

# TRANSFORMATION OF MACHENDRA BAHAL AT BUNGAMATI

## - CONSERVATION AND MANAGEMENT PLAN -

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### OVERVIEW AND STUDY OBJECTIVES OF THE PROJECT

Located 10 km south of the capital Kathmandu, Bungamati is an ancient 7th century 'newari' settlement enriched by the natural resources, compact built form and Hindu and Buddhist socio-cultural values. It is believed that 100 people from each principal cities of the Kathmandu Valley - Kathmandu, Lalitpur and Bhaktapur - were brought into this area at the time of King Narendradeva and housed them around 'Machendranath' [Bunga-dyo] in three different directions with construction of three artificial ponds corresponding to each community. Surrounded by different rivers and streams from all four directions, the town is condensed within an area of 4.03 sq. km with total population of only 5,667 in 2001. The first six wards on the sloped land accommodating 3,715 populations [65.55% of total population] of original inhabitants 'newars' represent the ancient settlement of Bungamati. In the whole settlement, the Machendra Bahal is the singular most important entity, as it is the biggest enclosed courtyard comprising of both Buddhist [Machendranath] and Hindu deities [Hayagriva Bhairav]. Moreover, its cultural infrastructure is not limited to the temples and shrines but also many other public amenities such as public rest place [pati], sunken water spout [dhunge dhara], god house [dyo chhen] and so on. However, these cultural resources are being gradually degraded. The situation has further worsened due to little efforts from the concerned public agencies as well as by the local community towards the conservation of the town. As a result, not only the physical structures but also the collective memory and shared values on the 'Bahal' are under threat. If no action is initiated immediately, the fate of the town in general and the 'Bahal' in particular will be that of other destructed towns of the Kathmandu Valley. Against such background, this project aims to prepare the conservation and management plan for the 'Machendra Bahal' within the framework of collective memory and shared value of communities of Bungamati with the followings objectives.

- [a] to identify the representatives of collective memory and shared values of communities of the ancient 'newari' settlement of Bungamati;
- [b] to identify the trend of transformation of the town and the society and then to check its numerous impacts on cultural infrastructure before relating the problems with the existing legal and institutional framework of urban development;
- [c] to prepare an inventory document within that framework for the religious structure and their associated community spaces within the 'Machendra Bahal' after analysing their values and the present condition;
- [d] to prepare a conservation and management plan with many site specific guidelines and strategic recommendations.

### LITERATURE REVIEW AND THEORETICAL FRAMEWORK PREPARATION

Both the ancient tangible [historic monuments, buildings, landmarks, archaeological remains, etc.] [Ross, 1996] and intangible [atmosphere, spirit of place, ambiances, customs and belief, etc.] [Ashworth, 1997] artefacts in various combinations produce the 'built form' of different scale. As every place has its own individual special uniqueness, character and identity thereby distinguishing

it from other places [Norberg-Shulz, 1980; Garnham, 1985], a place is the past and the present with future scope possessing cultural and experiential values. It provides meaning, order and stability to human existence [Lowenthal, 1975, Tuan, 1975]. Psychological reaction of human beings on spatial structures constitutes the 'memory of place' and 'time' dimension adds the experience of places [Lynch, 1960, 1972]. Thus, heritage is all the selected and interpreted remains from the past [Cantell, 1975] in various forms with different social, cultural, traditional and political significance [Dobby, 1978; Stipe, 1983]. Conservation of the past 'representational form' is required not only for retention of those old 'romantic' and 'artistic' values with 'variety' and 'richness' [Cantell, 1975] but also for 'good surrounding' from which people can derive 'the combination of beauty, character, harmony, mellowness, mature landscape and human scale' [Stipe, 1983]. Change in different forms - adaptive reuse, rehabilitation and redevelopment of older areas - is inevitable and management of such change is conservation [Tiesdell, Oc and Heath, 1996]. By these kinds of 're' actions, the architectural styles and ideally the original activities and ambience can be conserved and enhanced to accommodate contemporary uses and functions for the benefit of present and future of the towns [Steinberg, 1996].

## STUDY METHODOLOGY

The study methodology for conservation and management plan for 'Machendra Bahal' in Bungamati comprises of basically three parts [Fig. 1]. First, the town form of Bungamati including its street network and open space hierarchy is identified and then relates to the socio-economic activities occurring in these places. Moreover, the religious and cultural meanings celebrated through various rituals and customs in the form of local festivals are also identified. In the second phase, the representative of collective memories and shared values of communities of Bungamati that need attention are analysed, which also becomes the guiding principles for conservation and management plan for the 'Machendra Bahal.' The emerging problems in Bungamati in general and in 'Machendra Bahal' is particular are stated after analysing the transformation process of the town as well as migration of the communities especially associated with rituals and customs. Also, the numerous values associated with the cultural infrastructure of 'Machendra Bahal' are established before assessing the damage in those amenities. The emerging problems are linked with the existing legal and institutional framework of town growth management to check their effectiveness. In this stage, the transformation of architectural elements in the buildings is also studies and numerous analyses are carried out to regulate the individual private houses within the 'Bahal' environment. Finally in the third part, the conservation and management plan for 'Machendra Bahal' is proposed with recommendations for physical, social and cultural aspects on the four interlinked issues namely, [a] shrines and temples, [b] associated spaces and structures, [c] open court comprising of many elements, and [d] the embracing buildings encircling the open court. Moreover, both long term and short term recommendations are also suggested.

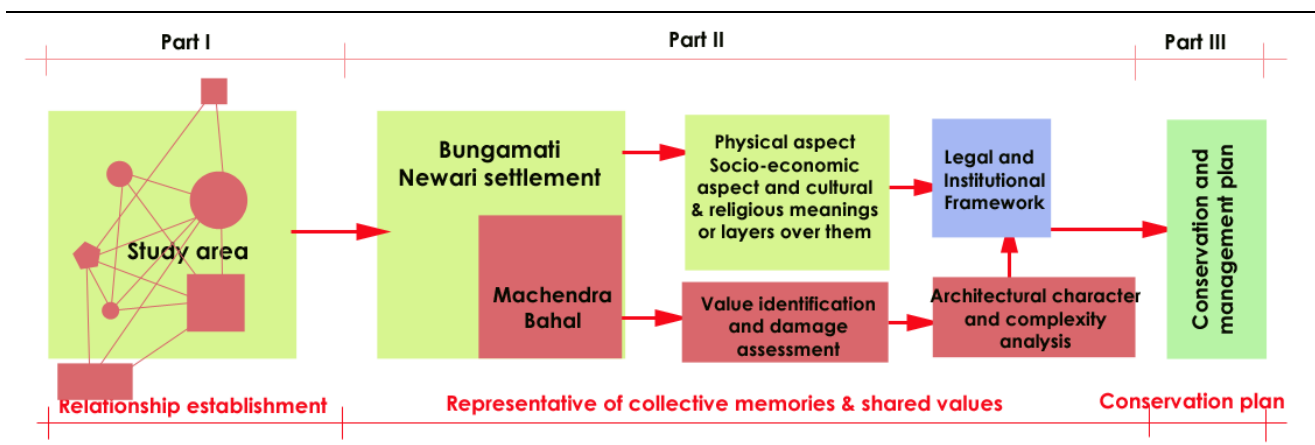


Fig. 1. Study methodology for the conservation and management plan for Machendra Bahal in Bungamati

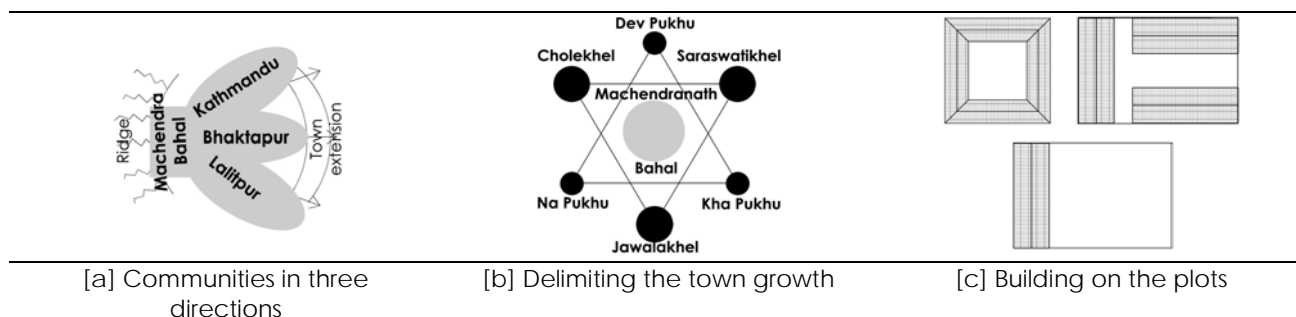
## REPRESENTATIVE OF COLLECTIVE MEMORY AND SHARED VALUES

The size, shape and planning principles adopted in the past including architectural vocabulary of Bungamati are unique and possess architectural, aesthetic and historical values. The ancient 'newari' settlement is of oval shape elongating north-south direction with gentle slope towards the north. Due to steep slope on the west side, the extension of the town has taken place in the three directions, mainly towards the east [Fig. 2]. The old town comprises of numerous salient features. The town form, street patterns and open space hierarchy including building components have different layers of socio-religious meanings, developed in different time period, which give the clues for the collective memory and shared values of communities.



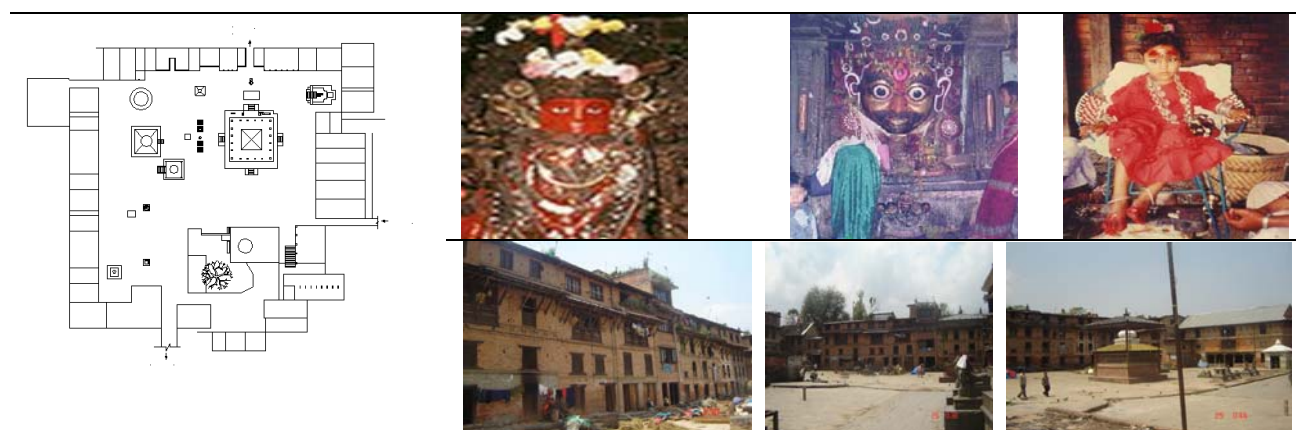
Fig. 2. Ancient newari settlement: town form and settlement view

First, unlike the 'newari' settlements in the urban context, which are 'palace' concentric with segregation of housing based on their profession [jaat], the built form of Bungamati comprises of 'Machendranath' temple as an 'anchoring node' with three communities residing in different directions - north-east [Kathmandu], east [Bhaktapur] and east-south [Lalitpur] [Fig. 3a]. Ritually higher ranked 'jaat' such as 'Shakyas' and 'Vajracharyas' were housed close to the temple. To perform various socio-cultural activities, separate artificial ponds were constructed for each community: 'Dev Pukhu' corresponding to 'Shakya' community from Kathmandu, 'Kha Pukhu' for 'Shrestha' family from Bhaktapur and 'Na Pukhu' for 'Jyapu' community of Lalitpur. Moreover, construction of two ponds [Dhoka piney pukhu] on either sides of the old entrance [believed to be a gate on the north-east side] leading to 'Machendranath' temple represented the 'newari' culture of keeping two water full pots on both sides of main entry of house as a symbol of good luck. Second, the tradition of keeping large open spaces [khyo or khel] for public benefit at the peripheral areas in 'newari' towns was also continued in this rural setting: 'Cholekhel', 'Jawalakhel' and 'Saraswatikhel'. In fact, these three 'public spaces' together with three artificially created ponds in three different directions with central location [spiritually] of 'Machendranath' temple indicated the boundary of old town delimiting the settlement growth towards the agricultural field [Fig. 3b]. Agricultural based society, local topography and climate have created three different typology of building layout on the plots [Fig. 2c]. Unlike the completely 'enclosed courtyards' with continuous encircling buildings [with common walls] in the city areas, majority of the 'building-form' at Bungamati are composed of individual structure encircling the open spaces with many entry access. Otherwise, buildings generally have vacant plot at the backside, used for 'vegetable garden' and utility functions [Fig. 3c].



**Fig. 3.** Unique features of town form and buildings on the plots in Bungamati

Third, streets and open spaces are not only for 'visual setting' to feel mystery, surprise, excitement and anticipation but they are also more like a 'shared community spaces' to perform multiple activities such as utensil and cloths washing, grain drying, working place, sunbathing and so on. Among the public spaces, the 'Machendra Bahal' is the focus of ritual and daily socioeconomic activities not only due to its large size open court but also because it houses numerous deities: Ajima temple, 'Kisidaga', sunken water conduit, bathing place, 'chaityas' and 'patis' besides the main 'Machendranath' and 'Bhairav' temples. 'Machendranath' having many important mythological, historical and contemporary ritual associations with water is a primordial rain god [Slusser, 1982; Locke, 1975, 1980] whereas 'Hayagriva Bhairav', the chief of all Bhairavs [Kal Bhairav, Akas Bhairav, Mahankal Bhairav and Bagh Bhairav] is regarded as one of the many 'roops' [faces] of Machendranath [Photo 1]. Again, both of them are also associated with 'Kumari' [living goddess], which is the symbol of purity and the promise of future fertility and prosperity. All these three deities are worshipped during the first day of 'Marga' [eighth month of Nepali calendar, i.e., mid-November] and on the month of 'Shrawan' [fourth month of Nepali calendar, i.e, mid-August]. Religious structures such as 'dabali' [square platform] and 'paati' [rest house] associated with these deities have also been used for display of god and goddess images, performance of religious dance and drama as well as for 'bhajan and kritan' [religious pray]. Thus, it has provided an opportunity for interaction of private and community life to enhance social bonds.



**Photo 1.** Machendranath Bahal with Buddhist and Hindu deities and open courtyard

Moreover, people in Bungamati possess some unique traditions contrasting the culture of other 'newari' towns. As 'Machendranath' boasts two temples: one in the Bungamati and other in Lalitpur, spending half a year in each place, the annual 'jatra' is performed at Lalitpur, but every twelfth year, the Chariot is reassembled at Bungamati and the 'jatra' itself begins and ends here after taking Chariot procession to Lalitpur. Similarly, the traditional ceremony called 'Hanuman Jagaune' celebrated during the 'Dashain' festival is the unique feature of Bungamati. Though the provision of 'Kumari' does exist, Indra-jatra [associated with Kumari] is not performed here. 'Krishna jatra' is celebrated only in the 'Maharjan community.' Also, monastic initiation and other Buddhist rituals



are performed at 'Machendranth' temple and not in the Buddhist bahals. This combined with the significant places like 'chhwasa' [a place protected by a demon] and 'lachhi' [private space in front of the house allocated for public use] has added cultural meaning to the bahal and streets. Fourth, though the basic architectural vocabulary of buildings at Bungamati matches with that of 'newari' settlements in the city context, nonetheless, it has some unique features, expressing the rural township. Wooden doors and windows with simple decoration and detailing as well as plain horizontal band indicating the storey difference on building façade has illustrated the rural craftsmanship whereas temporary additional layer on the building facade – hanging off of agricultural products, which keep on changing with seasons and the type of crops produced - has provided dynamism in the streetscape [Photo 2].

Not only has the layout of the settlement but the 'newari' houses also followed 'mandala' concept. The top floor of the house comprising of the worship place and kitchen as 'pure' area with access to higher 'jaat' and of the same 'jaat' whereas the lowest floor used for keeping utilities and dead body was 'pollution/impure' area. The lower caste people were allowed to enter into the ground floor only. Community spaces in front of individual houses are part and partial of architecture and without such spaces individual structure can not function as a house. Many daily activities such as weaving, knitting, bathing and washing including socialization with neighbours take place in the 'transitional spaces' between the 'private house' and 'public' street. Common life style, use of local materials and technology in the agricultural based society had produced similar type of building characters with many common unifying elements - vertical brick exposed façade, vertical oriented wooden windows and slopped roof with little variation on roof line. This combined with street width to building height ratio within the limit of 1:2 to 1:3 had contributed to the formation of 'sense of enclosure' and 'human scale' for pedestrians. Celebration of local festivals and procession on streets [and plazas] together with coexistence of buildings of different periods have generated a vibrant and lively rural townscape.



**Photo 2:** Temporary layer on building facade according to seasons and festivals

The management, operation and maintenance of religious, social and cultural artefacts and activities were achieved through 'guthi system,' which was a corporate body 'financed to perpetuity' through land grants. It is a community institution with overlapping networks of social relations, which serve to tie differently positioned individual members into the integrated community [Poonam, 2000]. Thus, combination of both material and mental has resulted into human experience that has been remembered, shared and communicated. Individual's relation with local environment is the product of historical context and accumulation of experiences of place over time [Norberg-Schulz, 1980; Heidegger, 1993; Wheeler, 1995].

### **TRANSFORMATION OF SETTLEMENT AND SOCIETY**

Though the population growth of Bungamati is nominal, extension of the surrounding urban areas towards the town, gradual shifting of economic base from agriculture to industry and service and migration of original people to the surrounding urban areas have gradually transformed the town and society with numerous consequences. First, two major elements namely pond [water body]

and large open space have been ignored. 'Kha Pukhu' associated with community of Bhaktapur does not exist any more whereas other ponds are also highly polluted due to disposal of garbage and direct discharge of sewer line from the surrounding households [Photo 3a]. In other cases, except for 'Cholekhel', the two others 'khel' have already been converted into new uses: local Bus Park at 'Jawalakhel' and new 'Amarpur Buddhist Vihar' at 'Saraswatikhel' [Photo 3b]. Similarly, the 'cultural space' just outside the 'Machendra Bahal,' where the chariot is being prepared, has been in the state of negligence. Second, though the 'shrine' of the 'bahal' is still intact, the other two elements namely the 'open court' and 'pati' have received little attention. A community toilet with water tank was constructed on the scared space of the court, which should strictly house only shrines, 'chaityas' and other related religious artefacts [Photo 3c].



[a] Dried off Kha pukhu



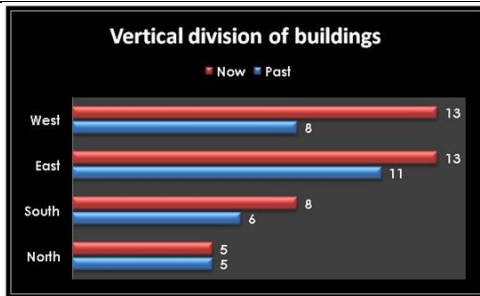
[b] Local bus park at Jawalakhel



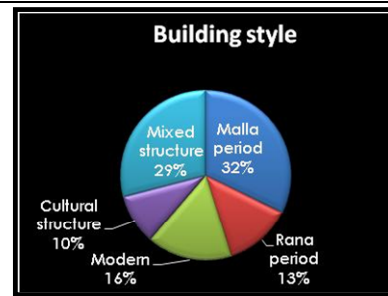
[c] Public toilet at bahal

**Photo 3.** Destruction of socio-cultural spaces

In other cases, the shop owners have encroached the front space of their buildings for personal use whereas others have enclosed the public rest house'. Third, haphazard infill development of the vacant lands, often with Reinforced Cement Concrete [RCC] structure with rolling shutter on the ground floor, irrespective of its location [pedestrian alleys, courtyards and vehicular street] and infrastructural capacity is destroying the earlier unique town form and building layout typology. Moreover, vertical division of old houses and their haphazard renovation [by creating door and window openings on the load bearing walls as well as by adding RCC floor on the existing old brick on mud mortar wall] and new construction, often 'unfit' with existing surrounding buildings in terms of material, bulk, volume, story height and architectural style has destroyed the earlier streetscape, reduced light and ventilation on the streets and courtyards, and intensified earthquake vulnerability. For instance, the earlier eight numbers of houses on the west side of Machendra Bahal has been increased upto thirteen at present due to vertical division [Graph 1a]. Similarly, other sides have also been affected by vertical division and haphazard renovation in many cases thereby changing the earlier building styles into mixed structures [Graph 1b].



[a] Vertical division of old houses



[b] Changes in building styles

**Graph 1.** Vertical division of traditional houses and their haphazard renovation at Machendra Bahal

Though communities living around Machendra Bahal are still occupying agriculture and wood carving as the main occupation, only half of them have sufficient food from their farms; the remaining have either enough food for six months or just for three months [Graph 2]. The tradition of dividing parental properties equally to the children has caused the fragmentation of lands and

buildings thereby decreasing their production and efficiency. The income of these people from other sources is minimum. In fact, these communities engaging in agriculture have enough time in celebrating numerous rituals and local festivals. However, shifting in other jobs from agriculture occupation has many negative consequences on the cultural and religious activities.



**Graph 2.** Socio-economic parameters of communities around Machendra Bahal

Demise of 'guthi' system, dispersion of 'guthi' members [guthiyars], conversion of 'guthi' lands into personal properties thereby reducing the income all have not only reduced the socio-cultural activities but have also hampered the maintenance and renovation of religious structures. Jyapu community known as 'suwal' is an integral part of the Machendranath and Bhairav rituals and 'jattras' whereas Kasai/Khadgi [butcher], Kusle used to play 'kahan baja' [long horned metal musical instrument] in different rituals like death, initiation and various festivals. However, such local rituals and customs have been gradually disappearing not only due to lack of interest and limited economic benefit but also because of mismanagement of land and corruption of the members of the guthi. Negligence of social artefacts and cultural spaces have diluted the memories of place and helped communities to develop a habit of not taking care of cultural properties. Thus, the process of negligence, misuse, encroachment and finally converting into private property has been continuously unabated.

## LEGAL AND INSTITUTIONAL FRAMEWORK

The existing legal and institutional framework is checked for two aspects: physical built environment and the socio-cultural activities. Numerous facts illustrate the inadequacy and ineffectiveness of the existing legal and institutional framework in addressing the emerging physical problems and socio-cultural issues. In terms of regulating physical growth, the weaknesses lie on three aspects: absence of plans and programs, lack of development control and building regulation and poor capacity of the Village Development Committee [VDC] and low priority given to conservation of the town by other city level public institutions [related to urban development and conservation]. First, the town lacks a Master Development Plan to guide the future growth as well as to conserve cultural heritage. In fact, except for some academic works and a brief general outline of the town by the government in 2003, hardly any study from conservation and development aspect has been so far done for this ancient 'newari' settlement. Absence of documentation of the public monuments, listing of private buildings and other artefacts has not only hampered public education and community awareness but has also made renovation work difficult. For instance, the Department of Archaeology is renovating the 'Prathampur Mahavihar' on ad-hoc basis without any measured drawings and documentations of the renovated works for future conservation. Also, lacking is the coordination with VDC. Second, due to its village status, one does not need to present detail blue prints for construction of any buildings, just simple permission from VDC is enough. No legal tool is available at present to regulate the new construction as well as to check the vertical division and haphazard renovation of old houses. Third, the VDC office has poor managerial and technical capability. In fact, this office itself was involved in the construction of community toilet at 'Machendra Bahal' and RCC community building adjacent to 'Bhairav Temple.' The public agency which needs to regulate the private construction and to educate general public itself requires awareness on conservation. Fourth, though more than two dozens of different



non-government organisations including few cooperative societies are engaged in the town, hardly any of them has been involved in conservation work. As this site is not listed in the World Heritage, the Lalitpur Municipality and Department of Archaeology [DoA] including United Nations Educational, Scientific and Cultural Organisation [UNESCO] has shown little concern on the destruction of the settlement.

Though Department of Archaeology in particular and Ministry of Culture in general is responsible for the conservation of cultural resources, no specific legal norms and institutions to look upon the religious works and cultural practices do exist. Though numerous nongovernment organisations are involved in this town, hardly any of them has focused on the cultural aspect of the community. In fact, the notion of conservation is limited to the national monuments [temples and old palaces], focusing on physical aspect and targeting only on promotion of international tourism. As a result, the breakdown of the traditional social network and erosion in rituals and celebration of festivals has been continued. The structural linkage between the socio-cultural practices and the town form in Bungamati in the past is yet to be acknowledged. The overall impact is the reduction in socio-cultural activities and religious works as well as destruction of cultural spaces and vernacular architecture thereby fading up the 'collective memory' and 'shared values.'

#### **INVENTORY DOCUMENTATION FOR RELIGIOUS STRUCTURES OF MACHENDRA BAHAL**

The religious structures within the Machendra Bahal can be divided into three types namely [a] main temples and shrines, [b] their associated spaces such as Dyo chhen [god's house], pati [rest house], etc. and [c] open court accommodating numerous religious elements [Photo 4]. Moreover, numerous religious activities during festival time as well as daily socioeconomic activities have strengthened values of these structures. Finally, the embracing buildings around the court with unifying architectural elements have completed the 'bahal' environment. Among many shrines in the bahal, the Machendranath [Bunga dyo] and Hayagriva Bhairav temple are the major one having both historical and symbolic/representative values.

It is believed that 'Machendranath' was brought to Kathmandu from Assam, India through tantric power to break down the mediation of 'Gorakhnath' who was holding all 'nagas' [snakes] thereby causing drought in the Kathmandu Valley [Locke, 1975]. As 'Hayagriva Bhairav' in disguise of a dog looked towards this village and started howling 'Bu', it was decided to put the 'Machendranath' temple at the spot where Bhairav was pointing. Because of the sound 'Bu' this place was named as 'Bungamati.' Local villagers believed that its name 'Bungamati' was derived by combining the two words: 'Bunga' [Bunga dyo] and 'mati' [river].



**Photo 4.** Cultural infrastructure – temple, pati [and dyo chhen] and open court

'Machendranath' having symbolic association with Hayagriva Bhairav was placed in the same complex of 'Machendra bahal.' Bugya-dyo having many important mythological, historical and contemporary ritual associations with water is a primordial rain god [Slusser, 1982; Locke, 1980] whereas 'Hayagriva Bhairav', the chief of all Bhairavs [Kal Bhairav, Akas Bhairav, Mahankal Bhairav and Bagh Bhairav] is regarded as one of the many 'roops' [faces] of Machendranath. The symbol of the triad - 'Brahma, Vishnu and Maheshwar' is depicted on the top of Machhendranath temple as well as in the chaityas around the temple square. Moreover, the religious values of these temples



are illustrated through their association with 'Kumari' [living goddess], which is the symbol of purity and the promise of future fertility and prosperity. Kumari appears at 'Machendra Bahal' twice a year: on the first day of 'Marga' [eighth month of Nepali calendar, i.e., mid-November] near the entrance of 'Bhairav' temple and other during the month of 'Shrawan' [i.e, mid-August] at the entrance of 'Machendra Bahal.' On the both occasions, all the three deity are worshipped and many people even from other parts of the Kathmandu Valley visit Bungamati to pay homage to these deities together. Also, monastic initiation and other Buddhist rituals are performed at 'Machendranath' temple and not in the Buddhist bahals. On the final day of 'gunla' month [12<sup>th</sup> August and ending around 10<sup>th</sup> September - the scared month of Lord Buddha] local people and other pilgrimages from different parts of Nepal visit Bungamati to offer food, fruits, flowers and coins to the deities at the temples of 'Machendranath' and 'Hayagriva Bhairav.'

'Patis' and 'dyo chhen' are major community structures associated with important temples to celebrate festivals and to perform other religious activities. In fact, the 'pati' as a shelter for travellers, a meeting place for social and religious activities including assembly of men for devotional music [bhajan and kritan] – provides an opportunity for interaction of private and community life to enhance social bonds. The pati and dyo cheen on the northern façade of the 'bahal' belong to 'Machendranath' temple whereas the structure on the east-south corner is associated with 'Bhairav' temple. Though these structures are still in tact, their functions for socialisation and other religious activities are gradually decreasing not only due to demise of traditional social system [guthi] but also because many families associated with those rituals and customs have been migrated into nearby cities for better job and income. Special 'Jyapu' community known as 'suwal' is an integral part of the 'Machendranath' and 'Bhairav' rituals and 'jstras.' They not only cook rice for feasts and perform sacrifices in Hindu festivals but also assist by holding umbrellas over the head of the initiated boys during the initiation rituals of the Shakya and Vajracharya [Photo 5] [Gurung, 2000].



**Photo 5.** Suwal community in numerous cultural activities

Number of such community has reduced from eight to three at present due to lack of interest and limited economic benefit. Numerous 'guthi' associated with temples [Dishi Pa guthi at Bhairav, Battish Paneju Samha guthi at Machendranath temple] and religious activities [Salu guthi for maintating the path leading to Machendranath temple, Bhajan guthi for playing Harmonium and Tabala] are not functioning well as earlier. People from different community such as Jyapu, Kasai/Khadgi [butcher], Kusle play 'kahan baja' [long horned metal musical instrument] in different rituals like death, initiation and various festivals. Though the architectural characters of these structures are not historical and representative, nonetheless, they have high religious and socio-cultural values. Recently, the old 'bhoey chen' [religious building] associated with Bhairav temple has been replaced by new huge reinforced cement concrete structure using iron shutter on the ground floor. It is not only 'unfit' with the surrounding existing buildings but also destructs the temple itself.

The open court has accommodated numerous Hindu and Buddhist shrines, sunken religious spaces for god and goddess, sunken water spout, bathing place [for god and goddess] including scared tree. Most of such structures are located on the west side of Machendranath temple. The construction of public toilet on the middle of southern side together with enclosing bar around the

tree has created an isolated open space at the east-south corner, which is comparative not clean and less used by local people. Some of the chaityas [Buddhist shrines] are in dilapidated conditions whereas the water spout at the north-east corner does not function at all. However, the community tap adjacent to the toilet and the well on the north-west corner are frequently used by local people for different purposes. Among many structures at the court, the bathing place [for Machendranath], the Buddhist temple and the 'Ajima' temple, both one storey have religious significant during festival and social value in daily activities of local people. However, the cultural significance of the open court is decreasing due to encroachment of the building front area by the shop owners and parking vehicles [motorbike] inside the court. Also, the sense of enclosure is being gradually destroying due to variations in buildings height, which is the result of either addition of floors or construction of new high rise structure. The value assessment of these cultural infrastructures can be grouped into three levels as high, medium and low [Table 1].

**Table 1.** Inventory and value assessment of cultural infrastructures of Machendra Bahal

Cultural structures	Values				
	Historical	Religious	Socio-economic	Representative	Architectural
<b>Temples and shrines</b>					
Machendranath	High	High	High	High	High
Bhairav temple	High	High	High	High	High
<b>Associate structure and spaces</b>					
Dyo chhen [M]	Medium	High	High	Low	Low
Pati [M]	Medium	High	High	Low	Low
Bhoey chhen [B]	Medium	High	High	Low	Low
<b>Open court</b>					
Open space	High	High	High	Medium	Medium
Chaityas	Low	Medium	Medium	Low	Low
Water spout	High	High	Medium	Low	Medium

Note: Scale of evaluation

*High* – Good physical structure with active socio-cultural functions;

*Medium* – Normal physical appearance with continuation of socio-cultural activities; and

*Low* – Poor condition of structure and discontinuation of religious and social activities

## DAMAGE ASSESSMENT

The damage assessment of cultural infrastructure is carried out based on observation and interview with local communities. The physical state of these amenities is slowing getting worse whereas many socio-cultural activities associated with them are decreasing [Table 2]. As a result, some of these structures have been converted for another use such as Local club. In other cases, for safety and security reasons, many religious structures are protected through iron wire all around the structure thereby decreasing its aesthetical and use values.

**Table 2.** Damage assessment of cultural infrastructures of Machendra Bahal

Cultural structures	Damage assessment
<b>Temples and shrines</b>	
Machendranath	Green plants growing from some part of the roof; new addition of main entry to the temple [RCC concrete] does not match with the traditional structure and material
Bhairav temple	The CGI sheet roofing of the first floor is poor, the ground floor under the temple is becoming dumping site, the whole temples needs paintings
<b>Associate structure and spaces</b>	
Dyo chhen [M]	Tilted wooden post on the ground floor [pati] with cracks and unstable, peeling off white cornices from the brick exposed façade, simple cracks on the walls, leaking of CGI sheet roof, dumping of waste stuffs such as cloths on the ground floor corner, dirty and dusty on the backside of the pati, encroachment of pati and the religious building [dyo chhen] itself
Pati [M]	Except the main entrance pati, the remaining two on each side of the main entry is not frequently used, sometimes used for storing wood [as a fuel], flooring is dirty and dusty

Bhoey chhen [B]	Rented some part of the ground floor, new construction but does not fit with the surroundings, height of the structure dominating the Bhairav temple
<b>Open court</b>	
Open space	Except the east-south corner, the rest are used for multiple functions, slowly evading community spaces by using bike parking, business work and so on
Chaityas	Some of them are in dilapidated state, other needs painting
Water spout	Not functioning thereby hampering the religious activities

### IDENTIFICATION OF ARCHITECTURAL CHARACTER OF BUNGAMATI

Traditional architecture of Bungamati is characterised by plain brick exposed wall façade with sloped tiled roof. Dominance of centrally located large window on the second floor with horizontal cornices separating the floors is another dimension of 'newari' architecture. However, these unifying elements among the building facades have been transforming with time to suit the needs of house owners. Such continuation on incremental basis linking with the past has been greatly ignored in the recent development of architecture. Transformation of the dominating roof in the first three stages has maintained traditional character to some extent whereas the recent development of reinforced cement concrete floor does not match with the old one in any way [Photo 6]. The sloped roof with locally made tiles used to be a dominating architectural element in the traditional houses, which has been completely lost in the modern structures.



**Photo 6.** Transformation of roof in traditional architecture with discontinuation in the recent development

This also hold good for façade treatment too, where the traditional houses are characterised by plain sun dried brick exposed façade with vertically oriented wooden windows [Photo 7a]. However, the projection of the floor or balcony on the upper floor in the recent time has not only reduced the light and ventilation on the traditional narrow streets but has also reduced the privacy level with the neighbours [Photo 7b]. The new structure in fact, does not posses any 'unifying elements' to 'fit' in the surrounding traditional buildings. However, there has been gradually improvement in the window openings to get more light and ventilation. The traditional square latticed window on the first floor is not longer suitable for the present context. Except the last two photos [on the right side] the remaining four categories of windows available in Bungamati should be the source of inspiration for new development. Cornices are found in the old buildings of Bungamati either separating the storey flooring or around the window openings. They are either simply brick decorated or built with white lime [Photo 7c]. However, continuation of such trend is not found in the new construction.



[a] Development of building façade from Malla period to recent development



[b] Modification of window opening



[c] Changes in cornices

**Photo 7.** Development of architectural elements in the building transformation in Bungamati

An analysis of ratio of solid [building façade] and void [door and window openings] along with complexity analysis reveals that north and south facades of the 'Machendra bahal' have similar ratio of solid void [greater than six] whereas the remaining two facades have comparable values of greater than three [Fig. 4 and Table 3]. In case of complexity, except the case of north elevation, the remaining three has similar level of complexity in building detailing. While analysing about a dozen of old buildings at different location of 'newari' settlement of Bungamati, it has been found that the average solid void ratio lies less than three and the complexity level is around thirteen.



**Fig. 4.** Building façade at Machendra bahal complex

**Table 3.** Solid void ratio analysis and complexity level at four different elevations

Machendra bahal	North elevation	South elevation	East elevation	West elevation	Traditional architecture
Solid/void ratio on façade	6.367	6.745	3.068	3.438	2.568
Complexity level	12.830	8.750	12.272	13.900	12.80

## CONSERVATION AND MANAGEMENT PLAN

In fact, the community's collective memory and shared value is the product of cohesion of socio-cultural activities into the built form through performance of daily activities and celebration of festivals, which has been sustained for the last many centuries through 'guthi' system at Bungamati. However, gradual shift in economic base from agriculture to service and demise of traditional social institutions has twin effects of reduction in religious activities and of conversion of public spaces [and religious structures] into dead area thereby not only eroding social belief and community behaviour but also accelerating the misuse, encroachment and capturing of community spaces [infrastructure] for personal uses. As a result, the earlier linkages between the building and collective memories [and shared values] have started disintegrating. Hence, the



conservation and restoration plan for Machendra Bahal should not only focus on the above mentioned three elements namely main temples, associated structures [pati and dyo chhen] and the open court itself including buildings encircling the court but also emphasis on numerous socio-cultural meanings associated with them [Table 4].

**Table 4.** Plan and program for action for conservation of Machendra Bahal

<b>Cultural structures</b>	<b>Aspect</b>	<b>Plan and program for action</b>
Temples	Physical	Both Machendranath and Bhairav temple need renovation and painting works
Associate structures		Patis and dyo-chhen associated with Machendranath needs repair and maintenance whereas the new structure linked with Bhairav temple needs façade treatment
Open court		Remove the public toilet , integrate the isolated community spaces on east-south side by removing the boundary of the tree; Revitalise the sunken water spout by restoring its drainage line, repair some of the chaityas and other tiny temples within the bahal complex
Embracing buildings		Regulate the individual buildings through urban design guidelines and implement them in issuing building permit and site checking
Temples	Socio-religious	Establish new community group and coordinate with the local VDC, Department of archaeology, nongovernment organisations for listing the buildings as well as continuing the socio-religious activities including public awareness programs;
Associate structures		
Open court		
Embracing buildings		List the two major temples as national monument and their associate cultural spaces [pati and dyo-chhen] as local significant monument and adopt these spaces for other uses such as community counselling, public awareness office and so on in daily life in addition to using these spaces for traditional function during the festival time;  Discourage the encroachment of community spaces for parking, business activities in the open court through developing a social norms and guidelines on the consensus basis among the community;  Develop urban design guidelines and architectural detailing for renovation of old houses as well as new construction. Also, strengthen the capacity of local VDC not only in developing these guidelines but also giving training to local masons and carpenters regarding vernacular architecture, indigenous technology and earthquake resistant construction
Temples	Implementation techniques	Apply various forms of incentives [tax cut, technical and financial support, floor area ratio bonus, etc.] in renovation and reconstruction works, whereas new community uses can be adopted in the religious structures;
Associate structures		
Open court		
Embracing buildings		Promote local festivals and religious activities not only for celebration but also for organising various community awareness programs such as workshop, exhibition and events.

Moreover, the management plan also includes the short term and long term program as follows [Table 5]:

**Table 5.** Short and long term management plan

<b>Short term program [1-3 years]</b>
Develop a strong institution with bridging between the local communities [including leaders, youth] and local government [VDC] through NGOs and professional bodies;
Prepare documentation and data recording for various cultural infrastructures including their trend of change and the present status'

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Protect the cultural amenities by adopting new uses in those spaces [and buildings] as well as by renovation and maintenance of those structures;

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Prepare flexible guidelines for building regulation through consensus among the development coalitions and implement them through providing incentives and other benefits for those adopting the guidelines

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#### **For long term plan [3-15 years]**

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Develop a master plan for ancient newari settlement of Bungamati and ensure new development as conservation oriented program ;

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Coordinate and cooperate with the town level agencies [water supply, sewerage management, etc] on horizontal axis and with city and district level organisations on vertical axis for socio-economic modernisation, fund raising and other assistance;

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Organise conservation oriented programs and educate the youth and local communities through various programs including exhibition;

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Promote the religious and cultural activities through development of traditional craftsmanship, music, material and profession associated with numerous customs and rituals.

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