himself, society and culture, and in this process he may interpret a given environment in different ways. ''*[96]

The chosen context of 'Somapura Mahavihara' was thus built within the contemporary societal forces through which the history of Vihara architecture was rewritten interpreting the existential foothold of the era.

'' A cultural landscape is based on 'cultivation', and contains defined places, paths and domains which concretize man's understanding of the natural environment. ''[97]

[93] Ahmed, Nazimuddin. *Discover the monuments of Bangladesh.* The University Press Limited. Dhaka. 1984. p.09.

[94] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.02.

[95] Ahmed, Nazimuddin. *Discover the monuments of Bangladesh.* The University Press Limited. Dhaka. 1984. p.22-23.

[96] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture.* Academy Editions, London. 1980. p.168.

[97] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture.* Academy Editions, London. 1980. p.52.

The cultivation of cultural landscape can well be recognized through the existence of 'Somapura Mahavihara' portraying man's understanding of his surrounding nature and time frame. It imprints itself in the territory to remark man's existence on earth by amalgamating the factors of life with nature, forming a cultural landscape.

'' The existential purpose of building (architecture) is therefore to make a site become a place, that is, to uncover the meanings potentially present in the given environment. ''[98]

Bengal landscape being gifted by mightiest rivers, is the receiver of a rich deposit of soft alluvium through receding flood water, every year. This clay, the readily cheap plastic material is the major raw material that produces 'bricks', which in turn is the chief building material of these Viharas of ancient Bengal.

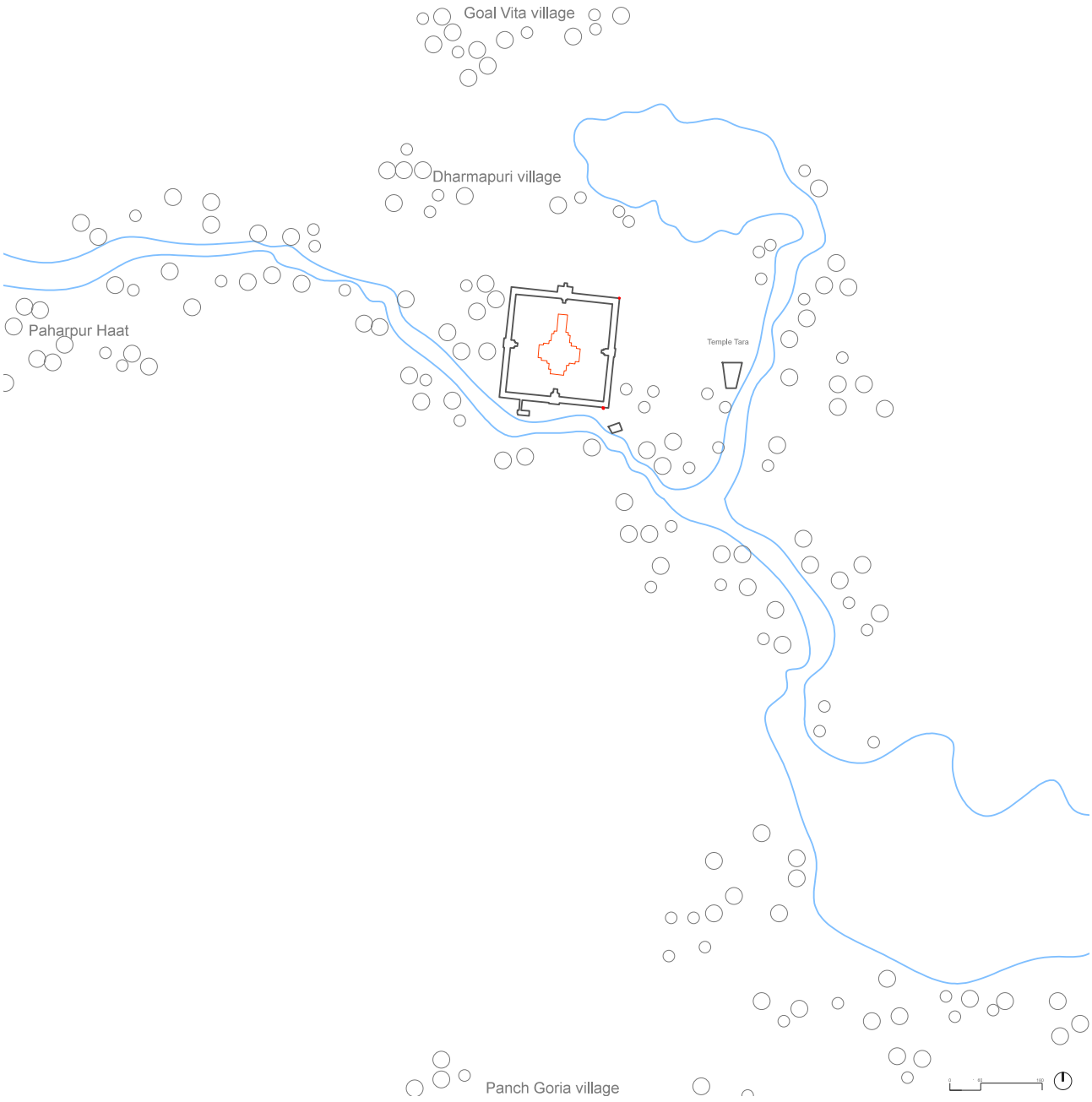
Hence, the material of these Viharas of ancient Bengal represents the potentiality of the context deeply rooted in the region. Within 12-18km of 'Somapura Mahavihara' stands other ancient Viharas (Holud Vihara, Jagaddal Vihara etc.) and these are assumed to be on the bank of a deep and wide river running in all seasons close by.[99]

The trace of the canal from the river has also been remarked through archaeological reports of 'Somapura Mahavihara';
'' The canal initially runs parallel to the south wall…and eventually discharges its water into the depression area 'bil' which is located northeast of the monastic complex. ''[100]

[98] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture.* Academy Editions, London. 1980. p.18.

[99] Alam, A.K.M.Shamsul. *Barendra Oncholer Itihash.* Shompadona Parishod. Rajshahi. p.364.
(translated by the author)

[100] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.39.



Further information of the scenario[101], can be translated by the schematic of figure no.56, illustrating the context of 'Somapura Mahavihara' of Pala dynasty.

It is interesting to note that,
'' The adjoining village is still named 'Dharmapuri'….although the Vihara founded by Dharmapala bore the name of 'Somapura', the settlement that grew to the north along with the gigantic Vihara was named after the founder. ''[102]

[101] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.65.
[102] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.18.

The reason of establishment of these villages can well be understood through analyzing other contemporary monastery, such as 'Nalanda Mahavihara', which was another remarkable monastery of Pala dynasty, running under the similar monastic regulations. As mentioned by Chinese pilgrim I-tsing,

'' …Nalanda Mahavihara was granted 200 villages by successive generations of kings for the maintenance of 300 monks. ''[103]

' The maintenance of these monks ' states the basic need specially food, since the monks were not engaged in agricultural activities. Thus it can well be understood that, those villages were the supporting arm of the gigantic monastic establishments of 'Somapura Mahavihara', and the food supply was one of the main reason of these villages, being closely constructed from the monastic establishment.

Financed by the royal patronage, the history of Buddhism thus returned to the domain of royalty, although the founder of Buddhism rejected all luxuries or support from his very own family, being the son of the king of Sakaya republic of Kapilavastu region, of the present Nepal.

Around 10th c. AD, the establishment of 'Tara temple' built further east of the main complex of 'Somapura Mahavihara' and the surrounding villages as supportive hands, portrays the foothold of 'Somapura Mahavihara' much extended beyond the Vihara itself.

'' Dwelling in nature is therefore not a simple question of 'refuge', it means to understand the given environment as a set of 'insides', from the macro down to the micro level. ''[105]

To understand this 'macro down to micro level', the functioning of the total establishment, has been studied in light of Archaeological surveys, evidences and reports to define the existential foothold imprinted by 'Somapura Mahavihara' in the history of ancient Bengal.

'' The individual 'genius loci' is therefore a hierarchical system, and must be seen in the context to be fully understood. ''[104]

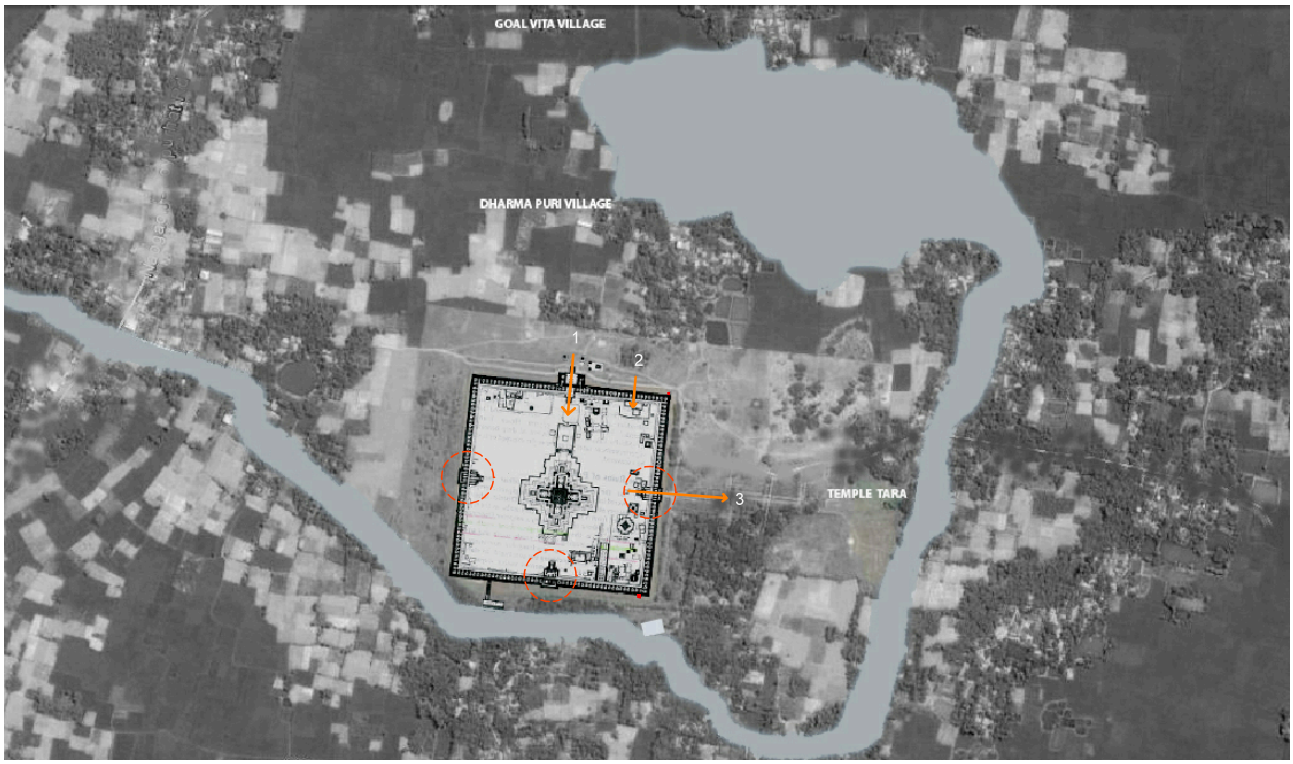
Fig 56 (adjucant page)
Context of Somapura Mahavihara, in light of Archaeological references.

source: satellite image, Google Earth 2014;
AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p.56.

[103] Thakur, Upendra. *Buddhist Cities in Early India. Sandeep Prakashan.* Delhi. 1995. p.86.

[104] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture.* Academy Editions, London. 1980. p.42.

[105] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture.* Academy Editions, London. 1980. p.48.


GOALVITA VILLAGE
DHARMA PURI VILLAGE
1
2
3
TEMPLE TARA

2.3 Functional Assumptions

The grandness of 'Somapura Mahavihara' is well understood through the comparative study; which had been achieved within the process of evolution of Vihara architecture within a time frame of around 1300 years.

This remarkable monument had been enlisted as UNESCO Heritage monument since 1985, regarding its embodied significance.

The archaeological knowledge is the basis of this research paper, to portray the existential foothold of 'Somapura Mahavihara', by using Architecture as a tool, for a better understanding of Vihara architecture. Regarding the comparative studies of selected Viharas, combining the archaeological evidences, the singularity and context of 'Somapura Mahavihara' can be proposed by the adjacent drawing.

In defining the existential foothold of 'Somapura Mahavihara', the inseparable connection of the users with their practised rituals, activities, ceremonies through different movements within the vast complex of 'Somapura Mahavihara', is a must for a complete understanding of the space organzation.

Fig 57 (adjacent page)
Identical elements of Somapura Mahavihara within its cotext as identified by comparative studies.

source: satellite image, Google Earth 2014;
AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p.56.

2.3.1 Users and Activities

'Somapura Mahavihara' being a reflector of 'Mahayana Vajrayana Buddhism', demands the understanding of its rituals and activities, in order to enhance the hypotheses of its functional establishment. The Users - dynamic and targeted group of the establishment, can be divided in several groups:

- monks
- students
- visitors — laity
  — pilgrims
  — merchants

The monks were the main authority of the Vihara, where the devoted students were admitted for education to become a monk within certain code of Mahayana Buddhism. After practising Mahayana Buddhism for five years, the student entering into a 'Vajrayana tradition' of 'Mahayana Buddhism' must take a dependence upon a 'Guru'(senior monk) with 'Tantric perceptions/vows' which takes 100days for a student to accomplish all the required rituals, who need isolation every night in his own cell, after ending the daily rituals; as a code of this religious order.

'' …a novice also has to go through a series of highly elaborate consecrations (abhiseka) full of symbolic and complex rites under the strict guidance of his Guru; ''[106]

Fig 58 (adjacent page)
Terracotta plaques depicting life of Somapura Mahavihara.
© Tamanna Ahmed photography, 2014.

[106] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.24.

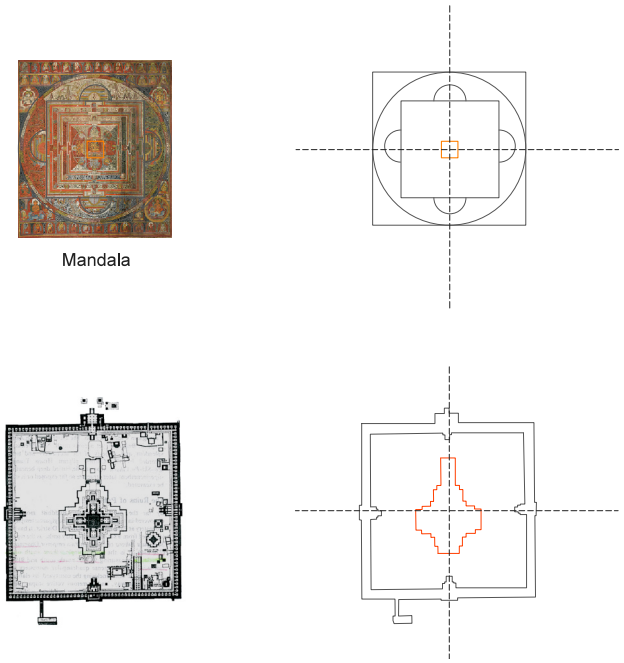


Fig 59
Buddhist symbolism in planning of Somapura Mahavihara.

source: www.en.wikipedia.org
AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p. 56.
© Tamanna Ahmed drawing, 2015.

It is important to note that, 'Tantra mediation' with 'Deity Yoga' is a daily practise of 'Vajrayana Mahayana Buddhsim' which represents imagination of own self as one of the deity Buddha of wisdom, to enhance the essence of emptiness, which is a must to attain enlightenment. In this connection, it is important to refer,

'' On the philosophical ground, the Mahayana holds that the real essence of all phenomena is 'Sunya'(emptiness)…all concepts exists only in the mind and thought, that are constantly changing and therefore unreal. ''[107]

Through the planning of 'Somapura Mahavihara', it is evident that it represent the 'Mandala'* - bearing a significant symbolic meaning by the religious belief of Buddhism. According to that, the symbolic importance of centre and the four cardinals had well be understood through the space organization of its proximate central temple and other functions of the total complex.

'' Another important icon of Vajrayana religious symbolisms is the Mandala….the inner circle of Mandala represents 'Nirvana'** and the world of enlightened Buddhas and Bodhisattvas***,while the outer square and periphery symbolise 'samsara'**** and the world of enlightenment beings. ''[108]
Following such representation of symbolism, the total planning of 'Somapura Mahavihara' had been shaped emphasizing the four cardinal points with image shrines, entrance and as well establishing the Temple in the middle of it.

* Mandala: a visual form to represent the core essence of the Vajrayana teachings. It represents the nature of the Enlightened mind and the greatest protection from samsara.****

**Nirvana: describes a state of freedom from suffering and rebirth i.e. enlightenment.

**Boddhisattvas: primarily used to refer specifically to Gautama Buddha in his former lives to embrace qualities like selfsacrifice and morality.

****Samsara: refers to the process of cycling through one rebirth after another where each realm can be understood as either a physical realm or a psychological state characterized by a particular type of suffering.

[107] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.22.

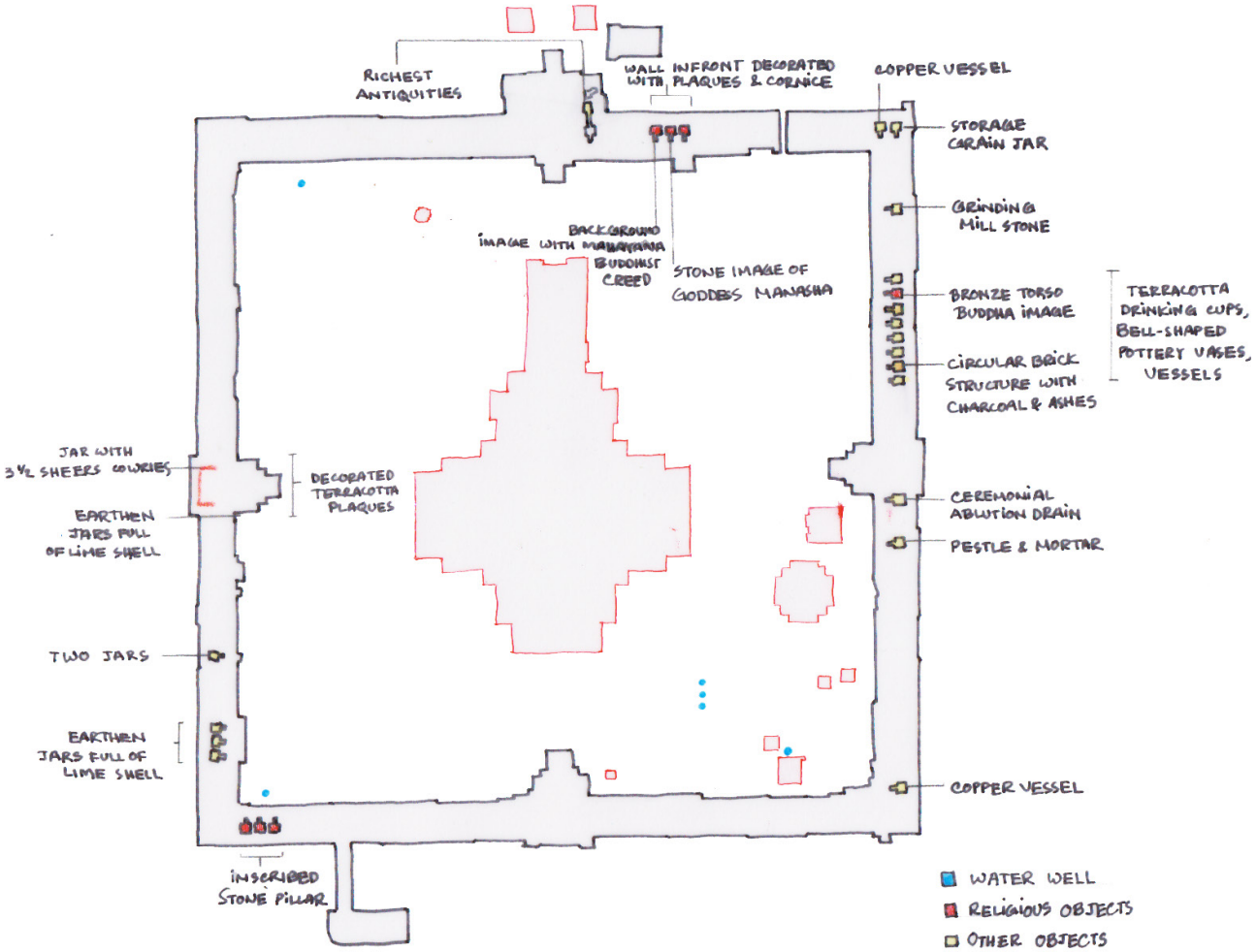
[108] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.24.

The significance of 'Mandala' can as well be understood through the rituals practised in 'Mahayana Vajrayana Buddhism'; the doctrine upon which 'Somapura Mahavihara' was established as well.

In Vajrayana teaching, after ending the dependence of 'Guru' (senior Monk), the student need to choose his image deity, with closed eyes and releasing a flower upon the disorientated 'Mandala'; the deity in 'Mandala' upon which the flower falls, becomes the 'deity Buddha' for the student concluding the dependence from the 'Guru'. Along with 'Tantra meditation' of 'Deity Buddha', other daily rituals include:
• chanting 'Mantras'(sacred utterance believed by Buddhism to have psychological and spiritual power) after bowing to each other;
• Circumambulating and chanting around the temple, speeding up the chanting with ringing of bells;
• the sudden stoppage of bell ringing provides a sense of emptiness and peace;
• after that, taking refugee to three jewels : Buddha, Dharma (Religion) & Shangha (community).

As the birth of 'Vihara' was after the ritual 'Rain Retreat', adhere to doctrine of Buddhism, it had been playing a vital role, along with other rituals; in shaping the spatial formation of Vihara Architecture. According to the doctrine of Buddhism, the 'Rain Retreat' is the 3months of rainy season or monsoon when the monks stay in one place rather going out for preaching in order not to hamper the living beings, insects etc. through stepping upon them while their walking since killing living organs is strictly forbidden in Buddhism.

This belief further generated the rituals associated to the core concept of Mahayana Buddhism, followed by the believers till date, such as:
• Kathina ceremony (robe offering ceremony from laity to the monks, after ending the 'Rain Retreat')
• Pavarana day (concluding day of 'Rain Retreat')
• Anapanasati day (ending day of one more month from 'Rain Retreat')
• Buddha day (celebrating birth, enlightenment and death of Buddha)
• Buddhist new year (of Mahayana tradition, first full moon day of January)
• Dhamma day (Buddha's 1st teaching, turning the wheel-of-law; full moon day of 8th lunar month)
• Loy Krathong (floating bowls removing bad lucks; full moon night of 12th lunar month)


RICHEST ANTIQUITIES
WALL INFRONT DECORATED WITH PLAQUES & CORNICE
COPPER VESSEL
STORAGE CARAIN JAR
GRINDING MILL STONE
BACKGROUND IMAGE WITH MAHAYANA BUDDHIST CREED
STONE IMAGE OF GODDESS MANASHA
BRONZE TORSO BUDDHA IMAGE
TERRACOTTA DRINKING CUPS, BELL-SHAPED POTTERY VASES, VESSELS
CIRCULAR BRICK STRUCTURE WITH CHARCOAL & ASHES
JAR WITH 3½L SHEERS COWRIES
DECORATED TERRACOTTA PLAQUES
EARTHEN JARS FULL OF LIME SHELL
CEREMONIAL ABLUTION DRAIN
PESTLE & MORTAR
TWO JARS
EARTHEN JARS FULL OF LIME SHELL
COPPER VESSEL
INSCRIBED STONE PILLAR
WATER WELL
RELIGIOUS OBJECTS
OTHER OBJECTS

All these rituals remarks public gatherings, that can well be identified through the spatial organization of 'Somapura Mahavihara', as planned to celebrate within its vast complex.

The religious relics and evidences found in 'Somapura Mahavihara' portrays their simplistic code of living, while indicating the functions performed within its vast complex beneath the sky. Thus these religious relics and evidences have vital importance as indicators of understanding the functioning of its total complex.

The religious relics found in the cells of the monastery suggest, the proximate central temple as the zone of mass prayer, while in later phases private worship spaces were created in 92 cells among 177 cells, through installation of pedestals. This indicates a decrease in the number of living cells, meaning a decrease in the population of its monk community. In the southeast corner of the monastic complex, the main temple miniature and other stupa structures suggest Tantric religious practise by smaller or more concentrated groups, while the walls and peripheral structures in ruin surrounded by them refers usable space for such activities. Among the daily use objects, the copper vessel found in room 22 with a hole in the pointed base suggests the purpose of some ceremonial ablution,[109] which as well is indicated by another copper vessel found in room 65. Another interesting evidence found on the floor of room no. 23 is a number of jars, which were apparently for the storage of grains and other necessities,[110] and similar jars were found in front of room 115-117, as well.[111]

'' From room 28 comes a grinding mill stone which was undoubtedly used for the daily food of the monks. Similar use must have included pestle and mortar found in the concrete course of room 48. ''[112]

Although the kitchen was situated on the south eastern part of the monastery, these storage jars and small equipments for grains indicates food storage of short period; perhaps for 'rain retreat' season or in spacial need. The food must have been received in daily basis from the adjacent villages; since no bigger storage of grains to serve the total monk community, had been found.[113]
However, in the later phase of its establishment, the total population of the monastery decreased which can well be identified by location of private pedestals in 92 cells among 177 cells of the total complex, while the amount of storage of grains must had been decreased as well.

Fig 60 (adjacent page)
Relics and evidences found in Somapura Mahavihara, represented in its plan by founded locations.

source: AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p. 56.

[109] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.23.

[110] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55. Dept. of Archaeology Govt. of India.* Delhi. 1938. p.22.

[111] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology *Govt. of India.* Delhi. 1938. p.32.

[112] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.27.

[113] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology

In this connection, it is important to note that, *'' Buddhist refectories were used to stock, cook, serve and distribute one meal a day, before noon.''*[114] This one meal per day system must have had created a major gathering of the monks in the refectory area of 'Somapura Mahavihara', that share the large refectory of over 120 ft. (approx. 34.48 m). After the only meal of the day , the monks must had been dedicated to various religious activities for rest of the day.

Through the archaeological evidences, not only the meal system of the monk community of VIII century can be recovered, but also their monitory system of the era. It is interesting to note that, in the passage of the central block of western wing of 'Somapura Mahavihara', a jar with a lid consisting of a half round brick, in which about 3 1/2 sheers of cowries were found.[115]

'' ...when the muslims first came to Bengal, they noticed no minted currency in the province, but found people using cowrie-shells in their financial transactions....It seems therefore, reasonable to conclude that from the time of the Palas in north Bengal and from the time of Chandras in southeast Bengal...cowries served as the medium of exchange. ''[116]

Since, the location of cowrie storage were not close to the entrances, it indicates that these cowries were not regularly used, rather kept for future need. As the inscription and clay seals of Dharmapala and Devapala were discovered in Nalanda Mahavihara (4th c.AD),[117] it can well be understood that the system of education of these Viharas were similar, being under the same ruler of the era. About the language used by the monks within the system of education, *'' Moreover, to successfully complete their mission, they had to acquire in the countries of their destination the necessary linguistic equipment...in order to translate the difficult philosophical text in Sanskrit or Pali into their languages. ''*[118]

The description by I-tsing provides interesting information about the subjects taught within the education system of these Mahaviharas (former universities).

[113] Musgrove,John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.762.

[114] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.33.

[115] Musgrove,John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.197.

[116] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.64.

[117] Thakur, Upendra. *Buddhist Cities in Early India.* Sandeep Prakashan. Delhi. 1995. p.102-103.

'' All study the great vehicle (Mahayana) and also the work belonging to the eighteen sects (Theravada), and not only so,but even ordinary (non-Buddhist and secular) works, such as the Vedas(Hindu) and other books, the Hetuvidya (logic), Sabdavidya (Sanskrit, grammar and philology), Cikitsyavidya (medicine), the works on magic (Atharvaveda), Sankhya (system of philosophy); besides these, they thoroughly investigate the miscellaneous works (probably literature and general knowledge).''[119]

Such system of education portrays the higher education system running since 5th century AD (Nalanda Mahavihara) in the land of Bengal, even before the birth of 'Somapura Mahavihara', which only carries the development of such educational religious order.

Among hundreds of monks of 'Somapura Mahavihara', Atisha (b. 980AD, Bengal) stayed many years to study there, who later became the great reformer of Tibetan Buddhism; being worshipped as a great saint in Tibet till date.[120]

Apart from nurturing religious & secular knowledge, the notion of these Mahaviharas can well be recognized as Political interest, through,
'' These were likely Royal monasteries funded by the state like Nalanda since they had been known to educate the scholars and individuals who would later be employed by the Government. ''[121]

Followed by the education system of these Mahaviharas, a 'Acarya'(or 'Pandit'), would be equivalent to Doctorate degree, who mastered on grammar & philology, medicine, logic, metaphysics and fine arts, as well recommendation from these Mahaviharas would employed in Government or king service.[122]

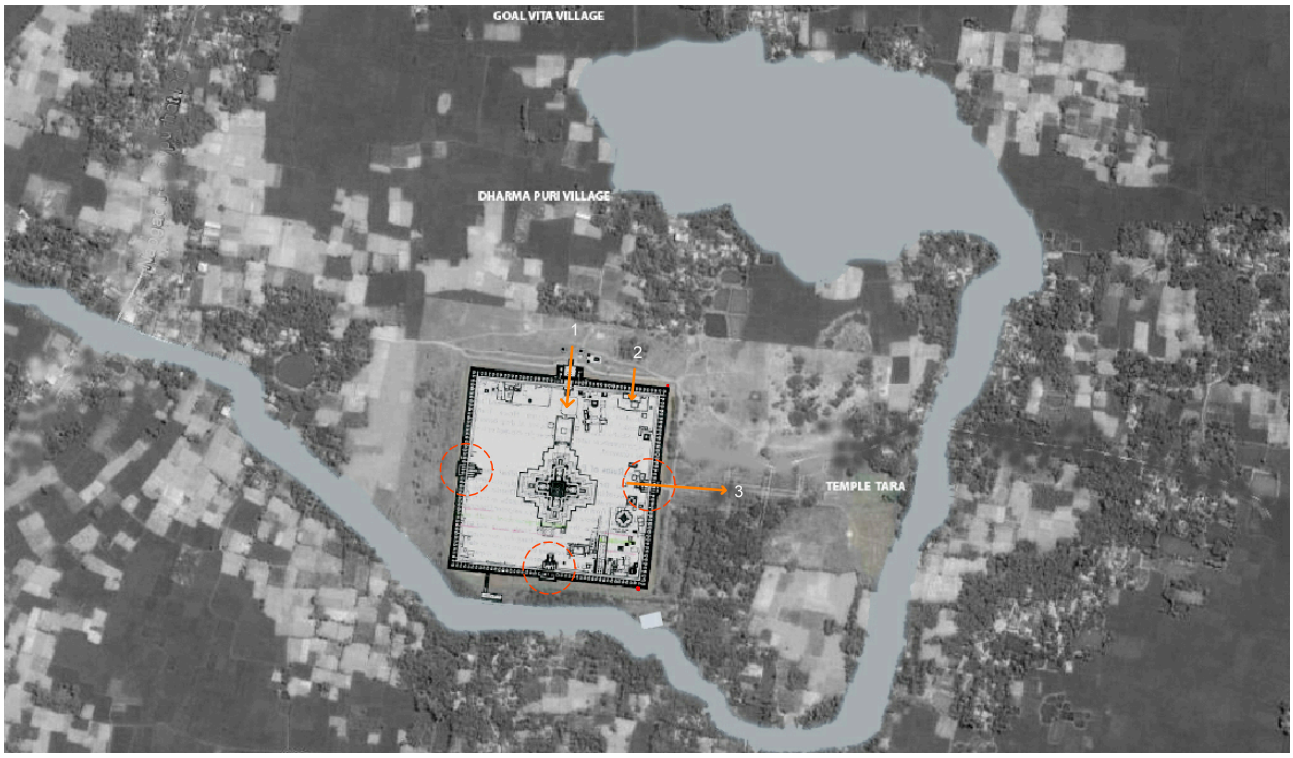
Hence, it is evident that the users of 'Somapura Mahavihara', were the prestigious group of people being prepared to play significant role of political, social, cultural and religious interests, not only in the region of ancient Bengal, but also to the brader zone of Tibet, Cambodia, Java, Nepal, Srilanka, China etc through exchange of knowledge of vaster disciplines.

[118] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.61.

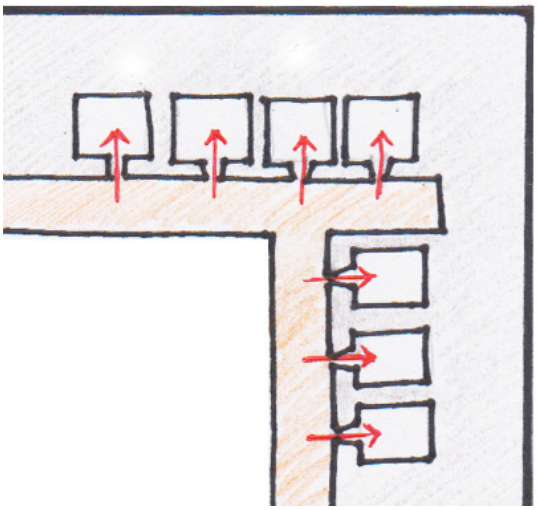
[120] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.23.

[121] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.71.

[122] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.61.



Outside Public domain zone to Inside collective private zone



Inside collectie private zone to Inside individual private zone

2.3.2 Entrance

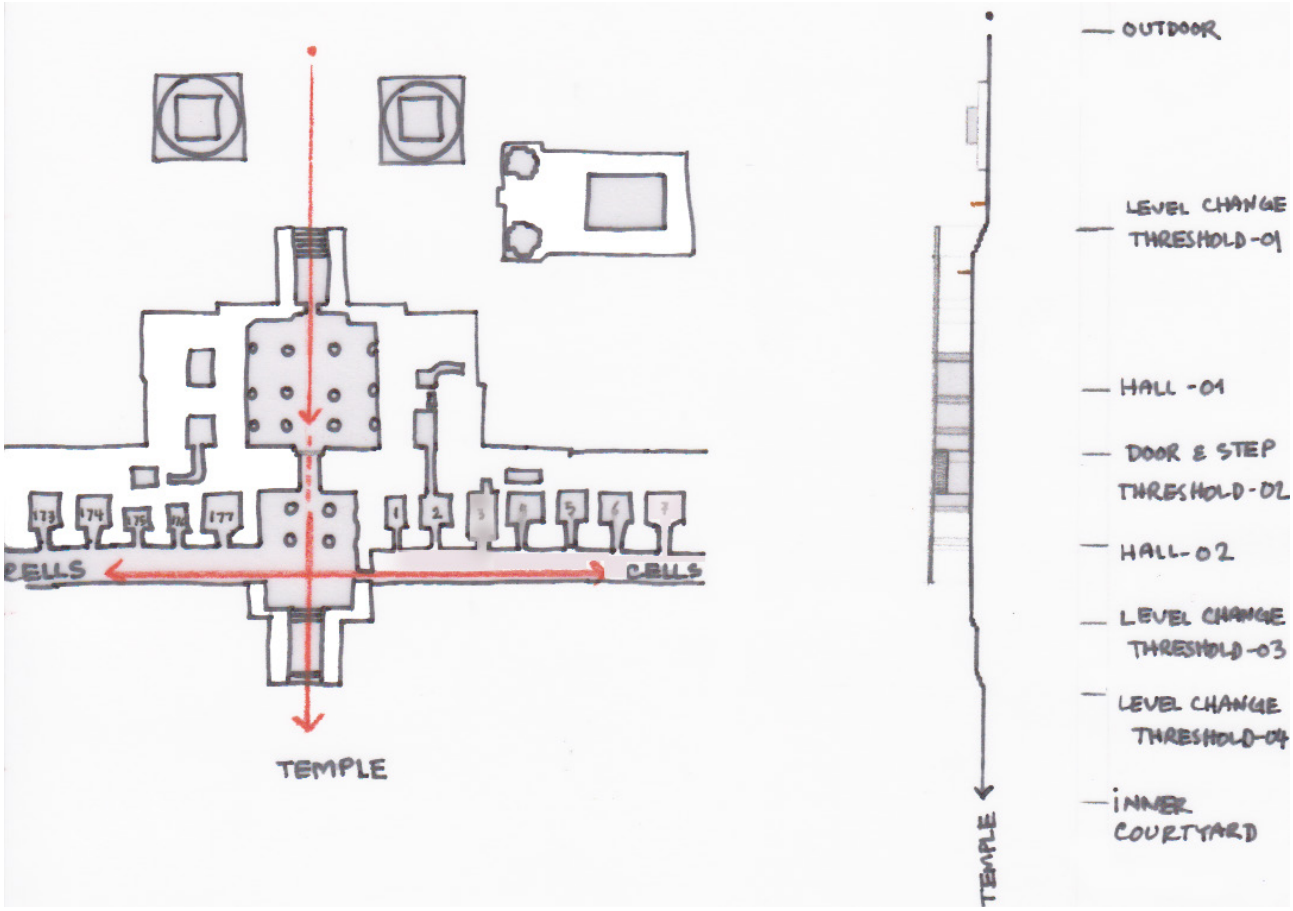
Entrance is the most significant element in the enclosure of Viharas, enhancing the transition from outside world to the inside world of enlightenment. In 'Somapura Mahavihara' one of the identical feature is the existence of more than one entrance; one main & two secondary.

These entrances indicates the threshold point that connect the external public domain to internal private zone within its contextual surrounding.

'Entrance' can also be remarked as 'internal public space' to 'internal private space' as from the verandah to each cell units in 'Somapura Mahavihara'.

Fig 61 (adjucent page)
Different entrance hierarchies of "Somapura Mahavihara".

source: satellite image, Google Earth 2014;
AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p.56.


CELLS
CELLS
TEMPLE
OUTDOOR
LEVEL CHANGE THRESHOLD-01
HALL-01
DOOR & STEP THRESHOLD-02
HALL-02
LEVEL CHANGE THRESHOLD-03
LEVEL CHANGE THRESHOLD-04
INNER COURTYARD
TEMPLE

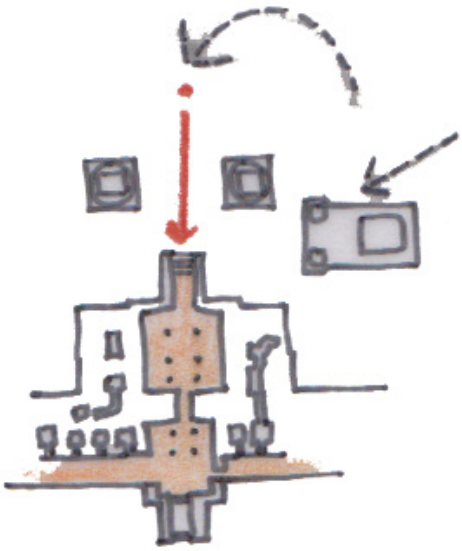
The grand preparation of the north entrance of 'Somapura Mahavihara' was undoubtedly ceremonial and the main entrance, which was flanked by two votive stupas and a guard room (as assumed on the north-eastern side). The configuration of the space associated to the main entrance of Somapura Mahavihara is drawn in 62.

It is noticed that, the main entrance of Viharas in comparison is composed of two hall rooms of different dimensions, acting as the foyer or preparation space, while in 'Somapura Mahavihara', this is planned in more elaborate way. In such succession of space through unequal size of hall rooms and the door in the middle, with threshold pauses that enhance in providing divine view of the Temple, standing in the proximate middle of the illuminated courtyard.

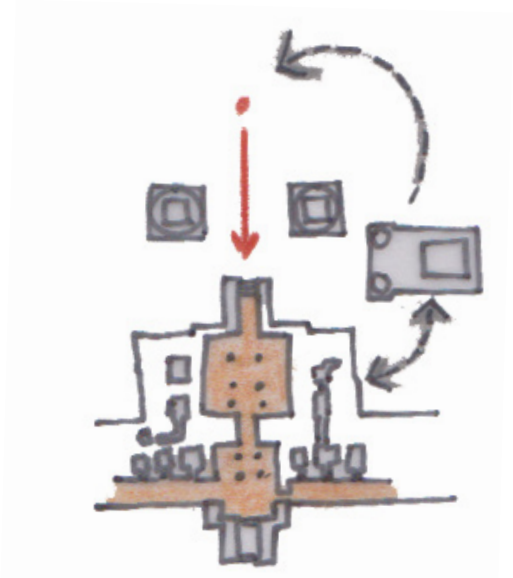
Fig 62 (adjacent page)
Analytical plan and cross-section of the main Entrance of 'Somapura Mahavihara' (770 AD).

source: AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p.56.
© Tamanna Ahmed drawing, 2015.

Fig 63
Remaining of main Entrance of 'Somapura Mahavihara'.
© Tamanna Ahmed photography, 2014.



Door opens in time of ceremony anf guarded from outside



Door closed and notified by guards in need, communicated through the window of room 2 extension

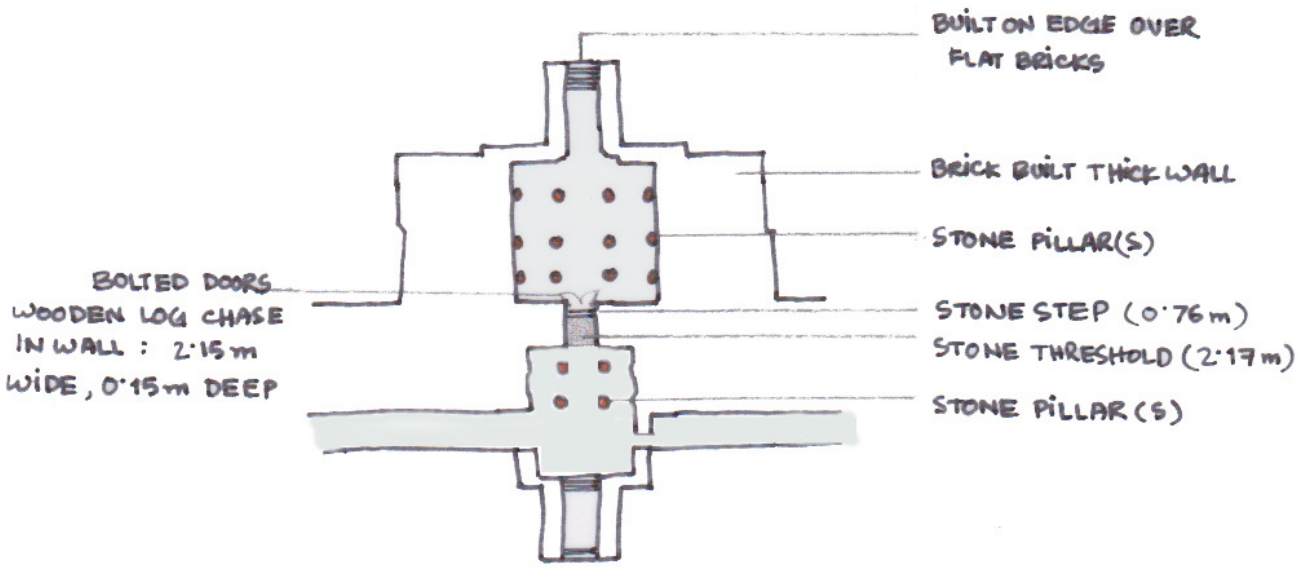


Fig 64 (adjacent page)
Hypotheses of entrance control of Somapura Mahavihara.

source: AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p.56.
© Tamanna Ahmed drawing, 2015.

Fig 65
Drawing of constitution of entrance of Somapura Mahavihara according to Archaeological data by K.N. Dikshit.

source: AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p.56.
© Tamanna Ahmed drawing, 2015.

The door of the main entrance, which was the key of the total establishment, must had been closed except for the ceremonial and processional times. The visitors would had been verified by guards from the guard room, who must had been communicated through the window situated on the extension of room no. 2; with the insiders to open the door.
According to the archaeological datas, Figure 64, illustrates the extension of room.2, which had a recessed opening in its east wall, assumed to be a window, which was found with the richest antiquities so far discovered in 'Somapura Mahavihara' compound.[123]

In this region the archaeological evidence as well proof the wooden rafter of Palm wood in the ceiling [124], which indicates the roofing system, preferably similar to the vernacular architecture of the region, pitched roof with wooden rafters.

The archaeological evidence indicates the material constitution of the main grand entrance of 'Somapura Mahavihara' as illustrated through the figure 55.[125]
About the main entrance door,
'' ...the main entry once had a pair of 4' (approx. 1.15 m) wide doors which could be locked by a large timber bolt. ''[126]

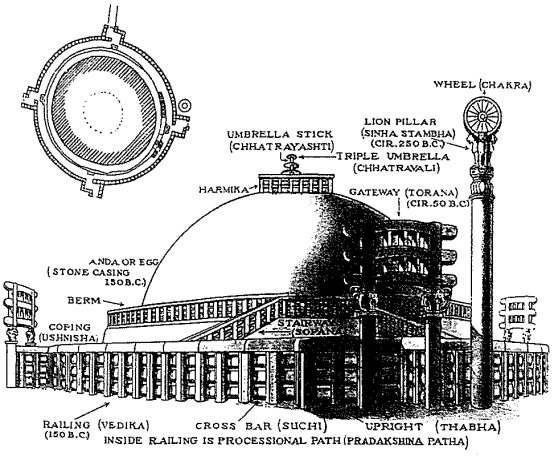
This clarify that, the main door, the key of the total establishment was double swing and made of timber with iron clamps and locked by a large timber bolt.

[123] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.20.

[124] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.20.

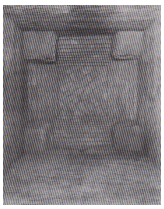
[125] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.18-19.

[126] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.72



Sanchi Stupa 3rd century BC.

Sanchi Stupa gateway



'Blind Cell' of Somapura main Temple

Fig 66
Sanchi stupa (3rd c. BC) complex with one of its four gateway.
The "blind-cell" of the main Temple of Somapura Mahavihara(770 AD).

BROWN, Percy (1942), *Indian Architecture (Hindu and Buddhist Period),* Bombay: Taraporevala Sons & Co. plate no: XII, XV.
ALAM, Shafiqul (2004), *Proceedings of the International seminar on elaboration of Heritage sites and its environment 20-25March, 2004,* Dhaka: Department of Archaeology - Bangladesh Government & UNESCO. p.19.

Although the public entrance of 'Somapura Mahavihara', was from the North, the three other cardinal points were remarked by image shrines, in its middle depicting illusion of gateways as well. This was to reflect the symbolic significance of 'Mandala' symbolism, which can also be seen in Sanchi Stupa (3rd c. BC) through four physical gateways, indicating the four cardinal points.

"…Sanchi thoranas (gateways) were decorated with low reliefs, depicting the stories from the Jatakas or historical events relating to the life of the Buddha."[127]

It is interesting to relate that, the central temple of 'Somapura Mahavihara' was a combined form of stupa and temple, remarked as 'Stupa Temple'; structured in the centre by a hollow shaft : both structural and symbolic meaning; known as 'blind cell', where few antiquities had been found.

Through evolution process of Vihara architecture, the symbolic meanings of Buddhism had been portrayed in different ways from Sanchi (3rd c. BC) to Somapura mahavihara (8th c. AD).

The stories as depicted through the gate decoration of Sanchi, transformed into the terracotta plaques of 'Somapura Mahavihara', in such a way to be noticed by the users circumambulating surround the main stupa-Temple.

[127] Musgrove, John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.751.

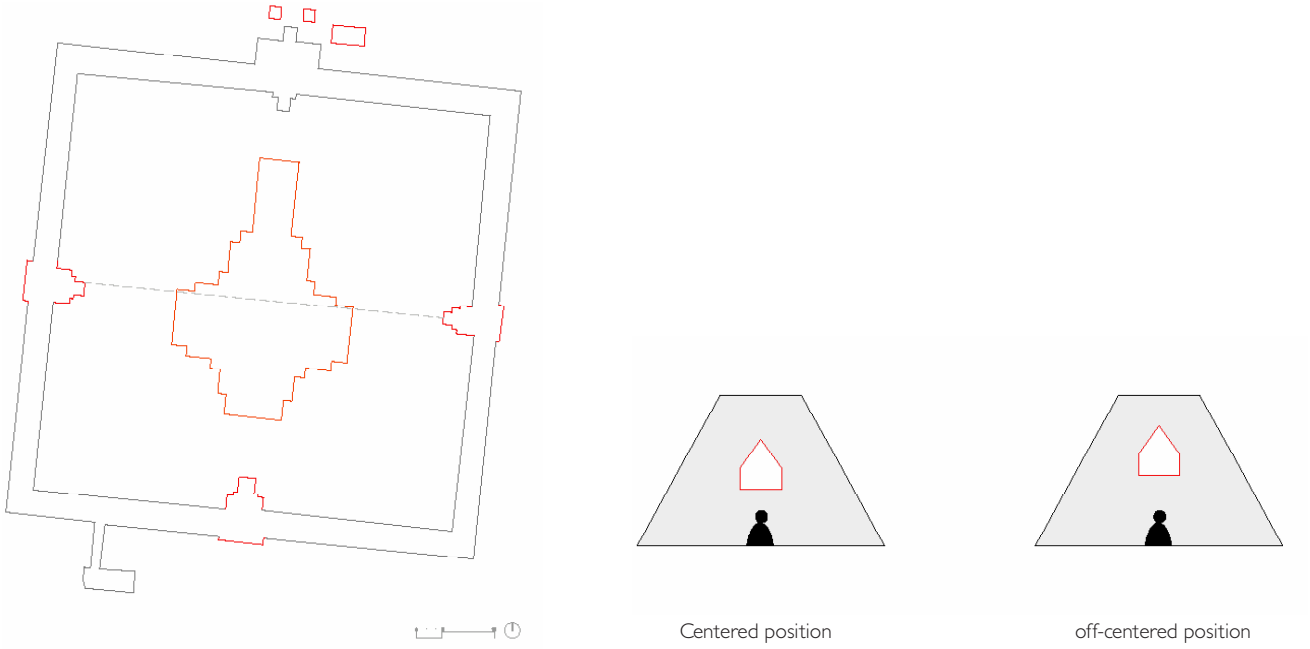


Fig 67
Analysis of the positioning of the main Temple of Somapura Mahavihara and the visual illusion it projects.
© Tamanna Ahmed drawing, 2015.

It is interesting to notice that, the positioning of the proximate central Temple of 'Somapura Mahavihara', was not placed in its exact centre, rather shifted more to the south.

'' The position of the central block of the eastern monastery and the steps leading to the courtyard is, however, removed by 40' (approx. 12.20 m) to the north of the centre of the eastern facade of the main temple. ''[128]

Such spatial planning indicates the consciousness in positioning the Temple location, more to south in order to provide elongated space after entrance from the main entrance. Not only that, but also it play a visual illusion indicating similar distance from all four sides, providing vastness of the complex, more than actuality.

[128] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55*. Dept. of Archaeology Govt. of India. Delhi. 1938. p.24.

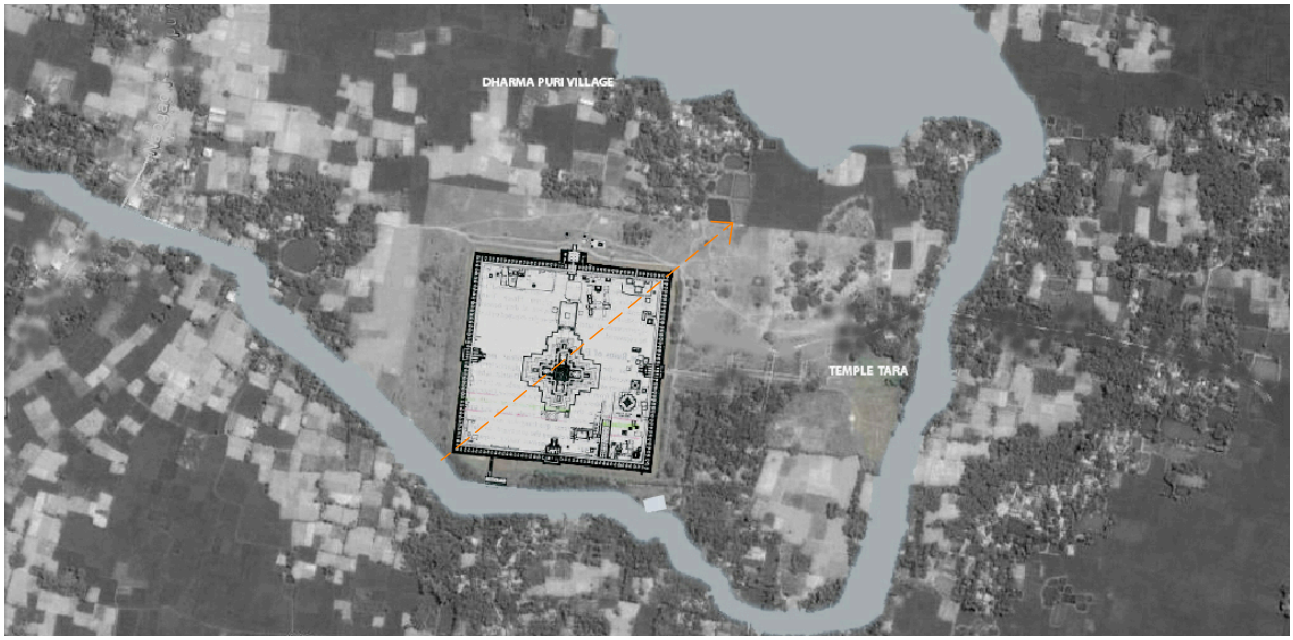


Fig 68
Natural slope and existence of lake in context of Somapura Mahavihara, by Archaeological data analysis.

source: satellite image, Google Earth 2014; AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p. 56.
© Tamanna Ahmed drawing, 2015.

Another element, in between the main entrance and the main Temple, is the existence of a pond that had been removed in the renovation time being proved not from the original planning phase.[129] As identified by the Archaeologist KN Dikshit,
" … the natural slope of the ground on which the Temple was built was from south-west to the north-east. "[130]

Although the pond was assumed to be a water tank collecting the drainage water from the quadrangular complex by archaeologist KN Dikshit [131], the existence of a 'bil' (lake) on the north-east side coinciding with the natural slope of 'Somapura Mahavihara' indicates absence of such water body inside the monastic complex, which supports the conscious aesthetic planning of its Entrance.

" The canal initially runs parallel to the south wall…and eventually discharges its water into the depression area 'bil' which is located north-east of the monastic complex. "[132]

To understand the planning of water drainage system of such Vihara complex, the contemporary monastery Nalanda Mahavihara can be referred,
" …drains were buried beneath the courtyard floor to discharge water to the back of the Vihara; "[133]

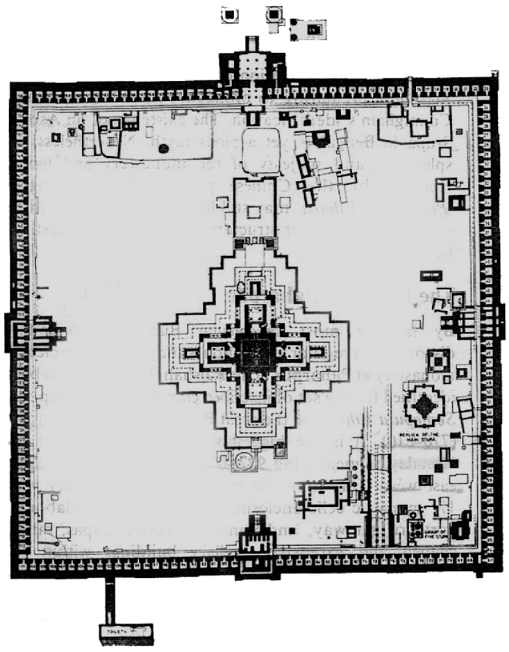
[129] Alam, A.K.M.Shamsul. *Barendra Oncholer Itihash.* Shompadona Parishod. Rajshahi. p.366. (translated by the author)

[130] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.17.

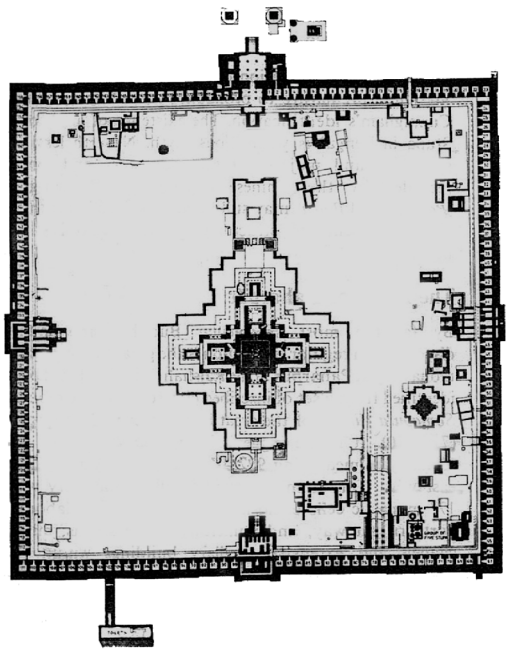
[131] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.11.

[132] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.39.

[133] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.62.



Presence of pond in between the main entrance and main Temple

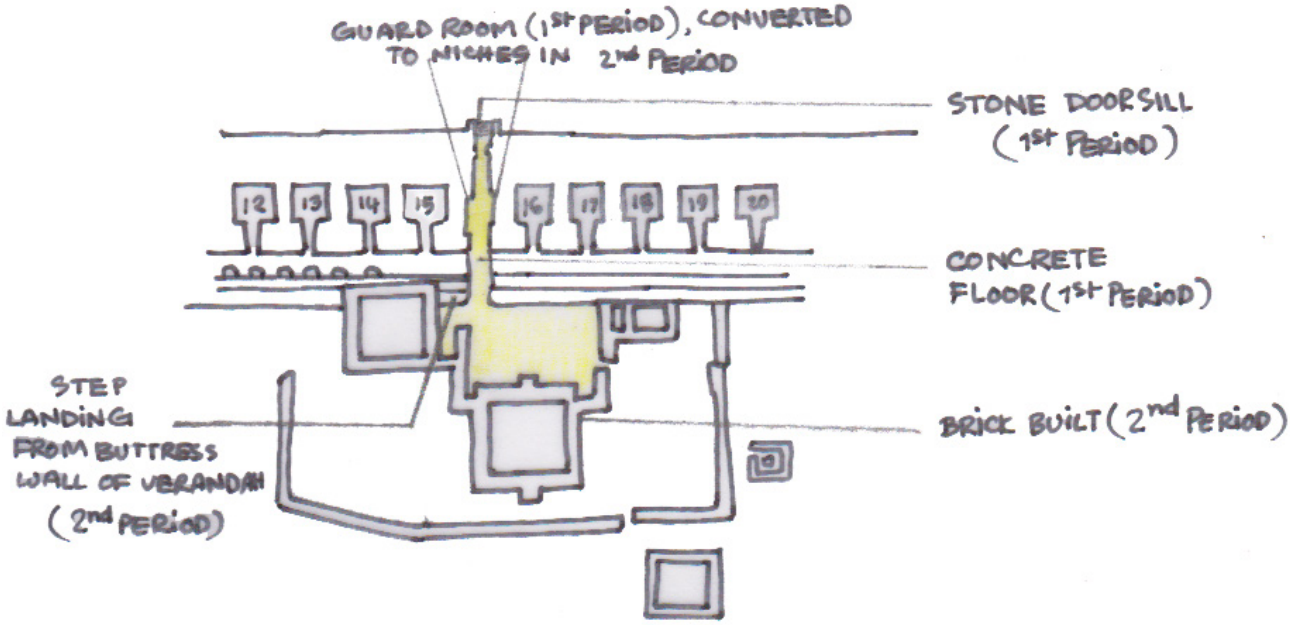


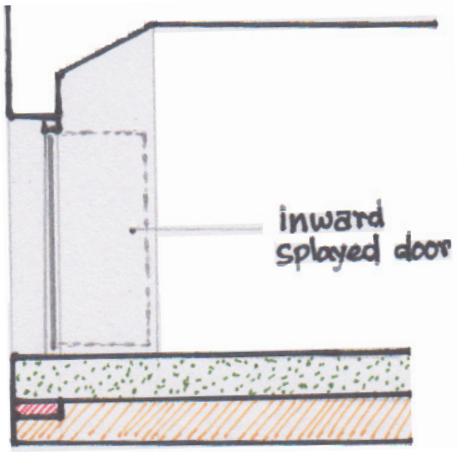
Elimination of the pond in between the main entrance and main Temple as original phase

Through such evidence of the contemporary establishment of 'Somapura Mahavihara', it can be assumed that, the drainage water of the total establishment was channeled through underground drainage duct (after collecting the water by the north-east natural slope of the complex) to the existing 'bil'(lake) situated outside north-east side corner of the monastery. Hence, the existence of the pond or water tank between main entrance and Temple can be assumed invalid in the conscious planning of 'Somapura Mahavihara'.

Fig 69
Revised plan of Somapura Mahavihara (770 AD), by eliminating the pond after entrance, as a hypotheses of original state, on analyzing Archaeological data.

source: AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p. 56.





BURNT BRICK FLOOR CONCRETE FLOOR (1st PERIOD) STONE DOOR SILL

One of the identical element of 'Somapura Mahavihara' is the secondary entrance situated on the north-eastern part of its enclosure. As archaeologist K.N. Dikshit reported, *'' Beyond room.15, in the northern side of the monastery there appears to have been originally a postern gate provided with the only other entrance to the monastery, except through the main gate on the north.''*[135]

After this entrance, the built structures surrounded by it suggests meeting of monks with the outsiders, preferably laity and receipt of daily food supply by the responsible from the adjacent villages, to support the huge monk community under royal patronage.

As seen in elsewhere of such Vihara complex of the conventional time period,
'' Another type of community hall within the Buddhist monasteries was the Sannipathasala or the hall of administration….which has a central seat on a platform of stone for the presiding monk. The monks and the laity met regularly in such halls to carry out the day-to-day business of the community. ''[136]

The spatial organization surround the second entrance suggests the regular meeting zone of outsiders with the monk community, which can be referred as hall or zone of administration. The structural elements of this secondary entrance can be acknowledged by the excavation report of archaeologist K.N. Diktat as,
'' …the doorway renovated at a higher level in burnt brick masonry with inward splayed doorjambs showing for resting the door-leaves, as in the regular door opening of this period. ''[137]

It is interesting to notice that, the concrete floor (mixture of lime and brick dust) of the second entrance continues to the enclosed space by several structures to provide a definite destination of its purpose. This space has clear distinction with the adjacent common verandah change in level, which assures the objective of this entrance more profoundly.

The overall constitution of the structural and spatial pattern of this postern gate remarks profound daily meetings among confidential group of people with the monk community of 'Somapura Mahavihara'.

Fig 70 (adjacent page)
Space organization of second entrance of 'Somapura Mahavihara' with probable section by data analysis of Archaeological report[134]

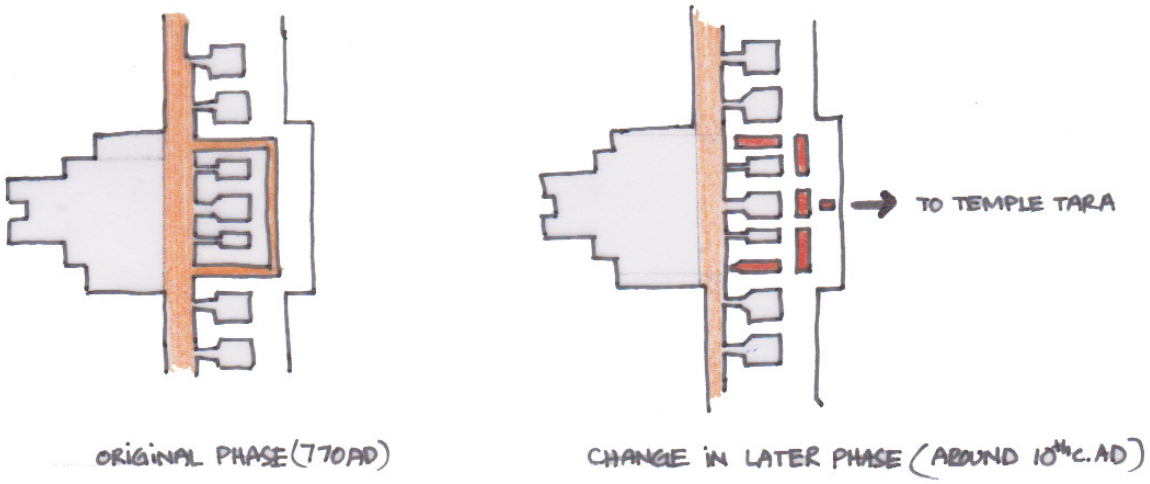
source: AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p. 56.
© Tamanna Ahmed drawing, 2015.

[134] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.22.

[135] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.21.

[136] Musgrove,John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.761.

[137] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.22.



In Somapura Mahavihara, another private entrance, as established on the later phase, had been traced on the central block of the eastern wing. It is believed to be built to provide access to the monastic complex of 'Tara Temple' built on 10th c. AD. This Temple complex is adorned by a vast number of stupas, believed to be built by the pilgrims to perform their rituals.[138]

However, this entrance is a continuation of the religious path from the central image shrine of the eastern wing, to the 'Tara Temple' situated about 300m east of the main complex of 'Somapura Mahavihara'. This circumambulatory passage although in the original phase was surrounded by 3 rooms, was later cut-off into five small cells providing the third entrance from its central part with the outside.[139] (as shown in figure 72)
Such space modification as well indicates the developed function of the eastern image shrine, as replaced by vaster religious complex, i.e. Tara Temple. Hence, the third entrance of 'Somapura Mahavihara' had the purpose of connecting greater religious establishment by diminishing smaller one, and thus continuing the religious journey until Tara Temple, around 300m east from its main complex. The entrances of 'Somapura Mahavihara' provide untold history of its enclosure modifications, that had been punctured in significant locations depicting the altered codes of the monk community inhabited within the communal order of Vihara Architecture.

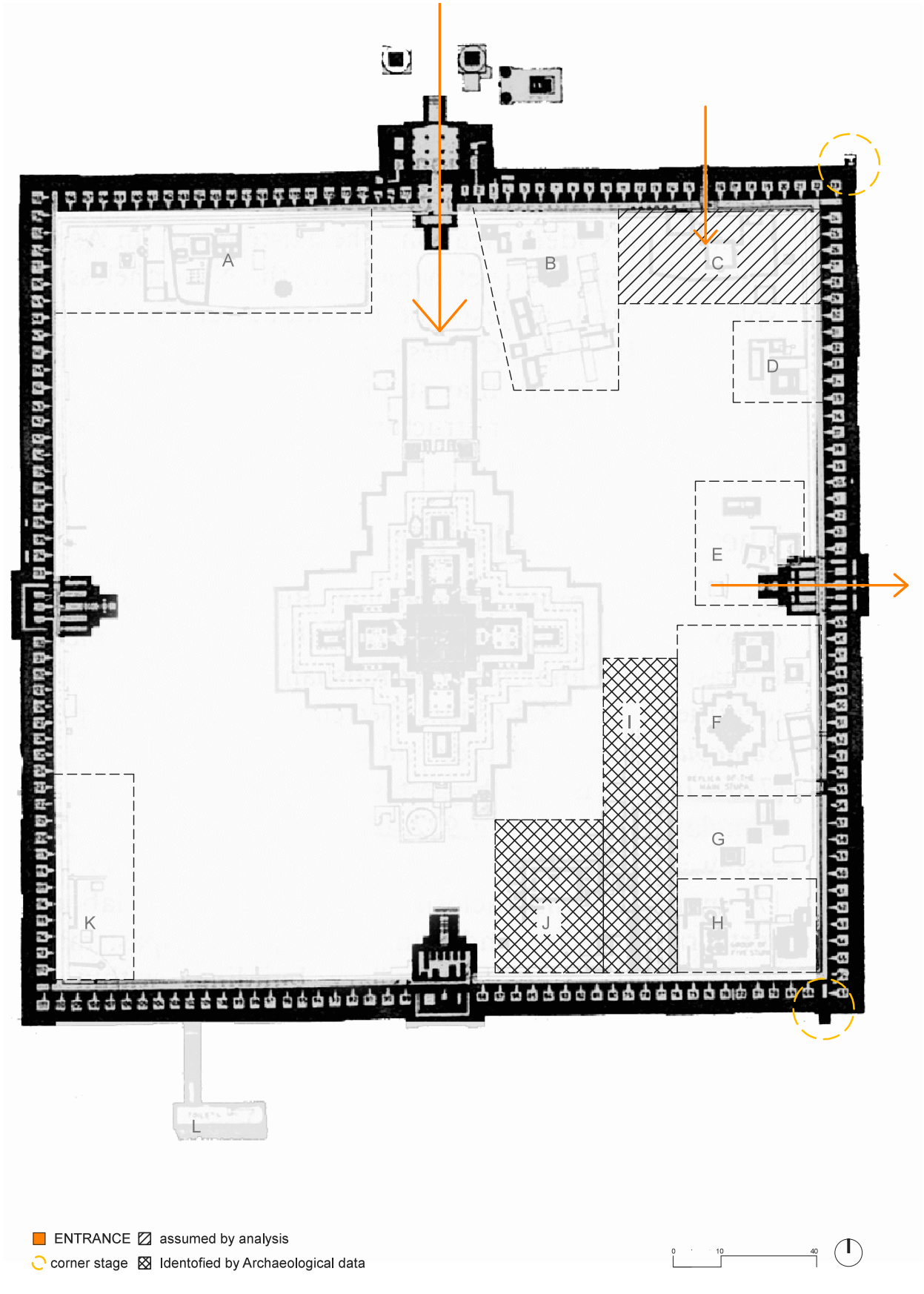
Fig 71 (adjacent page)
Looking toward the east centre block from the main Temple of 'Somapura Mahavihara' (770 AD)

Fig 72
Drawing of the change of third entrance of 'Somapura Mahavihara' translating Archaeological data.

source: AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p. 56.

[138] Alam,M.S. *Paharpur and Bagerhat : Two World cultural Heritage sites of Bangladesh.* Dept. of Archaeology, Govt. of Bangladesh & UNESCO. Dhaka. 2004. p.08.

[139] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.24.


A
B
C
D
E
F
G
H
I
J
K
L
ENTRANCE
assumed by analysis
corner stage
Identofied by Archaeological data
0
10
40

2.3.3 Formal Relationship

'' Whereas cosmic order is visualized by means of spatial organization, characters are symbolized through formal articulation. ''[140]

The spatial organization of 'Somapura Mahavihara' reflects the cosmic order knitted within the belief of Buddhism, while the character had been developed through the formal articulation of its provided functions. One of the singular character of 'Somapura Mahavihara' is the functional complexity within its vast quadrangular establishment, which had never been subjected to comparative study of Vihara Architecture.

These built spaces within the vast complex of 'Somapura Mahavihara' can be zoned in following segments, while indicating the identical elements it consists.
The spatial organization of zone 'C' had been analyzed with the second entrance of the complex, in previous section. According to the evidences reported by archaeologist K.N. Dikshit; zone 'I' , 'J' and 'L' had been identified as 'Refectory', 'Kitchen' and 'Toilet', respectively.

However, the archeological report remarks the built of many subsidiary structures of 'Somapura Mahavihara' on later phase, such as the structures around the second entrance of the complex.[141] This indicates the spatial adaptation according to the altered or developed rituals and codes of the monk community inhabited there.

Fig 73 (adjacent page)
Study division of functional zones of Somapura Mahavihara.

source: AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p. 56.
© Tamanna Ahmed drawing, 2015.

[140] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture.* Academy Editions, London. 1980. p.53.

[141] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India,Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.22.

About zone 'A' and 'B' there has been assumptions identifying the function as 'Library' and 'Administration' zone respectively by various sources. However, being religious educational institution, the functions commonly found in these Viharas were : library, meditation halls, guest halls for laity, meeting hall for performing important ceremonies, kitchen, refectory, gated chambers, fireplace halls, sheds, pavilions etc. (ref. Jetavanarama, 530 c. BC).[142]

The function called 'Administration' as a built form in terms of Vihara Architecture, is the meeting hall for the monks with the laity, controlling the total administration system of the Vihara coherent to the regional administration through discussion of daily affairs. As mentioned about the Viharas of ancient Bengal,
'' Another type of community hall within Buddhist monasteries was the Sannipathasala or the hall of administration….the monks and laity met regularly in such halls to carry out the day to day business of the community. ''[143]

However, In ''Jetavanarama'' where Buddha spent 19 Vasavasas (rain retreat), existence of no such separated space had been mentioned, as well in other comparative studies of later period Viharas. However, functional requirement suggests the Administration zone for 'Somapura Mahavihara' in ''zone C'', compatible by its spatial location and organization.

It is interesting to note that, about the conventional time period monastery 'Nalanda Mahavihara', the Chinese pilgrim Hsuan-tsang referred,
'' If men of other quarter desire to enter and take part in the discussions, the keeper of the gate proposes some hard questions; many are unable to answer and retire. One must have studied deeply both old and new (books) before getting admission. ''[144]

This situation suggests that it was difficult to get admitted into these Mahaviharas and not everyone could enter in such higher education system unless prepared beforehand. In such system of admission, the postern gate of 'Somapura Mahavihara' perhaps be used for examining the students before entering as traces of guard rooms had been found in both sides of the passage of this entrance of the complex.[145]

Hence, the postern gate is assumed as the daily meeting place of the monks with the laity to run the administration of the establishment; being more private in nature, while used for taking examination of the enrolled students as well.

[142] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.48.

[143] Musgrove,John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.761.

[144] Dutt, Sukumar. *Buddhist Monks and Monasteries of India: their history and contribution to Indian culture.* George Allen and Unwin Ltd. London.1962. p.332.

[145] Dikshit, K.N. *Paharpur memoirs of Archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.22.

Other activities by monk community within Vihara complex suggests,
'' Buddhist monks met regularly to recite the texts relation to public confession…identified as 'chapter house'. This was large enough to house the whole company of monks and the more elaborate examples had upper storey, used as a library. ''[146]

The definition of 'chapter house' denotes the space organization of zone A, in 'Somapura Mahavihara', since it offers a vast enclosure with individual boundary wall, a sense of privacy and buffering from the rest of the establishment with minimum structures within.

This zone can be assumed by its spatial organization as the assembly hall for the monks, where they met regularly for religious and monastic activities, as well for acquiring knowledge i.e. zone of library. This zone as Library, buffered by its own perimeter wall; adequate enough to contain vast number of monk community and adjacent to the main Entrance; can hence be referred as the 'Chapter house' with Library for the monk community of 'Somapura Mahavihara'.

Furthermore, another required space within vihara complex can be referred from,
'' Buildings in which to receive the offerings of Pilgrims and to hold the annual ceremonies and processions also found a place in each Vihara.''[147]

In time of annual ceremonies and processions, 'zone A' of 'Somapura Mahavihara', can well be assumed as used to receive the offerings of Pilgrims in its annual ceremonies, being vast by enclosure and close to the main entrance to contain such big group of people (monks, pilgrims, visitors etc.)

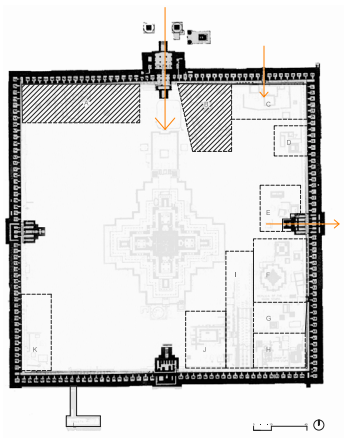
About zone 'A', archaeologist K.N. Dikshit remarks,
'' The most important structure within the enclosure is a square brick structure in which the lower part consists of three channels separated by wallings and closed on the top by corbel brick work. On this as a foundation was built a room with a verandah. ''[148]

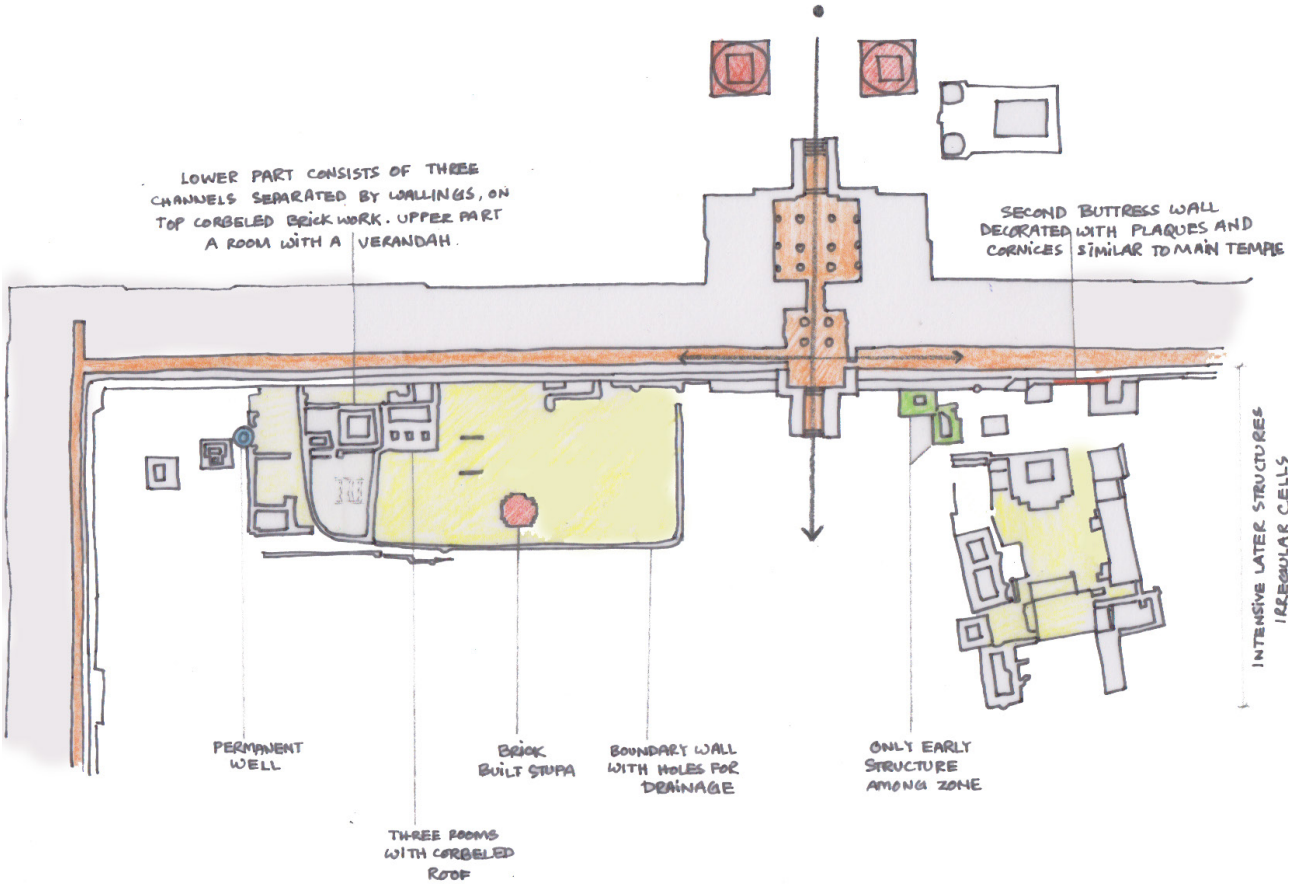
Since, 'zone A' consists of few room structures, as living unit and provides a big public gathering space within it, it can not be referred as the guest halls rather assembly space, pilgrimage gatherings, monks daily meeting place as well as the place of library, which is buffered by the vast enclosure wall adjacent to the west of the main entrance.

[146] Musgrove, John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.761.

[147] Musgrove, John. *Sir Banister Fletcher's a history of Architecture* (19th edition). CBS Publishers & Distributers. Delhi. 1987. p.745.

[148] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55*. Dept. of Archaeology Govt. of India. Delhi. 1938. p.35




LOWER PART CONSISTS OF THREE CHANNELS SEPARATED BY WALLINGS, ON TOP CORBELED BRICK WORK. UPPER PART A ROOM WITH A VERANDAH.
SECOND BUTTRESS WALL DECORATED WITH PLAQUES AND CORNICES SIMILAR TO MAIN TEMPLE
INTENSIVE LATER STRUCTURES IRREGULAR CELLS
PERMANENT WELL
THREE ROOMS WITH CORBELED ROOF
BRICK BUILT STUPA
BOUNDARY WALL WITH HOLES FOR DRAINAGE
ONLY EARLY STRUCTURE AMONG ZONE

Furthermore, 'zone B' is most likely to be the guest hall living space for pilgrims and visitors, being located close-by the main entrance, forming more introvert spatial organization with several separated cell structures around a common central space. According to Emily Lyle, the guest halls are mostly found near the front gate in more public area, whereas the teaching or meditation halls exist on the end of central axis.[149]

These altogether suggests the function of zone B, as accommodation space for the visitors of the monastery close--by the main Entrance within the public zone of the total complex. The assumption of 'zone B' as guest quarters is further supported by archaeological report of K.N. Dikshit (about zone B1),

'' Two square platforms one of which stands on a circular base adjoining the second buttress wall in front of room 4 and 5, appear to be the only early structure on this side. ''[150]

These platforms are assumed to be the earliest structures i.e. built in original phase to provide accommodation for the guests of the Vihara, which was extended to 'zone B' for exceeding numbers of pilgrims/guests, visiting the complex. As the archaeological report denotes, *''… in front of cells 4 to 9 there are extensive later structures, consisting of a number of irregular cells arranged round an open space, but there seems ta have been nothing of value either in the structures or the finds.''*[151]

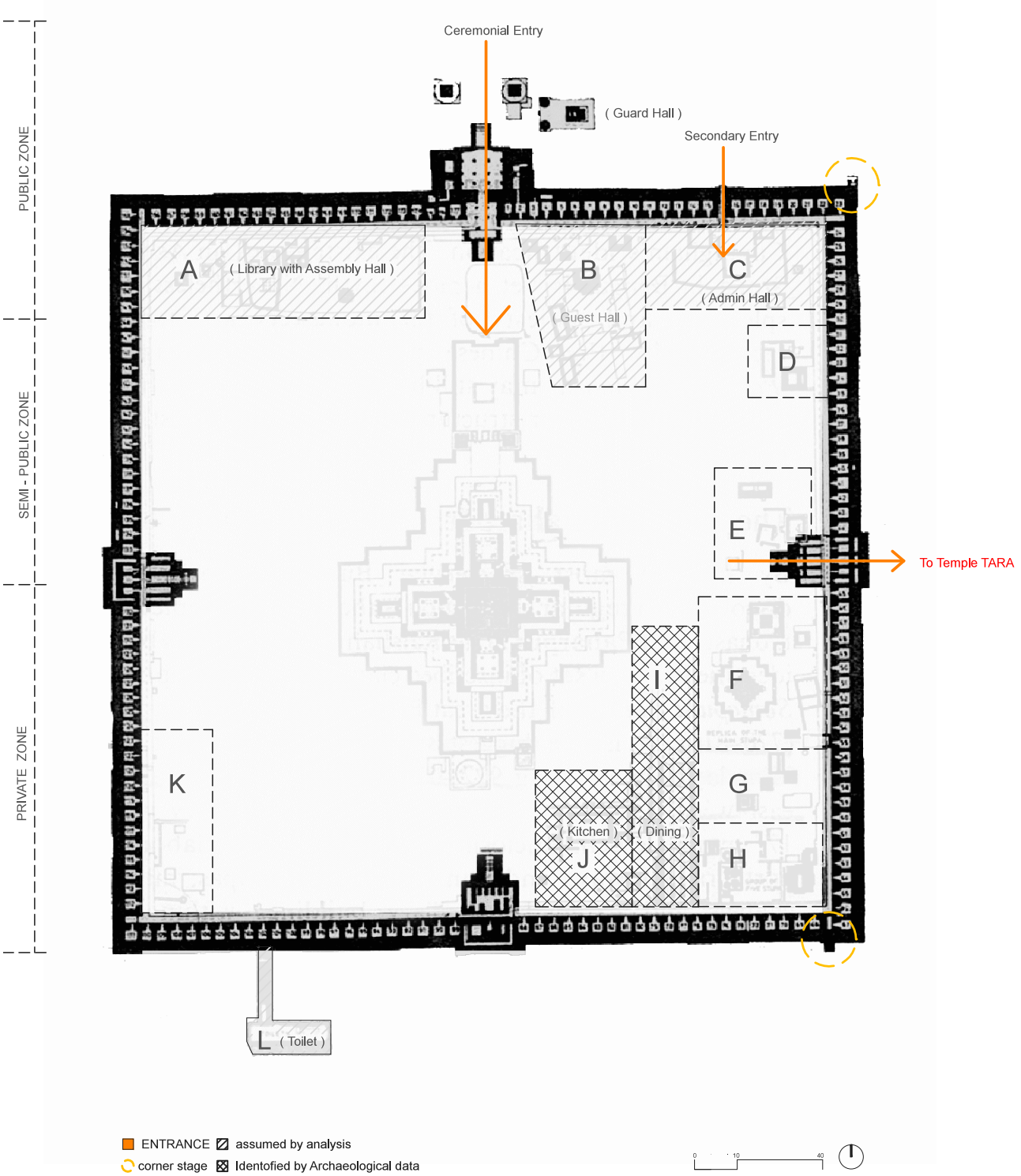
Fig 74 (adjacent page)
Defining ''zone A'' & ''zone B'' of Somapura Mahavihara.

source: AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p. 56.
© Tamanna Ahmed drawing, 2015.

[149] Lyle, Emily. *Sacred Architecture in the tradition of India, China , Judaism and Islam.* Edinburg University Press. 1992. p.85.

[150] Dikshit, K.N. *Paharpur memoirs of Archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.21.

[151] Dikshit, K.N. *Paharpur memoirs of Archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.21.


PUBLIC ZONE
SEMI - PUBLIC ZONE
PRIVATE ZONE
Ceremonial Entry
(Guard Hall)
Secondary Entry
A
(Library with Assembly Hall)
B
(Guest Hall)
C
(Admin Hall)
D
E
To Temple TARA
I
F
K
G
(Kitchen)
(Dining)
J
H
L
(Toilet)
ENTRANCE
assumed by analysis
corner stage
Identofied by Archaeological data
0
10
40

These irregular cells around its open space and located adjacent to the main entrance, providing an introvert private space in semi-public zone within its spatial organization suggests private living quarters for the guests, pilgrims, visitors of the monastic establishment. The zoning of 'Somapura Mahavihara' in terms of public/private spatial organization can be highlighted through figure 75.

In 'zone D' and 'zone E', the small clusters of cells can be assumed as the additional accommodation for some distinctive monks. Indication of such assumption had been referred by Archaeologist K.N.Dikshit while defining 'zone B' as,
'' On this as a foundation was built a room with a verandah. At several places in the Paharpur enclosure, similar structures have been found; ''[152]

Furthermore, the archaeological report of 'Nalanda Mahavihara' indicates,
'' We came across in all 300 cells…seems to have accommodated 1200 monks or students on the hypotheses of two persons per cell. Besides this, there was also separate accommodation for the teachers or dignitaries of the Mahavihara. ''[153]

These evidences signifies that, the cells were not in isolation, rather shared, as sleeping quarters of the monks. Hence,' zone D' and 'zone E' can well be assumed as living quarters for some monks or teachers of significance. This idea is further valued by the report of archeologist K.N. Dikshit,
'' At any rate, it is clear that while the original monastery was designed for the occupation of some 600 to 800 persons; ''[154]

Fig 75 (adjacent page)
Assumed zonal divisions of Somapura Mahavihara.

source: AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p. 56.

[152] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.35.

[153] Thakur, Upendra. *Buddhist Cities in Early India.* Sandeep Prakashan. Delhi. 1995. p.96.

[154] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.34.

Fig 76
Looking into the Replica shrine (zone F) from the east wing of Somapura Mahavihara
© Tamanna Ahmed photography, 2014.

Such statement approves the space sharing situation of the cells, rather isolated living within the cell units. Hence, 'zone D' & 'zone E' can be referred as living quarters of such spatial arrangement.

Zone 'F' ,'G' and 'H' have been identified with more religious structures, including replica of the main temple dated 10th - 11th century AD (the same time period as the 'Tara Temple', located approximately 300 m east from the main enclosure of 'Somapura Mahavihara').[155]

Within 'zone F', just on the north of the replica temple, stands another structure consists of an enclosure wall (17'x17'; approx. 4.89m x 4.89m), with five small square platforms; four in the corners and one in the middle, which was as well from the 10th or 11th century AD, depicts formation of Stupas on later phase.[156]

In 'zone G', the presence of two square structure and the rectangular structure with ambulatory path surround it remarks their religious character; date of which has not been identified, although believed to be from the original period.[157]
In 'zone H', the south-east corner structure is referred to the latest period (10th - 11th c. AD) of the monastery,[158] believed to be the destroyed remaining of a Temple of Tantra practitioners of the era.[159]

[155] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.25.

[156] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.27.

[157] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.27.

[158] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.27.

[159] Alam, A.K.M.Shamsul. *Barendra Oncholer Itihash.* Shompadona Parishod. Rajshahi. p.371. (translated by the author)

Fig 77
Looking into the Dining (zone I) and kitchen (zone J) area from the south wing of Somapura Mahavihara (770 AD)
© Tamanna Ahmed photography, 2014.

Just at the east of this structure, remains the five shrines (Pancha - Ratna, 10th - 11th c. AD) stupa structure attached with a flight of steps, approached from the southern verandah,[160] of the enclosure complex.

This arrangement, accompanied by wall structures, a well of 2.5' (approx. 0.72 m) diameter, signifies the presence of an individual Temple with stupa structures, when the monastery was subjected to extensive individualistic 'Tantra practice' around 10th -11th century AD.

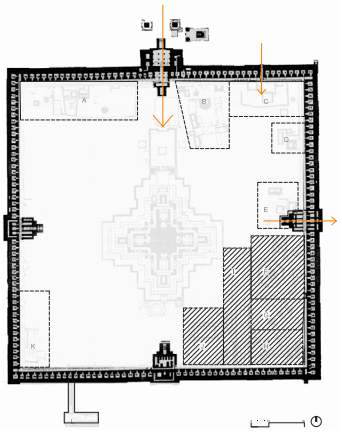
The conventioanl monastery 'Nalanda Mahavihara' as well remarks,
'' The Nalanda copper plate inscription of the Pala king Devapaladeva tells us that, 'Nalanda was the adobe of the Bhiksus and Bodhisattvas well-versed in the Tantras.' ''[161]

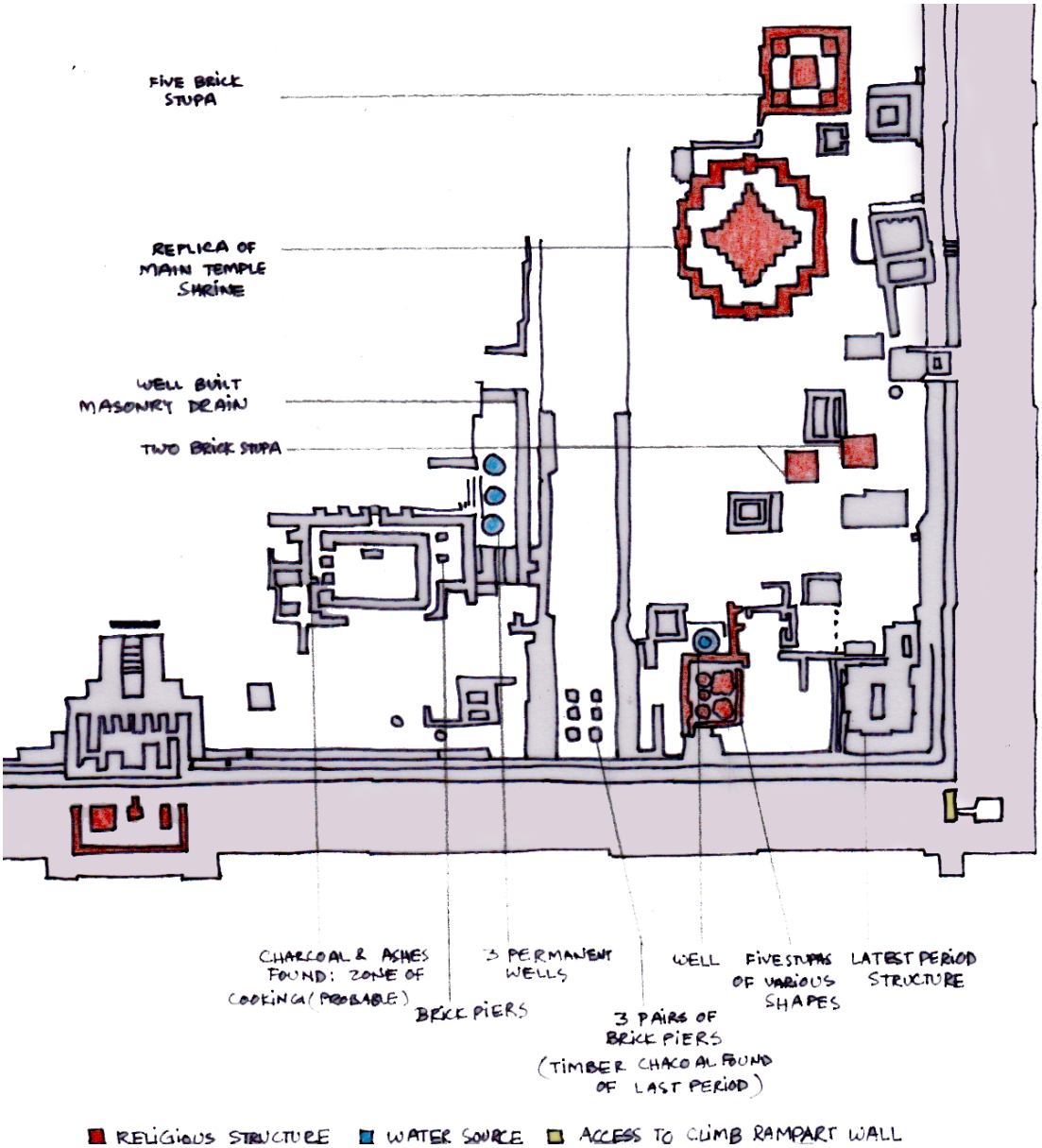
The religious structures dated to the latest period of 'Somapura Mahavihara' enhanced such practises, coherent to Hinduism which caused further complexity into its religious order and gradual decline by 1200 AD. The process of religious practice were complexified as referred,
'' 'Superstitions' and complex rituals also appeared in monasteries while spiritual salvation could be instantly attained simply by worshipping images and reciting the names of various Buddhas. ''[162]

[160] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.29.

[161] Thakur, Upendra. *Buddhist Cities in Early India.* Sandeep Prakashan. Delhi. 1995. p.100.

[162] Phuoc,Le Huu. Buddhist Architecture. Grafikol. United states of America, 2010. p.21.




FIVE BRICK STUPA
REPLICA OF MAIN TEMPLE SHRINE
WELL BUILT MASONRY DRAIN
TWO BRICK STUPA
CHARCOAL & ASHES FOUND: ZONE OF COOKING (PROBABLE)
BRICK PIERS
3 PERMANENT WELLS
3 PAIRS OF BRICK PIERS (TIMBER CHACOAL FOUND OF LAST PERIOD)
WELL
FIVE STUPAS OF VARIOUS SHAPES
LATEST PERIOD STRUCTURE
RELIGIOUS STRUCTURE
WATER SOURCE
ACCESS TO CLIMB RAMPART WALL

And, according to one of the greatest authority of Buddhism, Rhys David,

'' It's needless to add that under the overpowering influence of these sickly imaginations, the moral teachings of Gautama has been almost hidden from view….and the nobler and simpler lessons of the founder of the religion was smothered beneath the glittering mass of metaphysical subtitles. '' [164]

However, such situation justifies the complexities within the religious configuration of 'Somapura Mahavihara' in its life-span of more than 400 years.

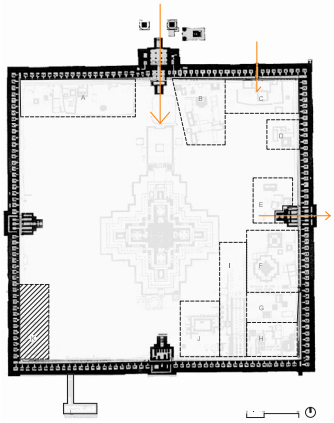
Zone 'I' & 'J' had clear evidences referred as the 'refectory' and the 'kitchen' respectively; serving the vast monk community of the total establishment. Three permanent wells were located to support functioning these zone with adequate water supply, as well other structural evidences by the archaeological data as illustrated by figure 78.

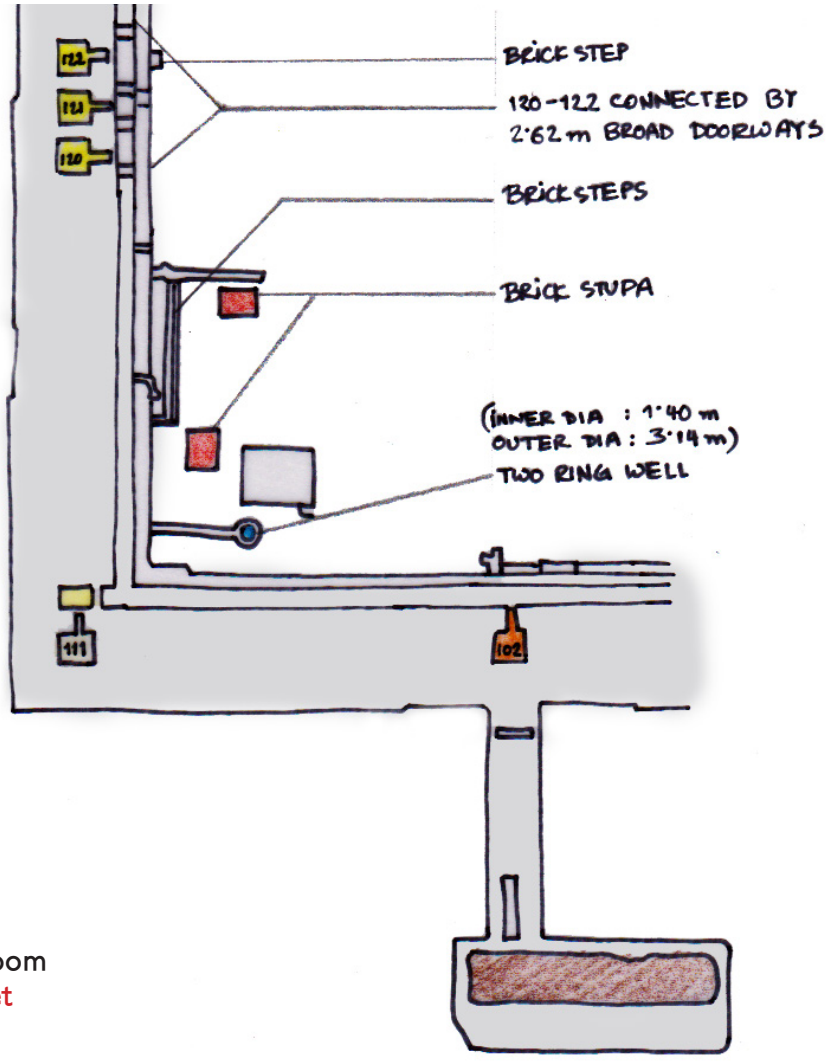
Fig 78 (adjacent page)
Zone F, G, H, I, J space assumption of Somapura Mahavihara on analysis of Archaeological report[163]

source: AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p. 56.

[163] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55*. Dept. of Archaeology Govt. of India. Delhi. 1938. p.29.

[164] Ahmed, Nazimuddin. *Discover the monuments of Bangladesh.* The University Press Limited. Dhaka. 1984. p.46.





- .Converted Room
- Access to Toilet
- Toilet

Another source of water, a two-ringed well was found from 'zone K' with brick-on-edge platform, perhaps be used for drinking, ablution and specially hygiene purpose being the closest water source from the toilet. It is interesting to note that, the location of the wells were chosen carefully on the corners to serve efficiently between the wings within its quadrangular complex of 'Somapura Mahavihara'.

According to the archaeological report regarding 'zone K' , *'' … in front of rooms 115-117 are certain walling were several earthen jars were apparently fixed in the floor of the latest period. The age of this area is apparent from the fact that it is connected with the last buttress wall of the verandah by a flight of stairs consisting of three steps. ''*[166]

The structural elements indicates the latest period construction and evidences of this zone, which as well signifies that, this zone was used frequently being close to the common use of 'toilet' zone. However, from room.122, two more earthen jars were found at a depth of 4'6'' (approx. 1.32 m) from the immediate floor levels.[167]

The frequency of the earthen jars in this zone and the location of the well with stupas and the toilet close-by, suggests the purpose of these earthen jars for ablution, drinking as well for hygiene purposes.

It is noticeable that, in front of room 120, 121 and 122, there had been an unique arrangement in the verandah where, three created rooms of 8'6'' (approx. 2.47 m) broad were connected by doorways, with a brick-on-edge steps leading to the courtyard; from the buttress wall of the verandah.[168] This indicates the width of the verandah as 8'6'' (approx. 2.47 m) and these connecting spaces were used as extensions to these rooms (120 to 122).

Fig 79 (adjacent page)
Zone K space definition on analysis of Archaeological report[165]

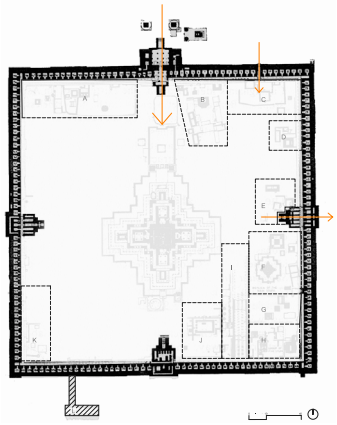
source: AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p. 56.

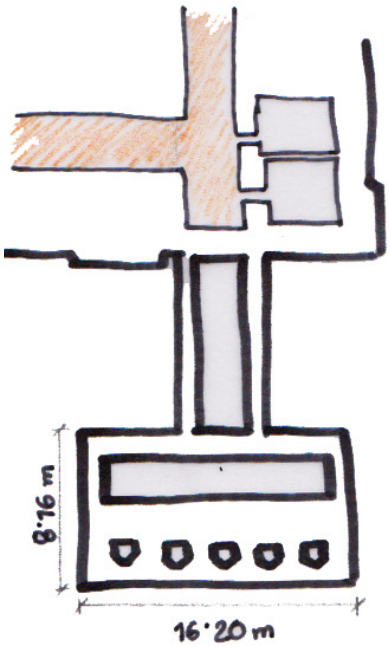
[165] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.32.

[166] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.32.

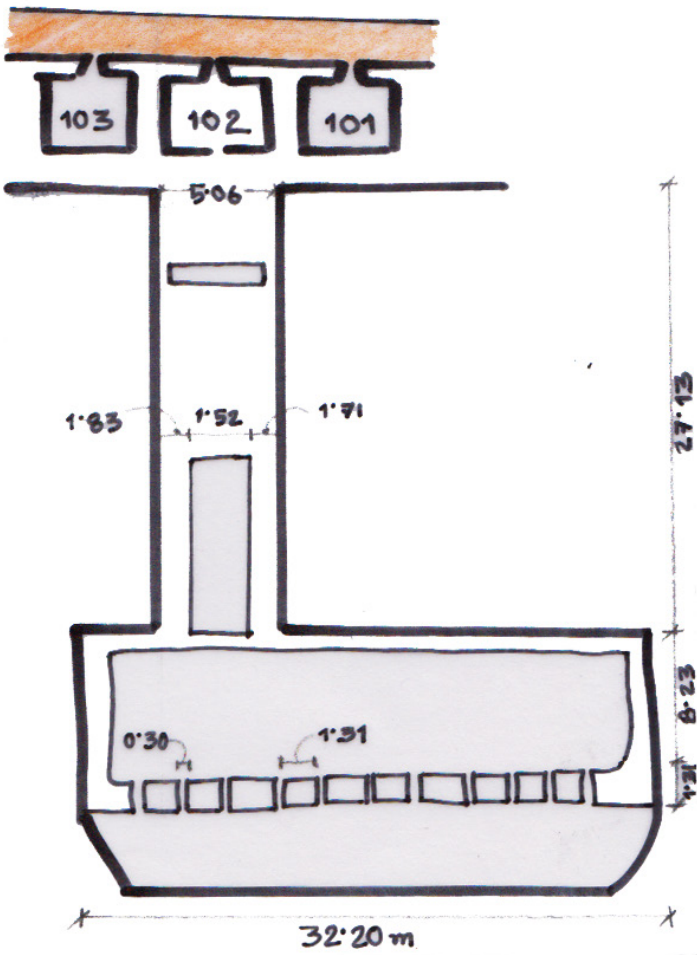
[167] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.33.

[168] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.33.





'Sitakot Vihara'(7th c. AD)



'Somapura Mahavihara' (770 AD)

The nearby 'zone L', despite being identified as Toilet, had been subjected to debates whether it was used only for ablution, bath or as well for toilet purposes.

In this connection, it is important to note that, similar latrine block has been found in the Sitakot Vihara (7th c. AD), located close-by 'Somapura Mahavihara'. There the location of the latrine block is situated south-east of the quadrangular monastery as a later addition, accessible only from the interior verandah space.[170]

It is interesting to note that, although added later, the latrine block of 'Sitakot Vihara' was well organized and placed in connection with the common corridor surround the central courtyard, rather from inside a room alike 'Somapura Mahavihara'. As seen in 'Somapura Mahavihara', this connection of the latrine block with the common corridor is being made through room.102 by a high platform of brick.[171]

Although the pin-wheel pattern corridor of 'Somapura Mahavihara' had the same scope as 'Sitakot Vihara' to connect the toilet block with the common corridor in its south-east corner of the quadrangular complex, it was rather used as to connect the staircase to access the rampart wall, for that specific location of guarding the total establishment. Another reason can be the route of the canal passing through the south part of the monastery, closer to the south-western part as to discharge its waste from the toilet block.

Fig 80 (adjacent page)
Comparative study of the latrine block of 'Sitakot Vihara' (7th c. AD) and 'Somapura Mahavihara'(770 AD)[169] on analysis of Archaeological data.

source: Archaeology Dept., Govt. of Bangladesh.
AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p. 56.

[169] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.30-31.

[170] Ahmed, Nazimuddin. *Discover the monuments of Bangladesh.* The University Press Limited. Dhaka. 1984. p.82.

[171] Alam, A.K.M.Shamsul. *Barendra Oncholer Itihash.* Shompadona Parishod. Rajshahi. p.367. (translated by the author)

Fig 81
Hypotheses of reasoning of 'corner stage'and 'toilet block' (zone L) location of Somapura Mahavihara on analyzing the archaeological evidences and data.

source: satellite image, Google Earth 2014; AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p. 56.
© Tamanna Ahmed drawing, 2015.

However, the location of corner tower in souther wing of 'Somapura Mahavihara' has a strong relation with the character of its enclosure wall. Since, the enclosure wall of 'Somapura Mahavihara' is punctured only on north and east side as Entrances; these sides are more vulnerable to be taken care of , where both in north and south sides these tower/stages are located.

In light of archaeological report regarding 'zone L', it is possible to shed light over the usage and structural advancement of the era.

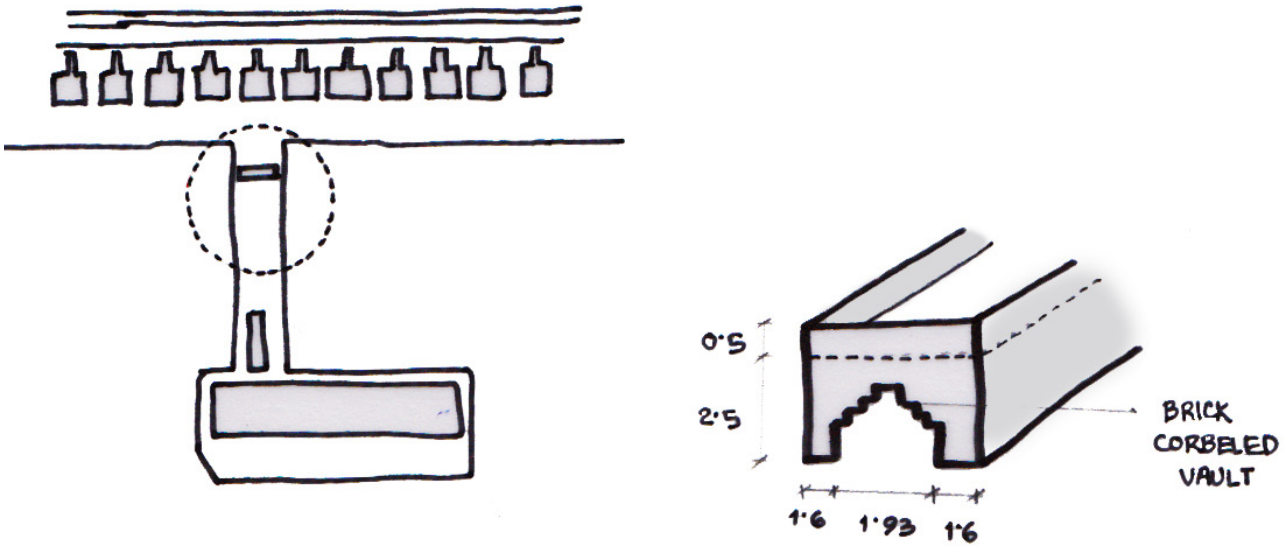


Fig 82
Vaulted passage (duct) below the toilet passage of Somapura Mahavihara by analysis of Archaeological data.

About the passage way connecting the main enclosure with the toilet block, it is to note that, *" … the path passed over a vaulted passage below, running parallel to the south rampart wall, which is 6'4" (approx. 1.84 m) in width and must have been at least 8'3" (approx. 2.39 m) in height…. A corbel construction…may have been restricted free passage of people outside the enclosure from one side to another; "*[172]

This corbeled vault perhaps be used for easy running of canal water situated in this zone of 'Somapura Mahavihara', lessoning the water pressure of the 89'(approx. 25.57m) long passageway to the toilet. As archaeologist K.N. Dikshit noted, *" The length to which the platform extends…being enveloped with a deposit of sand … apparently to be connected with the existence of an old bed of a river in the neighbourhood. "*[173]

Hence, location of the toilet block indicates the discharging of the waste to this bed of river or canal; which justifies its chosen location, through room no. 102; rather from common verandah space alike 'Sitakot Vihara'.

[172] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.30.

[173] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.31.

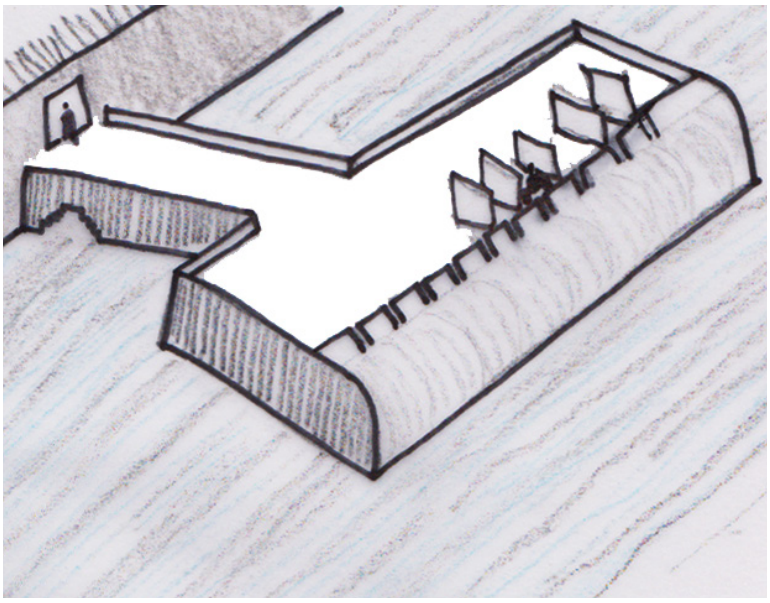


Fig 83
Hypotheses of Toilet (zone L) space organization of 'Somapura Mahavihara'
© Tamanna Ahmed drawing, 2015.

About the debatable usage of this zone L (toilet block), traces of parti walls dividing a long hall into compartments on its north-east part, suggests the location of the latrines on that region.[174]

However, the ergonomics and the spacing of the sloping ducts (30 cm long, at an interval ofm1.21m)[175] along with these compartments suggests the purpose of accommodating latrine usages well.

The purpose of bathing or washing clothes, is not evident in this platform, since the 'Bathing ghat' was found outside the monastic complex on its south-east side along the river or canal.

However, the west part of the platform may had been used for such purposes being provided with similar sloping ducts in its open rectangular platform (31'3'' x 105'6'';
approx. 9.0 m x 30.34 m).

The space organization of the bathing ghat discovered 49m south-east outside the main enclosure of 'Somapura Mahavihara', echoes the purpose of bathing and washing clothes, alike the vernacular way of living of the region.

[174] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.31.

[175] Ahmed, Nazimuddin. *Discover the monuments of Bangladesh.* The University Press Limited. Dhaka. 1984. p.367.

Fig 84
Hypothese of "Bathing ghat" spatial organization of Somapura Mahavihara (770 AD)
© Tamanna Ahmed drawing, 2015.

" The bed of the masonry ghat is covered with sand… the existence of a river is to be assumed in order to account for this sand, the river must have been at least a mile in width. "[176]

In this connection, it can well be assumed that, the path of the water course enhance the planning of the 'Bathing ghat' and 'latrine block' (zone L) of the total establishment serving the vast number of monk community of VIII century AD.

However, the presence of drainage water channel in most of the cells, the evidences of copper vessels, earthen jars within them as well the location of the wells with stupas, suggests the ablution for prayer was performed within the complex, rather in 'zone L' which can well be assumed as mainly dedicated for toilet purpose.

All these zones reflect the amalgamation of functional, religious, contextual forces in formation of 'Somapura Mahavihara' as one complete entity. The assumptions and hypotheses in light of archaeological reports enhance the formal relationship within the elements that altogether remarks the existential foothold of the monument.

[176] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55*. Dept. of Archaeology Govt. of India. Delhi. 1938. p.26.

2.3.4 Identical Elements

'Somapura Mahavihara', as a symbol of remarkable minute of art and architecture in ancient Bengal developed its singularity through evolution process of Vihara architecture. Apart form the Entrances, the other identical elements of 'Somapura Mahavihara' are adhered to its enclosure wall as identified through the comparative studies of contemporary Viharas; such as enhancement of four cardinal points through extended outer wallings (east, west and south; north as main entrance) and presence of the corner tower/stage in both north-east and south-east sides.

The purpose of the corner stage-like platform of the south-east part had clear evidences of climbing to the rampart wall of the monastery, hence must had been used for guarding and maintenance purposes. Being close to the zone of refectory & kitchen, the disposal of garbage or storage may also been managed through this stage--like structure in south-east side of the enclosure wall.

Following the axis on the other side, the purpose of the north--eastern stage like corner platform is not evident in terms of its functional use. Being located close-by the second entrance to the corner and accessible only from outside of the enclosure wall, it suggests guarding or announcement from a higher platform to communicate with the laity/villagers who meet the monks daily for discussions, providing foods etc. In such stage for communication purpose, the usage of Bell has been found common in other conventional Viharas of the region.

Fig 85 (adjacent page)
Looking into the central courtyard from east wing of Somapura Mahavihara (770 AD).

Fig 86
The bell found close-by Itakhola Vihara (7th c. AD)

source: RAHMAN, Habibur (1992), *Itakhola Bihar*, Comilla: Department of Archeology, Bangladesh Government.p. 2.

The bells were important means of communication as well for religious performance in these Viharas of ancient Bengal. As found in the central Temple of 'Somapura Mahavihara', *'' In the clearance of the northern outer chamber, a bronze bell…discovered on the floor. ''*[177]

The significance of Bell was not only for religious purpose, but also functional as identified in the history of Vihara architecture. As can be understood through the 1st century AD Vihara, Takht- i- bahi; that states,
'' This supposed observation tower could also be used as a bell tower to inform the inmates the transition of different activities, say from meditation to lunch time, in accordance to the daily schedule and monastic regulation. ''[178]

About the means of communication of Nalanda Mahavihara (4th c.AD), through the description of Chinese pilgrim I-tsing, *'' Clepsydra or water-clock, drum, conch-shell and bell were used instead. ''*[179]

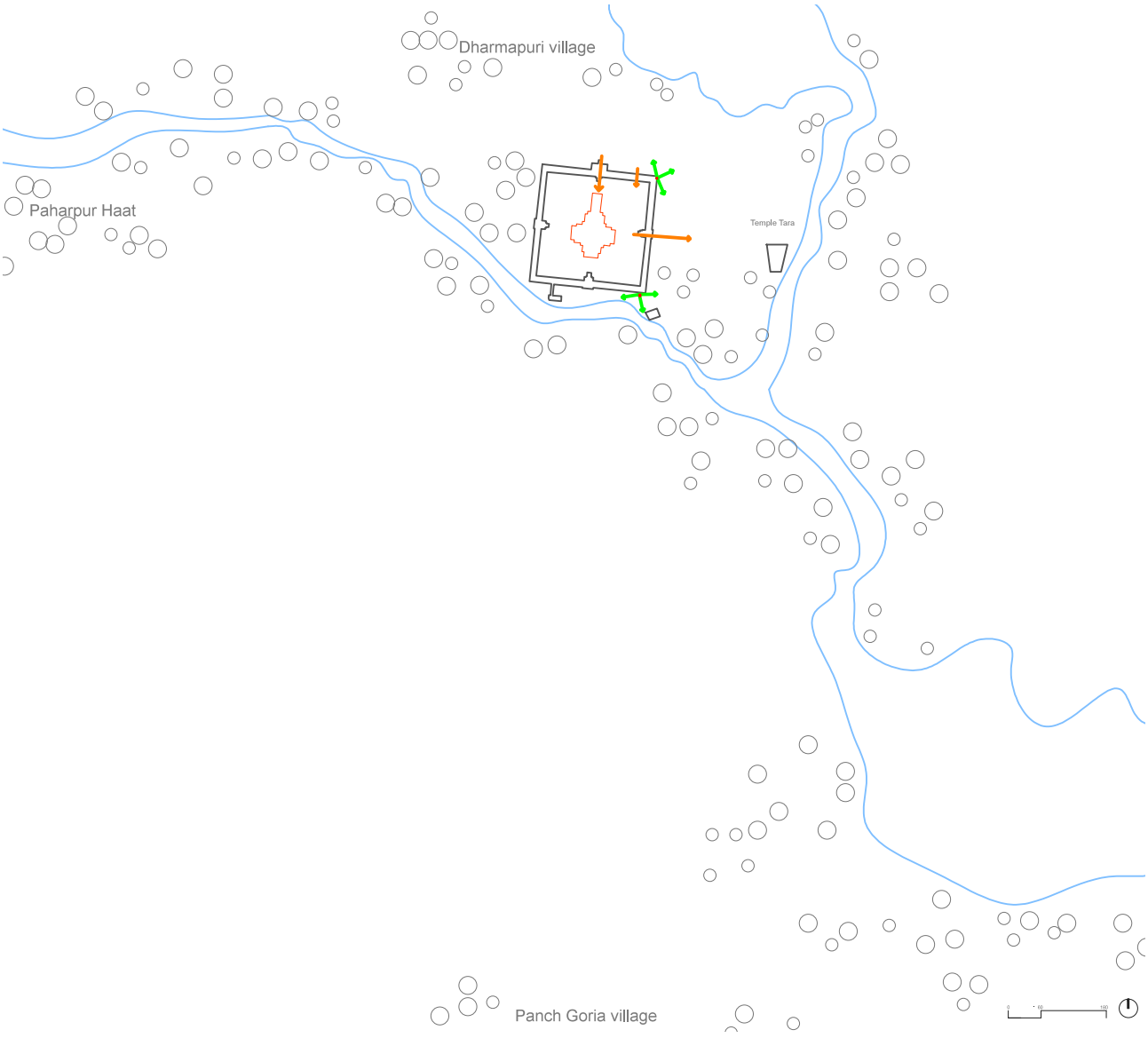
Advancing further in history of Vihara architecture, the largest metal bell of early medieval period was discovered closeby 'Itakhola Vihara'(7th c. AD), in Rupban mura (6th c.AD) located south-east Bengal; consisting 8'7'' (approx. 2.5 m) in circumference and 3'5'' (approx. 1.01 m) in height.[180]

[177] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.12.

[178] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.57.

[179] Dutt, Sukumar. *Buddhist Monks and Monasteries of India: their history and contribution to Indian culture.* George Allen and Unwin Ltd. London.1962. p.335-336.

[180] Ahmed, Nazimuddin. *Discover the monuments of Bangladesh.* The University Press Limited. Dhaka. 1984. p.76.



In another contemporary monastery Horyuji in Japan, with orientation of north-south axis (following the vernacular practice) and the main gate on its south, it is to note that, *" ..the bell and drum pavilions are located on both sides of the north-south axis. "*[181]

The importance of bell as a means of communication can well be understood through these evidences of various Viharas. However, the indication of high platforms located north-east and north-south outer wall of 'Somapura Mahavihara' enhance the axial planning system to ensure efficient functionality of the establishment, as reinforced in other Viharas of the period.

Fig 87
Hypotheses of context of 'Somapura Mahavihara'(770 AD)

source: satellite image, Google Earth 2014;
AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p. 56.
© Tamanna Ahmed drawing, 2015.

[181] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.69.

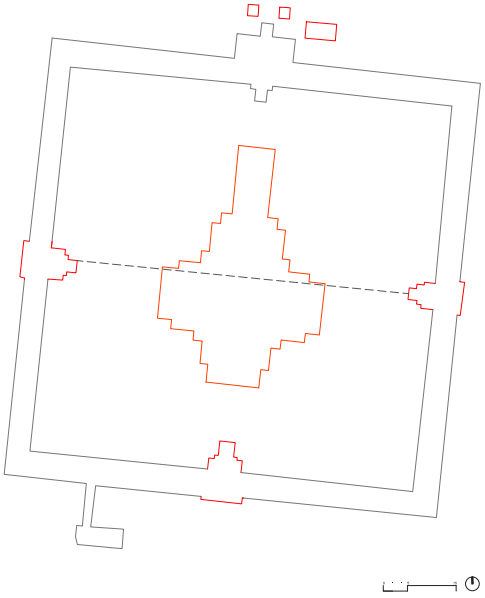


Fig 88
The cardinal image shrines (east, south and west) of Somapura Mahavihara.

source: AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p. 56.
© Tamanna Ahmed drawing, 2015.

Another singular feature of 'Somapura Mahavihara' is the marking of four cardinal points with symbolic gateways (except the main entrance form the north), which strongly echoes the 'Mandala' symbolism of Mahayana Buddhism.

These symbolic gateways of east, south and west wings were originally used as Image shrines, interiorly accommodated by circumambulatory path and projected stairways towards the main Temple, from all of its four wings enhancing the axial planning of 'Somapura Mahavihara'.

It is interesting to note that, the stairs leading from the east and west cardinal points to the courtyard; are not aligned by their mid points, while the eastern midpoint has a difference of around 11.49 m with the midpoint of the main Temple as shown in figure 88.

In its formal expression, the southern image shrine suggests uniqueness through identical treatment of its outer enclosure wall, unlike east or west wings. This as well denotes the northsouth axial significance of the monument.

In the southern wing, the uniqueness is not only in outer wall treatment, but also in its interior arrangement of cells surround the circumambulatory passage. Another unique feature is the presence of a parallel wall after the landing of the projected stairways towards the courtyard.

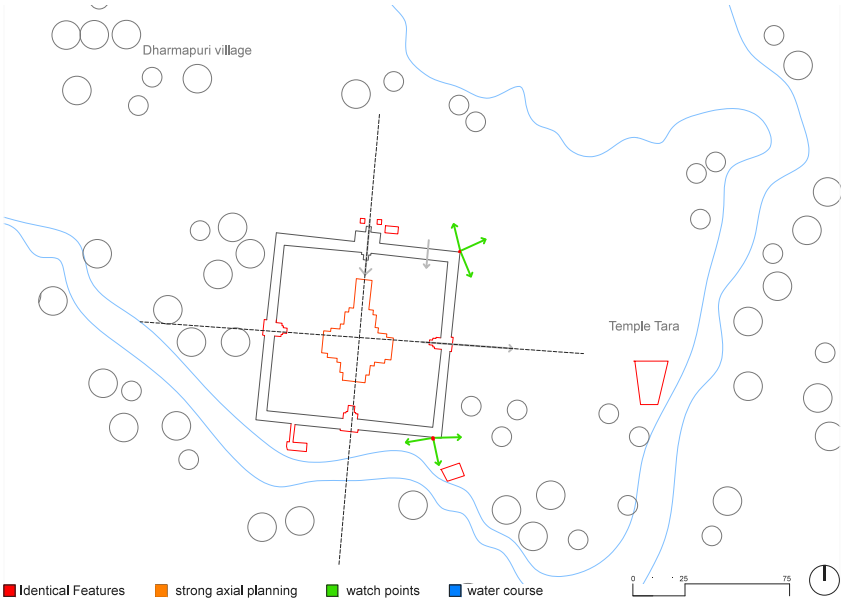


Fig 89
Identical features of Somapura Mahavihara (770 AD).

source: satellite image, Google Earth 2014;
AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p. 56.
© Tamanna Ahmed drawing, 2015.

In this wing, the archaeological survey suggests structural data as,
" ...existence of at least six brick piers with short walls...must have been intended for the support of the landing stairway. "[182]

Although the internal spatial organization of eastern and western Image shrines were similar originally; around 10th - 11th c.AD , the third entrance was punctured from the enclosure wall connected to the eastern image shrine circumambulatory path as the path was divided into 5 small cells[183]. This was to provide access to the 'Temple Tara' situated around 300m east of the main complex.

The spatial organization of 'Somapura Mahavihara' thus altered within its gradual development of belief, while representing the unparalleled example of Vihara architecture. In this process of adaptation and changes, it developed certain singular features that echoes the existential foothold of the monument within its context and belief.

These singular features of 'Somapura Mahavihara' pronounce the achievement of Vihara Architecture amalgamating art, architecture, religious belief and functionalism as a whole entity, celebrating its existential footprint in the reign of Pala dynasty (750AD - 1155AD)

[182] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.28.

[183] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.24.

2.4 Perception of Space

'' Primarily life is 'movement', and as such it possesses 'direction' and 'rhythm'. The path is therefore a fundamental existential symbol which concretises the dimension of time. Sometimes the path lead to a meaningful goal, where the movement is arrested and time becomes permanence. Another basic symbol which concretizes the temporal dimension is therefor the centre. ''[184]

In 'Somapura Mahavihara', the path as a fundamental existential symbol has been implied amalgamating religious symbolism connoted to functional rationalism, with strong axial planning in which the centre had been emphasised by the presence of the Temple; the heart of the establishment. The movement of 'Somapura Mahavihara', in simple yet robust geometry strengthen by the religious symbolism provides another dimension to the life of the dwellers, firmly engaged to their living habitat.

Fig 90 (adjacent page)
Looking into the east wing from the courtyard of Somapura Mahavihara (770 AD).

[184] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture*. Academy Editions, London. 1980. p.56.

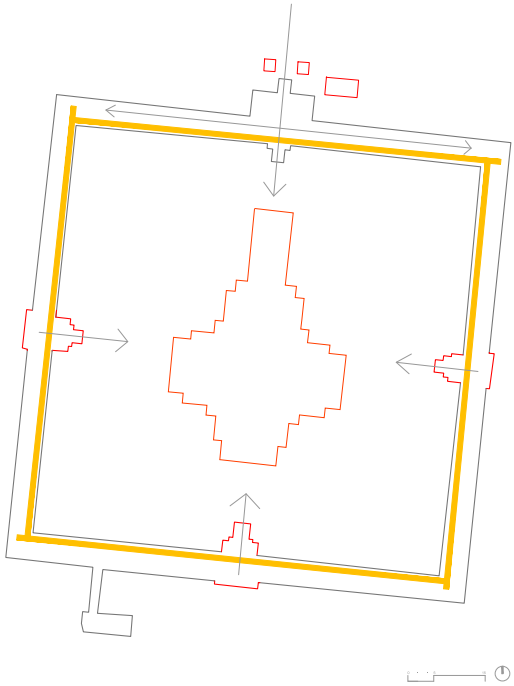


Fig 91
Movement in Somapura Mahavihara (770 AD)

source: AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p. 56.
© Tamanna Ahmed drawing, 2015.

It is evident that, the pin-wheel pattern corridor surrounded the vast courtyard enhance the clockwise circulation, where the movement is arrested in each cell units; making time permanent. However, the position of the proximate central Temple is accentuated through physical access from the middle of all the four wings of the quadrangular complex, thus not limited to symbolic meaning only but also spatial experience.
As Norberg Schulz referes,
" Thing, order, character, light and time are the basic categories of concrete natural understanding. "[185]

These natural understandings had been reflected through the spatial organization of 'Somapura Mahavihara', where things had been organized through public to private zone in characterizing its establishment. Within the firm belief of 'Mahayana Buddhism', the time had been arrested by connoting art and architecture, while enhancing vernacular architecture.
" The character of a work of architecture is therefore first of all determined by the kind of construction used…. And secondly by the making as such: binding, joining, erecting etc. "[186]

The character of 'Somapura Mahavihara' is echoed through the major building materials coherent to the contextual potentiality which in terms reflect man's relationship with his natural surroundings, on a specific time and place.

[185] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture.* Academy Editions, London. 1980. p.32.

[186] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture.* Academy Editions, London. 1980. p.66.

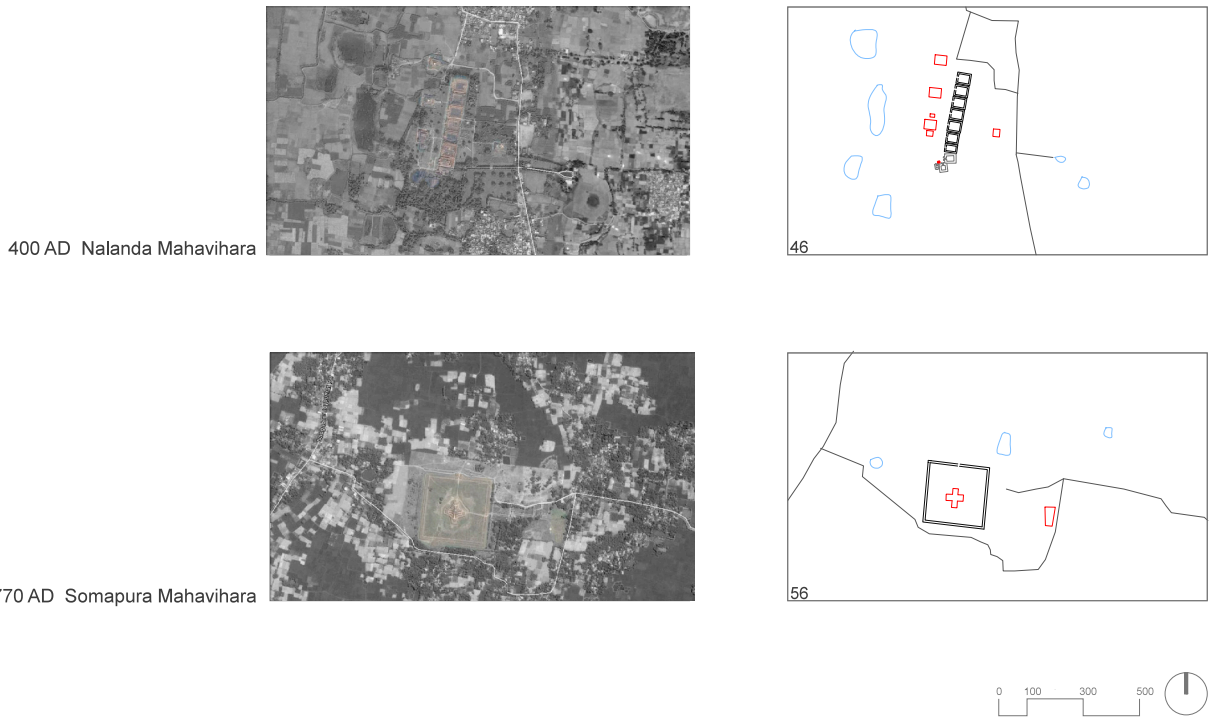


Fig 92
Present (2014) context of Nalanda Mahavihara (4th c. AD) and Somapura Mahavihara (770 AD)

source: satellite image, Google Earth 2014;
AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p.56.
PHUOC, Le Huu (2010), *Buddhist Architecture*, United States: Grafikol. p.63.

It is interesting to trace several ponds closeby both 'Somapura Mahavihara' and 'Nalanda Mahavihara' assumed to be responsible for their huge construction of burnt bricks, while the raw material clay was collected from their context.

As traced in the conventional monastery Nalanda Mahavihara,
'' The huge site of Nalanda (nearly 700' x 1900', approx. 201.15 m x 545.98 m) was originally surrounded with numerous ponds evidently for the occupation of a large population in the monastery. ''[187]

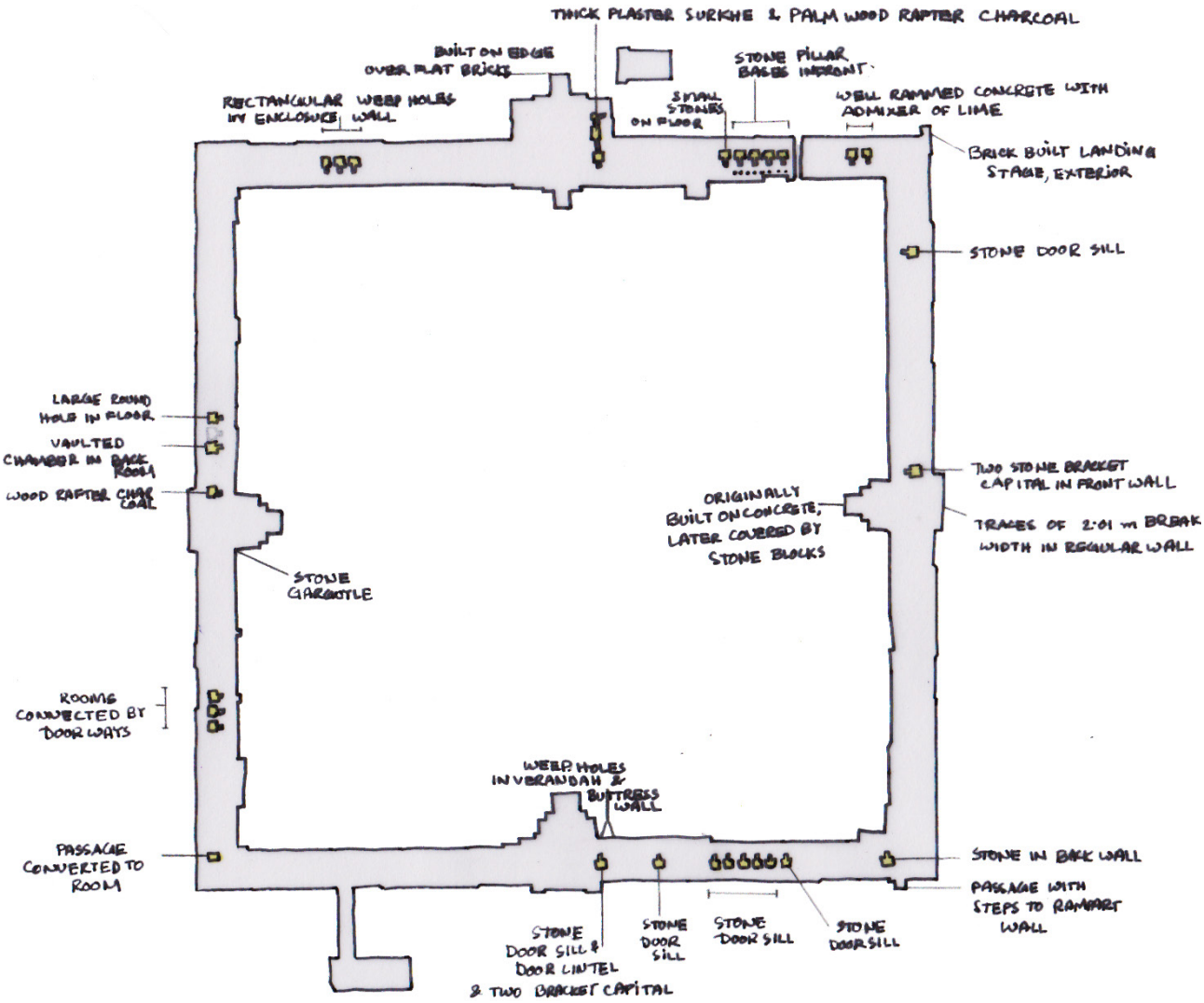
Hence, this construction of ponds were not only to collect the raw material for producing burnt bricks, but also to ensure functional aspects. This way, the landscape was transformed enhancing human relationship within nature for a better living.

As the architect Álvaro Siza dictates,
'' The landscape - as the dwelling-place of man - and man - as the creator of the landscape - both absorb everything, accepting or rejecting that which had a transitory form, because everything leaves its mark on them. ''[188]

This transformation of landscape valuing its natural instinct plays significant role announcing human relationship with his surrounding which produce a meaningful sustainable architecture of Somapura Mahavihara.

[187] Phuoc,Le Huu. *Buddhist Architecture.* Grafikol. United states of America, 2010. p.62.

[188] Frampton,Kenneth. *Alvaro Siza : Complete Works.* Phaidon Press Limited. London. 2000. p.71.


THICK PLASTER SURFACE & PALM WOOD RAFTER CHARCOAL
BUILT ON EDGE OVER FLAT BRICK
STONE PILLAR BASES INFRONT
RECTANGULAR WEEP HOLES IN ENCLOSURE WALL
SMALL STONES ON FLOOR
WELL RAMMED CONCRETE WITH ADMIXER OF LIME
BRICK BUILT LANDING STAGE, EXTERIOR
STONE DOOR SILL
LARGE ROUND HOLE IN FLOOR
VAULTED CHAMBER IN BACK ROOM
WOOD RAFTER CHARCOAL
TWO STONE BRACKET CAPITAL IN FRONT WALL
ORIGINALLY BUILT ON CONCRETE, LATER COVERED BY STONE BLOCKS
TRACES OF 2·01 m BREAK WIDTH IN REGULAR WALL
STONE GARGOYLE
ROOMS CONNECTED BY DOORWAYS
WEEP HOLES IN VERANDAH & BUTTRESS WALL
PASSAGE CONVERTED TO ROOM
STONE IN BACK WALL
PASSAGE WITH STEPS TO RAMPART WALL
STONE DOOR SILL & DOOR LINTEL & TWO BRACKET CAPITAL
STONE DOOR SILL
STONE DOOR SILL
STONE DOOR SILL

This way, the tale of the building had been imprinted through its material enrichment in 'Somapura Mahavihara', echoing the existential foothold of the reign. The natural material thus expresses the history, age and tale of its birth with the human use.

'' The tactile sense connects us with the time and tradition; through marks of touch, we shake the hands of countless generations. ''[189]

Through enhancing the natural materials within building experience, it strongly plays significant role in amalgamating the dwellers into their living space and building into its context.

Tactile quality of natural material thus provides the key of existential foothold of any monument into its context. In the movement within the formed spaces of 'Somapura Mahavihara', the material plays significant role in experiencing them. Through archaeological reports, the remaining structural materials of the establishment can be highlighted through figure 93.

Fig 93 (adjacent page)
Material and structural findings in Vihara zone of Somapura Mahavihara (770 AD) by Archaeological data analysis.

source: AHMED, Nazimuddin (1984), *Discover the monuments of Bangladesh,* Dhaka: The University Press Limited. p. 56.
© Tamanna Ahmed drawing, 2015.

Fig 94
Stone gargoyle as found in the central block stair of West wing of Somapura Mahavihara (770 AD)
© Tamanna Ahmed photography, 2014.

[189] Holl S., Pallasmaa J. & Pérez-Gomez A. *Question of Perception: Phenomenology of Architecture.* William Stout Publishers, San Francisco. 2006. p.33.

As the material itself reflects the history, age and the tale of human use, the transformed material into terracotta panels installed in the main Temple of 'Somapura Mahavihara' depicts the story of life of the era.

'' The results of creative participation constitute man's existential foothold, his culture….some of the results illuminate a wider range of phenomena than others, and deserve the name 'work of art'. In the work of art, man praises existence. ''[190]

This praise of existence can well be identified in every detail of 'Somapura Mahavihara', from ornamental brick to terracotta panels, stone gargoyle and stone images. It reflects the responsiveness of the artisans who were fully concerned to their surrounding environment.

In 'Somapura Mahavihara' both art and architecture achieved its flourishing minute adopting the character of Vihara architecture through evolution process, achieving identical values in determining the existential foothold of the era.
'' In the beginning of the 7th century, west and possibly also north Bengal was in the hands of king Sasanka….It is at this period that Bengal was trying to assert its individuality in the sphere of art and the first attempt at the formation of a school of a school of sculpture (as at Paharpur). ''[191]

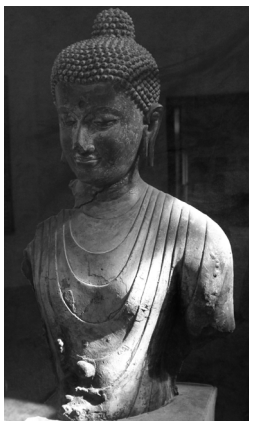
This school of sculpture was mostly of clay mouldings as found in numerous terracotta panels, bands and few stone sculpted idols, since Bengal always had scarcity in stones and these stones were imported from Choto Nagpur of Bihar and Rajmahal for sculptures,[192] of 'Somapura Mahavihara'.

Fig 95 (adjacent page)
Structural remains in Somapura Mahavihara (770 AD).
© Tamanna Ahmed photography, 2014.

[190] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture.* Academy Editions, London. 1980. p.185.

[191] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.05.

[192] Alam, A.K.M.Shamsul. *Barendra Oncholer Itihash.* Shompadona Parishod. Rajshahi. p.382. (translated by the author)



However, most of the stone sculptures of Brahminical beliefs are assumed to be collected from the Hindu or Jain Temples, which were the dominant religion of the region. Interestingly, the terracotta plaques of 'Somapura Mahavihara' depicts, 41.35% human figures, 16.14% Animals, 7.37% Brahminical religious figures and only 3.81% Buddhist religious figures.[193]

This as well reflects the amalgamation of Brahminical and Buddhist belief of 'Somapura Mahavihara', and perhaps the imported stone were sculpted in this school of sculpture to fulfil its ongoing religious belief.

The stone usage in structural purpose of the complex can also be assumed to be collected from abundant buildings or the remaining of the sacred idols inserted into the Temple of 'Somapura Mahavihara', for durability and structural stability.

It is to note that, the major theme of terracotta plaques as human figures depicts the intention of joyous and ceaseless representation of life of people within his nature, which is a spontaneous expression of the artist's humanistic attitudes based on realism, that remarks that the Artisans were fully responsive to their environment.

'' The panoramic view of Bengal is being represented through the terracotta art in which social, economic, religious and aesthetic features are too tightly interrelated, that manifest the Bengal art in its highest excellence. ''[194]

Fig 96 (adjacent page)
Artefacts of Somapura Mahavihara (770 AD).

source: Archaeology Museum, Naogaon, Bangladesh.
© Tamanna Ahmed photography, 2014.

[193] Alam, Md. Shafiqul. *Proceedings of the International seminar on elaboration of an archaeological research strategy for Paharpur World Heritage Site and its environment (Bangladesh) 20-25 March,2004.* Dept. of Archaeology, Govt. of Bangladesh & UNESCO Dhaka. 2004. p.25.

[194] Alam, Md. Shafiqul. *Proceedings of the International seminar on elaboration of an archaeological research strategy for Paharpur World Heritage Site and its environment (Bangladesh) 20-25 March,2004.* Dept. of Archaeology, Govt. of Bangladesh & UNESCO Dhaka. 2004. p.41.

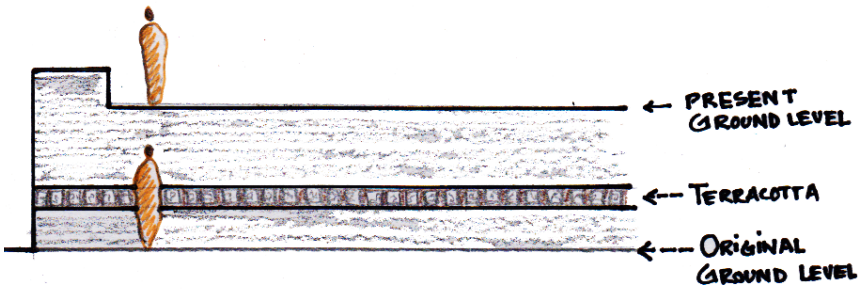


Fig 97
Original & present level of circumambulatory path of central Temple of Somapura Mahavihara[195]
© Tamanna Ahmed drawing, 2015.

These representation through terracotta art portrays meanings beyond only art work, offering another dimension within architectural inheritance of Vihara architecture. As Heidegger remarks,
'' Poetry is what first brings man into the earth, making him belong to it, and thus brings him into dwelling. ''[196]

Without poetry the dwelling misses its belonging, to remark a meaningful existence on earth. In 'Somapura Mahavihara', the poetry had been expressed in such a way, which not only reflects the life of people, but also pronounce firmly their existential foothold combining art, architecture, religion and nature as one complete entity.

It is important to note that, the proximate central Temple, holding the terracotta plaques was originally experienced from its north side only, by a journey through its circumambulatory path being screened off from rest of the courtyard by an enclosing wall running parallel to the walls of the main Temple. Because of the subsequent silting up of the site, not only architectural feature obliterated, but also the interesting stone sculptures are hidden from the view in present time. As a matter of fact, the present space experience of the heart of the complex is being portrayed in an incorrect way.

[195] Dikshit, K.N. *Paharpur memoirs of archaeological survey of India, Vol.55.* Dept. of Archaeology Govt. of India. Delhi. 1938. p.23,45.

[196] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture.* Academy Editions, London. 1980. p.23.

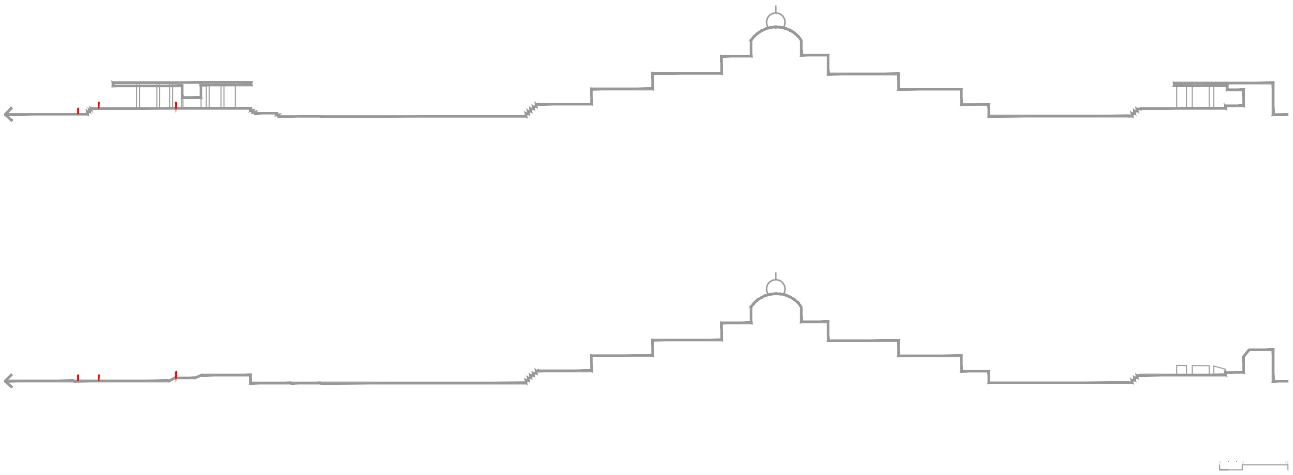


Fig 98
Comparative study of original and imposed present entrance of Somapura Mahavihara (770 AD)
© Tamanna Ahmed drawing, 2015.

As planned originally, the terracotta plaques of the circumambulatory path were at a height of 3' (approx. 0.86m) to be well observed by the monks chanting surround the Temple in clock-wise direction, engaging their religious belief through orientation in spatial understanding (figure 97).

Unfortunately, the imposed space alteration with religious evidences still buried underneath; altogether portrays an image which is far beyond the original scenario, which is in need of desperate recovery.

Nevertheless, the major element in the enclosure of Vihara architecture; connecting the outside world with the inside world of enlightenment, i.e. the main Entrance had not as well been integrated in the present renovation, while providing an imposing entrance form the east side to the main complex of 'Somapura Mahavihara', providing incorrect approach to the complex (figure 98).

Thus, the most significant element of Vihara architecture, the 'Entrance'; for both Vihara complex and the main Temple had been imposed in current renovation, which interrupts the original succession of space enriched by intervals as planned in VIII century AD in the land of Bengal.

'' Without interval, our sense of self gets lost; we lack the space to mark out what is still ourself, our territory. ''[197]

This interval plays vital role in enriching the space understanding, which had been disturbed by present renovation of 'Somapura Mahavihara'.

The space experience marked by the duality of space succession with material embodiment is a vital means where man asserts his existential foothold within his context.

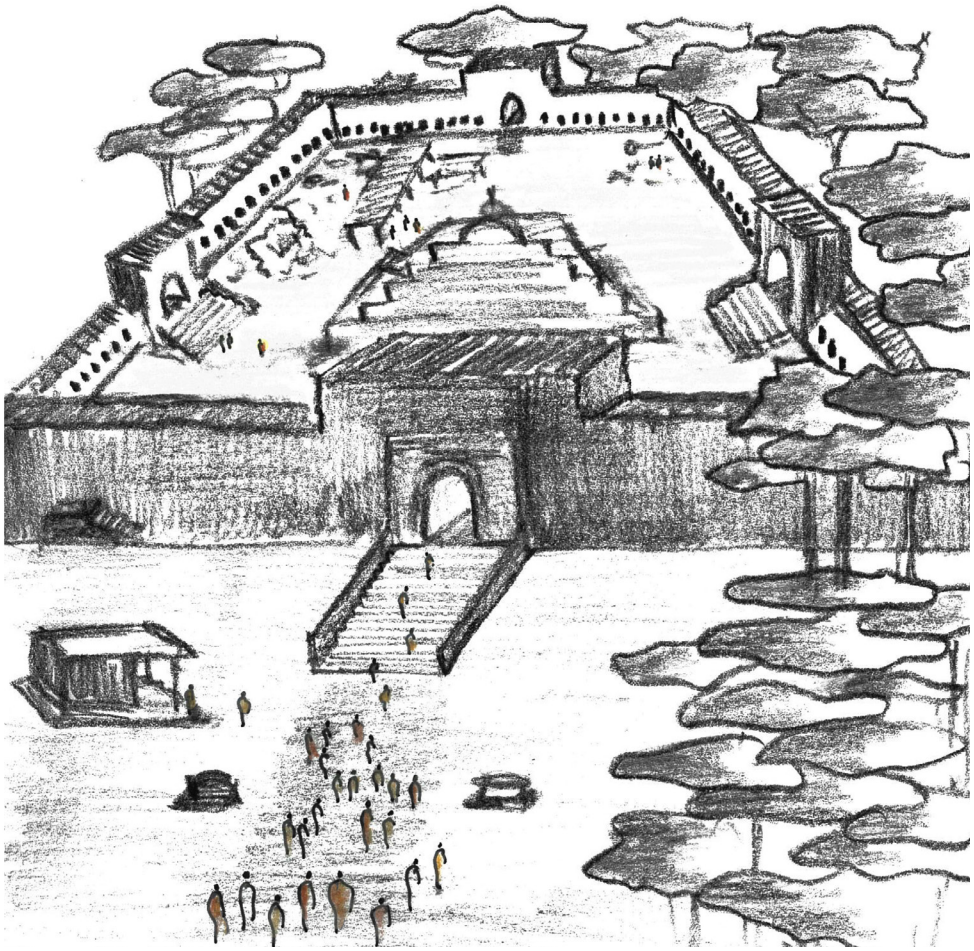
'' The architecture of early civilizations may therefore be interpreted as a concretization of the understanding of nature, described above in terms of things, order, character, light and time. The processes involved in 'translating' these meanings into man-made forms have already been defined 'visualisation', 'contemplation' and 'symbolisation'. ''[198]

This understanding of a concrete visualisation, complementation and symbolisation enhance meaningful architecture embodied in the very natural instinct of human existence.

Fig 99 (adjacent page)
Original entrance from the north and the intervented entrance from the east of Somapura Mahavihara.
© Tamanna Ahmed photography, 2014.

[197] Alison & Smithson P. *The Charged Void: Architecture*. The Monacelli Press. New York. 2001. p.455.

[198] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture*. Academy Editions, London. 1980. p.50-51.



This natural instinct had been disappearing in present world of architecture as,

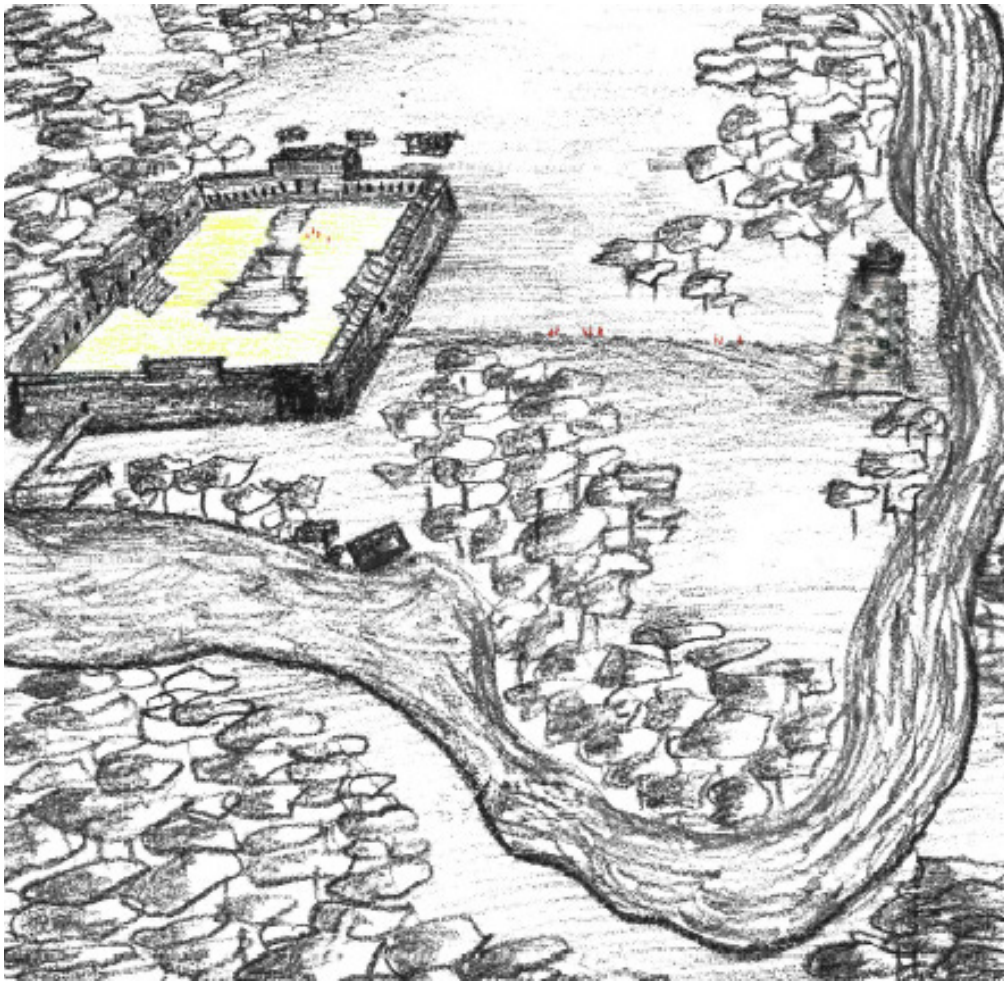
'' The current over emphasis on the intellectual and conceptual dimensions of architecture further contribute to a disappearance of the physical, sensual and embodied architecture. ''[199]

Analysing the VIII century monastery 'Somapura Mahavihara', reminds the significance of such embodied architecture which provide meaning in response to the life connoted to the spatial experience of human nature.

The adjacent drawing portraits a simulation of the original complex of 'Somapura Mahavihara', to look into the past in a modest and correct way in determining its character and strength within its total spatial organization.

Fig 100 (adjacent page)
Stimulation of succession of space from the main Entrance of Somapura Mahavihara (770 AD)
© Tamanna Ahmed drawing, 2015.

[199] Holl S., Pallasmaa J. & Pérez-Gomez A. *Question of Perception: Phenomenology of Architecture*. William Stout publishers, San Francisco. 2006. p.29.



Reminding Alfred North Whitehead's dictum,
'' The art of progress is to preserve order amid changes, and change amid order. ''[200]

This preservation of order however implies the understanding that,
'' The art of preservation….implies that architectural history is understood as a collection of cultural experiences, which should not get lost but remain present as possibilities for human use. ''[201]

To preserve the cultural experiences amalgamating art and architecture in 'Somapura Mahavihara', which in turns provides its remarkable footprint in history; following corrections are proposed:

• Main entrance from the North (as original);
• Temple entrance form the North (as original);
• Elimination of imposed structures, stairs, ramps in present renovation;

• Elimination of the added functional structures between Temple Tara and the main complex of 'Somapura Mahavihara' with mark of canals as were in original time, to project the imagination of its original space organization in a modest way;

• Expose the buried evidences of Temple and other parts, for a correct way of experiencing and looking into the past.

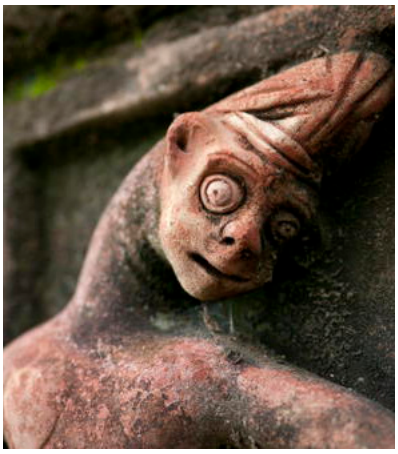
Fig 101
Visualization of the context of Somapura Mahavihara with Temple Tara (10th - 13th c.AD)
© Tamanna Ahmed drawing, 2015.

Fig 102 (next page)
Terracotta plaque of 'Somapura Mahavihara' (770 AD)
© Tamanna Ahmed photography 2014.

[200] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture.* Academy Editions, London. 1980. p.182.

[201] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture.* Academy Editions, London. 1980. p.180.

[202] Norberg-Schulz C. *Genius Loci: towards a phenomenology of Architecture.* Academy Editions, London. 1980. p.182.



'' To respect the genius loci does not mean to copy old models. It means to determine the identity of the place and to interpret it in ever new ways. Only then we may talk about a living tradition which makes change meaningful by relating it to a set of locally founded parameters. ''[202]

Conclusion

Archaeology of disappearance in recovering the existential foothold of 'Somapura Mahavihara' has been intensively applied in this research paper in defining the bridge between the Religious and Monastic part of Vihara Architecture. This bridge is a result of conscious amalgamation of Religious symbolism with Functional rationalism, in determining the overall planning of 'Somapura Mahavihara'; one of the finest example of Vihara architecture. Within the reasearch process the dual role of 'Architecture' with 'Archaeology' has been emphasized in discovering the Archeology of disapperance.

The evolution process (530 BC - 1220 AD) of Vihara Architecture interestingly document the gradual formation of 'Somapura Mahavihara', as a result of constant adaptation with the emerging socio - cultural - political hierarchies of the era. Through evolution process, comparative studies and archeological data, the unknown zones of 'Somapura Mahavihara' has been derived using 'Architecture' as a tool to recover the history, life and role of the establishment in connecting man with his nature, as a whole.

The major factors as identified in providing specific architectonic typology of 'Somapura Mahavihara' are:
- Evolutionary adaptation of Vihara architecture since 530 BC;
- 'Mahayana Vajrayana' order of Buddhism, in determining the major planning of the monument;
- Significant role of 'Mahavihara' as a highest institution of knowledge and belief of Pala dynasty (750 AD - 1155 AD);
- Vernacular architecture in providing compatibility to the building enclosure;

In defining the existential foothold of 'Somapura Mahavihara', it evidently emphasizes the role of Architecture as a mediator of socio-cultural-political hierarchies, while moulding itself within the firm belief of the dwellers. Through transforming the symbolic Religious meaning into space experience, the architecture of 'Somapura Mahavihara' enriched and enhanced the life of the dwellers within their specific context.

Thus, the existential foothold of 'Somapura Mahavihara' is nothing but the story of 'Recovery' of its place, time and existence, echoing basic relationship of man within his nature through constructing a meaningful Architecture.

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Glossary

Technical

Stupa : A stupa (from Sanskrit: m., , stupa, Tibetan chöten, Sinhalese: , Pali: "thupa", literally meaning "heap") is a mound-like or hemispherical structure containing Buddhist relics, typically the ashes of Buddhist monks, used by Buddhists as a place of meditation. Built for a variety of reasons, Buddhist stupas are classified based on form and function into five types:
- Relic stupa, in which the relics or remains of the Buddha, his disciples and lay saints are interred.
- Object stupa, in which the items interred are objects, belonged to the Buddha or his disciples such as a begging bowl or robe, or important Buddhist scriptures. Commemorative stupa, built to commemorate events in the lives of Buddha or his disciples.
- Symbolic stupa, to symbolise aspects of Buddhist theology
- Votive stupa, constructed to commemorate visits or to gain spiritual benefits.

Mahavihara : Mahavihara (Mahavihara) is the Sanskrit and Pali term for a Great Buddhist monastery and is used to describe a monastic complex of Viharas. The term ''Maha'' means ''Big'', hence it denotes the grandness of the Vihara, in terms of size, population and function.

Buddhist Monk: A bhikkhu (Pali, Sanskrit: nbhikhu) is an ordained Buddhist monk A female monastic (a nun) is called a bhikkhuni (Sanskrit: bhikhuni).The lives of bhikkhus and bhikkhunis are governed by a set of rules. Their lifestyle is shaped to support their spiritual practice: to live a simple and meditative life and attain enlightenment. A person under the age of 20 cannot be ordained as a bhikkhu or bhikkhuni.

Monastic cells : A cell is a small room used by a Hermit, Monk, Anchorite or nuns to live and as a devotional space. They are often part of larger communities like Christian monasteries and Buddhist vihara, but may also form stand alone structures, located in remote location. In Buddhist Architecture, it is always in the form of Vihara, cluster of cells.

Vihara : Vihara (, vihara) is the Sanskrit and Pali term for a Buddhist monastery. It originally meant "a secluded place in which to walk", and referred to "dwellings" or "refuges" used by wandering monks during the rainy season. The northern Indian state of Bihar derives its name from the word "vihara", due to the abundance of Buddhist monasteries in that area.

Analytical

Buddhist Architecture :

Buddhist religious architecture developed in South Asia in the 3rd century BCE. Three types of structures are associated with the religious architecture of early Buddhism: monasteries (viharas), places to venerate relics (stupas), and shrines or prayer halls (chaityas also called chaitya grihas), which later came to be called temples in some cases.

Existential foothold :

''Existential space'', comprises the basic relationships between man and his environment. In terms of analysis of a monument, the term Existential foothold has been used that denotes the basic elements that shape the monument while defining the relationship with the dwellers into the particular context it is subjected.

Foothold : It refers the anchoring of the monument, in terms of social, cultural, political, regional, territorial, structural, functional, religious symbolism and all other dimensions that contribute in shaping the monument into particular space and time.

Pala Dynasty : The Pala Dynasty comprised of the Pala Empire (750AD - 1155AD), who was a Buddhist imperial power in Classical India. It is named after its ruling dynasty, all of whose rulers bore names ending with the suffix -Pala (meaning "protector" in Prakrit). The kingdom was centred on present-day Bangladesh and eastern India.

Vihara Architecture :

Vihara or Buddhist monastery has two major parts: Religious and functional. The architecture of this building typology as a whole is defined as Vihara Architecture

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Annex

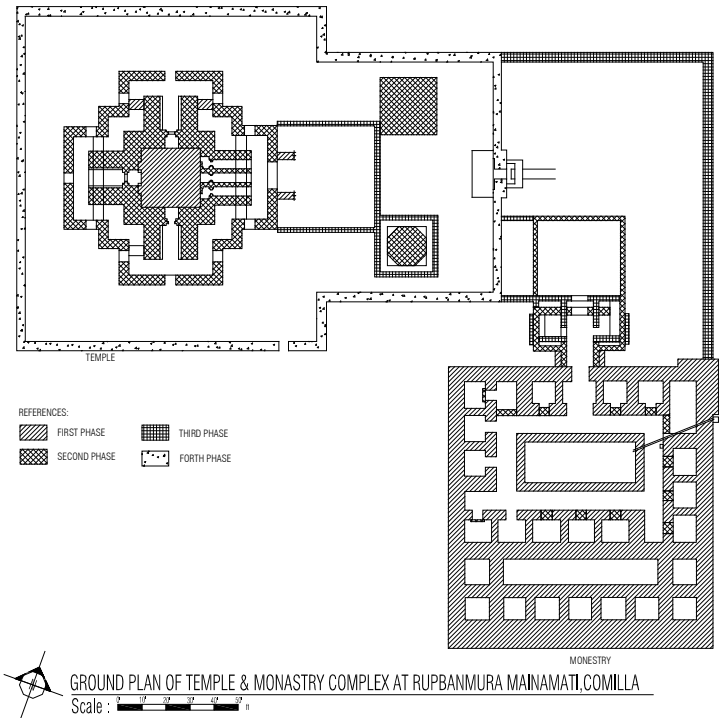

Fig 01
Rupban Mura Vihara ,6th c.AD

Source:
Department of Archaeology, Government of Bangladesh

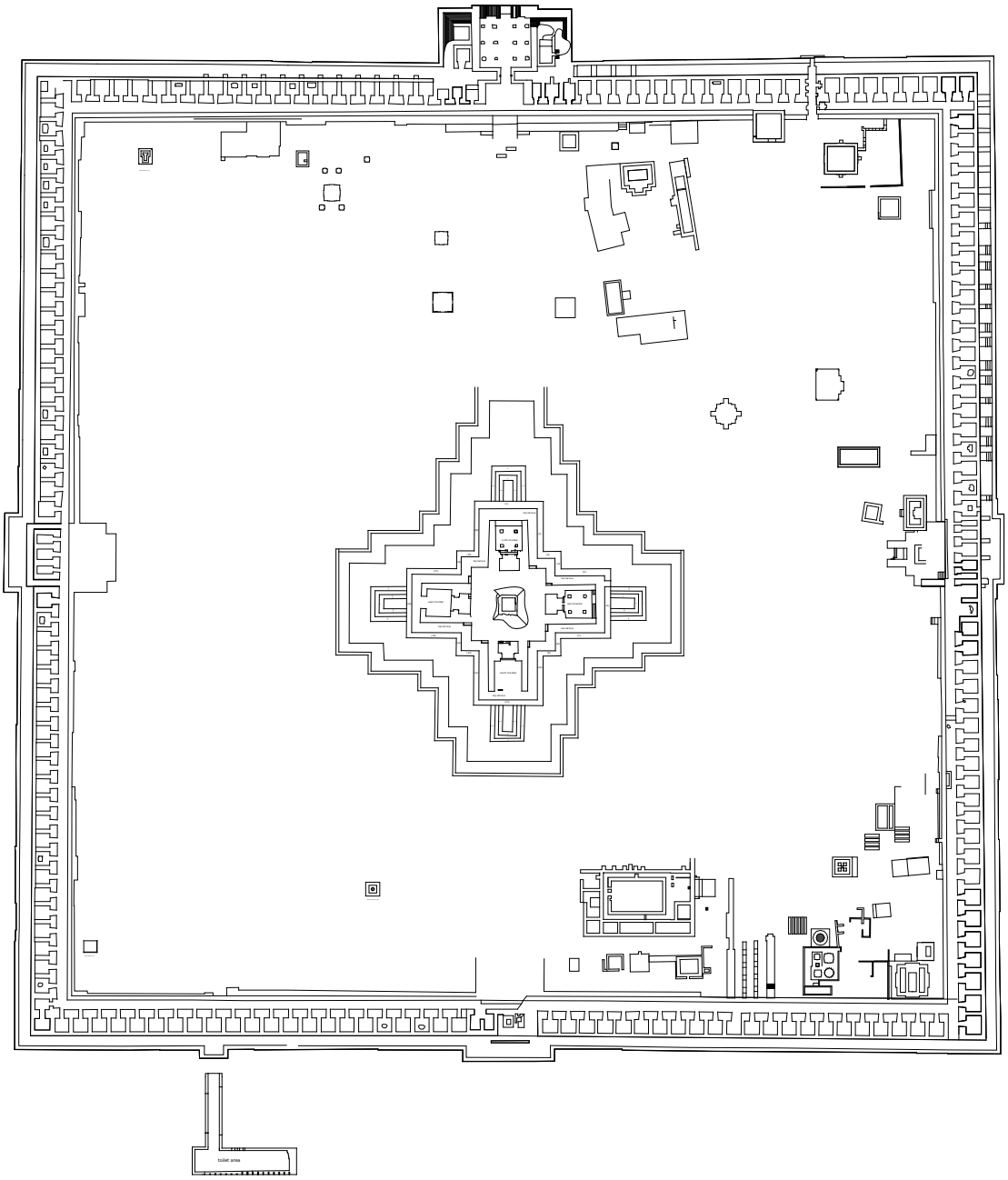

Fig 02
Plan of Somapura Mahavihara
source: Dept. of Archaeology, Govt of Bangladesh.

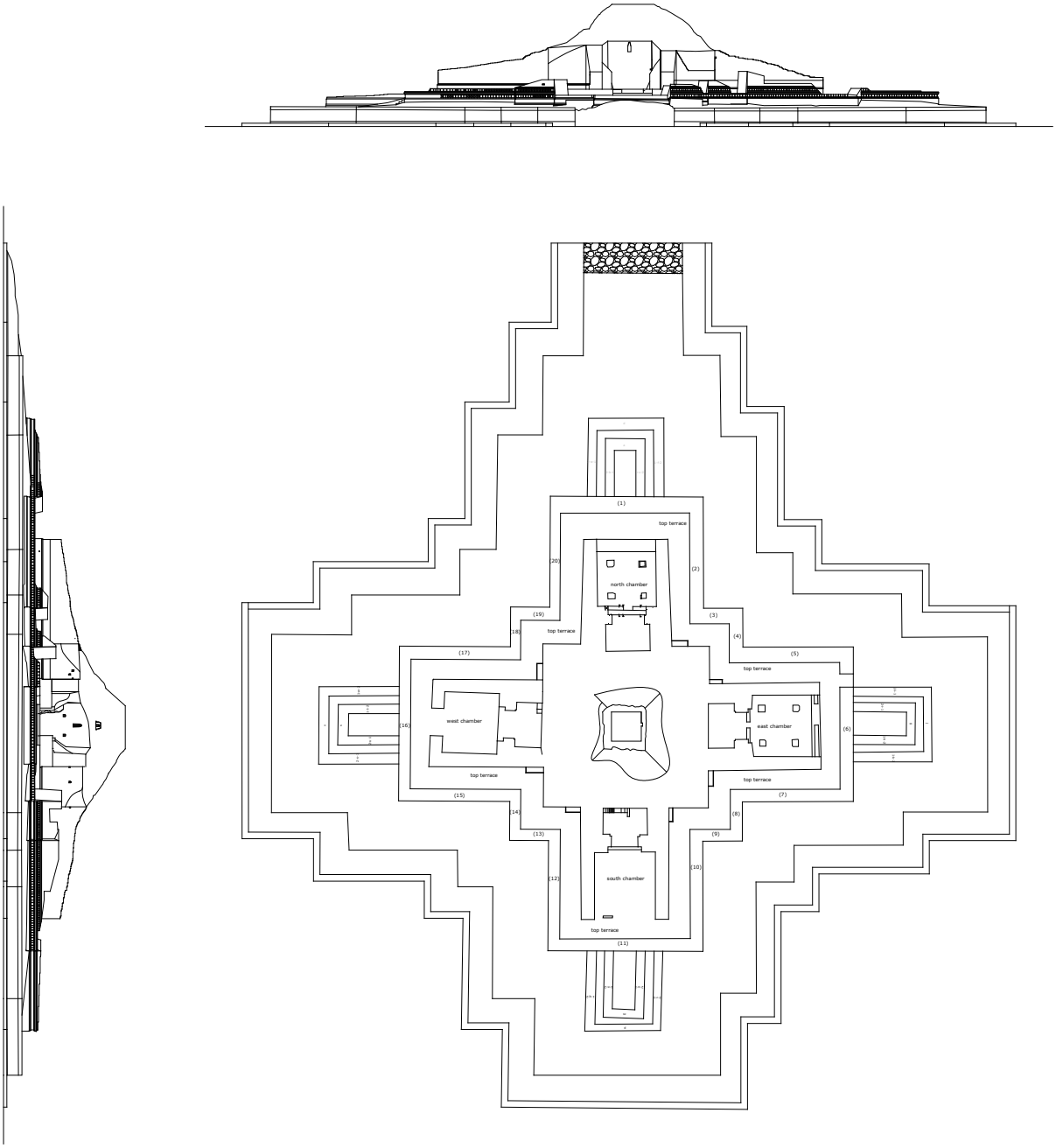

Fig 03
Temple of Somapura Mahavihara
with west and north elevation
source: Dept. of Archaeology,Govt of Bangladesh.

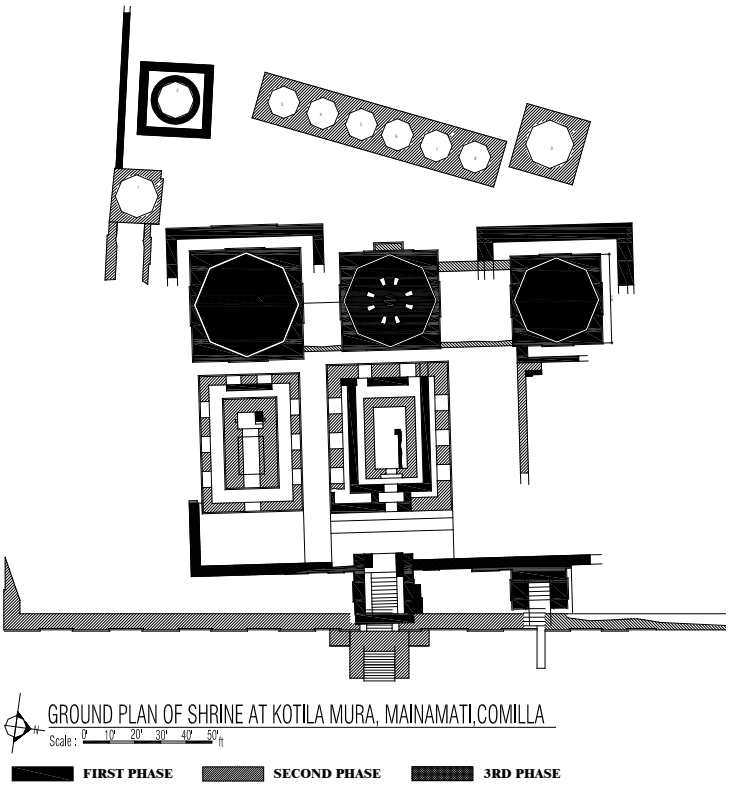

Fig 04
Kutila Mura Vihara, 7th c. AD

Source:
Department of Archaeology, Government of Bangladesh

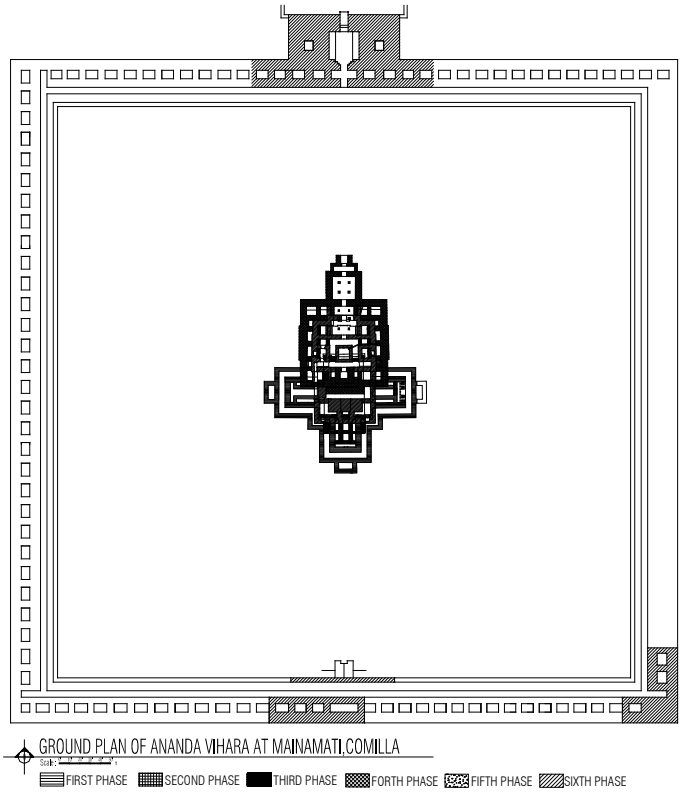

Fig 05
Ananda Vihara, 7th c. AD

Source:
Department of Archaeology, Government of Bangladesh

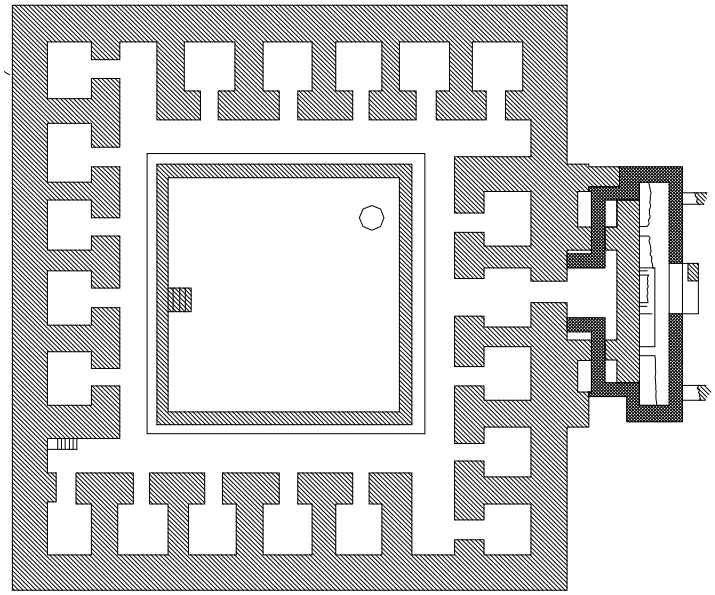

Fig 06
Itakhola Vihara, 7th c. AD

Source:
Department of Archaeology, Government of Bangladesh

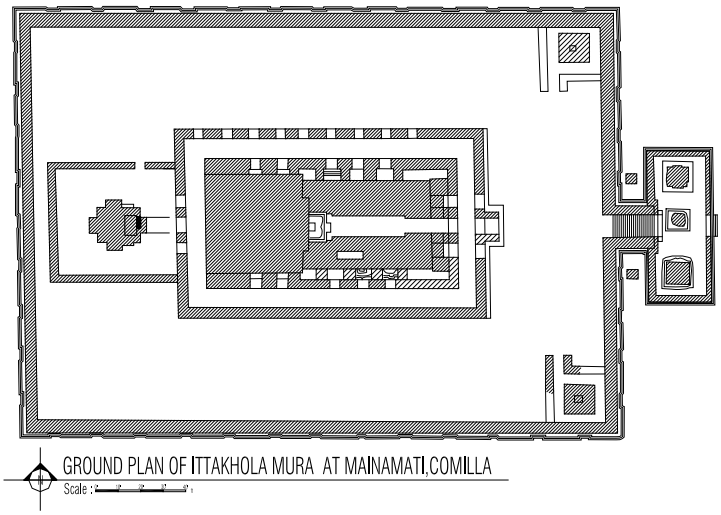

Fig 07
Itakhola Mura Temple, 7th c. AD

Source:
Department of Archaeology, Government of Bangladesh

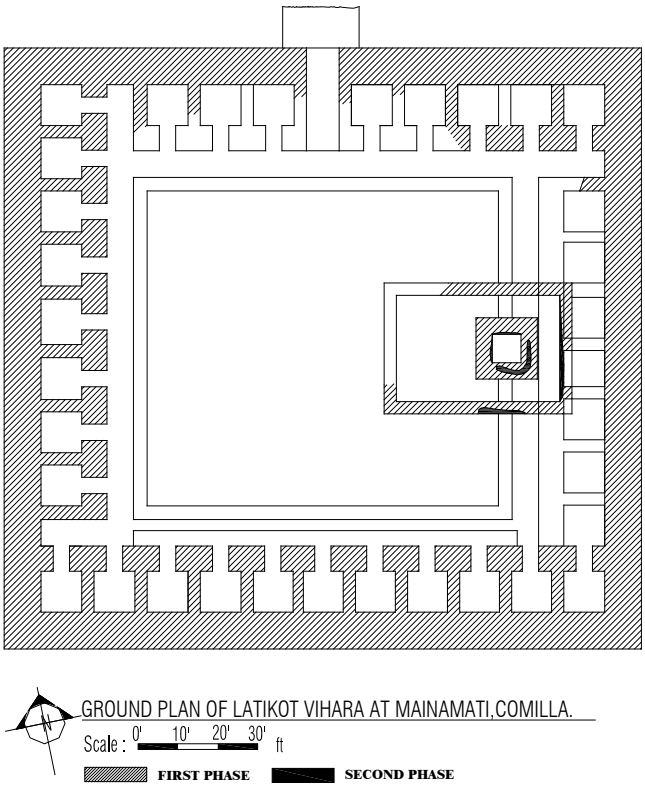

Fig 08
Latikot vihara, Comilla. 8Thc. AD

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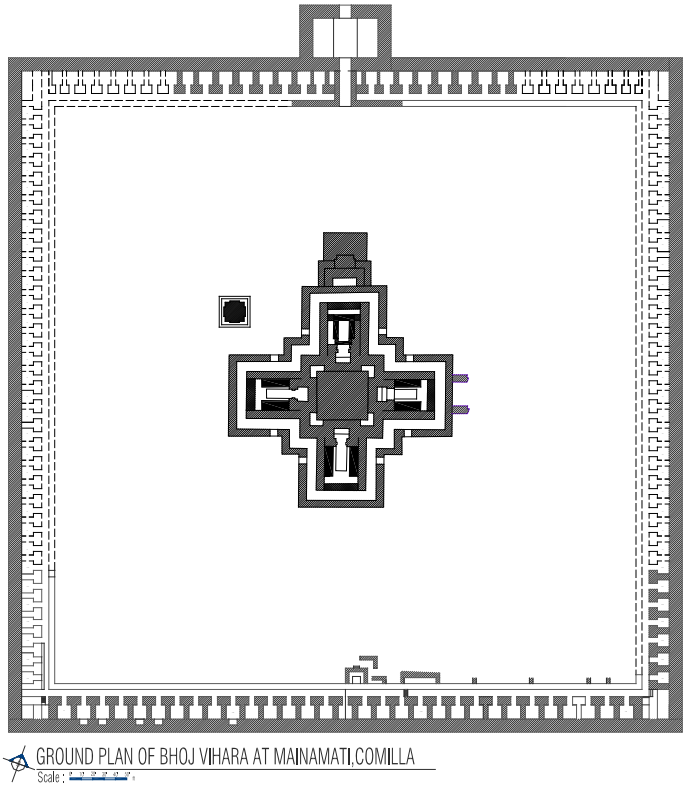

Fig 09
Bhoja Vihara, Comilla. 1220 AD

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