PROJECT TITLE

Appropriate vocabulary for a Hindu Temple design in Auckland
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RESEARCH QUESTION

How does the traditional planning principle and the aedicular composition of the tower (Shikhara) influence the design of a Hindu Temple in Auckland?

ABSTRACT - DESCRIPTION OF PROJECT

The Temple provides a deep insight into the spiritual and social aspects of the Hindu religion. With advancement in technology and communications, settlement patterns and Temple worship have undergone radical changes. So have the lifestyle and the attitude of people in general. However in the recent past there seems to be a general tendency to re-establish ones spiritual communion through Temple worship. The locals and the migrants seem to prefer to be in close contact with their culture and establish their place of worship wherever they are.

Temple design is usually weighed down by budgetary constraints, local planning regulations and the opinions of the project committee. However if there are no such constraints what would a Temple on a particular site look like? I am interested in investigating this question.

To understand the importance of the architectural forms in a traditional Hindu Temple, it is imperative to study the traditional planning principles and understand how they have been translated in the past. As a part of this research, I plan to identify the non-negotiable elements of traditional Temple design that impart its sacredness and not to challenge them. With the focus towards the migration of formal architectural devices from India to other countries, there is very little evidence of the translation of the traditional planning considerations in contemporary Temple design.

This research investigates some of the existing Temples in Auckland which may have followed the traditional principles and have added their own localized requirements in addition to the traditional spaces. I wish to re-explore the worship patterns today and assess the activities in the Temple and its precinct.

This research through design will be conducted to evaluate the traditional Temple designs, analyse the existing Temple designs in Auckland and develop an appropriate architectural vocabulary for a contemporary Hindu Temple.
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1.0 OUTLINE OF PROJECT

1.1 DESCRIPTION OF PROJECT

The project is to design a Hindu Temple for the Mangere Temple managing committee at 69 Tidal Road, Mangere. They want it designed as per the regulations of the traditional Temple design using local materials and resources. The Temple and the community hall will be open for all. The design process will seek to evaluate the essential elements of the traditional design principles and analyse them with respect to the four major existing Hindu Temples in Auckland. This research will subsequently form the basis of the proposed design.

1.2 RATIONALE

A Hindu Temple is designed as per the traditional planning principles with an element of acceptable variation in the overall design. The early Temples in India have been documented by various scholars to understand the translation of these principles with respect to the final design. Over the years there seems to be a deviation from these principles, whereby the focus has been merely to produce an exterior skin with the imagery of a temple. The lack of correct understanding of the validity of these principles have resulted their being watered down or completely lost. However there has not been any notable research of the contemporary Temples in India or abroad to substantiate or deny this point of view. This research aims at investigating the use of the traditional planning principles for a Hindu Temple, the local variants and seeks to apply them to a new Temple design in Auckland. The focus is to understand the importance of sacred spaces and compositional elements in the modern context.

1.3 METHODOLOGICAL CONSIDERATIONS

This research by design will involve two major areas of research. The first part would be to study the key elements of traditional Temple design and planning that have been described in the ancient texts, including critical reviews by contemporary researchers. A literature review of the research works of Stella Kramrisch, Adam Hardy, Michael Miester and George Michel would be important. This will enable me to enlist the bare essentials or the non negotiable elements that define the sacred space in a typical Hindu Temple.

The second part of the research would be to analyse the four prominent Hindu Temples in Auckland and investigate the extent to which these planning principles have been followed. The research will also focus on the spaces and elements of design that have been added of altered to the primary layout as a response to the New Zealand context and the changing worship patterns of the congregation.

“Preserving the spirit of a historical environment does not necessarily mean a fanatic repetition of its language”

- Nili Portugali, Architect & Academician, Israel

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Spirituality is an important facet that informs all aspects of Indian culture permeating political, social and family life. It is all encompassing and expressed in a way that engages its practitioners. The external and visible elements of religious buildings signify the faith of a particular community, where people have congregated for worship and exhibited their reverence towards the divine. It is these places of worship, as a site for contact with the divine by the believers, which break the homogeneity of the profane world.

For the purpose of this research by design, I shall limit my scope of this study to the culture, beliefs and the place of worship of the Hindu community.

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1.4 BACKGROUND OF HINDUISM AND THE TEMPLE

Hinduism and spirituality
Hindu religion can be described as a huge Banyan tree with many roots and branches. These branches in turn develop their own roots with the growth of the tree. Although it has many roots, leaves and flowers it is essentially a single tree. Similarly Hinduism is an ever growing unified religion with varied beliefs and customs. 4

The attainment of liberation is considered a long journey in Hinduism. It is often visualized as a continuous progression through the different stages of consciousness. The Temple is the worship place of the Supreme Personality of Godhead and all those who engage in the spiritual practices achieve a unity of the self with Godhead and achieve their ultimate destination. The Temple is perhaps the most artistic expression of Hinduism that provides a focus onto the spiritual and social aspects of the community. It reflects the culture and ideals of the patrons and the devotees as a link between man and the Supreme Being. 5

SUPREME BEING

Figure 2

COMMUNION

Temple
Apart from the act of communion with the Supreme Being, the Supreme Personality of Godhead, Temples were always the centre of intellectual and artistic expression of the community. Devotion to God was not merely a religion, but a way of life. Many schools and colleges were incorporated as a part of the Temple complex. The spacious halls were used for singing of hymns and devotional congregational chanting, that was believed to benefit the community at large. They were also used for music, dance, food distribution and social gatherings. Temples were the direct manifestation of a need to provide an appropriate shelter to a divine force in the form of the Deity that would otherwise remain invisible. 6

Traditionally Temples have always been an integral part of city planning. They were financed and built under the patronage of the rulers in consultation with the priests and executed by the local skilled craftsmen. It was believed that a grant towards the Temple construction greatly promoted one’s religious merit and brought them closer to the path of liberation. Regular donations not only took care of the worship and maintenance expenses, but also helped in land acquisition. This in turn provided a means of livelihood for a large group of families in the community apart from exerting a great influence on the local economy. 

With the passage of time, the onus of undertaking such projects went into the hands of the elected public servants or big industrial houses. In modern times this responsibility is usually shared by a select group of devotees within a congregation. They voluntarily take up the austerity of sourcing the funds and completing the project with minimal government support. In India there have been many examples of contemporary Temple architecture that follow the traditional principles by using locally available materials and resources with the aid of modern technology and construction techniques.

1.5 HINDUISM IN AUCKLAND

Over the years Auckland has seen a huge surge in skilled migrants from India amongst various other countries who bring with them their own culture and devotional practices. According to Statistics New Zealand, there were 39,798 Hindus in 2002, up 56 percent since the last census was conducted in 1996. The report said that although the number of Hindus, Buddhists and Muslims remained small compared with predominant Christian community, they have increased dramatically in percentage terms. The report also found that Asians remained the fastest growing ethnic group in New Zealand. The Indian community increased by 63 percent from the last census making it the third largest growing group of migrants in New Zealand behind China and South Africa. Most Asians are concentrated in Auckland, which, as New Zealand’s leading centre for migrant entry, cemented its status as the dominant region for ethnic diversity.

As the Hindu community grew, Temple projects were being undertaken. Four prominent Temples have been built in the last few years namely the ISCKON Temple in Kumeu, the Swaminarayan Temple in Papatoetoe, Balmoral Temple and the Radha Krishna Temple in Kingsland. There is also a Ganesh Temple in Papakura and another Swaminarayan Temple in Avondale. There are a few smaller Temples in Auckland functioning presently in refurbished houses or industrial sheds. Although traditional Temple design experts from India were consulted, most of these temples have faced challenges with planning regulations, resources and suitable building materials forcing the designer to modify the design to more adaptive to the local conditions.

The Mangere Temple community although comprising of many Indians is an International community of devotees. With the increasing number of congregation members they wish to undertake their first Temple project in accordance with the traditional planning principles and create a landmark using local materials and resources.

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8 “Census Snapshot : Cultural Diversity,” (Statistics New Zealand, 2002).
2.0 UNDERSTANDING THE TRADITIONAL TEMPLE DESIGN AND PLANNING

There has always been an intimate relationship between religion and architecture. A place of worship is usually an impressive architectural landmark that has a special position in society. The faith of a community is expressed by the place of worship through external and visible symbols. Such religious buildings translate a set of beliefs into a built form that proclaims its tradition, history and the aspirations of the community.

I wish to study the importance of the architectural forms in a traditional Hindu Temple. It is also necessary to investigate the origin and the development of the design with respect to the cultural differences, varied geographical features and the variations in climate.

2.1 BASIS OF PLANNING AND DESIGN

Sacred architecture can be described as a built form which has a religious function or expresses a vocabulary of forms as per the existing religious practice. The proportions, patterns and rhythms impart a natural energy and spirituality. However the design elements that give the building their sacred character seem to have been forgotten, ignored, modified, misunderstood and eliminated from the contemporary architectural parlance. This has happened in a way that very few designers actually realize that the sacred ever existed. It is therefore a hidden discipline that warrants a rediscovery.

The purpose of visiting the Temple is to behold the beauty of the deities and worship them. The temple is designed as a sacred space to facilitate communion between the created (human being) and the creator (Supreme Being). The essential elements that facilitate this contact come from the ancient texts that have the directions and the regulations for Temple architecture. All the existing ones that stand today were built in various styles from the fifth century A.D. The scriptural injunctions were compiled to provide a ritual validation for Temple design intended for all craftsmen. Researchers in the past have analysed the temple in their specific contexts and have explored the sociology of their use. The studies have also explored the evolution of the architectural morphology and its symbolism. It was accepted that the iconic symbolism was very valuable in the way it impacted the emotions of the worshipper.

As a designer, it is very important to note the existing condition of a problem, understand its context and gather the relevant information that needs to be incorporated in the proposed design.

There are 3 important components that are considered very important in the creation of any building. The first is to define the type of building required to fulfil a particular type of need. The second component is to explore its form to fulfill those needs physically and emotionally. Lastly it is important to analyse whether the skills required to put up such an architectural form are readily available and it is economically viable.

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10 Rudolf Stegers, Sacred Buildings (Sweden: Berghauser Verlag AG, 2008).
2.2 THE ANCIENT TEXTS AND THE PLANNING GRID

Research into the development of Temple architecture is primarily an exercise to rediscover the design concepts and the governing regulations. This would be useful in formulating concepts that can be applied to future Temple construction.15

A Temple is considered to be in harmony with the mathematical basis of the universe, provided it is constructed according to a mathematical system which determines the proportions of the design. Similarly a Temple which is constructed as per the mathematical system of the scriptures can be expected to be in harmony with the mathematical basis of the universe. The inverse of this belief also holds true. Hence for the happiness and welfare of the community, it was considered important to follow this mathematical system.16

These systems were codified in treatises consisting of a sacred geometric diagram commonly referred to as Vastu Purush Mandala. This diagram is a Yantra, a geometrical contrivance by which an aspect of the Supreme may be bound (‘yantr’ implies ‘to bind’) to any location for worship. This diagram is instrumental in regulating the form of the Temple and establishes a symbolic connection with the Supreme. It is in principle a square and the record of an architectural rite. It could be converted into other shapes like a rectangle or octagon, yet retain its symbolism. This square is called Vaastu Purush Mandala. Purush is the original essence, the principle of all things. Vaastu is the site. The Mandala (closed polygon) or the plan is the diagrammatic form of the Purush. It is the place for the meeting of heaven on earth and accessible to the common man. This ritual drawing manifests the super structure of the Temple, which is the manifestation of God.

Vaatstu Shastra, the traditional science of architecture forms an auxiliary part of the Vedas, the primordial knowledge of the Hindus. The surface of the earth in traditional Indian cosmology is demarcated by sunrise and sunset as the east and west points in the square Mandala.17

A geometric grid comprising of 64 squares for Temples (Fig. 3B) and 81 squares for residences (Fig 3A) was recommended as per the 6 century text Brihat Samhita. A survey of the Temples in the seventh and eighth century illustrates this. The 4 squares in the centre (indicted by the word BRAHMA in Fig 3A and the brown fill in Fig 3B) of the 64-square grid represent the Sanctum housing the Temple deity and the peripheral squares depict the other demigods.18

Figure 3 A - The planning grid – Vastu Purusha Mandala

Figure 3 B-Simplified Temple Planning grid

It is indeed difficult to visualise how these grids could scaffold the architectural forms. However the translation of the grid into the Temple floor plan can be perceived with the following examples from the research work of Meister (Fig 4A) and Hardy (Fig 4B).

Figure 4 A – Derivative Temple plans from the Grid

Figure 4 B – Grid and Temple Plan
Reference to this grid seemed to be for understanding the proportions rather than directly dictating the Temple construction. Fig. 5 indicates the translation of the planning grid to the floor plan of the Temple. There was always an allowance for plans to generate various layouts and forms while still conforming the planning grid.

The centre of the Mandala is very significant. It is in this area that the devotee comes in contact with the Supreme and experiences a subtle transformation. It is considered the most sacred part of the diagram and the position of the presiding Deity. This is called the womb chamber, Garbhagriha, (Garbha meaning ‘womb’) and will be referred to as the “Sanctum” in this research. Its sacredness is due to the presence of the Deity, which results in the radiation of energy outwards from the centre in all the 4 directions. The access to this area is through the centre of the sanctum along the east west axis.

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2.3 EVOLUTION OF MATERIALS

There seems to be no tangible evidence of any sacred structures in India before the second century BC. The earliest records indicate the use of timber, mud and plaster. Larger Temples employed brick or stone. However it is in stone that the Temple architecture evolved to impart its most characteristic expression. The earliest stone Temples were designed by excavating into solid rock like the Ellora Caves in western India. (Fig 6A) The first free standing Temples (Fig. 6B) were reminiscent of the rock cut temples but later had their own distinct style by laying stone blocks one upon the other. This type of construction was self supporting and did not use any mortar. This post and beam construction was followed by the corbelling technique. Stones were progressively projected to narrow down the gap between the walls and finish the top with a single stone slab (Fig 6C). Iron clamps were used for wooden joints and the stone blocks were held together with iron dowels. The columns were usually spaced at about 2.5m. This was determined not only by the load bearing capacity but also the practicality of quarrying and lifting of the stone slabs. Today concrete and masonry work take precedence over any other material available. (Fig 6D)

24 Adam Hardy, The Temple Architecture of India (Chichester, UK: John Wiley and Sons, 2007).
2.4 ESSENTIAL PARTS OF A TYPICAL TEMPLE

The entrance is oriented to face the rising sun and is therefore ideally along the true east west axis. The devotee enters the Temple through a series of enclosures which become increasingly sacred. The key enclosures can be classified into three sections

1. Ardha mandapa (Porch)
   This refers to the elevated porch at the entrance of the temple. One entered the Temple complex through an ornate gateway into an open area and comes across a porch with supporting pillars or by a large pillared hall.  

2. The Mandapa (Primary Congregation Hall)
   This is the central assembly hall primarily for chanting and glorification of the Deity. There might be one or many Mandapas attached to or detached from each other. It is usually a pillared hall for the congregation. In some of the early Temples this was a separate structure. However they were connected in later constructions through an intermediate porch or small room. Smaller towers were positioned above the hall. This was usually on a raised platform, set in a rectangular courtyard. Mandapas were usually classified into two types, the completely enclosed ones and the open ones, like an extended porch. In the closed ones, the only source of light was through the doorways, which struck the floor and cast a reflected (divine) glow onto the ceilings. Some of the earlier Temples had an ante-chamber (Antarala – a transitory space) between the Mandapa and the Sanctum. From the 8 century onwards Mandapas had a Sanctum like character dominated by a large central bay and cross axes. Open Mandapas, with just a roof over, were usually bigger in size to accommodate more people and let in more light from all sides.

3. Garbhagriha (Sanctum)
   This was the inner sanctuary housing the presiding Deity and sacred objects. From about the fifth to the tenth century, the plan of the Temple was just a square with an entrance door leading the devotee into the square sanctum within. The most elevated part of the Temple is over the Sanctum. It is a dominating feature and connects one with the Divine. In some Temples from South India, the entrance ways (Gopurams) are more elevated and highly ornamented. The simplest of the Temples has a Sanctum and a porch. The bigger and more popular ones have a Mandapa and an entrance porch along the cardinal axis. Some have porches on all the three sides. The proportions of the grid were used to regulate the most important part of the temple – the Sanctum but were applied in a variety of different ways by the designer.

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25 Meister, "Mandala and Practice in Nagara Architecture in North India."
27 Meister, "Mandala and Practice in Nagara Architecture in North India."
Symbolically these areas represent the various bodily features of the Supreme Person. His head represents the Sanctum and the Gateway represents his feet. The various energy fields in the body of the Supreme are said to be transmitted in his palace (Temple) and are experienced by the worshipper. The direction of the movement of these energy fields are indicated in Fig 12 and Fig 21 and discussed in further detail.

The height of the gate was either half or three fourths or equal to its width.

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Sanctum  Primary Congregation Area  Entrance Porch

Figure 9 – Axonometric view of a typical temple explaining all the primary areas
2.5 SHIKHARA (TOWER)

The Shikhara is the superstructure like a mountainous peak above the Sanctum in the Nagara style of Temple architecture (Fig. 10). It is curvilinear with a crown and a neck. It could also be shaped like pyramid with a neck and a massive dome shaped crown. The vast superstructure is invisible from inside where the hall and Sanctum are closed by domes of varying heights.

The Temple design is essentially to provide a sheltered place for the Deity in the Sanctum and for the worshipper in the form of the hall or portico. The Temples with multiple subsidiary shrines were built on platforms. They were provided with covered circumambulatory paths, enclosed halls, dedicated areas for songs and dance and a formal kitchen. Various regions had their own ways of providing solutions to cater to the changes in the ritualistic ceremonies. The Shikhara over the Sanctum has been a part of the Temple design since the middle of the fifth century and has assumed considerable significance since then. (Fig. 11)

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2.6 FLOW OF SPACES

The character of the interior spaces in the Temple as one proceeds from the porch towards the Sanctum is very significant. The devotee gradually progresses from the open to the closed areas, from light to darkness, climbing up a few levels and goes through unfolding layers and thresholds. The entrance gate marked the threshold of the sacred precinct leading one to the semi enclosed entrance porch (sides open, maximum light) through a flight of steps. From here, one approaches the Hall (Mandapa) which is an enclosure consisting of small openings to let in minimal light. From here one climbs a couple of steps or a threshold to enter the Sanctum with no openings or any natural light. The wall surfaces are not mere shells but a ground for aedicular niches and pilasters (Fig 7).

Circumambulation of the shrine was an important element and is observed in Temples from around the 5 century and was achieved in 2 ways. Some of them were built on a high platform which served as an open air circumambulatory path, while others had an enclosed walkway adjacent the sanctum. In some of the later ones, the path was designed as a separate feature away from the hall. The walls were, in some instances, designed as an integral part of the natural topography to make a formal enclosure.

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12A - The Energy field of the sanctum

12B - The Circumambulation path

Figure 12 – Flow of the Energy field within the Sanctum

12C – The Sanctum and the Shikhara

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33 Hardy, *The Temple Architecture of India*. 
2.7 MY ANALYSIS

I have tried to assimilate the information of the traditional grid and the primary sacred spaces in a simple diagram to help me form a template and analyse any contemporary Temple. This template is based on my study of the Brihadeeshvara Temple (1010 AD) in Tamil Nadu, India, listed as one of UNESCO’s World Heritage sites 34

![Diagram of the Brihadeeshvara Temple]

**Figure 13 – Primary Spaces in the Traditional Temple**

Based on my findings in Fig. 13, I have noted the hierarchy of sacred spaces that form part of any traditional Temple and have colour coded them to distinguish these areas in the template.

The red area is the ‘Sanctum’ and consists of the altar, the circumambulation path, deity store and the area for personal worship. The orange area has been named as the ‘Primary Congregation Area’. It is used as a congregation area for the devotees to witness and participate in the rituals and ceremonies. The blue area is the ‘Entrance Porch’ functioning as a transitional space and is usually semi enclosed. The yellow area is the outdoor congregation area. This area is not mentioned in the hierarchy of sacred spaces in the texts or in the study above. However the texts do indicate that there was an outdoor area within the confines of the Temple boundary where a larger audience experienced the devotional music,

dance, drama and discourses during the course of the day. I have termed this as the Secondary Congregation area. The fifth element is the ceremonial entrance indicated as a hatched magenta rectangle. All these areas are aligned along the East West axis with the entrance from the East. The final template is indicated below.

Using this template I have analysed another Temple floor plan to study the primary areas. The result of the study is as indicated in Fig.14
2.8 CLASSIFICATION OF TEMPLES

Architectural styles initiated during the 5th and 6th centuries found their fullest expression in the medieval period when great stone Temples were built. In spite of the havoc wrought by the destructive invasions, an extremely large number of monuments have survived in almost every other part of India and these continue to be discovered and recorded to the present day. Although Temple design has formal regulations, the geographical, climatic, cultural and historical diversities have paved the way for various styles of architecture.

The main styles can be broadly classified into three types and have been identified by some scholars as

1. Nagara
This was classified as a unique style originating from Northern India. It comprises of a beehive shaped tower or Shikhara that rises in a conical shape which is topped by a large round element called Amlaka and is the most prominent element of the Temple. The Shikhara is essentially stepped and slightly curved. It is derived from the word “Nagara” which means ‘pertaining to a city’. Their shape is derived from the Vimana, a chariot created by a demigod Brahma for the transport of the Supreme Person. The same shape that is used to accommodate them in the spiritual world is used to accommodate them on Earth.

2. Dravida
This style originated in Southern India. Its distinguishing feature is a pyramid shaped Shikhara made up of progressively smaller units (stepped) as it rises higher and is topped by a dome. There are elaborate gateways to the Temple called the Gopurams, which is the most striking feature of the Temple.

3. Vesara
It is a mix between the Nagara and Dravida style of Temple architecture with features from both the styles. But over the years this has been considered a separate style with its unique architectural vocabulary.

Figure 15 – Architectural Styles

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35 Rao, "Devalaya Vastu," review of Reviewed Item, no.
36 Kramrisch, The Hindu Temple.
37 Ibid.
Contemporary Temple Style

Contemporary Hindu Temples in India can be broadly classified into 4 categories – those that are naïve, those that are naïve but more popular among the masses, traditional architects who strictly follow a particular lineage of this knowledge and the contemporary qualified architects. The wide spectrums of such design outputs by these designers include a range of derivative forms that is more than the simple classified Nagara or the Dravida examples. Temples outside India have to respond to the climatic needs and the more congregational forms of worship. Stone is not abundantly available. Cement is the cheaper alternative and faster medium to work with. Contemporary designers seem to be oblivious to the vertical connectivity based on the multi aedicular compositions. An example of this apparent ignorance is illustrated when a Temple needs to be roofed over in cold climate like Auckland. A suspended ceiling is introduced that disconnects the visual alignment with the Shikhara for the worshippers within.

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38 Hardy, The Temple Architecture of India.
3.0 DISCUSSION ON THE TRADITIONAL PRINCIPLES

3.1 UNDERSTANDING OF THE PLANNING GRID

Relevance of the grid and various arguments
According to Sonit Bafna, there is very little evidence of the Mandala planning grid acting as a generative diagram for planning a Temple. Any historical structure that exhibits a square profile or is indicative of an orthogonal grid is interpreted as being designed as per the Mandala. Traditional literature seems to have been scattered within a diverse range of writings right from encyclopaedic works to technical manuals like the Manasara and the Mayamatam. The authors of such works are not really established. They were at times credited to the sages collating them or the patrons commissioning them. Later works like Silpasarini and Silpaprakasra seemed to have been written by the artisans themselves, documenting all that was passed on through generations. Some of the ancient texts like the Matsya Purana (chapter 252-270), the Agnipurana (21-106, 263-272 and 317-326) discuss topics related to the architecture and the Mandala. The elaborate classification of Temples along with the names of the various components, rituals and the mythological contexts has been described in the scriptures. However these have not been very useful for the modern scholars to understand the design of the temples.

Another issue is the varying nature of the information available and the difficulty in dating the texts. There was hardly a mention of the Mandala in one of the earliest attempts to translate the Vaastu Shashtra texts in Ram Raz’s 1834 publication, "Essay on the Architecture of the Hindus". P.K. Acharya in his book, “The architecture of Manasara” made a logical connection between the Mandala and Temple design. He does mention the use of 4 squares for the main Temple, the first enclosure with 16 squares and the second enclosure with 64 squares. However the texts give very little information on the accuracy of these grids to determine the architectural forms. Stella Kramrisch in her book, “The Hindu Temple”, one of the earliest and well researched publications endowed the Mandala a great significance. She mentions that the earth is conceived as a circle in the Vedic tradition but is visualized as a square grid once it is oriented along the cardinal axis. Alice Boner, in an article in 1975 illustrated how the temple at Konark, India corresponds very closely with the scriptural injunctions, but did not find the texts informative as a design tool. On the other hand Michael Meister, in his analysis of Temple plans and elevations proves that most of the temple superstructures are based on the square grid with some apparent deviations as a leeway for the local designers. They could vary the position and thickness of the wall while maintaining the alignment with the grid.

This is illustrated in a study conducted by V.S. Pramar. He confirms the 64 square grid as a planning module in his extensive studies of Temples in India. He confirms that most of the stone temples in central and western India were derivatives of the timber prototypes. The tradition of incorporating a layout with a lot of columns based on the wooden construction techniques were carried forward in the design of the stone temple. He substantiates his findings by conducting a study of the Parsvanath Temple in Khajuraho, central India. Refer the plan (Fig. 16) and the corresponding elevation (Fig. 17) on the next page.

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39 Sonit Bafna is a research scholar from Georgia Institute of Technology and has questioned the relevance of the planning grid on the temple plans
41 P.K. Acharya was the first person to have translated the various texts on the planning principles and presented them with the diagrams and sketches in the ‘Manasara’ series consisting of six volumes.
42 Stella Kramrisch, specialist on ancient Indian art & architecture explains the religious and spiritual significance of the Temple with respect to the Sanskrit Texts.
44 Michael Meister is a professor of the history of art at the University of Pennsylvania and has written articles in many journals on Temple art and architecture
46 V.S Pramar teaches at the M. S. University, Baroda and specialises in timber architecture. He has also authored a few books on this topic.
The Temple layout consists of 2 primary squares, indicated with the diagonals in the plan above. Their perimeter is not in line with any visible part of the superstructure but within the masonry walls. Since this grid is hidden and not accessible to taking measurements, it has led to an ambiguity amongst the researchers. Each primary square was further divided into smaller squares. The sanctum is positioned in the central ritual square of the primary square.

Figure 16 - Analysis of Parsvanath Temple - Plan
The elevation of the Shikhara is also made up of 2 primary squares but the grid dimensions of the plan and elevation are different. In this case it was a 18 grid square in the plan and a 10 grid square in the elevation. This compliments the findings of Meister illustrated earlier in the example of the Brihadeesvara Temple. It was also observed that the base of the Shikhara rested not on the walls of the sanctum but on the walls of the circumambulatory path.  

Figure 17 – Analysis of Parsvanath Temple - Elevation

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3.2 PROPORTIONS OF THE PLAN AND THE SHIKHARA IN ELEVATION

Kramrisch has analysed the curvature of the Shikhara as a geometric progression. This is represented in Fig.18

Studies conducted by Meister indicate the proportions of the curvilinear tower (Shikhara). It was meant to span the distance of the exterior walls of the Temple to the walls of the Sanctum. The curvature is also defined as a segment of a circle that is a multiple of the Temple width as the radius. The various possibilities of the curvature are indicated in the diagram below. The tower, which is the vertical extension of the Sanctum, is topped by an “Amalaka”, the crown of the temple. It has a cogged wheel and is surmounted by the finial with a vase (Kalasha) as an important element.

Figure 18 A – Curvature of the Shikhara (division and geometric progression by 6)

18B – Temple: relation of plan to elevation and radii to determine curvature

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48 Meister, "De and Re Constructing the Indian Temple."
50 Meister, "Geometry and Measure in Indian Temple Plans: Rectangular Temples."
The height of the Shikhara \((2W = 60\text{M approx.})\) indicated above is half the width of the enclosure \((4W)\) and twice the width of the sub base (Sanctum) indicated as \(W\) in the diagram above. \(^{51}^{52}\) (Analysis by Pichard, Cited in Hardy). Fig. 19 shows the photograph of the actual temple as it exists today.

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\(^{51}\) Hardy, *The Temple Architecture of India.*

\(^{52}\) Analysis done by Pichard cited above
3.3 IMPORTANCE OF COMPOSITION

The understanding of the radial and bilateral symmetries in the orderly distribution of the various design elements is the only external clue to understanding the centre of emanation within the superstructure. According to Indorf, there are 2 ways to recognise the conceptualization of form applied to Temple design. The first aspect is the notion of movement. The Temple expresses a movement expanding outward and upwards from the centre or the sanctum. The second aspect is the proportionate measurement applied to the plan and the elevation of the Temple. A compositional technique, which includes the use of a system of proportions, is used to create this feeling of movement. My study proposes to evaluate these aspects of movement and measurement and propose a model for the new temple design.

3.4 AEDICULE

Hardy introduces us to the concept of the “Aedicule” to understand the movement and the composition of the Shikhara in a typical Hindu Temple. This word is derived from the Latin word ‘aedicule’ and means ‘little building’. This particular term is used to imply a miniature shrine or temple. It was James Fergusson in 1876, who stated that architectural decoration is essentially composed of smaller versions of the large built form. Subsequent writers did notice this occurrence in various levels but it was Hardy who analysed the aedicule as the basic unit in the composition. The Temple design is conceived as a hierarchical arrangement of many smaller temples in varying proportions within each other or embedded within the whole. He provides a delightful experience in understanding the plausible rationale behind the form of such soaring monuments.

**Movement**

Movement in architecture is expressed in the way people move through buildings and how their eyes perceive the various architectural elements. It is also about the architectural forms that are composed in a certain manner to convey movement. There are certain ways in which this is expressed but the Indian Temple has used these elements explicitly and consistently over a period of time.

The skilled Temple craftsman, by his expertise, converts a solid mass of stone into a dynamic composition. The concept of the static is conspicuous by its absence with everything originating at some point, growing, decaying and completely vanishing at some point of time.

---

53 Pinna Indorf is an architectural historian and asst. professor at NUS, dept. of architecture
55 Dr. Adam Hardy is a professor of Asian Architecture at the Welch School of Architecture. He is a research scholar whose main interest lies in Indian Temple Architecture and its detailed formal analysis
56 Hardy, *The Temple Architecture of India*.
This pattern is an animation of the axial organization one experiences in the temple. Fig. 21 shows the sense of movement in the Temple which seems to originate at the top of the Shikhara and progresses downwards from this point and outwards with respect to the vertical axis. It radiates all around in the four cardinal directions.

### 3.5 SIX WAYS OF AEDICULAR COMPOSITION

In the course of his research, Hardy has put forward 6 different ways in which the aedicule is composed to express movement in the Shikhara.

1. **Projection of an embedded form.** This in turn suggests emergence or emanation in a throw forward or sideward motion. Fig. 22A

2. **Staggering or progressive stepping out.** It suggests a serial emanation. Such offset from in a bunch gives the impression of vibration as well. Embedded within one another, they seem to step out like an unfolding telescope. Fig. 22B

3. **Splitting of the whole element with two aligned symmetrical halves.** When a projected form comes between them, it gives the impression of still separating. Fig. 22C

4. **Bursting of boundaries of the visible element in the front.** This gives a feeling of emergence and expansion when a enshrined form overlaps the frame it is confined in. Fig. 22D

5. **Progressive multiplication.** The elements are sequentially arranged in rows and increases progressively with number. Fig. 22E

6. **Expanding repetition.** The similar elements in the composition get progressively bigger. This conveys the feeling of growth. Fig. 22F
3.6 SUMMARY OF THESE COMPOSITIONAL TECHNIQUES

Each element in itself does not convey any visual movement. However when they mutually reinforce each other in a pattern of centrifugal growth, the eyes cannot remain static on any single element. From this study Hardy mentions that projection, staggering and expanding repetitions are more prominently visible in the Nagara style of Temples with the curvilinear Shikhara. These 3 elements of composition will be incorporated in the final design of the Shikhara.

3.7 COMPOSITION OF AEDICULES

Temple architecture should be viewed and appreciated not only for its static composition but also its temporal structure which is perceived by a momentary glimpse or a succession of such glimpses. The emission of repetitive diminishing forms which are placed along the cardinal axes becomes a sequence that expresses growth and proliferation downwards and outwards simultaneously. The forms that are repeated become larger as the eyes move upwards and the entire composition seems to ascend heavenwards. Quarter Shikharas are positioned along the side of the half Shikharas (half embedded) to form a cruciform pattern of four emerging from one and is reflected in the embedded clusters (Refer Fig.23 & 24A)

The patterns of proliferation, expansion and emergence that are used in the composition of the temple design are evident in the development of forms in the various traditions, wherein new compositions are revealed and derived from the preceding ones. One form generates another and this goes on as a dynamic process, preserving the old within the new form. An earlier composition is filled with new primary aedicules from the intersections or the existing ones to maintain a particular height. Secondary aedicules emerge from the primary ones. Fig 24C

Since the composition and the development pattern of the Temple design have been described in this way, it would be incorrect to assume that this was the only way of achieving these forms. The architects of the early stone Temples in India would have inherited similar forms from the wooden predecessors and forged an expressive architectural vocabulary.58

The Temple designer needs to understand the importance of visualization and the construction techniques and have the ability to design as per the relative proportions. One needs to master this before any radical changes are introduced. The transmitted knowledge was very significant in this regard. Geometry was not the origin of the architectural imagery. However it was often observed that geometrical ideas would lead to various new ways of putting them together. (Fig. 24B) Temple Architecture reveals a huge variety of designs and also the means by which they were created. This includes the aedicular composition, their manipulation and combination to discover new types of arrangement.59

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58 Hardy, *The Temple Architecture of India*.
59 Hardy, "Tradition and Transformation: Continuity and Ingenuity in the Temples of Karnataka."
Figure 24 A - Aedicular compositions

Figure 24 B - Identifying the aedicule

Figure 24 C
4.0 WORSHIP PATTERNS

4.1 TRADITIONAL TEMPLE WORSHIP

The worship patterns, celebration of festivals and the activities performed in the Temple and its precinct have evolved over the years. This has directly influenced the planning and design of the existing areas and added new areas to the old ones. Traditionally the entrance was ceremonial and one could see the Shikhara directly in line with the entrance and the aedicular roof over the hall signifying a feeling of movement towards the heavens. Upon entering the Temple precinct into a semi enclosed area one had to remove their footwear and wash their feet. After this physical purification, one came to the entrance porch which in turn took one to the hall with openings and decorative features. Usually the Temple was located on a high platform. This act of climbing towards the supreme along with the hierarchy of spaces gave it its sacredness. This in turn takes one to the transitional threshold between the hall and sanctum and finally into the sanctum itself. The altar was always a dark sanctum large enough to accommodate a family. There were no decorations or fenestrations in this area. The focus was on the Deity.

The early Temples did not have electricity and even the later ones had minimal lighting facilities. They depended on natural light for indoor lighting and all activities concluded before sunset. The enclosed areas were primarily assembly areas for worship and fire sacrifices. All other congregational activities including discourses, cultural programmes, and study classes were conducted in the open or semi enclosed areas within the temple precinct. Major festivals were planned consciously avoiding the hot summer period and the monsoon. There were no toilets (considered impure) within the temple. Even the residential quarters of the priest was outside the Temple boundary. The shops selling devotional items and offerings were located just outside the Temple near the entrance. Being geographically in the centre of any town or village helped the people to visually connect themselves at all times. It was indeed a landmark and a feeling of pride to reside close to one. Like any other public architecture, Temple design has always been evolving and adapting itself to the local site conditions, building materials and construction techniques.
4.2 THE CHANGES IN WORSHIP PATTERN AND ITS INFLUENCE ON DESIGN

The worship pattern has changed over the years with changes in the lifestyle of the worshippers along with the introduction of electricity and new building materials. Some areas have been added while some traditional areas have been modified or shifted (Fig.25). Some of the outdoor activities have been accommodated indoors. With a comparatively busier life than before, people visit Temples either early morning, late evenings or during weekends. The pre-sunset activities conducted in the Temple earlier are now conducted in the evening to ensure people can participate in it after coming back from work. It is observed that people today do not spend as much time in the Temple as they used to. They would prefer to go for a quick visit, offer their prayers and move on. Hence the Sanctum that was meant for personal worship earlier has now become part of a big hall where every assembled devotee can worship the Lord simultaneously. As a result the dark small sanctum is now a part of a big hall with bright lights and a display of artwork or ornamental elements (Fig.26 B & C). The traditional hierarchy of space design has been maintained in most temples; however the spaces in themselves have undergone transformations. However it seems that this has not been documented in any form. I wish to identify these changes and interpret them in my design proposal. The lack of adequate resources and the desire to finish construction in the shortest possible time has forced designers to simplify or over simplify the Temple design (Fig.27).
5.0 ANALYSIS OF TEMPLES IN AUCKLAND

TEMPLES IN AUCKLAND, NZ AND THE CHALLENGES

There are 4 prominent Hindu Temples in Auckland. Their study and analysis is important to assess the use of the traditional planning principles in the New Zealand context. Identification of the additional areas that have been incorporated in the design of these temples will be important in this study.

I had analysed and identified (with colour coding) the hierarchy of the important sacred spaces in a typical Hindu Temple in the form of a template and analysed a traditional Temple on page 20. I wish to superimpose that template on these 4 temples to analyse their adherence to the primary sacred areas, discover the additional areas, their location and their connection with the primary sacred areas. Similarly I had made a template for the ideal proportions of the Shikhara based on my research on page 27 which shall be used to analyse the proportions followed by the 4 temples in Auckland and their conformity to this template.

There was no written information or documentation of these relatively new Temples. So the challenge was to find the designer, ask for their design briefs, understand their design philosophy and have access to the architectural drawings. Tibbits, who had designed 2 of the Temples in this study, the Balmoral Temple and the ISKCON Temple, is no longer with us to tell his story. So all I could get is a set of plans from the existing Temple committee and their comments on the proposed design. Dylan from Chow and Hill Architects designed the Swaminarayan Temple in Papatoetoe and forwarded a copy of the Temple design. The architectural finishes and embellishments were predetermined by the Temple managing committee and the designer had to work within a rigid framework. The maximum input through drawings and design development was from the designer of the Radha Krishna Temple, Manoj Dutta. He reinforced my analysis with his experience in Temple Design.

Except for the ISKCON Temple, none of the others were oriented along the cardinal directions. I believe that all other Temples were restricted by the orientation of the site that was made available to them. Being in rural open area, the ISKCON temple had no such restrictions. A summary of the conclusions of this analysis is included at the end of this study. A study of this nature has never been attempted before. Hence I would regard this work significant for any future research work on evolving Temple architecture.
5.1 RADHA KRISHNA TEMPLE, KINGSLAND - Example 1

A part of the famous Mahatma Gandhi community hall, this was the first Hindu Temple in Auckland. An existing hall was renovated to design a temple adjacent the parking lot to the east, commercial premises and a house to the south (Fig.29). The footprint was a limiting factor in this design. Although the entrance to the site and the existing hall was from the south, another entrance to the temple was provided from the east. The superimposition of the template shows that the hierarchies of the primary sacred spaces have been followed. The east west axis along the grid has been incorporated and strong symmetry is evident in the design. The Sanctum is a part of the congregation area. The additional areas introduced in the porch are an airlock space, shoe racks and toilets. The Sanctum has a kitchen area for regular cooking and offerings for worship. The Shikhara seems to follow the traditional proportions as per the template (Fig.30). However there does not seem to be any prominent use of aedicules apart from the multiplication of the dome like elements. These seem to be merely placed above the hall and the porch over a relatively flat roof. An interesting feature is the addition of small glazing areas in the dome over the hall.

Figure 28 – View from the parking lot in front of MG Centre, New North Road

Figure 29

Figure 30
5.2 THE BALMORAL TEMPLE - Example 2
This was the second Temple in Auckland built in a residential area on Balmoral Road. It was the first Temple that was purposefully designed as one unlike the Radha Krishna Temple. However the vehicular entry is from the less busy Arabi street to the east. One has to come to the rear of the temple, park and then enter from the front. Although there is a provision for pedestrian entry from the North straight into the temple porch, this is not used. (Fig.31) The grid is along the north south axis with the main entrance from the north. The template analysis indicates the hierarchy of the typical sacred spaces though it doesn’t align with the cardinal axis. The sanctum is adjacent a meeting room and the circumambulatory path is around this room, making it excessively long. The entrance porch had toilets on either side of the doorway in the final design but they were constructed at the lower level when work commenced on site. The Shikhara rises as a series of simple bands and is non proportionate to the Shikhara template. The secondary congregation area with the main kitchen, library and storage are located in the lower level.
Figure 33
5.3 ISKCON RADHA GIRIDHARI TEMPLE, KUMEU - Example 3

The foundation stone for ISKCON Temple at Kumeu was laid in 1987, but went through several changes and alterations before being completed in 2004. Chronologically the third to be built, it has a distinct octagonal plan and 3 entry points from the north, north-west and south-west. The entrance is not in line with the sanctum. However it is located in one of the best surroundings in the middle of a rural landscape (Fig.34). One experiences this inside the hall with the large fixed glazing all around the primary congregation area. Part of this glazing comprises of stain glass panels which lets in beautiful coloured light in the late afternoons. There is a landscaped walkway from the parking area to the Temple entrance. The main hall has timber panelling with exposed Glulam rafters. The infill panels between the rafters have beautiful canvas paintings and skylights which keeps one visually connected with the Shikhara. The paintings depicting the pastimes of the Lord along with the stain glass panels seem to be the contemporary version of the sculptural artwork found in the traditional temples. There is an elaborate Deity paraphernalia area adjacent the Sanctum and an office. There is however no circumambulatory path. The secondary congregation area is at the lower level along with the kitchen, a devotional shop and the toilets. The Shikhara does not conform to the proportions of the template and is a simple curvilinear structure. Although the primary sacred spaces have been incorporated, the temple does not align with the directions of a traditional temple plan.
TEMPLES IN AUCKLAND - I

ISKCON SRI SRI RADHA GIRIDHARI TEMPLE, KUMEU

Figure 36

ISKCON SRI SRI RADHA GIRIDHARI TEMPLE, KUMEU
5.4 SWAMINARAYAN TEMPLE, PAPATOETOE - Example 4

Recently completed, one enters in the Temple complex from the south. The Temple has 2 entrance porches. Pedestrians walk in from the south and another porch is to the side of the property from the east for others. This temple follows the north south axis along the grid and constitutes one big congregation area comprising the sanctum, hall and the secondary gathering space. There is a formal dining area and kitchen which have the ability to be segregated from the hall with sliding folding doors. The temple is part of a formal theatre. This seems to dilute the sacredness of the Sanctum and the congregation hall. When there is a programme on stage, any visitor who comes in for worship will potentially be distracted by the stage performance. Hence sliding folding doors have been installed between the two areas. There is a formal reception and office area with a shoe rack area in the front porch only. The residential quarter for the priests is located on the part upper level. The 3 towers of the Shikhara were aligned along the axis. The fibreglass elements seem to merely imitate the aedicule of the traditional temples. The Shikhara does not conform to the template proportions.
SWAMINARAYAN TEMPLE, PAPATOETOE
5.5 CONCLUSION OF MY ANALYSIS

All the 4 temples seemed to have consciously used the planning grid in the Temple design. The 4 primary areas of a typical Temple and their hierarchy seem to have been followed. However examples 1, 3 and 4 have incorporated the east west axis to align these areas along the grid. In 3, the main entrance in not along the axis but from the north. The entrance to the site is from the east in the case of 1 and 2. But in the case of 3, it is from the west and in 4 it is from the south. The direction of the road boundary dictated this in all of the above examples. To incorporate the growing requirements of the devotees, additional areas were incorporated a part of the overall design. I shall explain them in each of the earlier examples.

Example 1 was a single level Temple with very few additions to the typical areas. A kitchen, store, shoe area and toilets were the notable additions. The placement of the toilet (considered impure) next to that the hall was accessed from the entrance porch adjacent the shoe store area. However there was no circumambulation path. The dedicated secondary congregation area was conspicuous by its absence in the Temple. However the Mahatma Gandhi hall being adjacent this Temple, serves as the secondary congregation area during the festivals.

Example 2 had the main pedestrian and vehicular traffic entering the site from the East although there was a provision for pedestrian entry from the north. It had a large meeting room adjacent the sanctum – the most sacred part of the temple. However to ensure that the sacredness of the sanctum area is not diluted this room was segregated by locating it on a split level with access from the lower level and the main hall through a pair of double doors. There are 2 sets of staircases to go downstairs – one for the visitors in the porch area and another next to the meeting area near the Sanctum for the priests. As a result of these areas being grouped around the Sanctum the circumambulatory path was very long. The lower level had the toilets and the kitchen with the library and the secondary congregation area. However there was no dedicated shoe storage area.

Example 3 has additional entrances from the west and south west in the form of a semi enclosed veranda. The additional areas were the Deity store and kitchen and the office area on the upper level. Two symmetrical sets of staircases in the porch area take the visitors downstairs. A single flight staircase is for the priests adjacent the Deity store area. The lower area consists of the toilets, kitchen, secondary congregation area and a devotional shop. There is however no circumambulation path or a dedicated shoes area. The shoes are scattered all over the veranda during festivals making it an ugly sight and a challenge to find them on the way back similar to example 2.

Example 4 has a big multipurpose hall which can be segregated into 3 sections with sliding folding doors as per the requirements. The first section is the primary hall which can be closed in. Another section is the secondary congregation area with a formal stage. The third section is the dining area with the kitchen and the toilets. A separate pedestrian entry is from the south through a porch along with a formal reception and shoe storage area. There is no circumambulation path. The priest rooms are located on the part upper level to the west.

Analysis of the Shikhara in the 4 Temples

All the 4 examples have a curvilinear Shikhara. However only example 1 seems to conform to the proportions of the tower as per the template. All of them have false ceiling in the hall and seem to have no visual connection with the Shikhara when one is inside the temple. There seems to be some vertical element above the hall and a smaller version of the same over the entrance porch. However except for example 3 and example 1 to an extent with some small glazed panels, none of these have reflected the structural vocabulary of these elements from within. In the case of example 3, the skylights between the rafters keep the worshippers always connected to the Shikhara. From the compositional point of view, repetition and staggering of the architectural elements have been used in the Shikhara in example 1 and 2. The notable difference observed in example 4 was the fact that the traditional aedicular elements were merely duplicated and placed on a relatively flat roof.
### 5.5 TABULAR COMPARISON - SUMMARY OF THE ANALYSIS

<table>
<thead>
<tr>
<th>Analytical points</th>
<th>Radha Krishna Temple</th>
<th>Balmoral Temple</th>
<th>ISKCON Temple</th>
<th>Swaminarayan Temple</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Example 1</td>
<td>Example 2</td>
<td>Example 3</td>
<td>Example 4</td>
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<tr>
<td>Temple entrance</td>
<td>East and North</td>
<td>North</td>
<td>North, Additional entrance from W &amp; SW</td>
<td>South and East</td>
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<td>West</td>
<td>South</td>
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<td>East West</td>
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<td>Yes</td>
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<td>Entrance Porch</td>
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<td>Yes</td>
<td>Yes</td>
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</tr>
<tr>
<td>Secondary Cong. Hall</td>
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<td>Yes</td>
</tr>
<tr>
<td>Circumambulatory path</td>
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<td>No</td>
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</tr>
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<td>Devotional Shop</td>
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</tr>
<tr>
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<td>Yes</td>
</tr>
<tr>
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<td>No, but there is one near temple</td>
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6.0 DESIGN PROJECT

6.1 PROJECT BRIEF

Brief from the Proposed Temple Construction managing Committee
The Temple managing committee wanted the Temple to be designed as per the regulations of the traditional Temple design in India using local materials and resources as much as possible. The temple shall have a congregation hall for 500 people, altar, devotional items, Deity Kitchen, Temple office, an office/reception area, area for removing shoes and stacking them, library and reading room with multimedia facilities, for general meetings as well, shop for devotional items, dining hall, kitchen, toilets rest room and a children's play area.

THE SITE

Figure 40 – Site for Temple design – marked in red

6.2 SITE ANALYSIS

Site topography
Traditionally Temples were planned on the best location in any region and the entire township grew in an organic way around it. However today, the left over open spaces are all that is available for Temples since they are usually donated or sold at throw away prices to the Temple Committees. The site that this Temple committee has procured is an example of this trend. The Temple planning is usually on a square, rectangle or a regular shaped site. However the triangular shaped site posed the biggest challenge. The tip of the triangle faces south and is a relatively flat section with no significant trees or any landscape feature apart from the grass

Surrounding
The site is about 2000sq.m. located in 69 Tidal Road, Mangere, adjacent to the motorway. It is surrounded by a predominantly residential area especially towards the south and the east. On the North and North West are commercial/industrial buildings and there is an open area towards the south west.
Zoning and road hierarchy

The site is at the transition between the residential and commercial zone. It has 2 adjacent roads along its 2 sides, the Tidal Road to the south west and the Gee road to the east. Gee road culminates in a cul-de-sac and keeps all the residences and this site away from the noise and the traffic of Tidal Road. Considering this, it is perhaps a good idea to have the main entrance to the site from this road.

Sound and traffic

There is a green buffer belt between the site and the motorway that acts as a sound barrier. This can in turn be utilized as an extended part of the site for parking and a children’s play area. These facilities in turn can be utilized by the neighbouring properties.

Architectural character, materials used

The surrounding commercial structures have predominantly corrugated iron roofs and painted weatherboard claddings. The houses are simple single storey blocks with brick or weatherboard cladding and concrete tiles.

Climate

Mangere is a part of the greater Auckland region and has an average mean temperature of 14.6 C. It experiences 174 days of heavy rainfall (0.1mm or more) and about 2176 hours of sunshine annually.

Site response
Rather than looking at the confines of the site boundaries I wanted to explore the possibilities of integrating the surrounding green areas and the cul-de-sac area of the road between the site and the neighbouring houses. While on site, I found that the structure adjacent to the site at the northern end was a factory shed that is being used as a church. It had a relatively big parking lot adjacent to our site. Considering that the weekly service times of the church and the Temple are different, I plan to utilise the option of using the Church parking lot along with that of the Temple as a common area for the devotees of the 2 different places of worship. This will also ensure that in future, the parking is able to cope up with the growing congregation of the church and the Temple.

6.3 CONCEPTUAL DESIGN CONSIDERATIONS
The feeling of holiness is perceived if it requires layers of slow progressive access, gradual revelation and levels of approach. 61. These are the essential emotional elements to be aware of. It is important to summarise the primary elements that have been researched so far, which cannot be altered in any way without affecting the sacredness of my design. All other requirements including additional areas can be based on the local conditions.

6.4 THE NON-NEGOTIABLE ELEMENTS
From the research undertaken as a result of analysing the traditional Temple design and the examples in Auckland, I have formulated these non negotiable elements that signify the sacredness in a typical Hindu Temple.

1. The entrance should be from the east. This is to ensure it faces the rising sun and is in the centre of the town and also faces the place where people live
2. The slope of the land towards the north and east or both is considered the best.
3. The site should ideally be a square or a rectangle. For rectangle sites the ratios should be 4:8, 4:7, 4:6 or 4:5. If the site is of any other shape it should be demarcated and rendered a square or a rectangle.
4. The Temple plan should be ideally a square or a rectangle or a octagon
5. The commonly followed grid is the one with 64 squares called Manduka Mandala. The earth is considered a living organism full of life and energy. This energy is symbolized as a person and the site is considered his field
6. The centre part of the building is to be kept open. It is considered as a breathing space for the Vastu Purusha
7. The wet areas are recommended in the south or west areas of the building.
8. The south west part must be stable and strong to support heavy weights.
9. The base should be heavy and the apex should be tapering like a hill visually
10. The Temple should be on level ground.
11. The heart of the temple is the Sanctum which houses the Deity, a Mandapa, which is a hall for congregation and for activities like discourses, singing and dancing. This can be divided into an indoor area and an outdoor area, if required,
12. The Deity should face east.
13. There needs to be a circumambulatory path around the Deity area
14. There should be a ceremonial entrance.
15. The entrance door should be along the cardinal point with the height being twice its width.

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6.5 PROPORTIONS AND LAYING THE GRID

Extracting the authority of the traditional planning grid comprising of 64 squares, I superimposed a 64 square grid with each grid being 8x8m grid on the site orienting it along the east west axis. Due to the shape of the site, the grid projected beyond the site boundaries. (Stage 1, Page 48) The Sanctum which is located in the centre of the grid was positioned at the core of the site. This was just enough for the Altar and the primary congregation area. So I decided to add another square area of the same dimensions adjacent to the temple and connect the two squares with a transitory area. (Stage 3, Page 49) However symmetry and lack of a clearly defined processional entry made me relook at the grid dimensions. I reduced the grid to 6x6m each, still maintaining the 64 squares. The main temple was now smaller than earlier. So I added 2 squares adjacent to the sanctum square to maintain the symmetry and define the primary congregation area. The area adjacent the 2 squares served an excellent transition area. (Stage 5, Page 50)

6.6 DESIGN DEVELOPMENT

The translation of the planning grid
The grid (64 squares with each square being 8x8m) and my template

The site and its surroundings
Superimposition of the grid on site with the east west orientation and locating the Sanctum

Placing the primary congregation area
The size of the 64 square grid was reduced by decreasing the size of each individual square to 6x6m. This enabled a bigger congregation area and a symmetrical layout.
Laying the Ground floor plan
Lower level plan

- Secondary Congregation area
- Outdoor areas (walkways and amphitheatre)
- Kitchen and toilets
- Parking
Upper level plan
- Sanctum, Circumambulation area
- Workshop area
- Library/Devotional shop
- Reception/Office, shoe store
The resultant design based on the planning grid and my template could be summarised as above. The proportion of the Shikhara was as per the template and the curvature was derived using a multiple of the base of the Sanctum as the radius.
Conceptual sketch of the Shikhara.

Design development sketches

Sketches marking the possibilities of the roof above the Temple in conjunction with the Shikhara.
Stage 1 above
Stage 2 below
Conceptualisation of the “light well” aedicule and the introduction of the horizontal curvilinear roof to intersect the curvilinear vertical roof (Shikhara)
6.7 CRITIQUE AND FEEDBACK

There was criticism about the complete symmetry of the initial design and further investigation was needed into the additional areas that have over the years become a part of the temple.

Further design development
The additional spaces and their link to the primary spaces, Symmetry, Site conditions

The hierarchy of the sacred spaces in the Temple design is bound by the symmetry and symbolically conveys the perfection and sacredness of the enclosed space. The sacredness is also emphasized by locating the Temple on an elevated level with a grand staircase connecting the ceremonial entrance to the patio. The residual area below the temple is utilized as the parking area. However the additional areas like the library, secondary hall, kitchen and the devotional shop do not have to conform to this symmetrical pattern. Hence I decided to locate these on the ground level along the north south axis of the main Temple footprint. Respecting the angular site boundary, I oriented a part of these areas accordingly.

The formal temple fused with the Kiwi Bach

The overall feeling was that of the New Zealand vernacular penetrating the main symmetrical Temple and imparting homogeneity to the overall Temple precinct.

Climatic factors

The entrance had a limitation in not being a longer walkway compared to the traditional Temple. However the design has a patio leading one through the entrance gate from the road up to the staircase. Due to the wet climate in Auckland these open areas have been kept to the minimum and provided with enclosures as an integral part of the Temple roof. The secondary hall opens onto a small sunken amphitheatre to the south at the junction of the two roads

Use of the common green areas outside the site boundary

This area in between the boundary of the last house in the cul-de-sac and the church can be utilized as a parking area and children’s play area to benefit all the neighbouring residents. The periphery of this area can be suitably landscaped to create a buffer screen to prevent the north westerlies and the noise from the adjacent motorway

My discovery – the Shikhara – A “light well” aedicule

The worshipper needs to experience the descending light from above showing the presence of God. It also enriches the inner spiritual experience. It reminds us that a higher order exists and helps one comprehend the divine that is usually beyond one’s normal conception.  


The Shikhara in my Temple design is a lightweight concrete aedicule comprising of smaller aedicules above the Sanctum. Although symmetrical in spirit, I visualize them as an illuminated light well not just with small skylights but with the major part of the curvilinear tower comprising of glazed panels. The worshipper in front of the Sanctum would bath in the (divine) natural light during the day and in the artificial lights at night. This has the potential to become an excellent illuminated feature at night, something that a devotee can associate with within the temple.

Each concrete curvilinear slab is an aedicule. They have been composed incorporating 3 of the aedicular elements that have been studied earlier namely staggering progression, expanding repetition and projection of embedded form

The Shikhara is a vertical curvilinear roof. The roof above the primary congregation hall and the entrance porch has been conceptualised as a horizontal curvilinear roof that intersects the Shikhara. The curvilinear wave of this roof is dynamic and conveys a feeling of movement towards the Shikhara. There are 2 big skylights on this roof. One is above the entrance porch and another one is over the hall just before the Sanctum. These skylights not only add to the verticality of the curvilinear roof, but also enable the worshipper to maintain visual contact with the Shikhara from within.

Thus I have been able to maintain the planning principles and the hierarchy of the sacred spaces. However this design process has allowed me to express movement with modern materials and the advanced construction technology to emerge with a completely new vocabulary.
6.8 LIMITATIONS OF THIS STUDY

It seemed that I may not have been doing justice to a study of this magnitude if I do not focus my study on a couple of key elements in the Temple design. Hence the focus of this design and the research has been on the relevance of the planning grid and to analyse the non-negotiable elements of the Temple plan. The second element was to study the aedicular composition of the Shikhara (tower), its importance, evolution and its interpretation. I anticipate that in future studies will be undertaken to study the other components of the Hindu Temple architecture and re-interpret them in a contemporary context.

6.9 CONCLUSION

This research by design helped me trace the roots of Hindu sacred architecture. This study helped me assimilate the essential characteristics of a Temple and its importance in imparting the feeling of sacredness in the mind of the worshipper. It helped me analyse the hierarchy of sacred space in the plan and its inter-dependence of the use of the traditional planning grid. The evolutions of other additional areas over a period of time coupled with the changing worship patterns have also been an important part of this study. The hierarchy of architectural forms and their composition in the elevation had a direct relation with the proportions of the floor plan. Keeping these research parameters in mind helped me use their vocabulary and evolve my own language to express the inherent qualities of the Temple in contemporary context in New Zealand.

The Final Design of the temple can be broadly classified into two components. The first element is the formal sanctum and the worship area along a strict axis at an elevated level. This design is essentially symmetrical and has provision for some car parking area below. The main sanctum is a vertical curvilinear aedicule comprising of light weight concrete slabs and infill glazing panels. The roof of the hall that emanates from the base of the tower over the sanctum is a horizontal curvilinear element that varies in height from the entrance porch to the base of the Shikhara in a manner that signifies a strong visual movement like the traditional design elements. 2 huge skylights are inserted in the roof to accentuate this visual movement and enable the worshipper to be visually connected to the Shikhara even after entering the hall until one reaches the sanctum.

The additional areas with the additional requirements have been added on both sides of the temple in lower level with a curved roof. The hall has been placed at an angle respecting the parameters of this particular site. The lower level visually penetrates the formal temple and displays a different vocabulary with its curved roof and plywood cladding.

The marriage of a New Zealand vernacular and the formal Hindu Temple becomes a strong design statement and a landmark in its own way.
7.0 APPENDICES

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http://ssubbanna.sulekha.com/blog/post/2008/03/temple-architecture-devalaya-vastu-part-three.htm, accessed on 08/10/10

Figure 1 : Spirituality - http://glennsimmons.wordpress.com/2010/07/01/richard-rohr-a-life-of-spiritual-contemplation/ Accessed 08/10/10

Figure 2 : Photograph, Temple in Avondale – Bobby Banerjee

Figure 3 : A - Vaastu Purusha Mandala, The Planning Grid - http://ssubbanna.sulekha.com/blog/post/2008/03/temple-architecture-devalaya-vastu-part-four-4.htm, accessed 04/04/09


B - Hardy, Adam. The Temple Architecture of India. Chichester, UK: John Wiley and Sons, 2007, page 139

Figure 5 : Derivatives of the Planning Grid - Hardy, Adam. The Temple Architecture of India. Chichester, UK: John Wiley and Sons, 2007. Page 98

Figure 6 : A – Photograph - http://www.destination360.com/asia/india/ellora-temples, accessed 22/06/10


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Figure 7 : Parts of a Temple – Image - http://ssubbanna.sulekha.com/blog/post/2008/03/temple-architecture-devalaya-vastu-part-four-4.htm, accessed 04/04/09

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7.2 BIBLIOGRAPHY


8.0 FINAL DESIGN IMAGES
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MAIN ENTRANCE SANCTUM, PRIMARY WORSHIP.
Appropriate vocabulary for a Hindu Temple design in Auckland

IMAGES OF THE STUDY MODEL