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Ar. Anand Palaye

## EDITORIAL

Dear Fellow Members and Readers,

Greetings for the upcoming new year 2021, with a hope that it will usher in health and peace into our world.

We are now at the end of our long and extended term, and I have a lot of mixed feelings about this. On one hand, I am happy that we could work as a core IIA team for a longer period of time and provide our readers professionally relevant information. On the other hand, the reasons for this extended tenure were very unusual. It is my most sincere wish that the such a situation is not repeated again.

The dreadful COVID-19 pandemic was a game changer that caused a lot of pain and misery, but it also brought out the resilience of the entire society in so many ways.

The IIA has numerous achievements to its credit, which are there for all to see. Successfully adapting to the digital platforms, holding of regular meetings and a National Convention with international participation on-line is one of the major milestones achieved.

A deeply reassuring factor I noted was the level of thinking and the sensitive, responsive approach shown by the architectural community, especially the younger members. This makes me feel very optimistic about the future of architecture in our nation.

As always, in this issue, we present many interesting articles and papers covering **Heritage Structures, Essays on ideas to counter pandemic-related problems, Transit-related development, changing Land Dynamics, Life at the edge of water, and an Oceanarium in the Arabian Sea** that our readers will find useful and interesting.

To conclude, I wish the IIA and the incoming team, great success and I firmly believe that our great Institute will rise to even greater levels in future.

Wish you all a great future.

A handwritten signature in black ink, appearing to read 'Anand Palaye', with a horizontal line underneath it.

Ar. Anand Palaye

Chairman - Publication Board & Executive Editor, JIIA



Ar. Divya Kush

## PRESIDENT'S MESSAGE

### **Warm Greetings & A Very Happy, Healthy and Prosperous New Year 2021.**

Friends, year 2020 has been a particularly difficult year not only for all of us in the profession but equally or possibly more so for most sections of our society world over due to the spread of the Pandemic, COVID 19. Suffering was particularly heart breaking & killing for our brother's and sister's at the bottom of the Pyramid of our society.

However, as always our profession like most others not only stood the ground with fortitude, courage and remarkable empathy for the fellow citizens. The selfless service of the Cover Warriors, however out shines above all.

After initial state of shock and uncertainty, we all did our best to get back to normal. Various initiatives were taken by **The Indian Institute of Architects** at all levels to conduct **Seminars, Conferences, Workshops, Competitions etc.** including but not limited to organising a very successful online **IIA Natcon 19 and the launch of IIA CAD.**

**The IIA Elections**, which were already long overdue were also announced and the voting process was concluded on **December 28th, 2020.** The results will be announced shortly in early **January, 2021.**

I take this opportunity, to wish best of luck to all the candidates who have offered to commit their valuable time in the service of the Institute.

I am sure, the newly elected members for various positions will take the profession of the Institute to much greater heights during their tenure.

This issue has in it many interesting articles and papers along with the short listed entries of the Design Ideas Competition on the theme **"Building Resilience & Anti Fragility"**.

**Once again wishing you a very Happy, Healthy and Prosperous New Year.**

A handwritten signature in black ink that reads "Divyakush". The signature is fluid and cursive.

Ar. Divya Kush

President,

The Indian Institute of Architects

## Mapping The Lost Identity Of Heritage Structures While Digging The Foundation For New



**Ar. Mrunal Garud** - Email : ar.mrunalgarud@gmail.com

Ar. Mrunal Garud, being Alumni student of St. Joseph's Convent High School, Jalgaon and graduating (B.Arch) from Sinhgad College of Architecture, Pune (2015), for gaining post qualification experience, I worked with an architectural firms for 3 years seeking experience in housing schemes like DSKs, and Paranjpes, Educational Institutions, Residential and Commercial Complexes, Interiors and Landscapes etc. Currently practicing at Nashik in Individual capacity giving architectural, interior and contracting services to clients.

Work experience : (1) Environs India, Pune (2) PlanArch, Pune (3) Design Consultant Architects, Pune (4) Currently Independently practicing at Nashik.



Picture Credit : Pinterest.com

It all started when I was amused looking at the glimpses of dazzling beauty and structural strength of the Kedarnath temple shown in the movie Kedarnath. We all know about the 2013 Uttarakhand landslides due to the floods, which damaged several houses and structures, and which led to unfortunate death of many who were trapped. The heavy rains resulted in large flash floods and massive landslides. Entire

villages and settlements such as Gaurikund and the market town of Ram Bada, had been destroyed. Several houses, shops nearby temple, the path towards temple everything washed away leaving just few signs of their existence. In such nature's fury the temple was standing unharmed as compared to the destroyed recent structures. The temple has flagged its identity and stood the test of time and calamities.

I still wonder how did the temple survive?

And so I decided to dig into some interesting facts about it. It is said that the temple of Kedarnath was under snow for about 400 years. The temple not only survived being under the snow for 400 years but also escaped any serious damage from the disaster happened in 2013. So the real question is how? The answer to this question might be sustainability in construction, its capability of coping with the damage that any building is exposed to and quality as well as excellence in planning and execution.

The ancient technologies which were used to construct our heritage properties are worth taking example of. During the early times, there was an ecological balance maintained between man-made structures and natural environment. They believed in collaborating the nature with the building to create a pleasing frame so did not harm the natural beauty of the environment.



Picture 1 : Shows back side of Temple in the aftermath of flood. It is said the huge stone seen in picture saved the temple during the disaster.



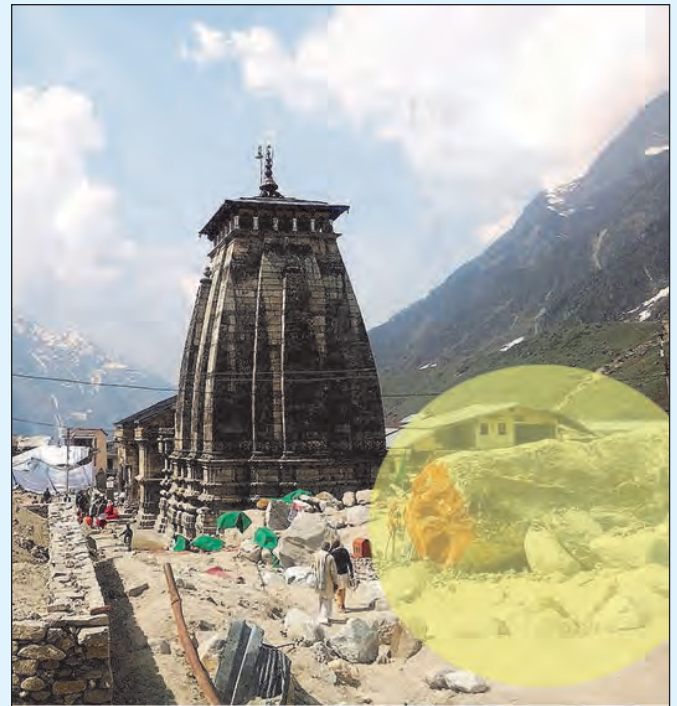
Picture 1 : Shows front side of the Temple and path towards the temple and damaged surrounding structures.

During the disaster, after the cloud burst the glacier flooded from north side of the temple carrying a huge rock which later stuck behind the shikhara of the temple as shown with arrows. It further swept the surrounding buildings and it rushed its way towards south. So following might be the architectural reasons behind the survival of the temple :



Picture 3 : Shows view of the Temple with direction of glacier movements in blue arrows and position of the huge stone in yellow arrow.

1. Orientation of the temple could be one of the basic reasons behind its survival. Mostly temples face east or west. But this temple is facing south, which is a rare phenomenon. The planning and orientation of the temple might be done taking into consideration the hierarchy of the terrain and probable danger due to glaciers.
2. Shikhara being the tallest element in the temple facing the mountains perpendicularly, its stone based plinth ,foundation and wall thickness could be considerably deep and thick enough respectively to take all the pressure and load created by the forced glacier flow, protecting the rest of the structure from the forceful impact of sudden flooding glacier all over the temple. Its walls are 12 feet thick and built from extremely strong stones and stands on a six-foot high platform. The stone slabs are interlocked with each other with the use of iron clamps
3. The huge stone that rolled down towards Shikhara along with glacier itself, added to the inbuilt strength of the Shikhara as a protection, helping it to protect the remaining structure. The amount of glacier that flowed towards the temple hit the stone and might have bounced upwards as shown in picture to skip the effect of the impact to the shikhara.
4. Its inverted lotus-shaped dome does not let snow to accumulate during the harsh winter months and avoids creating a pressure to the main structure, thus making it sturdier.
5. The broad base of the Shikhara narrowing towards tip of the Kalasa is planned so as to transfer any type of wind load, snow load, etc. to the base of the structure as shown by red arrows making it stand in any given situation.

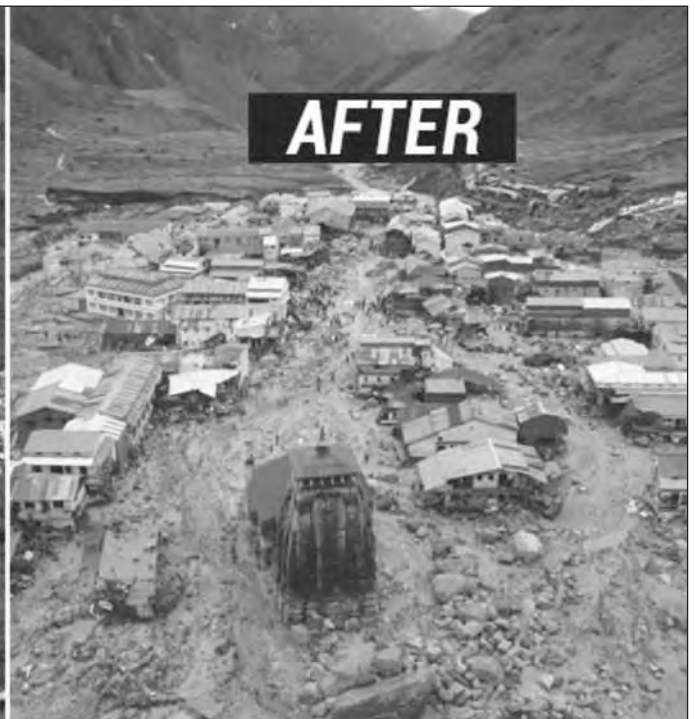


Picture 4 : Shows back side of the Temple in the aftermath of flood. The huge stone behind the temple shikhara is highlighted in yellow.



**BEFORE**

Picture Credit : Chardham Yatra



**AFTER**

Picture Credit : Chardham Yatra

### WHY DID THE STRUCTURES AROUND TEMPLE NOT SURVIVE IN THE DISASTER?

1. Kedarnath is situated in the valley surrounded by Himalayan range of mountains.
2. The location of temple is such that it gave majority way to the Mandakini river leaving its original path clear unlike the other structure which were hurdle to its path.
3. Lack of structural stability to face the enormous amount of glacier pouring on its surfaces led to disaster for the surrounding.

So where do we lack? Do we need to turn around looking back and learn?

### WALKING THROUGH THE TIMELINE

The answers to these questions are still standing in front of us in the form of heritage structures like that of Kedarnath temple and many more till date which speak of its time and place. For instance, we can consider Indian Architecture right from Indus Valley Civilisation to Hoysala period to Mughals, Marathas to British. Each style of architecture depicted the lifestyle and pattern of living. It inherited unique identity according to different locations.

In India, heritage structures stand as monuments reflecting our involvement in construction, detailing, artistic ornamentation and Climate responsive Architecture, procuring the material as well as expertise from within the close vicinity.

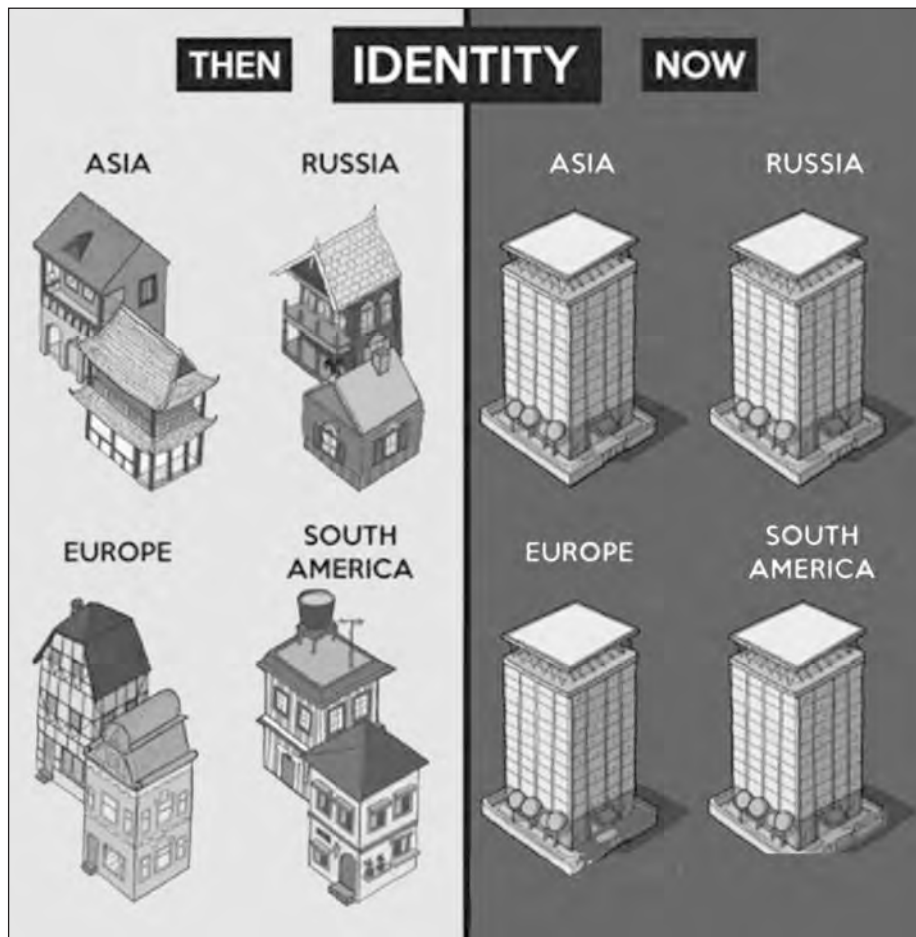


Picture Credit : Culture Trip

Picture showing Konark Sun Temple

Heritage structures having sculptures and paintings of important happenings in history showing timeline of events is one of the important treasures of historical noting which are useful for studying the pattern and lifestyle of people of those eras.

However, with the significant western influence, welcoming industrialization and technological innovations, there is change of pattern of lifestyle and inclination towards minimalism.



Picture showing change in different identities of building according to different places to single identity.

Picture Credit : leewardists

### IDENTIFYING THE CHANGES

Historic houses help to define a community, create a sense of history and permanence, and contribute to community pride. So the real question is why don't we build such detailed beautiful buildings like those anymore?

1. There is noticeable fall of graph in detailed ornamentation of structures as compared to heritage ones, in which detailing like cornices, brackets, arches etc. were part of structure and not just ornamentation.
2. The scale of structure, planning according to vastu and geographic conditions, use of locally available materials, structural stability, details like carvings, paintings, etc. shows sign of patience regarding time it might have taken to complete the desired work without any ailments such that the structures are standing with pride even after end of the era in which they are constructed.
3. There is change in needs and day to day lifestyle demanding fast growth leading to need of quick results by also considering money and time required.

4. Spending more time on any one structure nowadays is considered as a monetary loss, which means one cannot spare much time in constructing thick walls or in ornamental detailing, etc.
5. One of the main reasons behind such changes is population growth leading to increasing demands and decreasing resources leading to vertical growth for occupying more requirements in lesser land which nowadays collaterally damages the individual identity of the buildings according to its region, as depicted in the image above.

### THE CONCLUSION

Lastly a little effort towards retaining the losing identity of our heritage prosperity is what everyone should try for by understanding that there was reason why the structures were constructed as they are so we could see them survive even in the worst fury of nature.

# Impact of Lockdown on The Architecture and Planning in Near Future



**Ar. Manish Gode** - Email : manishgode@gmail.com

Ar. Manish Gode, is a Graduate from The Indian Institute of Architects and did his Masters in Urban Planner from V.R.C.E. Nagpur. He is a Working Architect at Nagpur since 2000. His field of interests are Research & Analysis, Creative Writing, Poetry and Fiction. He has participated in National as well as International Architectural Design Competitions. His some of the winning projects are to formulate Ideas for Smart City Nagpur by Nagpur Municipal Corporation.

He has won India Next Competition West Zone Finalist for providing Smart Ideas for Flood Water Harvesting in Rural India. He was among the Top 50 entrants for designing "The Black Taj", among Top 5 entrants for designing H.O. building for INSDAG in Kolkata and much more to list out.

## Introduction :

The entire world came to a standstill due to a Pandemic occurred by an invisible crisis. The impact was so high that in near future there is going to be a radical change in human behaviour thus, changing human tendency to deal with its surrounding. The Human – Purusha :

A Big City is inside our body. Human Body, which contains 11 doors, is a complete city in itself; 11 doors consist of 5 Gyanendriya, 5 Karmendriya & 1 Mann or Mind. 'Pur' means Nagar, that's why a city is called a Purusha. Thus, Purusha means where the God resides. This Purusha is very precious; it has a big population of seven crores living cells in it. If we scale a single cell to a human body, the size of these cells may occupy the area of the entire London City..!

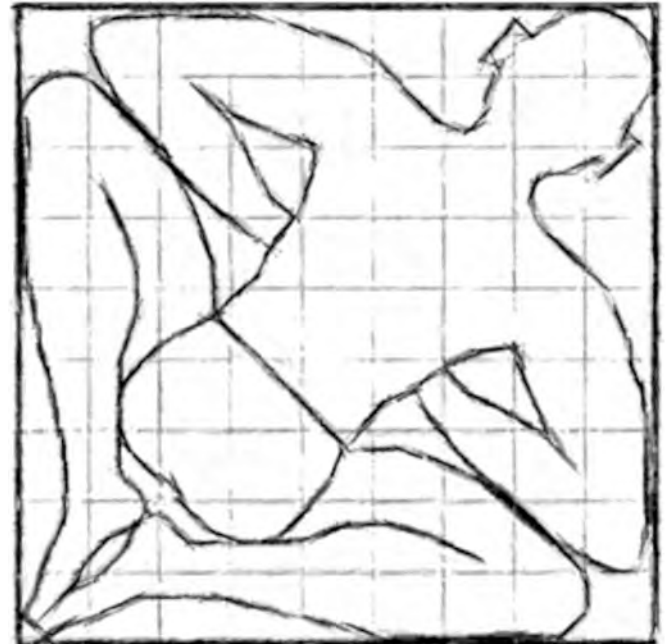
This human city contains all physical infrastructures that are present in a developed city. It contains a proper road network, telecom system, a river inside like any city. It also has its own Defence system; White Blood Cells works like Military, which attacks the virus entering inside the body. There are owners of these cells; there are also slaves who work day and night without halt. Interesting thing is how they know, in which part of the body the infection has entered through wound. We don't know about their work, still all of them are working like a dedicated team headed by our Brain.

It's been said that 'the Verna System' was the outcome from our body, where our Brain is Brahman- the Master of our body, Kshatriya- the warriors, who protect us from the enemy, Vaishya- are doing business of making Blood cells, digesting the food to make energy for our body and Shudras- who are cleansing our body in various ways. This thought of four Verna is the very Indian thought. Western Society doesn't have this system of work, neither in past nor in present.

There is a perfect system of inner engineering of the body to run it smoothly and hassle-free.

## Human Behaviour :

To understand how human behaviour responses in pandemic situation is call of the time in present and coming future. Since the human behaviour is the response of individuals or groups



*Illustration : The Purusha & its Varna Bheda*

of humans to internal and external stimuli, it refers to the array of every physical action and observable emotion associated with individuals, as well as the human race. The behaviour of humans and other organisms and even mechanisms falls within a range with some behaviour being common, some unusual, some acceptable and some beyond acceptable limits. The acceptability of behaviour depends heavily upon social norms and is regulated by various means of social control. The analysis shows that people's behaviour is responsive to the cost of self-protection, the reported prevalence of disease and their experiences earlier in the epidemic. Specifically, decreasing the cost of self-protection increases the rate of self-behaviour. Individuals' experiences in term of how often an infection was acquired when they didn't engage in self-protection are another factor that determines whether they will invest in preventive measures later on. When prevalence is high, people are more likely to adopt self-protective measures as time goes by; when prevalence is low, a 'self-protection fatigue' effect sets in whereby individuals are less willing to engage in safe behaviour over time. It has been argued that behavioural responses, such as wearing of mask,

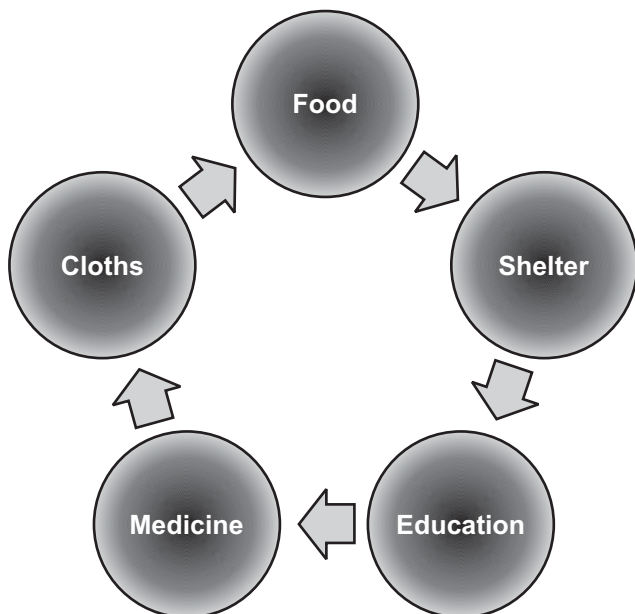
more frequent washing of hands and avoiding crowded places, of people to the 2003 SARS outbreak contributed significantly to the containment of that epidemic.

It has been observed that there is a significant change in human behaviour regarding hygienic habits of day to day life. New ideas are emerging for making life simpler and safe. One of such ideas is to how to deal when there is nothing in the kitchen or you can't go out to buy vegetables or other daily needs. So, people start innovating new ideas to adjust with the stuffs you never expected. There are so many solutions to one problem; we just have to explore it. Finding new ways out when all the doors are locked down. Waiting is not the solution for all the problems. If we just wait and watch, we won't find out the vaccine to this novel dieses. We won't be able to find the anti-virus, as in the case of Personal Computers. Fighting the evils is the wisdom to mankind, its usual human behaviour. Never give up; the proverb was invented by us.

**Two New Basic Needs :**

If we classify the entire scenario into one gamut, we will find that there are three basic needs to survive in a provided situation. Ample food grain, Shelter and few clothing; in addition to it now a day, lifesaving medicines and distance education have added the list of essential commodities.

If we segregate two long lasting needs i.e. Shelter and Cloths, remaining two out of three are perishable; they are Food and Medicine. Medicine gets change from time to time. It also has expiry as that of Food viz. Grains and Veggies. Education is an ongoing process, unless it ends at a certain point. So, we have to find out that critical point at which human behaviour starts to self-protecting along with his family. We may identify that two needs out of five are those where onwards human mind changes its behaviour i.e., food and medicine. So, for fulfilling these two needs, a person crosses the social distancing limit.



At this point the chances of getting infected are more. Thus, we have to find solution so that we may not come near this critical point. Panic moment is more dangerous than actual disease. Most of us get into depression just because of being Panic. So, we have to analysis the situation and find solutions for it.

**Utilization of Amenity space :**

What can we do to get ample food grain and vegetable when we get into such crises? If we analyse the situation, we find that there is a sudden rise in cost of perishable goods. Big shop keepers start selling the commodities on higher prices just for the sake of lower supply. It is but natural - human tendency to behave like this, otherwise goods won't be on the shelves for a long interval. Here we can see the effect of high demand and lower supply. Since transportation is on a halt, commodities from farmers don't arrive to the central business district. So, one of the solutions can be to produce at least some of the food items and vegetables inside our housing societies. There are two types of Open spaces in any layout or sub division of the land having more than 1.0 hectare area, which has to be reserved for playground and public utility i.e., 10% area for recreational open space such as playground and 10% for the Amenity space, out of which 15% of the Amenity space can be utilised for construction of club house, bank, post offices, library, Gymnasium etc. as per the National Building Code. Rest of the 90% of the Amenity space can be used for growing vegetables using the methods of natural farming.

This Hypothesis can be understood by the Central Place Theory which was derived from the work of the German Geographer Walter Christaller, who investigated the urban system of Southern Germany during 1930s.

He was mainly looking for relationships between the size, the number and the geographic distribution of cities. Central places theory tries to explain the spatial distribution of a system of cities. This distribution is best understood by assuming a central place and its market area. A central place has the main function to supply goods and services to the surrounding population.

**Central Places Theory (Market Principle)**

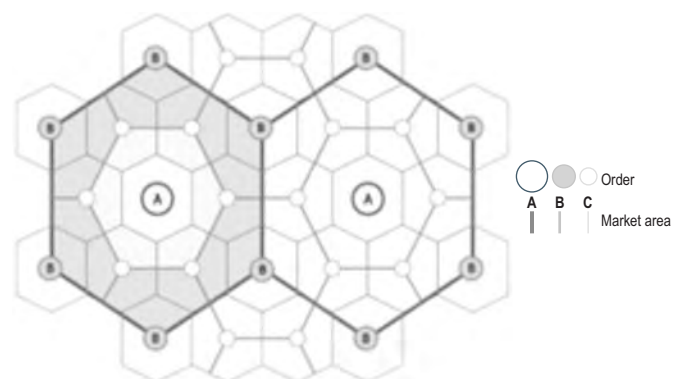


Illustration 2



Illustration 3

Census data suggests that 31% of India is Urban but Images from satellites tell us that a whopping 63% of India is Urban; with the density of 400 people per square km.

If we consider half of the population living in Urban Area; that means we have @1.35 Lacs sq. km. area of Public Utility land within these housing societies. This is a very big vacant land laying along with the playgrounds in these housing societies. These lands can be used for growing vegetable to cater our day to day requirement in the kitchen. Similar type of design philosophy was proposed by Hon. F.L. Wright in his famous work "The Illinois – The Skyscraper Centre". It was the design of a Mile-High cantilever sky-city to honour the state of Illinois and the city of Chicago.



Illustration 4 : Courtesy - F.L. Wright

In his Illustration F.L. Wright suggested the farm land around his Mile-high Skyscraper Centre. Food grains were supposed to grow here, to cater the need of the residents. This is indeed a brilliant idea in crises. Since the transportation is nil, we can get the Food in cheaper rate.

**Case Study :**

Ramdaspath in Nagpur is situated in the central part of Nagpur, with most of the bigger open spaces all around. These spaces were the foresight of Britishers, who designed this Garden space named as "Lendra Park." One of the important features of this area is that water level is very low. One may find the underground water on just 5 feet level. That's why there are so many evergreen trees in this garden, ageing more than 100 years or so. Facing south, the left part is kept as a play area and right part has beautiful garden within. A 300-meter walkway is logged with shrubs and flowering plants on both the sides.

There is an old banyan tree in between and other flowering trees all around. There is also a Natural Shop, which provides Natural food and vegetables without using any chemical fertilizer. This Garden is maintained by Ramdaspath Citizens Forum. We may notice some pockets as seen in the Drawing, which are always vacant surrounded by seasonal flowers. The land in between can be used to grow vegetables. The land is good and has ample water in it.

Padmashree Subhash Palekar from Vidarbha, Amravati, has discovered from the ancient Japanese System of Natural Farming. In this type of Farming, one can get good crop with very less expenditure. Following Illustrations shows how to yield optimum crop in less area of land. His philosophy of Natural Farming is based on four pillars viz., knowledge, Science, Truth and non-violence. In his introduction speech, he wisely elaborates his theory, which is based on logics.

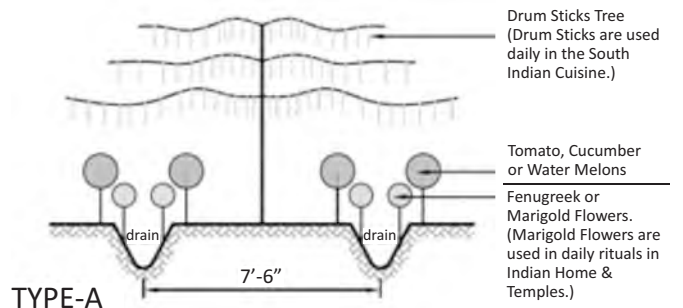


Illustration 5 : Subhash Palekar Natural Farming-1

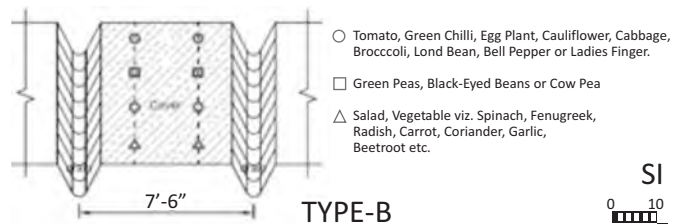


Illustration 6 : Subhash Palekar Natural Farming-2



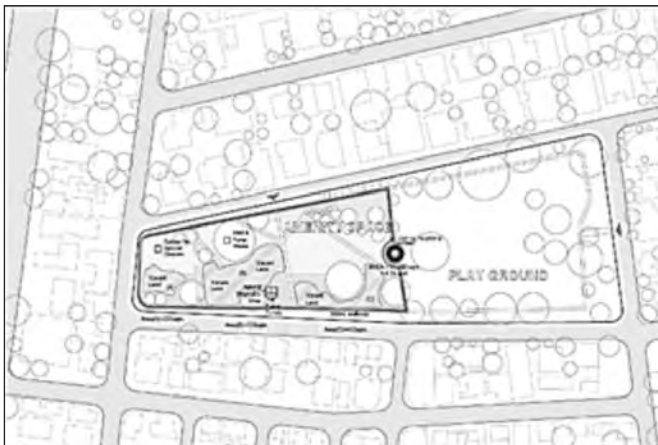


Illustration 7 : Site Plan of Ramdaspath Garden



Illustration 9 : Medicine Vendor Machine



Illustration 8 : Ramdaspath, Nagpur

### Medicine Kiosks and Vendor Machines :

Medicine is another basic need, which has to be taken into account in the time of crises. In Lockdown Situation, if the Medicine is ending at our place, it may develop more critical condition into human behaviour.

Similarly, Prescription Vendor Machines are also available, for those who are in need for appropriate medicine. So, its high time to append with this new technology in every 500 mt. distance, when people are compelled to sit at home during quarantine period.

Smaller Medicine Kiosks can also be provided along the Highways for those who are in urgent need of Medication help, such as in the case of high blood pressure and Diabetes Patients. These Kiosks can be connected with GPS system to know the exact co-ordinates of it and to know when to refill them. Any person, with the impression of his finger print can get access to the medicine and also the system may keep record of his medical history. The system may also direct any person what, when and where to reach for level-2 medication.

### Virtual Education System :

Thanks to Telecom companies for providing ample Giga-bytes of Data during crises. Internet via satellite towers are like life line for human being. Lacs of people are working from home during this Lockdown period. Now people's worries are lower down. Some companies are also giving tasks to their employees from home. Digital India has given us more opportunity and freedom to do our respective jobs from home.

One of the major sectors is Educational Institutions. In this Lockdown period, new session has been started and some of the teachers are giving assignments via social media platform to the student by forming small groups of them. Students are not been spoon feed, instead on the concept of hearing and understanding, they are given assignments, like writing on the spoken content and then give the answers asked at the end. Students are delighted with this new methodology of studying. For them, it's like fun while learn kind of thing. Thus, we can foresee the coming time when teacher may take the class sitting at their place and take a virtual class on laptop or smart TV.

### Conclusions :

So, the concluding word of this article is that we Architects have to ponder upon the present and future situation, when human beings are in any crises. We have to change our strategy while designing any new Institution, Commercial space or a modified Residence for the better future. So that self-protected citizens may feel peaceful atmosphere where ever they live.

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## Life at the Edge of Water



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Ar. Mrinalini Sane - A practising architect and interior designer with 27 years of experience, Mrinalini Sane has also been involved with architectural education as a visiting faculty member since 1993. Actively involved with the profession as an Executive Committee Member of IIA Pune Centre, she has also been associated with PCERF – Pune Construction Engineering Research Foundation, a Pune based NGO, also as an Executive Committee Member for more than 15 years. She has organised the PCERF Vidyarthi Competition for two years as the Convenor. She regularly contributes to local newspapers on issues relating to property and architecture. She has contributed to the profession in a unique way – as an ISO Auditor, Consultant and Trainer, she offers Quality Management Systems as a tool to improve office working efficiency of construction professionals. She has also represented India through Rotary Group Study Exchange programme.

### Introduction :

Since the dawn the civilization, man has sought out suitable water bodies beside which to form settlements. Be it a lake, river, lagoon or besides the sea. As civilization advanced, man was capable of harvesting surrounding areas for water and creating artificial water bodies which became the fulcrum of these settlements.

India, being an ancient civilization, showcases all these in abundance in various places. In the North, there is the city of Srinagar in Kashmir around the glacial melt water fed, multiple lake system, the most famous of which is the Dal Lake. In the South are the cities of Kumarakom and Alleppy which are settled around the vast inland lagoon called Lake Vembanad. In the East are the settlements of Santhal tribe on the shifting islands of the Sundarbansdelta at the mouth of the mighty Ganges and Brahmaputra river system. And in the West is the man-made lake system around Lake Pichola around which the city of Udaipur stands proudly as an oasis at the boundary of the Thar Desert.

The land and climatic conditions of all these four places are a study in contrast, the only common link being the human ingenuity in adapting and using the water bodies to create not only livelihoods, but four exquisitely rich cultures. This article is an attempt to highlight the similarities and differences of human cultures and heritages in these four corners of India.



*Fishing in crocodile infested waters - Sundarbans*

### Settlement : Kumarakom –Alappuzha, Kerala, India

#### Waterbody : Vembanad Lake (2033 sq km area, depth about 40 feet)

Situated on the banks of the lake Vembanad in the State of Kerala in South India are the twin cities of Alappuzha (Alleppy) and Kumarakom. Alleppy is famous as the Venice of the east, and with good reason! The major transport system in this town are the waterways. Apart from the houseboats engaged in the tourist trade, a common sight is School Boats ferrying students from designated boat stops. Boats ply the waterways formed by the small tributaries of the river Pampa like buses to provide transport to local residents. And like any road network, the main broad waterways are connected by a criss-cross network of narrower waterways to provide connectivity by boats of large and small capacity. The type of boats used are also a reflection of the economic function they are used in – from super luxurious, one or two bedroom Houseboats that ply the Kochi – Kumarakom – Alappuzha route to the humble single canoes of the local fisherman. Due to the back flow of the sea water at high tides, the water of the lake Vembanad is brackish water, not fit for drinking. A common hazard is the flooding of surrounding fields with salt water destroying standing crops. Small bunds have been created to keep the lagoon water at bay to protect the cultivated fields. However if the monsoon rains are heavy and the tides rise, the fields are inundated with salt water, laying waste the farmer's source of income.



*Fishermen on Lake Vembanad*



*The dance of the Great Egrets*

Houses are built around the waterways, with private boats tied at the entrance. Every house has a few fish lines dropped in the water and a common sight is the lady of the house stepping out of her kitchen to pull out a fresh catch to add to her day's cooking. Currimean, Jumbo prawns and shrimp are found in abundance in these waters. A gigantic 12 inch prawn can be obtained fairly easily. Historically, Kerala has been the spice capital of the world, and this is amply evident in the delicious cuisine of the people. The fresh local coconut or palm wine called Toddy is refreshing in the humid climate.

The affluent people built houses made of seasoned teak wood with central square courtyards, called a Nalla Kettu. In the palace of the local king or nobleman, more often there are two square courtyards and such a house is called an Aettu Kettu (see pic.) The decorative carvings on the ceilings and columns of these structures depict ancient gods and goddesses as well as geometric designs. Some are inlaid with metal like silver or even gold. In Vasco Da Gama's times, one kg. of black pepper sold for a thousand pounds in Europe. So these palaces are a reflection of the affluence of this community since those spice trading days.



*NallaKettu Inlay on wooden door panels*

The traditional apparel here is the Mundu for men – a white cotton hand woven garment like a “lungi”, with gold thread or zari border. Lore has it that the thinner the width of the zari border, the more subtle and elegant the garment! Minimalism is valued. The women wear a similar, but longer white cotton hand woven sari – like garment with gold thread or zari border, called the Kasavu. In old times, both men and women wore no upper body garment or vest, and lore has it that the women had to pay a tax to the king to cover their upper torsos with cloth.



The waters of the Lagoon are murky, though not very deep. One can spot families of otters and Cormorants drying their wings. In season, one can even witness the dance of the Great Egrets at a nearby bird sanctuary. Small waterways navigable by canoes criss-cross the landscape.

In Kumarakom and Alappuzha, we see a people, beautifully adapted to their surrounding water and creating a rich culture which is a part of India's common heritage. They have nurtured this region called “God's own Country”.

**Settlement : Srinagar, Kashmir, India**

**Waterbody : Dal Lake (18-22 sq km area, depth about 20 feet)**

Situated on the banks of the Dal Lake in the North Indian Union Territory of Jammu and Kashmir which is famous as Heaven on Earth, is the ancient city of Srinagar. Lying at a junction of the old Silk Route, the people and culture of this place reflect centuries of traditions and cultures of travellers from across Eurasia.



*Flower Vendor, Nigeen Lake*



*Houseboat, Srinagar*

The Dal Lake system is a multiple lake system – Dal Lake, part of which are locally called the Hazratbal Lake and the Golden Lake, Nigeen Lake lie at the heart of the city of Srinagar. The Anchar Lake and Wular Lakes lie farther north east. The origin of the lake system is unclear, perhaps it is a result of an ancient glacial melt or perhaps it is the result of the overflow area of the river Jhelum. There are two small islands in the lake system which are called the Golden Char Chinar and the Silver Char Chinar – as there were four Chinar Trees on these Islands, although a fire a few years ago has damaged a couple of the Chinar trees.

The banks of this lake system comprise of the most valuable real estate in the city and is bursting with Deodar wood houseboats parked chock a block next to one another as far as the eye can see. These houseboats are made of exquisitely carved interiors of Deodar, Walnut and Cedar wood (see pic). The floors are beautifully carpeted in Kashmiri rugs and there is an old wooden stove heater in most houseboats for warmth. However, these houseboats are permanently parked at the edge of the lake and don't ply the lake as houseboats in Kumarakom and Alleppy do. For transport on the lakes, there are the smaller boats called "Shikara". Still smaller canoes with the boatman perched at the very tip, fish for Carp. Kingfishers and geese flit on the still, cold waters with the mighty snow-capped Himalayan peaks of the Shankaracharya range in the background. Prayers are offered in the holy Shankaracharya temple high up in the mountain, while the lakeside Hazratbal mosque reverberates with the azaan.

The houseboats are perched on the edge of the lakes. This allows the access to the houseboat, both from land as well as water. The service lines – electrical and plumbing - are connected from land. A luxury houseboat will have not only an attached toilet to the bedroom, it will have a bathtub with running hot and cold water. Like a garden on land, the houseboat window will overlook a water garden – a lotus patch! Sitting in the houseboat veranda, sipping "Noon Tea", a special Kashmiri tea, in the misty, cold morning, one can enjoy the sunrise across the grey waters of the lake, which slowly



*Mughal Gardens*

turn red, and then golden, as the sun bursts out from behind the mountains, and fills up the sky in a glory of brightness!

The current economy of this region depends heavily on the tourist trade. There is a floating flower and vegetable market where a variety of local flora and vegetables are sold on boats. Craftsmen sell exquisite papier-mâché artefacts, woollen articles and knick-knacks. A very colourful milieu. The lake freezes in the winter and there is a layer of ice transforming the region into a winter fairyland. This is the time to wear a woollen "Feran" and hold a coal lit "Kangdi" under the garment for warmth while drinking the local saffron flavoured tea called "Kehwa".

The lake system is connected by small channels called "Guruth Pao". It is a difficult task keeping these channels open due to hyacinth congestion and the more welcome growth of the lotus plants. The locals grow vegetables and lotus in private patches. "Nadru", the lotus stem, is a local delicacy. Goshtaba – an exquisite mutton dish and freshly baked "Girda" – a type of leavened roti, from the tandoor of the next-door baker, are local specialities.

The challenges of living in a mountainous terrain are numerous. However, the people living around these lakes have learned to flourish, showcasing the natural beauty of the land while utilizing water in multiple ways.

#### **Settlement : Udaipur, Rajasthan, India**

#### **Waterbody : Pichola Lake (696 hectares area, depth about 30 feet)**

On the banks of the Lake Pichola is the beautiful city of Udaipur, the capital of the House of Mewar. The Pichola lake system is a man-made lake system built as a store of the scarce resource - water – at the edge of the Thar Desert in Western India. Subsequent kings built palaces of great grandeur not only around the Lake but a couple of them on two islands situated within the Lake. These palaces made of marble and decorated with coloured stained glass, were a place of frolic and romance for the royals as well as a seat of governance.



*Lake Palace- passengers in a ferry on Lake Pichola*

These days the palaces are converted into some of the best known luxury hotels in the world – The Jag Niwas palace is now the Taj Lake Palace, the Jag Mandir is a tourist attraction, Fateh Prakash and Shiv Niwas Palaces, erstwhile parts of the Great City Palace, are luxury hotels. The Oberoi Udai Vilas Palace, built near the bird sanctuary surrounding the lake and The Leela are some of the new buildings built exclusively as hotels. Small motor boats ferry guests to and from these hotels to the jetty on the mainland. Each hotel has an exclusive jetty. And the economy, which was earlier dependent on silver and nickel mining is turning to tourism. Wood and silver Craftsmen and Bandhej fabric dyers sell their wares in markets surrounding the lake. It is a beautiful showcase of Rajasthan's high regal civilization.

The lake itself, as it is man-made, faces environmental challenges due to pollution and over population. The local hotel industry contributes towards cleaning of the lake. At the Lake Palace, which is in the middle of the lake, logistics of maintaining guests in world class luxury is a basic challenge. Every leaf of vegetable has to be brought in and every scrap of waste must be taken out by dedicated motorboats.

The lake banks are dotted with temples and other community spaces. These were important in the olden days, when the access to water was controlled, due to its paucity. Today, water scarcity is a fact of life in Rajasthan. However, the lake system offers water conservation and management opportunities from the historical times. The rain water flowing down the Aravalli ranges was captured by means of bunds. The sandstone and mountains with desert sand create a canvas of yellow to ochre with the vast expanse of blue sky above. In this arid yellow-blue scheme, green colour from vegetation is conspicuous by its absence. The human endeavour has filled in this gap – with the help of vegetable dyes, the clothes worn by the locals have an overwhelming amount of colour and embroidery. The mud plastered houses are painted with vibrant colours. And the Palaces, have stained glass windows – which offers another dimension to colour... the rippling reflection of the wavelets of the lake on the marble floor, through the colourful stained glass, creates a sense of wonder. The multi-coloured mirrored thikri work on the walls of the palaces tells the story of glory and valour of the bygone days. The Lake system is the pulsating heart of this white city - Udaipur.



*Stained Glass Windows letting in light Thikri Work*



**Settlement : Sundarbans, West Bengal, India**

**Water body : Sundarbans delta (10,000 sq km – 4000 sq km in India, balance in Bangladesh, depth variable)**

*I am a daughter of the Sundarbans*

*My mother goes fishing and a crocodile eats her*

*My father goes to the jungle to gather honey, and a tiger eats him*

*Yet I will not leave and I am happy that I am a daughter of the Sundarbans.*

So goes a song to which the local Santhal women dance, clad in the traditional white cotton saris with bright red borders. That, in a nutshell, is the story of these people living at the edge of civilization. The Sundarbans delta comprises of hundreds of small islands formed due to alluvial deposits at the place where the Ganga and the mighty Brahmaputra (called Padma locally) rivers meet the sea – Bay of Bengal. The backflow from the sea has made the waters of the entire region brackish and hence, unfit for consumption. Water-water everywhere and not a drop to drink! Fresh water bore wells on some of the islands are the only source of drinking water.

After a three hour drive south of Kolkata, one is at the jetty town of Godkhali. The last historically significant house is the one where Rabindra Nath Tagore lived for a few months (see pic). After this there are just the thatch roofed houses of the Santhal. From here one has to travel the waters by boat – a houseboat if one is lucky – to go in the interior of the Sundarbans.

This is the realm of Dakkhin Rai – the forest deity symbolised by the Royal Bengal tiger. All tigers in the Sundarbans are man eaters. Bon Bibi is the Goddess to whom one prays when one wants to be saved from Dakkhin Rai. One can see rags of cloths tied to trees on islands as a symbol of prayer. Some pieces of cloth mark the tree where the Tigers had killed a human. There



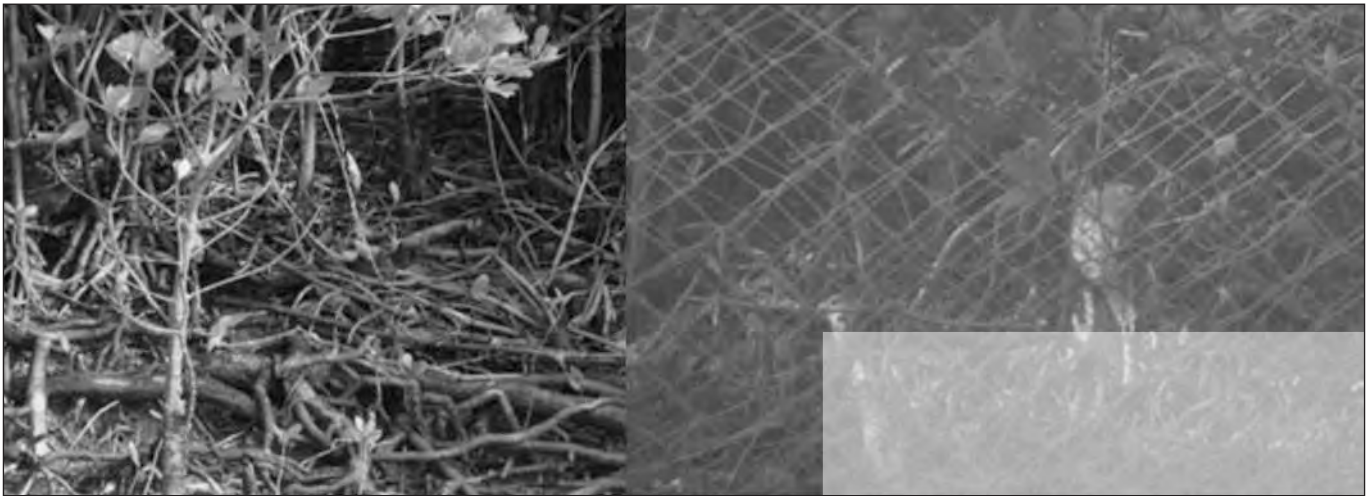
*Red cloths tied to Sundari tree – prayers to Bon Bibi*

are many such cloths fluttering in the winds on remote islands as the boat glides by. Moreover, the boats are all moored in the middle of the water at night, and not on water's edge – the tiger can swim across islands and hunt on land. But perhaps, he can't hunt in water, or even if the tiger swims up to the boat, he will not be able to jump up, into the boat... At least that is the hope.

Come evening, the sky is lit up in shades of red and gold, a bird sanctuary on the banks of the river Bidyadhari bursts with raucous clamour. Cormorants can be seen flying in droves. A variety of solitary Kingfishers can be spotted. And on a lucky day, one can spot the enormous Great Adjutant bird standing 5 feet tall, brooding on the banks. The islands are separated from the water with high chain-link fences, with the hope that Dakkhin Rai will be confined to the Wildlife sanctuary islands and not move out into the water and swim across to human settlements. The exposed orange coloured roots of mangrove trees (Sundari trees) create a series of light and dark shadows which is ideal camouflage for a lurking striped Bengal Tiger. The locals call this "Chalawa" – dangerous illusion. As a tourist, entry on these islands is prohibited, except for some designated paths and viewing points.



*Tagore's Bungalow, Sundarbans*



*Chhalawa: Orange tree roots...or maybe a tiger? Wild Stag*

To add to the challenges of survival in this remote area, the entire Sundarbans delta falls in the path of hurricanes (Ghurnijhor) that come annually from the Bay of Bengal. These hurricanes destroy everything in their paths, cutting off people from the mainland, inundating islands, rendering the fencing useless. The entire landscape changes... and rebuilding work begins, again and again, year after year.

It is beautiful in a wild way...and scary.

Each year new islands crop up and some old are submerged after the monsoon, making a shifting and hostile landscape. The mangrove jungles on the islands are home to an animal which is at the top of all food chains - the Royal Bengal Tiger. Moreover, ALL tigers in the Sundarbans are man eaters – the locals say due to eating human remains floating down the river down the ages from places like Varanasi. One wonders where the truth and myth merge, much like the silty river becoming land and islands dissolving in the water. River distributaries are infested with crocodiles. The livelihood of the Santhal tribal people mostly depends on fishing and honey gathering. Except, here, the crocodiles are a constant danger while fishing and the tigers are a constant danger while honey gathering in the mangroves. However, with tourism on the rise in recent times, simple bamboo artefacts and knick-knacks are sold to tourists by the locals to supplement their meagre income.

What the Santhals lack in refinement, they make up for in their enthusiasm and joi de vivre. The Hilsa fish – which the Bengalis call Illish – is a delicacy to die for. The local rice wine – Hadiya – though not as delicious as Toddy from Kerala, is also enjoyable.

The large water channels of the river delta are a route of trade vessels to come from Dhaka to Haldia Port. On a good day, tourist boats can go as far west as the Raimangal River, through the middle of which runs the India - Bangladesh border. Two thirds of the Sundarbans lie in Bangladesh.

The Santhal tribal people are now mostly migrant labour in places far away from the land of Dakkhin Rai, from their beloved Sundarbans. Perhaps it is safer. The ones who have stayed, adapt to the caprices of nature, while those who leave will adapt to the caprices of civilization elsewhere...

#### Summary :

While the presence of water is important to life, water as a life force, can also be a life taking force. In Srinagar, the water offers a source of food with fish as well as lotus gardens. The waterways of Vembanad give food but also take away food when the brackish water enters rice fields. The Udaipur lake waters are no longer potable. The Sundarbans river delta gives both – life as in fish and death with crocodiles.

What is surprising, is the diversity and contrast in dwellings in all 4 places. The white marble Palaces of Udaipur are a case study in over the top luxury. Those in Kumarakom, on the other hand, though equally rich in dark wood carvings and inlay work, are minimalistic, subtle and uncluttered in design. The houseboats of Srinagar proudly display the exquisite wood carving work of local artisans while bamboo is used in a variety of ways in the houseboats in Kerala. The boats that ply the Sundarbans river delta and the humble dwellings that dot the islands are minimum basic in nature. A house here is not more than a roof over 4 mud or thatch walls! And that too, may not last the year due to hurricanes. In fact, the land on which the house is located, also may get submerged or eroded by the shifting dynamics of the delta.

Man in his ingenuity, has harnessed the proximity of water and reaped benefits but water has shown its ability to overpower man and destroy what man creates. Nature and man live harmoniously in some places while nature in its sway cuts man down to size in other places. Over the years, mankind has learnt the art of survival and development, leading to civilisation, prosperity and high culture - when man has understood, worked with and respected nature's authority in one of its primal forces – water!

# Building Resilience and Antifragility

## COVID-19 : CALL FOR IDEAS

Today the world is facing an unprecedented scenario due to COVID-19: a state of global medical emergency has befallen us with uncertainty of what will happen next. Many experts believe that this situation has worsened the woes of our economic state, and deeply affected the construction industry in particular- reduced construction outflows attributable to a slowdown in project execution activity, a weaker real-estate market and probably low disposable incomes for the client due to global economic disruptions are some of the most direct impacts. This, in turn has affected the stakeholders-architects, skilled and unskilled labourers, builders, material suppliers, trade partners, contractors and many more. Students and colleges are also another large segment of the fraternity staring at uncertain times. With each passing day, the world is looking for a ray of hope, a way to make the situation better which highlights the need for new ideas for us to overcome the crisis together.

The Indian Institute of Architects partnered with Ethos and launched the initiative **COVID-19 Call for Ideas to Build Resilience and Antifragility** in April 2020. The objective of this open-to-all initiative was to source ideas that aim to resolve problems that have arisen in the construction industry. The participants were also encouraged to assess and design for potential problems that may arise.

The brief titled *COVID-19 Call for Ideas to build Resilience and Antifragility* was co-curated by Ethos and Ar. Darpana Athale. Solutions were invited that could be a product or a process targeted towards any one or multiple group of stakeholders within the architecture, design and construction fraternity. Entries were expected to focus on Communication, Design, Process, Innovation, Technology or any other action area that the participants identified. Proposals that have the potential to create a significant impact to any of the stages of coping with a pandemic and its effects were sought.

The Review Panel selected 14 ideas out of around 100 entries received. Many ideas out of these integrate more than one aspect or stakeholders and would fall under multiple categories at the same time.

### Submitted Entries

Category	No. of Entries
Architecture + Design	30
Technology	30
Healthcare	12
Product Design	8
Urbanism	8
Socio-Economic	8
Real Estate	4
Arts and Crafts	4

Shortlisted Ideas	Team
Gurugram SOHO-small office home office	Zorawar Singh Basur and Anima Beri
HomeWork Pod	Om Merchant
Shramik Setu - Enlist Enable Empower	K.Shravan and Gita Balakrishnan
Migrant Transport with Social Distancing	Arpan Johari and Hemant Diyalani
Disaster Management Healthcare Units	KNS Architects- Kanhai Gandhi, Santosh Jadhav & Janhavi
MODULE (X), An Emergency Plug-in Pod	Aswin.S.Kumar and Sibin Sabu
Collaborative Initiatives : Collaborative Initiatives : Re-Program and Re-imagine the Urban Neighborhood Post Pandemic.	Shalu Mishra and Aditi Jain, Mistry Architects
Resilient Housing for All	Leena Kumar and Yamini Kumar
DIVIDE - disintegrating density	Suresh Batra and Amar Agrawal
T(C)ube	Murtuza Indorewala
Self Sanitizing Handrail	Himanshu Verma and Akanksha Singh
Re-calibrating Rural India... To a Post-Covid Life	Akshata Shenoy and Shruthi Mrinalini
Call Out for action	Mishali Desai
COVID-19 ToolKit	Sapan Hirpara and Gunjan Modi

**Gurugram Soho** (Fig.1) is a plug-in solution to 'Work from home' - a flexible module of a 'Home Office'. The design provides different options to people with varying needs as these modules can be installed and dismantled as per the situation.

Today when the concept of working from home has become more relevant than ever, it is paramount to not just understand the needs but also identify issues faced by people.

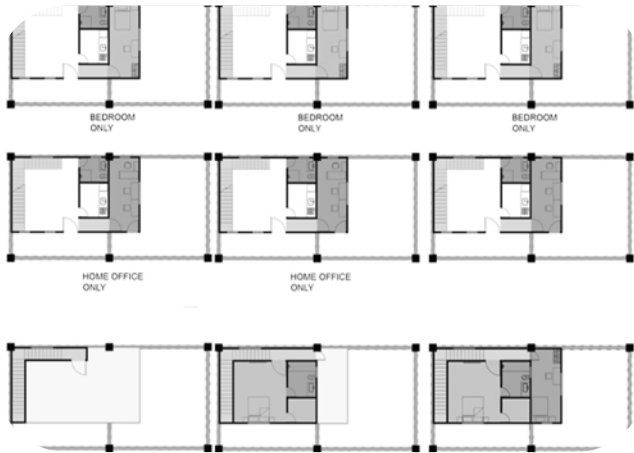


Fig. 1 : Gurugram SOHO

**Home Work Pod- Work & Play at home** (Fig.2) also addresses the problem of working from home efficiently through a 'Home Work Pod' which is a furniture system that enables all, young and old to conduct formal tasks from the comforts of their homes. This system consists of a workstation and chair which is ergonomically designed for all age-groups for study, video communication, gaming and entertainment in complete privacy and comfort.

Many of the entries focused on migrant and labourer's housing, healthcare, social distancing and the problems faced by the disadvantaged.

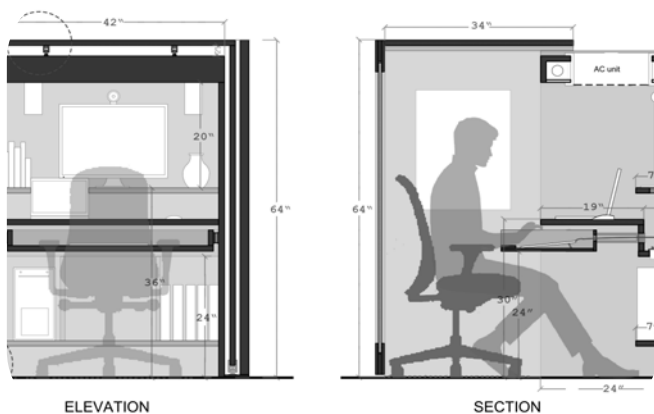


Fig. 2 : Home Work Pod

**Shramik Setu** (Fig.3) focuses on the problem of guest workers/migrant workers and an app that can help them find operational construction sites for employment in their vicinity.

The problem of migrant workers got accentuated during this period as they faced uncertain circumstances with scarcity of resources and lack of an efficient transportation mode to get them home and save themselves and their families from the disease. The entry offers a solution for the migrant workers who have had to take to reverse migration.



Fig. 3 : Shramik Setu

**Migrant Transport with Social Distancing** (Fig.4) proposes a modification on standard State Transport buses that will allow guest workers to reach home with dignity, through a safe and effective mode of transportation which can later be used as regular transport services. This cost-effective, quick and easy to build modification will transport people in reasonable comfort. Given that social distancing will be the new normal, it can be used in regular bus fleets after transporting the migrants. This would be the easiest way to use existing bus infrastructure to transport people safely and with minimal investment.

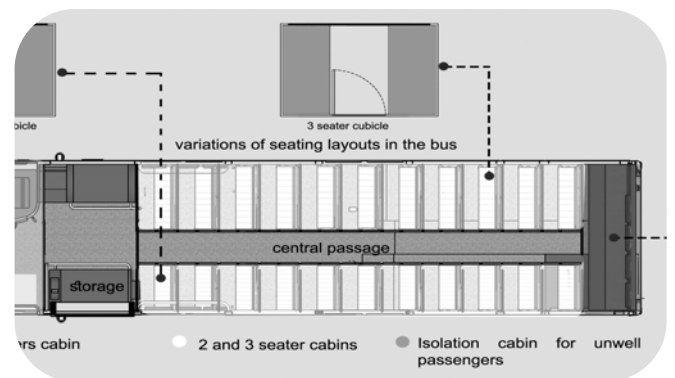


Fig. 4 : Migrant Transport with Social Distancing

**Disaster Management Healthcare Units** (Fig.5) targets the need for quick and easily deployable healthcare units. In recent times, shipping containers have been explored by Architects world over to create portable facilities. The advantages being that they already exist, are economical, easy to transport, and quick to transform into something which can be habitable. The time span to put up these healthcare units is less than 2 weeks.

Referring to the above entry, Dr. Desai said "It is robust, offers quick installation, is transferable, reusable, monsoon-ready". Mr. Bhattacharya complimented the concept for being clearly presented, along with details that address various needs for a prefab system.

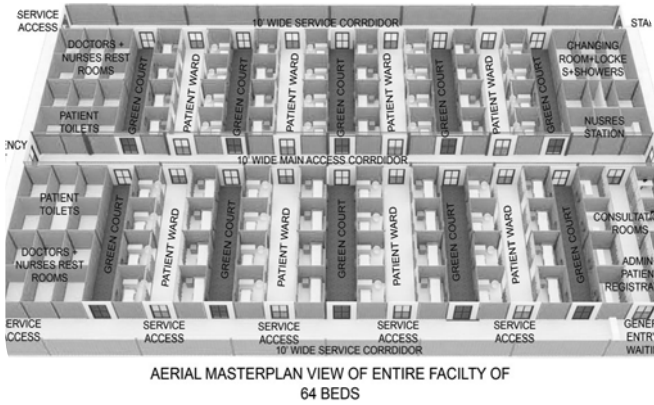


Fig. 5 : Disaster Management Fig.4 Migrant Transport with Social Distancing Healthcare Units

**Module X - Emergency Plug-in Pod** (Fig.6) selected under the healthcare category provides a design for an isolation and quarantine facility for guest workers reaching back to their hometowns and villages in large numbers. The pod is detailed out in a way that it can be plugged-in to any existing context. Clustering of these pods can provide a combined Quarantine facility for larger groups. Referring to this idea, Dr. Desai said “these pods can be created within housing colonies or even as short stay rental premises as a business idea.”

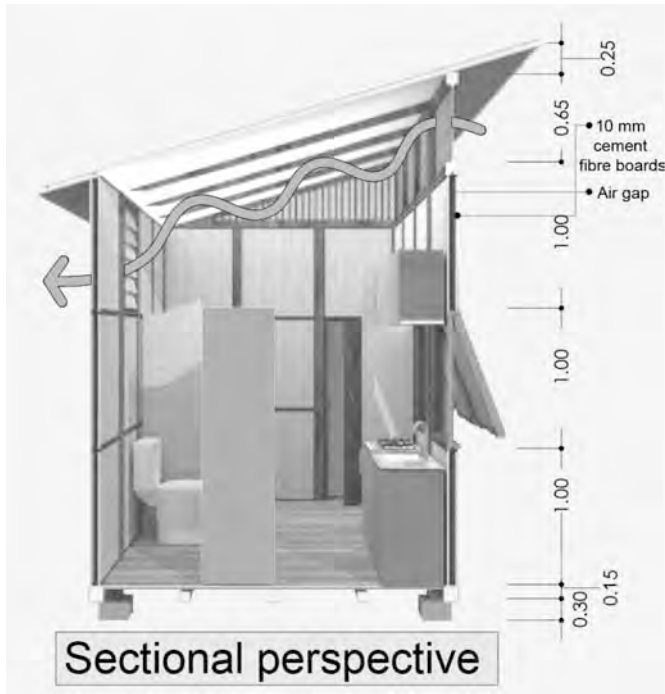


Fig. 6 : Module X - Emergency Plug-in Pod

**Collaborative Initiatives : Re-Program and Re-imagine the Urban Neighborhood Post Pandemic** (Fig.7) recognises the stark reality of social inequality in urban areas, essential to tackle the current pandemic. Addressing this issue can also help cities build back better and be more resilient to future crises. However, with the current scenario, change in

infrastructure is not a feasible approach. Thus, the team suggests smaller additions in the form of tactical solutions that can be done at the neighborhood level and by understanding the needs of the stakeholders involved. George Ferguson, first-Mayor of Bristol and Architect who was part of the review panel mentioned about the entry that offers tactical solutions for public spaces “A brilliant vision for a fairer city demonstrated at a human scale.”

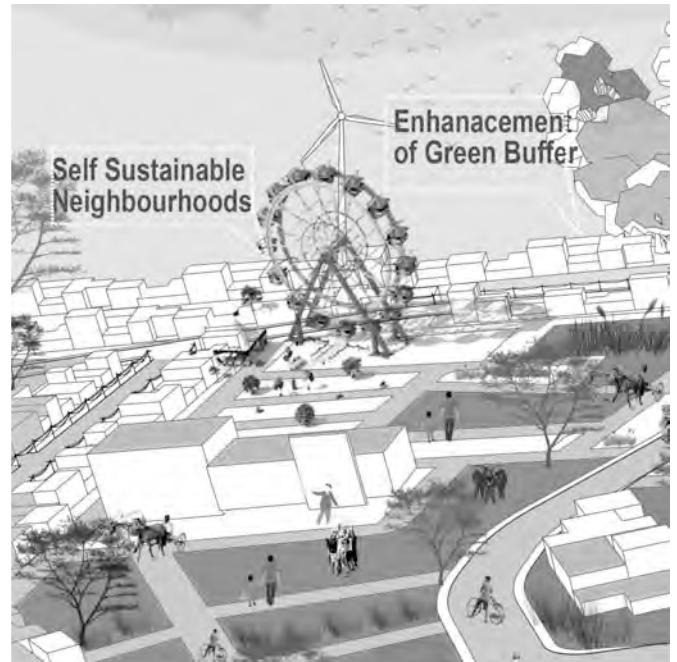


Fig. 7 : Collaborative Initiatives

**Resilient Housing for All** (Fig. 8) proposes a design for prefabricated housing units which are resilient and affordable, while ensuring well-being for the stakeholders at the bottom of the economic pyramid. The design is focused on factors that most impact the physical and mental health of citizens: connection to nature, freedom and equality of opportunity in good times and bad, social interaction and support, reduced environmental stresses like noise and squalor, pleasant diversions from work like art and culture.

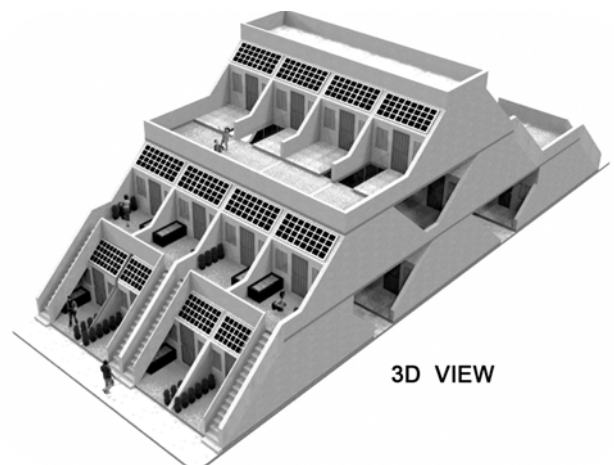


Fig. 8 : Resilient Housing for All

**Divide-Disintegrating Density** (Fig. 9) aims at implementation of Social Distancing through radical policy interventions. It also provides a detailed blueprint to ensure that the foot fall or population density of a particular area can be decreased to two-thirds of the total number.

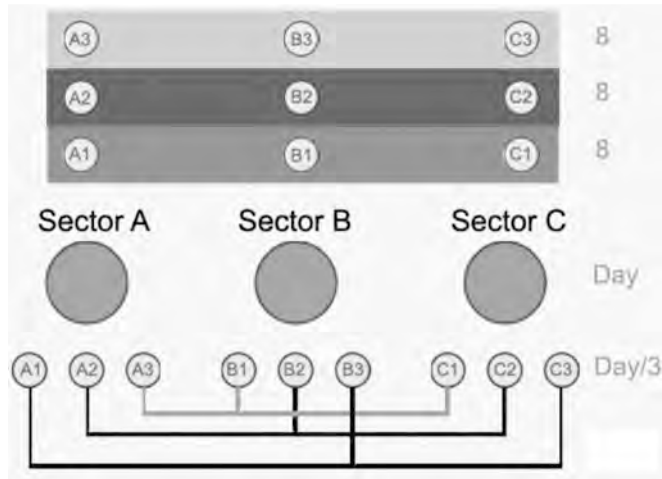


Fig. 9 : Divide-Disintegrating Density

**T-Cube**, (Fig. 10) using social distancing as a tool, attempts to provide experimental measures to control the spread of any communicable disease in densely populated areas within a fully functional city.

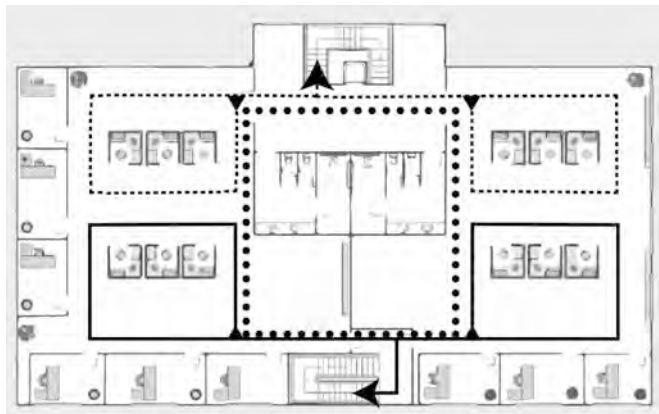


Fig. 10 : T(C)ube

**Self-Sanitizing Handrails** (Fig. 11) has taken an essential architectural element with an aim to prevent it from becoming a catalyst in the community spread of disease. The team has designed a self-cleaning rail, with a sanitizing strip embedded in the rail section operating on electricity.



Fig. 11 : Self-Sanitizing handrail

**Re-calibrating Rural India...To a Post-COVID Life** (Fig. 12) looks at how we could secure the futures of the migrants who have returned to their rural villages and hometowns. It suggests policy interventions that establish industries and work opportunities for rural populations based on skills and resources available to them.



Fig. 12 : Recalibrating Rural India

**Call out for action** (Fig.13) is another idea to resolve a similar problem and it takes an inclusive approach towards dealing with the crisis, by charting out an outline of participatory actions & changes to adapt & adopt from every concerned individual of our fraternity. The entry questions the new normal & how it will be perceived and practiced by people.



Fig. 13 : Call out for Action

**COVID-19 Toolkit** (Fig. 14) provides designs for instantly deployable multipurpose cells that can be used as a shelter in times of emergency, such as the one we face today. The Toolkit Comprises of Multi-purpose Isolation Cells, Large Multipurpose Cells, Foldable Bed, Foot Operated Soap dispensers, Upcycled PVC Bamboo basin and Bamboo Partitions. The fabric used for the beds, partitions, and deployable enclosures is UV stabilized, fire retardant and also has the property to disintegrate the virus in a matter of hours. The simplistic bamboo frame and cloth tent allow for safe and comfortable distancing and isolating, and can be manufactured and assembled easily and almost anywhere.



3

Straighten the frame from three sides, such that the bamboo poles touch the ground evenly and the structure stands upright.

Fig. 14 : COVID-19 Toolkit

Each idea submitted for this initiative outlined the most important issues that we are facing today. Besides these comprehensive selected projects, Special Mentions were awarded to 16 other teams :

1. Low Cost Bed, Jayendar. A and Akshaya R.
2. Concoction of Smaller Interventions, Sampada Netke
3. COVID-19 SHELTER DESIGN, Kaif Ali
4. Dignity Villages, Kavneet Grover
5. Assess | Brainstorm | Crowdfund | Deploy, Gita Balakrishnan and Ankita Arora
6. Vaahan, Kanchi Parmar
7. Sanitation Facility for Construction Workers, Phalguni Pendharkar
8. Signage and Communication Design through Craft, Kaustav Kalyan Deb Burman
9. Upgrade Your Space, Lakhan Gujarati
10. Construction Site Guidelines and Safety Regulations, Radhika Suresh and Aparna Lakshmy Krishnan
11. BRAHMASTRA- a fashion oriented tool, Prabhanshu sharma
12. Strategic Response, Nitika Verma

13. Safety measures at railway ticket counter, Ameer Ambani
14. A Green Dream, Aditi Dhavle and Anurag Bhambal
15. Touch-Me-Not, Zinal Dudhat and Jasma Vekaria
16. Holistic Rural Development, Mishali Desai

On his experience of reviewing the entries Ar. George Ferguson said, "it was intriguing to see the variety. It has been really interesting trying to compare 'drums with violins' and 'mice with elephants' - which is always difficult - but so many good ideas with some standing out from the pack". The response from the community and the innovation that participants came up in the times of a global crisis is much appreciated. As aptly said by French poet Victor Hugo,

*"There is one thing stronger than all the armies in the world, and that is an Idea whose time has come."*

This initiative evoked a lot of interest, and generated original thinking. However, the onus of citing any ideas borrowed rests with the submitter. A summary report of these ideas is available on the website [www.ethosindia.in](http://www.ethosindia.in) and a detailed one can be requested for from the IIA or Ethos. We invite all industry partners, NGOs, organizations or individuals who can help implement some of these solutions on ground to come forward and get in touch with us at : [ethosindia.helpdesk@gmail.com](mailto:ethosindia.helpdesk@gmail.com)

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# An Integrated Design for Shopping Centre and Transportation Hub at Shivajinagar, Bangalore



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Mr. Shreyas Varun K., originally from Rajahmundry (Andhra Pradesh), have been living in Bengaluru since birth. He is pursuing Undergraduate program(B.Arch) in Nitte School of Architecture Planning & Design and currently studying in 7th semester. He is always trying to learn new skills to keep pace with the changing technology landscape. He especially value dedication, passion towards goal, being able to communicate, respect for culture and elders, staying healthy and the freedom to think out of the box.

**Ms. Shreelaxmi S.** - Email : shreelaxmiss@gmail.com

Ms. Shreelaxmi S. is pursuing Undergraduate program (B.Arch) in Nitte School of Architecture Planning & Design and currently studying in 7th semester. Growing up in a family full of art enthusiasts, designing has always fascinated me. She is a hard-worker who believes in consistency and growth.



**Ms. Misha Khatija** - Email : mishyeol61@gmail.com

Ms. Misha Khatija is pursuing Undergraduate program (B.Arch) in Nitte School of Architecture Planning & Design and currently studying in 7th semester. A motivated student, able to make decisions, solve problems and a team player with good communication skills.

(Supervisors : Prof. Dr. N. S. Nalini, Ar. Bindu Malhotra, Ar. Dhruva Kumar, Ar. Badri Narayan, Prof. Dr. Rekha Chandran Jetty)

**ABSTRACT :** Aim of the project was to design a space that would cater to all classes of Shivajinagar area. It was necessary to restore the earlier activities of the site by giving space for the small scale vendors too who occupied that space. Therefore the theme was gentrification without displacement thereby encouraging all possible activities of the neighbourhood within the shopping complex. The other challenge of the project was a proposed underground metro station, due to which the site was bifurcated into two triangles. The design proposal dealt with this challenge creatively by interconnecting bridges.

## Introduction :

The primary changes observed in urban life as a consequence of urbanization are a hurried lifestyle, demand for faster modes of transportation, long-distance traveling, and so on. On the other hand, the positive side of urbanization provided more job opportunities and higher income. Infrastructure and transportation also developed correspondingly to keep in tune with the pace of peoples' lifestyles. Several city authorities are planning to integrate different modes of transportation (Bhattacharya and Rathi, 2015) terminals in close proximity, to aid long-distance travellers. Such locations turn into real estate hot-spots where in general shopping

complexes, restaurants and/or hotels run a thriving business. One such location was chosen as part of the Architectural Design major project for B. Arch 5th semester studio. The students belong to the NITTE School of Architecture, Bangalore. The site is located in the Shivajinagar area in Bangalore city, Karnataka state.

Bangalore is one of the rapidly growing cities in India (Deccan Herald, 2020) and globally, and Shivajinagar is a well-known Central Business District (CBD) as well as the commercial hub of this city. Historically Shivajinagar is one of the oldest areas of the city and it was known as Blackpally during the colonial rule. It houses many heritage structures like Bowring and

## AN INTEGRATED DESIGN FOR SHOPPING CENTRE AND TRANSPORTATION HUB AT SHIVAJINAGAR, BANGALORE

Curzon Hospital, Russel market, St Mary's Basilica among others. In the name of progress, many of these historical structures have given way to modern buildings due to the onslaught of urbanization. Today Shivajinagar is one of the prominent shopping areas with popular places like Commercial Street and Russel market. It has a large bus station and is well connected with the majority of localities in the city.

The site is located adjacent to Shivajinagar bus station and was recently chosen by the government for the construction of an underground metro station as part of the Bangalore Metro Rail Corporation Limited (BMRCL) phase 2 rail networks. A feasibility study was carried out by the students to arrive at the best possible proposal for the site through the elimination process. The study finally concluded that the proposal of shopping complex integrated with office and restaurant spaces, is most appropriate for that prime location. Students were also given the challenge of designing Transit-Oriented Development as a minor project, wherein creating connectivity between the bus station and the metro station through the shopping complex was the main design objective.

### Design Challenges :

The project started by referring to the necessary bye-laws which required special attention due to the proposal of the underground metro station. The major design constraint due to the proposed metro station was that the metro line is running diagonally right through the middle of the site. Because of this, 20 m from the centre of the metro line on either side could not have any structure that needed a foundation. This divided the site into three parts, of which the central part could not have any superstructure and only the

other two sides could be accounted for the built-up area (Fig 1 and 2). The second challenge was to accommodate ample car parking space in the basement with site constraints due to the underground metro station. The third challenge was connectivity; between metro and bus station, had to consider level difference; and connecting the two blocks on either side to create an interesting architectural design.

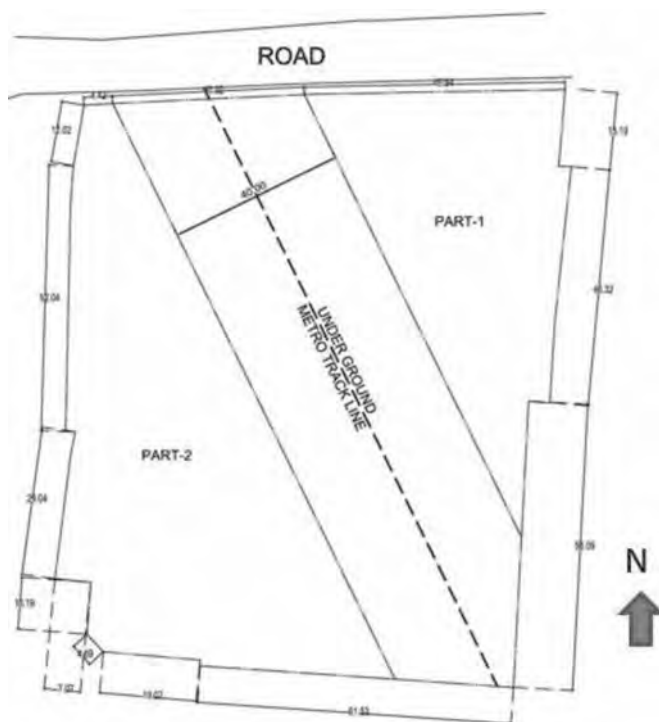


Fig. 1 : Site plan showing the division of site due to the proposed underground metro station.

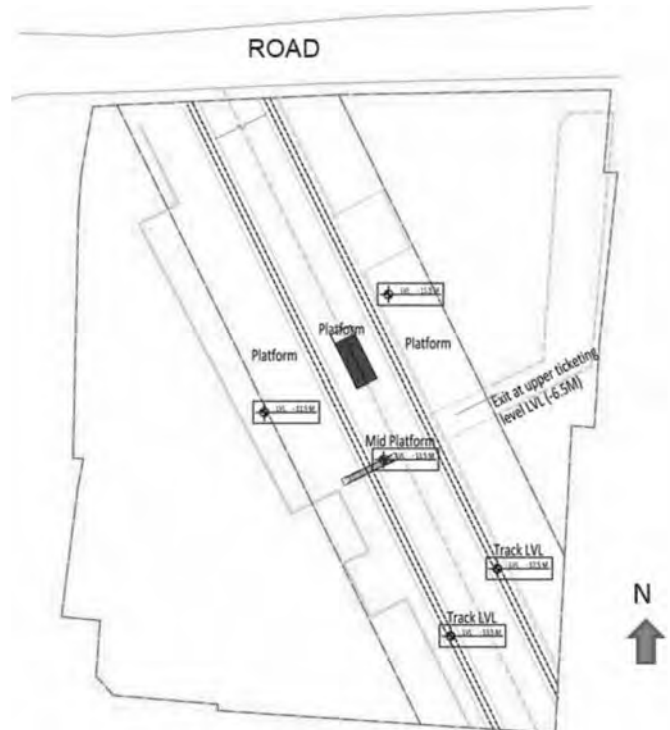


Fig. 2 : Site plan showing the layout plan of proposed underground metro station.

### Design Proposal :

The overall site area measured 3.02 acres. The site is close to Russel Market, a FAR of 2.5, and ground coverage of 75% was allowed as per the Bruhat Bengaluru Mahanagara Palike (BBMP) byelaws. As a result permissible total built-up area was 30,577.5 Sq. M in which ground coverage was 9173.25 Sq. M. Proposal of underground metro line almost divided the site into two and with 20 M offset the two triangles measured 4346.371 Sq. m and 2579.25 Sq. m. Central atrium measured 4170.14 Sq M. To achieve the required FAR with the given ground coverage a minimum of ground plus four floors were required but the maximum permissible was ground plus 12 floors. Therefore students proposed stores and food courts on the lower floors (Fig 3 and 4) and upper floors were given for offices and restaurants (Fig 5 and 6). Location of the site being in the prime area, the shops were designed keeping in mind the visibility of shops and brand value. Hence the types of shops proposed were premium, standard and mini. While frontage of all these types had to remain uniform, the total area inside varied as per brand value. Premium shops were also proposed with fashionable currently trending double-height spaces. While these are general design processes carried out, challenges were picked up efficiently by three students.

AN INTEGRATED DESIGN FOR SHOPPING CENTRE AND TRANSPORTATION HUB AT SHIVAJINAGAR, BANGALORE



Fig. 3 : Ground, first and second floor plans showing the layout of shops. Two wheeler parking and entry-exit points to basement in ground floor.

**Central Atrium :**

Considering the location of the project to be in Shivajinagar, a place full of live, diverse culture and people belonging to different economic groups, the idea was to design a gentrified



Fig. 4 : Third floor plan showing the layout of shops and food courts.

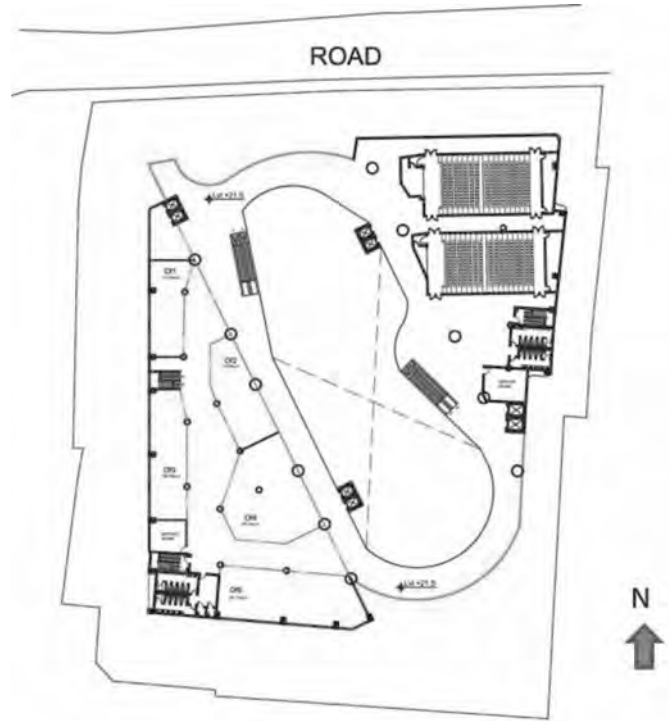


Fig. 5 : Fifth floor plan showing the layout of offices and multiplexes.

community space that feels more advanced yet boosts the sense of belonging, a place that invites people from the neighbourhood. Gentrification is a process of changing the character of a neighbourhood through the influx of more affluent residents and businesses. This is a common and controversial topic in urban planning. Gentrification often increases the economic value of a neighbourhood, but the resulting demographic change is frequently a cause of controversy. Hence we focus on gentrification without displacement. The design attempted to provide a solution for this issue by using the central 4170.14 sq.m space for place making of the space, where a vibrant, lively space, a market like ambience was created with temporary stalls and place for hawkers. Placemaking also included a performance area for street plays as a point of interest and seating spaces with beautiful landscaping (Fig 7).

The shopping complex was designed in a continuous loop between the two buildings with a point of interest (anchor stores, departmental stores, eateries) at the ends to make the shoppers walk all around the complex to generate footfall, majority of the shops are provided with shop fronts towards the atrium or the circulation space not only to achieve more rental value and to maximize the visibility of every shop but to create a more colourful atmosphere. The multiplex which is capable of generating footfall in the morning and night was located in a space in which the people have to walk past a line of stores to reach it. The office space above was designed as a productive co-working space which is not only a flexible space but a one with ample room of various sizes and functions.

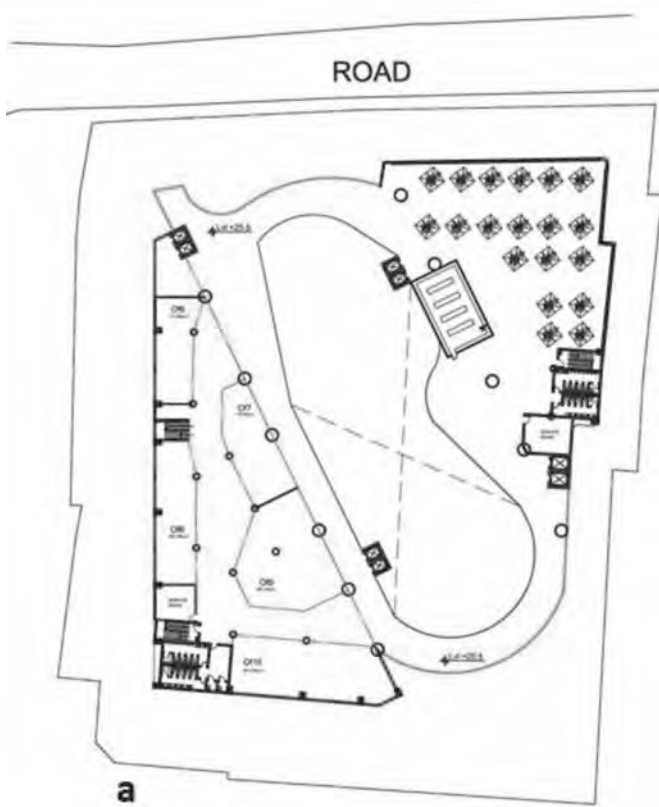


Fig. 6 : (a) Sixth floor plan showing the layout of offices and restaurants.

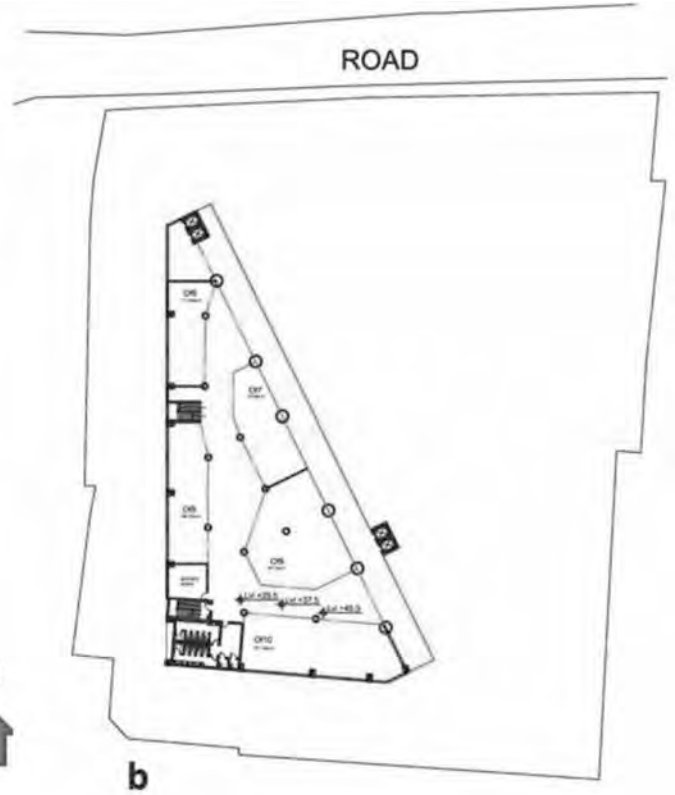


Fig. 6 : (b) Typical floor plan 7th - 12th

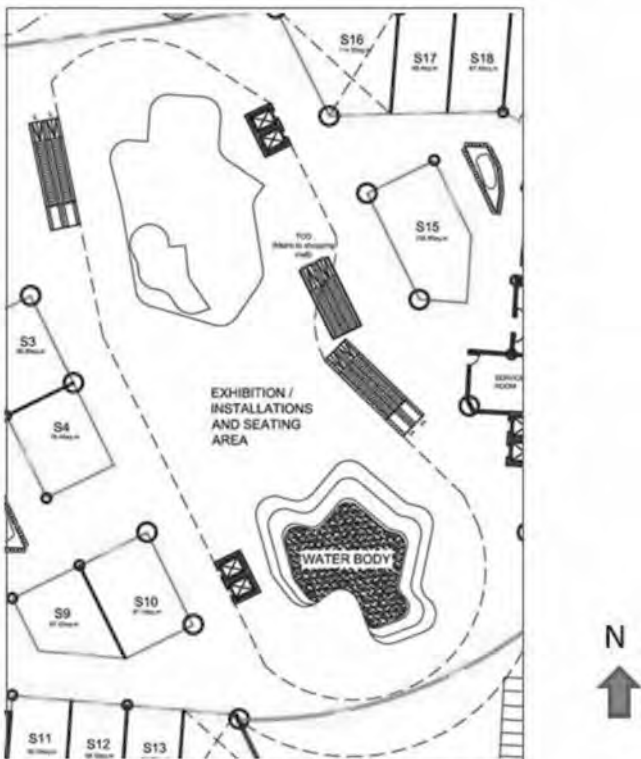


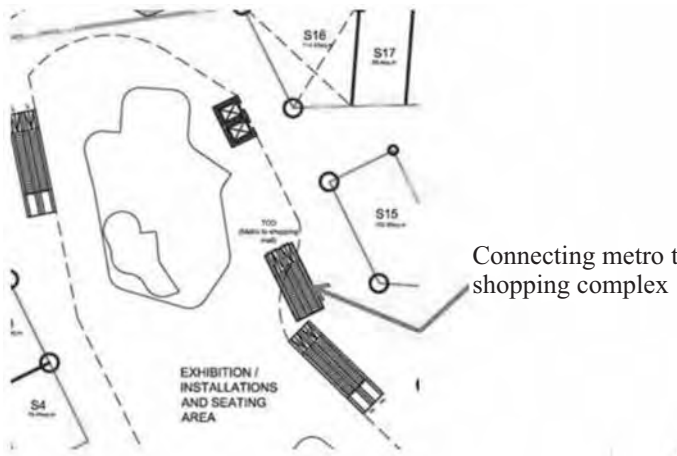
Fig. 7 : Central, Atrium design solution to the space above the metro station.

### Transit-Oriented Development (TOD) :

Though by definition 'TOD, or transit-oriented development, means integrated urban places designed to bring people, activities, buildings, and public space together, with easy walking and cycling connection between them and near-excellent transit service to the rest of the city' (ITDP), in this design problem we only focused on connectivity between the bus shelter and the metro station through the shopping complex. The metro line running below the site has the exit coming up into the site. The location of the exit is designed such that one can view most of the activities happening in the shopping complex as the public come up and also could accommodate the continuous influx of people from the metro. This will help the shopping complex attract more people coming out of the metro station. This is an international approach adopted by Korea, Japan, and the Netherlands among others. People can shop on their way home encouraging public transport over private. There are three ways to exit after landing in the shopping complex from the metro station.

- From behind the complex to the bus stand.
- Passing through the ground floor of one of the complexes to get to the bus stand.
- Walking through the site to reach the main road.

## AN INTEGRATED DESIGN FOR SHOPPING CENTRE AND TRANSPORTATION HUB AT SHIVAJINAGAR, BANGALORE



Making people walk through the complex and the site will be an added advantage to the income as the majority of the people who come there are for shopping and the rest as a point of change over routes to commute (Figure 8). Another attraction on the site is the weekly flea markets. This will hold the people for a little longer on the site and encourage them to explore more places in the site thereby helps in community integration. The site also transformed as a congregational space during the festivals like Ramzan and St Mary's feast, the two main festivals observed in the neighbourhood.

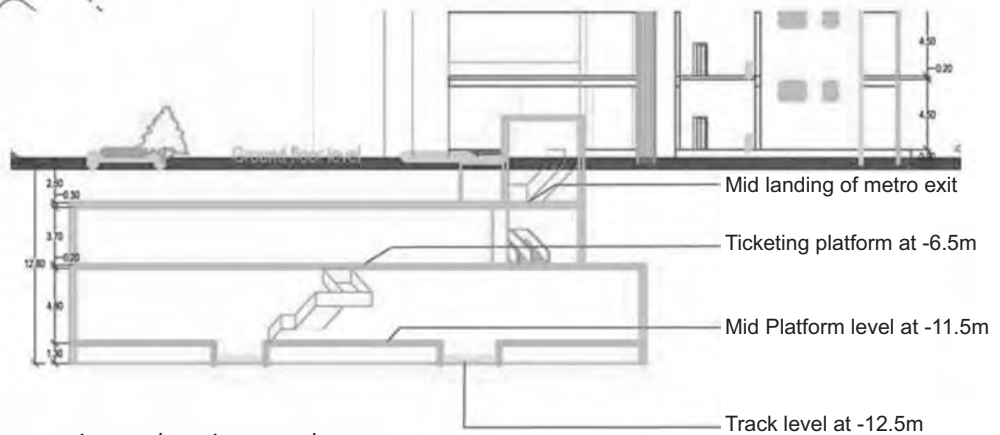


Fig. 8 : TOD, connecting metro station to shopping complex

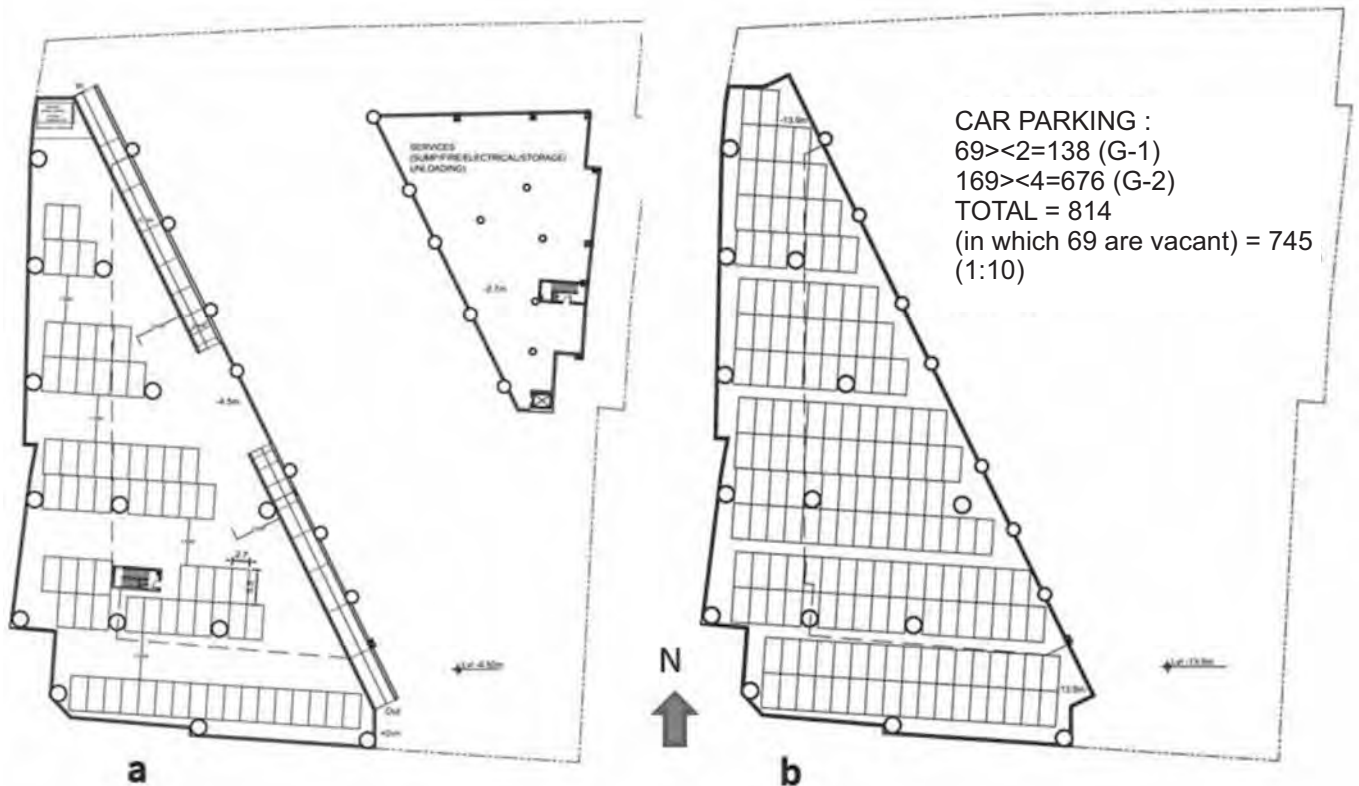


Fig. 9 : Basement Floor Plan. (a) G-1 Parking, (b) G-2 Stack Parking

## AN INTEGRATED DESIGN FOR SHOPPING CENTRE AND TRANSPORTATION HUB AT SHIVAJINAGAR, BANGALORE

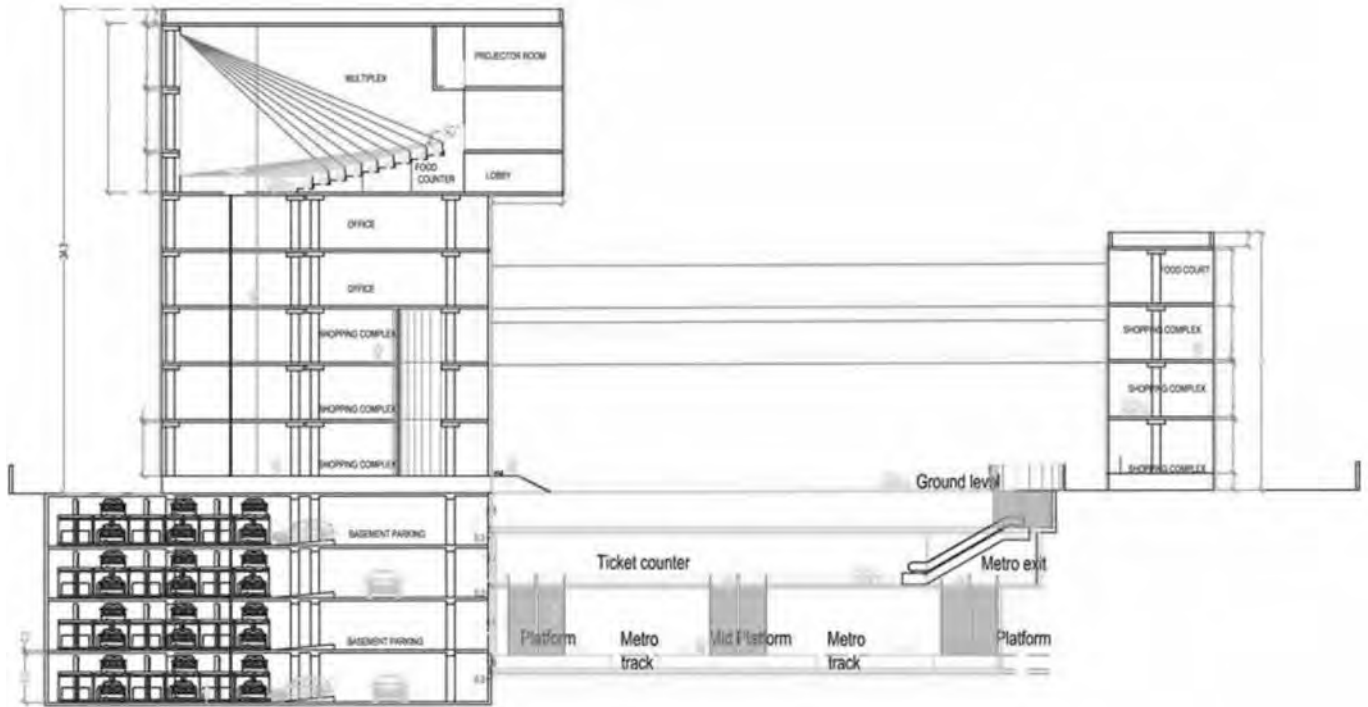


Fig. 10 : Section showing the two block of shopping complex with the underground metro station and basement car parking

### Parking facility :

As per the byelaw for the permissible built-up area obtained, parking for 600 cars were required with around 1000 two-wheeler parking. It was a challenge to provide parking for the required number with the available site area and the restrictions due to the proposal of an underground metro station. After referring to several case studies, new techniques of car parking were identified that are fully automated. Stack parking is one such type and among several types of stack parking Puzzle Stack Parking was adopted as it has the advantage of less ground coverage with provision for more cars (Figure 9). To fit the required number, two levels of parking were provided, in which G-1 level had 2 stacks and G-2 had 4 stacks. Only the G-1 level is accessible for the public whereas the G-2 level was restricted to service purposes only.

Parking in the basement is given access through a ramp, for entrance and exit separately. Vacant voids are provided for easy flow of cars to stack and to get them out (Figure 10). The Parking was divided into clusters of five, so that the operation could be done in less time. The entire Puzzle Stack Parking is run by electricity and a separate generator was provided for parking to function even when there were power shutdowns. Two-wheeler parking was provided at ground level in the front and on sides of the site. The foundation design for the basement considered vibration of the metro rail movement.

### Conclusions :

The design of the shopping complex with integrated TOD was thus handled by the students efficiently who came up with innovative design concepts. The design not only looked at gentrification without displacement but also provided design solutions to bifurcated site through interconnected building parts. The challenge of providing parking facilities was tactically handled by recent innovative method of mechanical stack parking system.

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# Changing Land Dynamics Due To Urban Sprawl



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Ar. Varsha Singh is an Architect (B.Arch 2009 passout) and Regional Planner (M.Plan 2011 passout) from Pune University and School of Planning and Architecture, New Delhi respectively. She has 9+ years of experience in planning, designing and execution of residential, commercial and institutional projects in North India and is currently working at National Institute of Urban Affairs, deputed at Delhi Development Authority for the formulation of Master Plan for Delhi 2041.



**ABSTRACT :** *As per the information available from the United Nations, two thirds of the world economy currently is generated from cities, and as per the recent estimates and trends, nearly 70 percent of the world would live in urban areas by 2030. For India, the estimated urban population stands at 50 percent by 2030, a massive change from the current 35 percent.*

*Land is a limited resource and one cannot stop a megacity such as Delhi to put a stop to in-migration, thus, there is a pressing need to combat this resultant, unchecked urban sprawl which is leading to depletion of fertile peripheral agricultural areas, under utilisation of existing land use due to restrictive building codes, depletion of water bodies etc.. The maximum growth in the near future is expected to be in and around megacities which see the maximum amount of migration of people from rural areas to these bustling urban centres in search for better opportunities and improved quality of life.*

*The ever-increasing population cannot be accommodated within the existing city limits without taking proactive steps such as reworking the development controls, spatial redistribution, encouraging mixed land use development, implementing transit-oriented development models, improving infrastructure network. There is an immediate and serious need for effectively and efficiently integrating issues of land use, housing, socio-economic aspects, industrial/services development, energy use, transportation and environment planning in these ever-expanding urban centres to accommodate this population and preventing urban sprawl instreaming several cross-cutting issues such as climate change, disaster risk reduction etc. as well as following laid down planning procedures. Even with a growing population of close to 1.8 crores, one cannot by any stretch of imagination stop migration into Delhi, but through effective, scientific and contemporary planning tools, we can definitely improve the living conditions of those who choose to inhabit the megacity.*

**KEYWORDS :** *Urban sprawl, Urbanization, Megacity, Land and Population, Sustainable cities*

## Introduction

"Cities are born, change and sometimes disappear based on the creation or closure of commercial routes, development or decline of industrial manufacturing processes, discovery or exhaustion of mining resources, or development of services and tourism" (Lacaze, 1990).

Cities are seen as epicentres/ engines of economic growth. For India this roughly translates to 50 percent of urban population by 2030. Globally too, this number stands at 50 percent contributing to 80 percent of the global GDP. Cities are thrust areas for economic and social development. They focus much

of the national economic activities like trade and commerce, governance, transportation, and thus act as a bridge between rural and urban areas. It is this economic growth that propels the productive peripheral rural areas to turn into nouveau cheaper urban areas.

## Background and Purpose of the Study

As per the information available from the United Nations, two thirds of the world economy currently is generated from cities, and as per the recent estimates and trends, nearly 70 percent of the world would live in urban areas by 2030. For India, the estimated urban population stands at 50 percent by 2030, a massive change from the current 35 percent.

Land use transformations that occur in these fast-growing urban centres particularly under the form of urban sprawl, is an important phenomenon due to its environmental and socioeconomic impacts. This sprawl directly has an impact on the transformation of the land use of not only of the urban area, but also of the immediate area of influence which usually is the highly productive-peripheral agricultural area.

Of course, optimists would always favour urban sprawl for its superficial positive aspects like better employment opportunities for people, enhanced economic growth rates and lower property prices. But, the negative aspects such as higher water and air pollution, increased traffic fatalities and jams, loss of agricultural capacity, increased car dependency, higher taxes, increased runoff into rivers and lakes, harmful effects on human health, including higher rates of obesity, high blood pressure, hypertension and chronic diseases, increased flooding, decrease in social capital and loss of natural habitats, wildlife and open space. Urban sprawl effortlessly eats up prime agricultural land, woodlands, wetlands in its path. It consumes immeasurable acres of forests, farmland, woodlands and wetlands and in its wake, leaves vacant storefronts, vacant houses, closed businesses, abandoned and usually contaminated industrial sites and traffic congestion.

**Objectives of the Study**

This study starts with understanding the concept of urban sprawl and also investigates the drivers of urban sprawl which dictate the transformation of land. These mainly pertain to the effects of rapid development and city structure transformation. Identifying the driving forces are useful concept for exploring urban sprawl. This requires an understanding of causes and effects on the structure of the city. This paper seeks to explore these driving forces through study of urban sprawl and its connections with various guidelines set by planning authorities in various cities. In addition, this study shall reveal the connections between these driving forces and its effects on the land dynamics in cities, highlighting the most significant factors such as land degradation, socio-economic and environmental issues.

**Methodology**

The background study deals with the topic and shall help understand the viability and need of the study. It includes the important analysis of the rising trends of urbanisation in India and establishing the essence of Urban Sprawl and concluding with the factors responsible for it. The literature study will help in understanding the phenomenon of sprawl in detail. This is followed by the analysis of the status of urban sprawl in the city and fringe areas and the triggering factors leading to sprawl. The third stage aims at identification of the issues and problems as an outcome of the analysis. The last stage elaborates about the formulation of the planning strategies for an integrated and planned development approach of urban sprawl of a city. For case studies, two cities have been taken up for understanding the phenomenon and identifying the underlined causes of the change in land dynamics of the two cities respectively.

**Concept of Urban Sprawl**

Urban sprawl is the growth of a metropolitan or urban area in an unplanned and unstructured manner. It occurs due to callous development of prime peripheral land into scattered urban uses. The remainder areas or gaps left in between are slowly bridged with complementary uses. Urban growth patterns can be found across time and space due to physical, geographic, cultural, legislative, administrative, social, economic or environmental constraints (Mitrea, 2008; Petrişor, 2008). This sprawl can be further classified as compact (e.g. concentric, grid, or linear) and diffuse (e.g. patches, tentacles, strips, federative). Temporal growth of urban centres determines the future path of these cities.

**Types of Sprawls**

Broadly sprawl is of three types or in other words a city grows in a set and understood spatial pattern which can be described through three terminologies described by Harvey (1965). These are: - Low density continuous development, Ribbon development and Leap frog development:

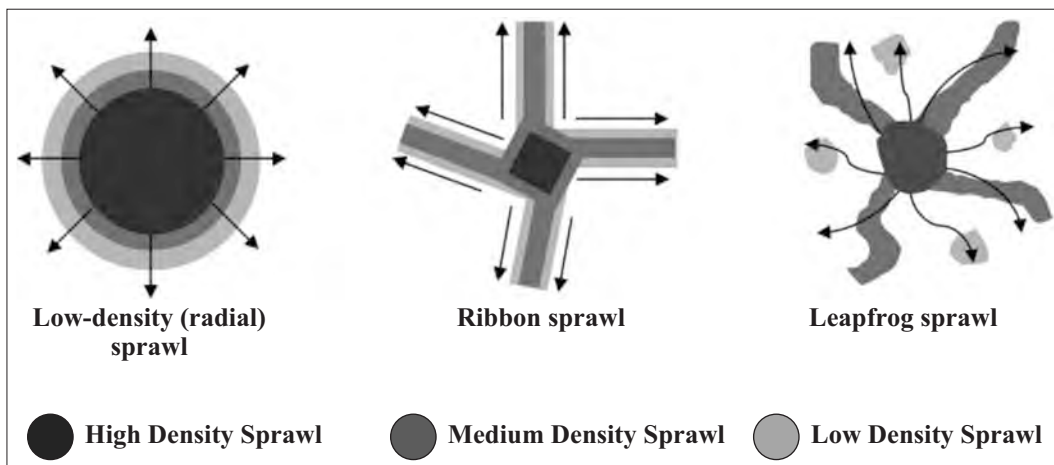


Fig. 1 : Types of Urban Sprawls (Source: link.springer.com)

**Low-density sprawl** - The immoderate and unplanned consumptive usage of land for urban uses along the periphery of current urban areas/ city limits. It also exhibits bunched up physical and social infrastructure like water supply, sewerage, electrification, schools, health clinics and that of mobility.

**Ribbon development** – This variety of sprawl tends to follow the major transportation corridors that originate from the core city. This newly converted land, over a period of time tends to demand a better premium due to its enhanced attributes. The corresponding infrastructure extends vertically as well as horizontally along the development corridors. (Linear). It is only the land along these transport corridors which are developed. Those parcels that are devoid of this do not tend to undergo this transformation.

**Leap frog development** – This type of sprawl consists of the sporadic arrangement of land in urban use. These parcels tend to be separated from each other. This form of development is the costliest and most resource consuming with respect to providing urban services such as water supply and sewerage.

### Characterizations of Urban Sprawl

According to Galster et al. (2001), there are 8 clear indicators of sprawl-

**Density** : In terms of population and building density.

**Continuity** : In terms of sporadic or continuous development of the said fringe areas.

**Concentration** : In terms of how evenly spread the growth is, whether it is even or sporadic.

**Clustering** : In terms of the degree of the bunching up of development.

**Centrality** : The loss of centrality is one of the most serious concern about sprawl.

**Nuclearity** : In terms of the number of city cores and its impact on the new fringe development.

**Mixed uses** : In terms of separation of different types of land uses from one another (in terms of division of residential, commercial, institutional, recreational uses, along with differentiation on the basis of income and race)

**Proximity** : In terms of the contiguousness of the different types of land uses with one another. The lack of which contributes to secondary causes of urban sprawl.

The built-up component of an urban-scape is what is taken up as a standard in determining the urban sprawl (Torrens and Alberti, 2000; Barnes et al., 2001; Epstein et al., 2002). It is measured as the key component of urban sprawl. This built up data is acquired using satellite imagery, toposheets, survey maps.

### Impact of Urban Sprawl on Development

#### Land Impact

Unlike what we are made to believe, urban sprawl isn't a new term or for that matter a new phenomenon. It is a natural phenomenon accompanying rapid urban growth. It dates back to Roman age as well, when Rome was the first city to reach a status of being a million plus city. In spite of several impositions and limitations put on Rome, it grew.

But sprawl is the unchecked, unintelligent, unplanned, clustered growth and expansion of an area without completely exploring the impact of such a spread. It is steered by a plethora of different externalities that lead to inefficient and detrimental resource implementation that can be attributed to the result of urbanisation. The major characteristics can be based on density changes, growth pattern, land use, public service access, public space, infrastructure and the planning process, among the other indicators discussed above.

Such expansion thus occurs in a scattered fashion, and productive agricultural land is frequently replaced with suburban sprawl, even though sprawl is synonymous with growth, it generally has negative connotations due to the health, environment and cultural issues associated with the term. As cities get bigger, the first natural and organic step to follow is the expansion around the peripheries and along the major transport corridors. This is far easier and cheaper than redensifying the central core/centrality of the city, in order to accommodate the increasing population.

Urban sprawl is often seen as a short cut to urbanisation, a lazy form of urban development that devours productive peripheral agricultural areas. With lesser initial investment, one can easily accommodate the increase in population within the urban fringe areas, without touching the existing development code or building bylaws. The rate at which India's productive agricultural land is being destroyed and recklessly developed and converted to other uses continues to increase. This again happens due to a wide variety of factors. Agricultural areas in the periphery of such urban settlements is also usually the most productive, but due to its location and proximity it is almost always lying in the way of urban expansion or development.

Such a fringe can be a bridge between the rural area on the one side and urban centre on the other; all the characteristics of urbanity and realism are medium in the fringe area. These characteristics are travel time, urban habits, land-values, public utility services, community population, non-agricultural activities, population density, primary activities, built up area and sex ratio, literacy and agricultural activities, etc. The characteristic may vary from town to town on the basis of the physical and cultural status of the town.

Obviously, the long-term implications of such random, clustered development are neither accounted for nor catered for. The rate at which the peripheral land is acquired for development far outruns the rate at which there is planned growth. It then becomes a classic case of short-term solutions breeding long term problems. In such cases it is the market forces that completely dictate the land use change dynamics.

Urban sprawl not only eats up prime agricultural land, it impacts on natural resources and energy, life quality and health, but also destroys the rural economy, makes urban infrastructure unsustainable due to large networks that forms as a result of this expansion, uneconomical commuting due to the lower quality of transport services, increased cost of living apart from damaging our environment irreversibly. (Salas-Olmedo and Nogués, 2010)

Another consequence that is often side-lined is the concentration of higher income groups in these low-density areas, which end up creating pockets of high and extremely low-income groups. The more affluent one is, the closer they stay to their workplace and to the public infrastructure, as it is these areas that demand the highest cost for the same parcel of land.

In order to tackle this, the immediate thought of redensifying the existing inner cores and implementing what is the go-to concept of the decade of "Transit oriented Development" comes to mind, besides alterations to the development codes, building bylaws.

In another dimension, transportation and communication technology innovations have also contributed to the spread of urban functions over wide geographic areas, resulting in settlement systems that are not easily captured by a simple urban-rural structure. In addition, some areas with zones of huge intense economic activity have emerged in the intersection between cities and rural areas that are neither urban nor rural. In the traditional sense they contain essential elements of both. This has resulted to be the scene and setting of a huge social, economic, and political transformation. The physical aspects like that of urban development, socio-economic factors have been effectively considered when quantifying urban sprawl issues.

The analysis of urban sprawl and its indicators provides a deep insight in addressing the main issues related to the land use and land cover features. In fact, through the indicators of urban sprawl, and in addition to that the consistent assessment of the situation, it is possible to understand the dynamics of landscape capacities of peri-urban areas around urban agglomerations and therefore to reform the planning instruments in current practice.

Urban Sprawl is not limited to developed countries, and may be even more prevalent in developing countries. Future population growth in developed nations will be far more

controlled. Almost 80 percent of their population already resides in urban areas. Whereas, the opposite holds true for developing countries. They are at the cusp of the transformation process from an agrarian to a manufacturing or service driven economy. This shift is what causes the decline in agricultural practices and paves way for a permanent shift to secondary and tertiary sectors.

The growth of any city depends on the main contributing entities like population growth and time. With time this dynamic process of sprawl evolves and leads to formation of agglomerations and conurbations spreading over other urban centres and engulfing more suburban areas. Hence there is certainly a two-way process between these factors that lead to change in the city dynamics and these factors are thereby responsible for Sprawl. Sprawl can be said to be a result of these changes and vice-versa. Hence it will not be wrong to characterise Sprawl and define it like a process, a phenomenon rather than a constant.

### ***Socio-Economic Impact***

The outcomes and centrality of spread, great or not, are assessed dependent on its financial and natural effect. In the accompanying segment, the financial results of spread are considered, just as the effect of spread on ecological assets and characteristic assets.

The feeling has all the earmarks of being isolated over the social and monetary effect of spread, and proof shows that the two advantages and costs collect from this wonder. For instance, a publication in Herald on September 5, 2001 that considered the social advantages of spread referred to an ongoing report by Matthew Kahn of Tufts University's Fletcher School, where Kahn presumes that spread is decreasing the lodging hole among blacks and whites and is expanding the reasonableness of lodging in the two rural areas and urban communities. "As spread builds, the lodging of Black Americans all the more intently moves toward that of White Americans in the size of their homes and probability of home proprietorship" (Herald, 2001). Pundits of current enemy of spread projects are worried that these endeavours will drive up lodging costs, expanding the potential for exclusionary impacts.

In any case, spread forces significant financial, passionate, tasteful, and physical expenses on inhabitants in the country's significant metropolitan regions. Horrible financial costs incorporate higher charges, greater expenses of giving framework, antagonistic monetary impacts on neighbourhood governments; sick wellbeing from air contamination created by traffic, and decreased specialist efficiency. Passionate costs incorporate loss of network soul and qualities and loss of feeling of spot. Tasteful costs incorporate less recreation time and uglier, dreary rural scenes. Physical costs incorporate stuffed schools, expanded traffic blockage, longer driving occasions, and increasingly

forceful driving examples. There is checked spatial divergence in riches among urban communities and rural areas, and land improvement design setting up and utilizing mass travel frameworks troublesome (Harrison 1967). For example, Stoel refers to a recent report on traffic clog that gauges the normal Washington D.C. worker loses two work filled weeks out of every year stuck on streets and interstates, with the expense in postponements and fuel totalling 1,055.00 Dollars per inhabitant of the metropolitan locale (1999).

### **Environmental Impact**

Sprawl considerably affects biological systems and other ecological assets, which give cultural and natural advantages just by existing and working. These fundamental natural and physical frameworks incorporate wetlands that give flood control and wastewater redesign; air, timberlands, and meadows that give atmosphere guideline; biodiversity factors that add to solid, well-working biological systems; and merchandise, for example, sun powered vitality, wind vitality, style, clean air, clean water, and potential assets. Natural assets add to, however are not immediate sources of info or yields of monetary frameworks, for they are products and ventures gave ordinarily set up, merchandise and enterprises that proceed as long as the biological frameworks and spaces expected to create them stay unaltered. Nonetheless, over the top contamination, biological system demolition, and different types of abuse debase or crush natural assets (Daily 1997).

Different impacts of spread may not be so self-evident, on the grounds that they hinder the nature of both ground and surface waters, ineffectively performing septic frameworks which represent a noteworthy ecological risk. Inhabitants who are subject to close by or on location wells for their water supply may find that groundwater pollution by bombing septic frameworks, which compromises their well being and welfare. Likewise, gushing from polluted groundwater sources and tempest water overflow starting from impenetrable surfaces debases sea-going, estuarine, and close shore marine biological systems.

### **Impact on Natural Resources**

Rural areas are presently viewed as the predominant private, retail, and business focuses of development, political muscle, and the continuation and replication of this pattern places tremendous pressure ashore, water, and different assets (Diamond and Noonan 1996, 94). Rural and exurban advancement not just debases ecological assets, for example, water quality, air quality, and untamed life territories, yet additionally restricts or disposes of openness to normal assets, for example, farming lands, timberland, minerals, and water. Common assets are the structure squares of monetary frameworks, without which economies would stop to work. Regular assets are removed from the ecological situations and changed into completed merchandise or utilized for control.

Farming grounds, timber, and water are sustainable assets in that they react to human control, and with cautious the board, their utilization can be broadened uncertainly. Minerals, for example, non-renewable energy sources and metallic minerals are non-inexhaustible, for they are devoured in the creation of products, and people can't incite their collection.

Croplands and brushing lands are regular assets in that the items or merchandise got from these terrains – yields, meat, and poultry—are extricated, at that point conveyed among individuals from society by means of commercial centre exchanges. Farming in India relies upon a blend of natural administrations, for example, soil richness, soil dampness, sun powered vitality, and atmosphere, contributions of human, animal, and petroleum product vitality by means of work and apparatus, and a variety of different sources of info, practices, and projects, for example, composts, pesticides, water system, soil preservation, research, and government agrarian bolster programs.

### **Case Studies**

For the purpose of understanding the impact of urban sprawl on land dynamics and the reasons behind that growth, two cities are taken into consideration for understanding and identifying the factors. The cities chosen have distinct features and are among the tier 2 cities.

#### **Pune**

Pune has a population of 31.15 lakhs as per census 2011 and ranks 8th in the list of most populous cities in India. There has been 74% increase in the urban area for Pune in the period of 1971-2001. The city density is 128 pph and the growth pattern shows sectoral residential development clusters evident after 1985. Some of the salient features for the city and its fringes are:

- The rapid advent of Information Technology (IT) attracted migrant workers post 2001. Pune saw a rise in population by approx. 50% in search of better career opportunities.
- Maximum number of people living in the peripheral areas of Pune were dependent on this amplified income. Which in turn enabled them to afford better housing with better infrastructure. This led to development of residential townships in the peripheral areas which led to changes in land dynamics in the form of unplanned, haphazard development.
- The expansion of the core city along the transport nodes had transformed the predominantly agricultural peripheral areas, into new residential townships. This newly converted habitable areas were then inhabited by the migrant population that cannot afford the high rents in the inner core, so the construction in fringe areas were all rampant and unplanned.

- The unplanned growth had a number of serious adverse effects. Large areas became characterized by the initial scattered land uses so that balanced planning of the areas became impossible. The lack of planning is also reflected in the high cost and poor qualities of public facilities serving the urban fringe areas.
- In-migration towards cities due to lack of employment in the agricultural sector and displacement of people due to river-erosion and frequent natural disasters produced high rate of urbanization.
- As Urbanization took place, their needs increased, the greater number of people started living in smaller plots of land which led to increase in density of buildings, basic necessities and more consumption of water with other natural resources. This resulted in depletion of water body, namely river Mula-Mutha, due to urban sprawl which can be seen in the temporal analysis in the land use maps showed below.

**Jaipur**

Jaipur is the 10th most populous city in India with 30.73 lakhs people spread over an urban area of 288 sq.km. The density in 2001 in 107 pph experiencing mixed development pattern after 1980's on the fringes. Industries are the most important economic base for the city and have a work participation rate of 49%. Some of the salient features are:

- Requirement of additional houses has increased the demand of land within the core city and outskirts of city. Increasing land value trend shows the demand of residential land increased over time, as when mass migration happened, the need arose which increases the standard of living and people are compelled to live in outskirts to satiate the same.
- The pressure increases on the urban area, the demand of land increases, the land prices go up, even the sharing of basic infrastructure like road network, water supply, sewerage, and natural resources like land, ground water increases.

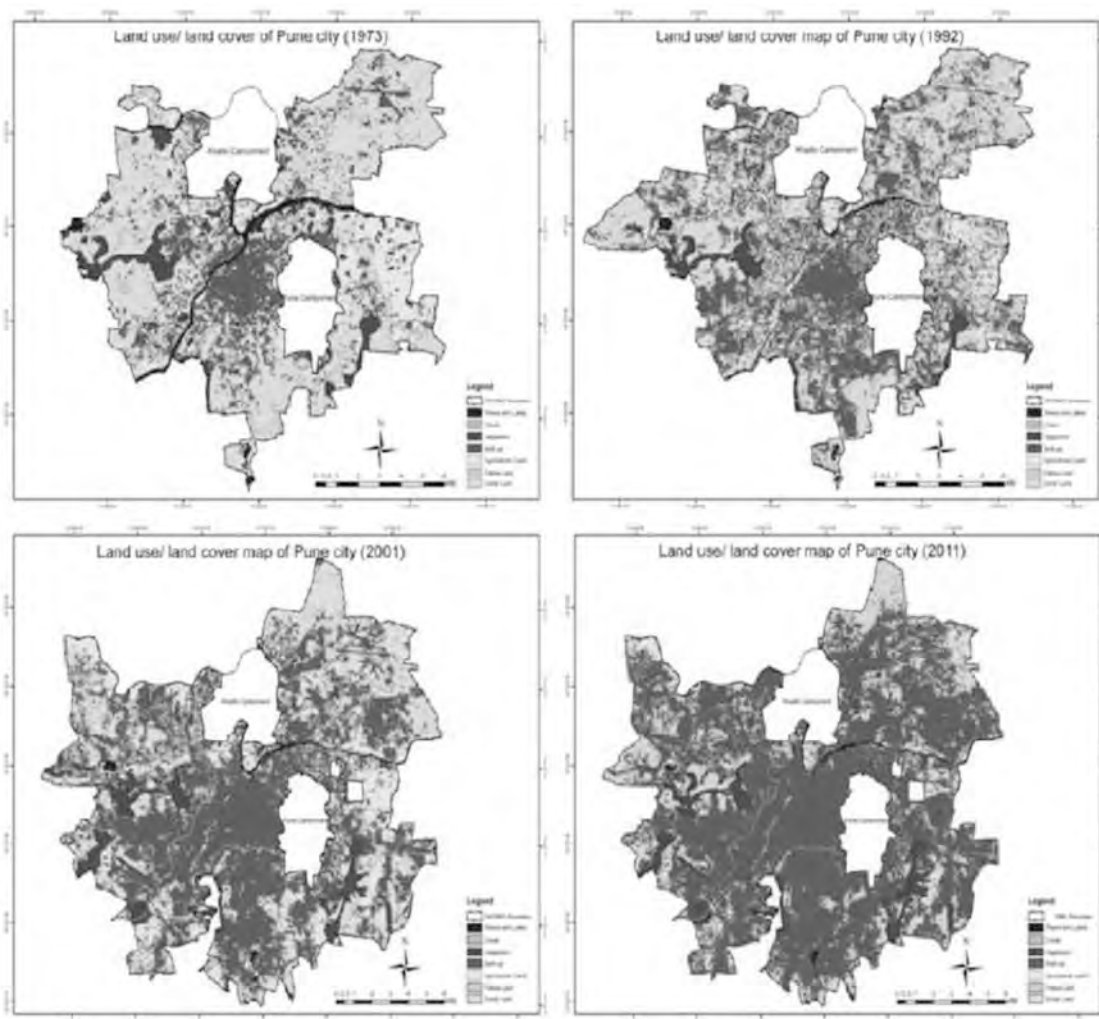


Fig. 2 : Land Use/Land Cover Map of Pune 1973, 1982, 2001 & 2011  
(Source: Landsat Thematic Mapper)

- The emergence of fringe zone with its complex problems of adjustments in between rural and urban ways of life has led to serious land use problems like loss of agricultural land, unauthorized urban sprawl, high land values, unauthorized constructions and speculation in land prices due to market forces.
- It has been observed that there has been a 400 percent growth rate in urban area from 1971 to 2001.

**Conclusion**

The expansion of urban area is mainly at the cost of peripheral agricultural land. The private developers played an important role in land development. Development control rules used by town planners have always been a tool for controlling the city sprawl. But as one can see, in the 1980s period, due to availability of surplus land for urbanisation, there were no such development control rules or building bylaws to control the urban sprawl. This led to city expansion and change in its dynamics over a period. The core/ central part of these cities especially the old areas lack basic facilities like proper drainage, sewerage and solid waste disposal. This not only led to expansion along existing infrastructure, but led to income and race-based clustering of population.

The absence of intra city public transport in these older pockets having narrower roads and poor connectivity has hampered the inner-city growth, pushing the city outwards. For optimal utilisation of land, the existing legal tools, building bylaws and regulations should be reformed and liberalised. There is a need for demand-based building regulations. The building bylaws need periodic revisions and changes as per changing market scenarios. There is a need for increased plot coverage, building heights, along with an increase in population density, which would in turn curb the city expansion, enabling better use of existing land. In view of this, the science-based effective control of urban growth has become an important component in the city planning that must be considered in urban planning and policy design, to curb damaging land use changes due to city sprawl.

**Acknowledgement**

The completion of this research paper gives us immense pleasure. We are extremely grateful to our families for the continuous motivation and support during the preparation of this research. Also, we would also like to thank our workplaces, University School of Architecture and Planning, GGSIPU and National Institute of Urban Affairs for continuously providing us with good inspiration and motivation.

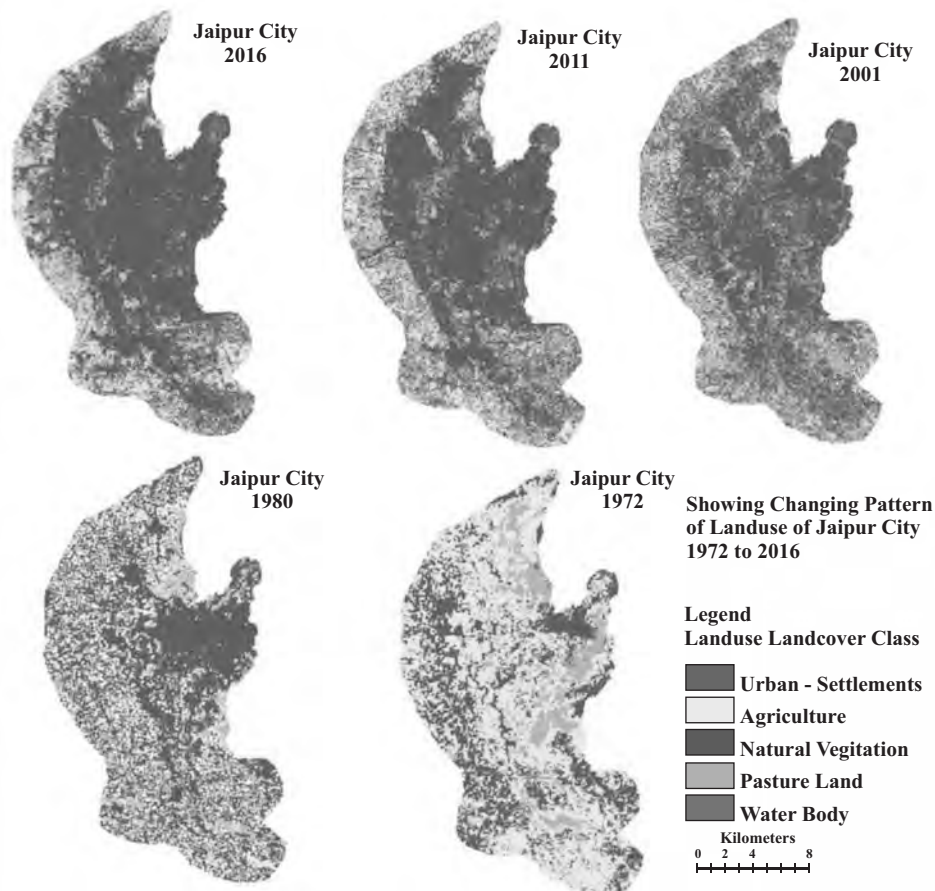


Fig. 3 : Land Use/Land Cover Map of Jaipur 1972, 1980, 2001, 2011 & 2016  
(Source: Landsat Thematic Mapper)

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# Arabian Sea Oceanarium : Place To Call Home For Marine Life



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Ar. Anirudha.S.Adivarekar, 25 year on-going born in Pune on 13 January 1995, he study Bachelor of Architecture from Pune University in 2018, first class with distinction, Current work as freelance architect. His thesis project "Arabian Sea Oceanarium: place to call home for marine life" is truly camouflage of Bio-mimicry architecture.



## INTRODUCTION :

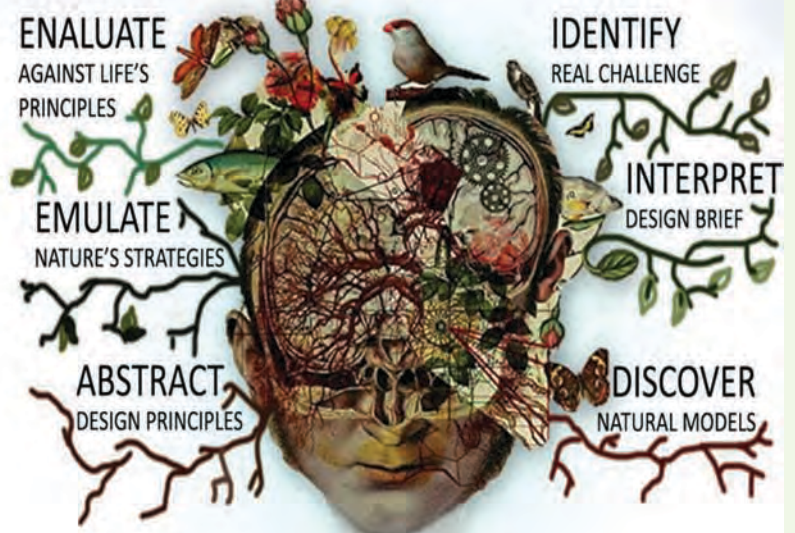
**What is the issue/purpose/cause does your thesis project serves?**

**Answer :**

The purpose of building an Oceanarium is to help reproduction of marine life, as open oceans and coastal sites are losing oxygen and low-oxygen zones are spreading due to rising ocean temperatures and nutrient pollution from fertilizers and human sewage. The project will house sea creatures that live in the epipelagic zone of the sea coast along the western coast of India, the Malabar, the gulf of Khambhat and Lakshadweep islands, situated in the Arabian Sea. This is where over 80% of the fish variety of India come from, which are in endangered due to the long term overfishing.

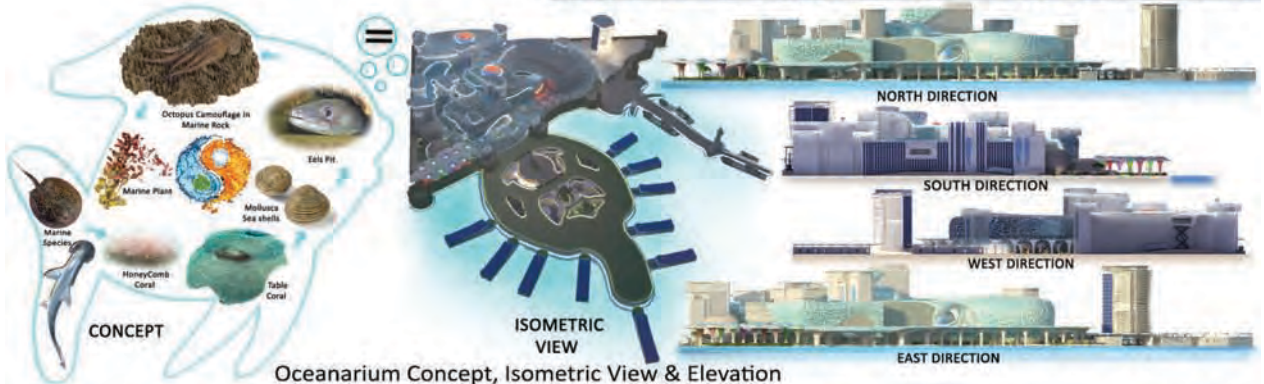
The purpose of the thesis project is also to hold a Marine DNA research laboratory, specializing in creating a vaccination for cancer, HIV/AIDS and age-related illnesses in humans, Sperm Test-tube laboratory for the reproduction of marine species. After the sea creature is dead, it is brought to the Oceanarium taxidermy Laboratory for preservation by stuffing or mounting, plastination, artificial mounting, preservation marine species in glycerol/ethanol/formalin and skeleton preservation for display and study purposes.

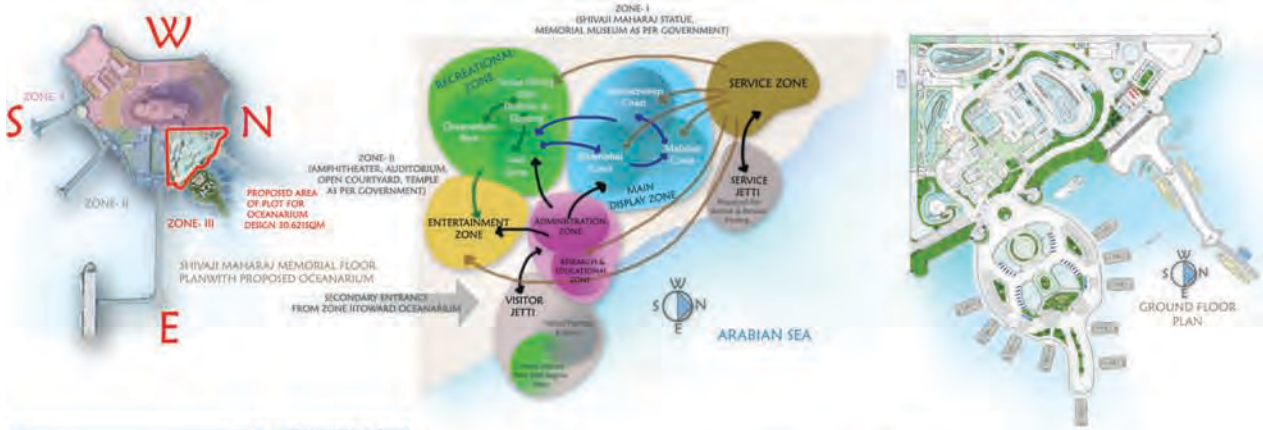
The project will provide job opportunities for 300 people of different capabilities including for physically challenged people. Planning is done taking into account accessibility for physically challenged staff and visitors with elevators with carrying capacity of 36-64 person. Escalators and ramps will be provided in adequate slopes and space for queues, all around aquariums to easy movement. Interior exhibit spaces range from grand to intimate, giving the spectators an array of diverse environments and moods.



**GENERAL DESCRIPTION OF PROPOSED SITE :**

1. SHIVAJI MEMORIAL SITE AREA: 1, 59,600 (15.96 ha)
2. PROPOSED OCEANARIUM CAMPUS SITE AREA: 30,621m<sup>2</sup>
  - BUILDING BUILT UP AREA: 15,131 m<sup>2</sup>
  - ANCILLARY BUILDING SERVICES AREA: 12,500 m<sup>2</sup>
3. PROPOSED OCEANARIUM CAMPUS SITE SETBACK :
  - Entire surrounding Shivaji Memorial site will have 500 m set back from 13 m Height RCC Janjira fort style wall. The Oceanarium campus site will have 6m setback from south & west side; 12m setback north & east side from 13 m Height RCC Janjira fort style wall.
4. PROPOSED SITE GENERAL DESCRIPTION AS PER BY STATE GOVERNMENT :
  - The site is located in the Arabian Sea supported on pile foundation resting on rocks. Since, the whole recreational plot is covered on rock, excavation for basement is not allowed by the state government.
5. SUSTAINABILITY ECONOMICAL :
  - Central government small percentage possible, major financing by state government economically viable sustainable
6. STRUCTURAL CONSIDERATIONS :
  - Self-Weight Occupants Load, Cyclone Earthquake (Seismic Load), Tsunami, RCC Pile Foundation & RCC M45 Composite Section & Grid Beam.
7. FACILITIES FOR REACHING The PROPOSED OCEANARIUM :
  - Total visitor visit per day at Oceanarium is expected to be 6000. As per proposed traffic plan 10 electric passenger ferry with 150 carrying capacity per hours from 10.00 am to 6 pm will be operating from Nariman point and gateway of India. From gateway of India Sea routes distance is 12 km and from Nariman point is 3.5 km.
8. Annual Energy Consumption & Surplus :
  - a) 500 solar panel for oceanarium space, which carry 500W per solar panel. Produce according to sun hours in Mumbai are as follows.
    - Annual Required Energy Consumption : 547.5MW
    - Annual Energy Generation : 799.7MW
    - Annual Energy Surplus : 252.2MW
  - b) 250 solar panel for public space, which carry 500W per solar panel. Produce according to sun hours in Mumbai are as follows.
    - Annual Required Energy Consumption: 273.75MW
    - Annual Energy Generation: 399.8MW
    - Annual Energy Surplus: 126.1MW

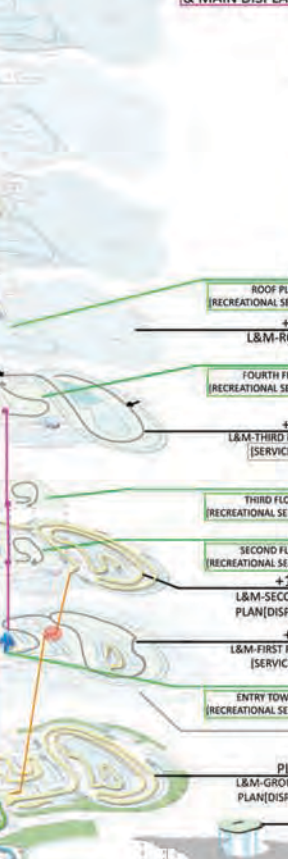
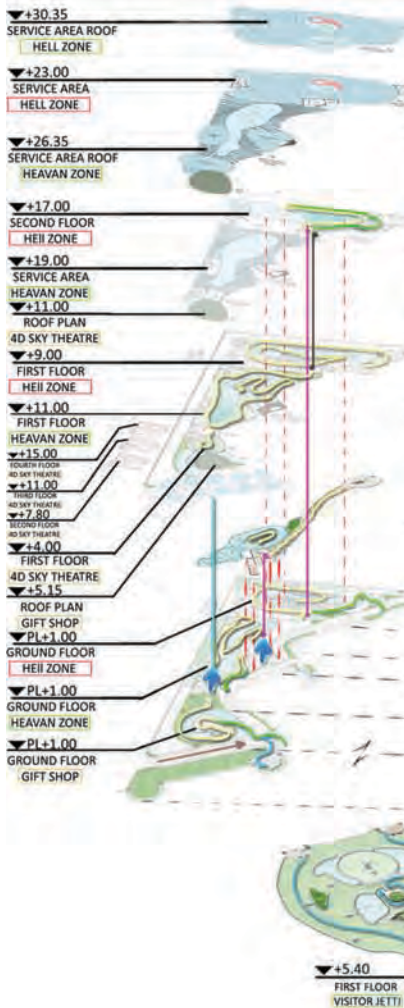




OVER ALL ROOF PLAN  
ADMINISTRATION  
& MAIN DISPLAY ZONE

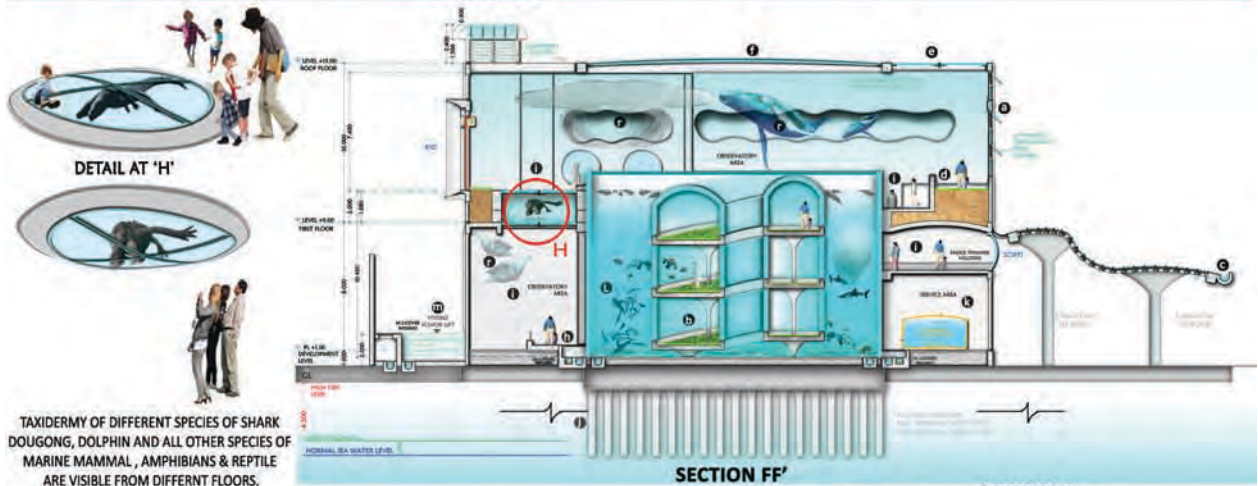
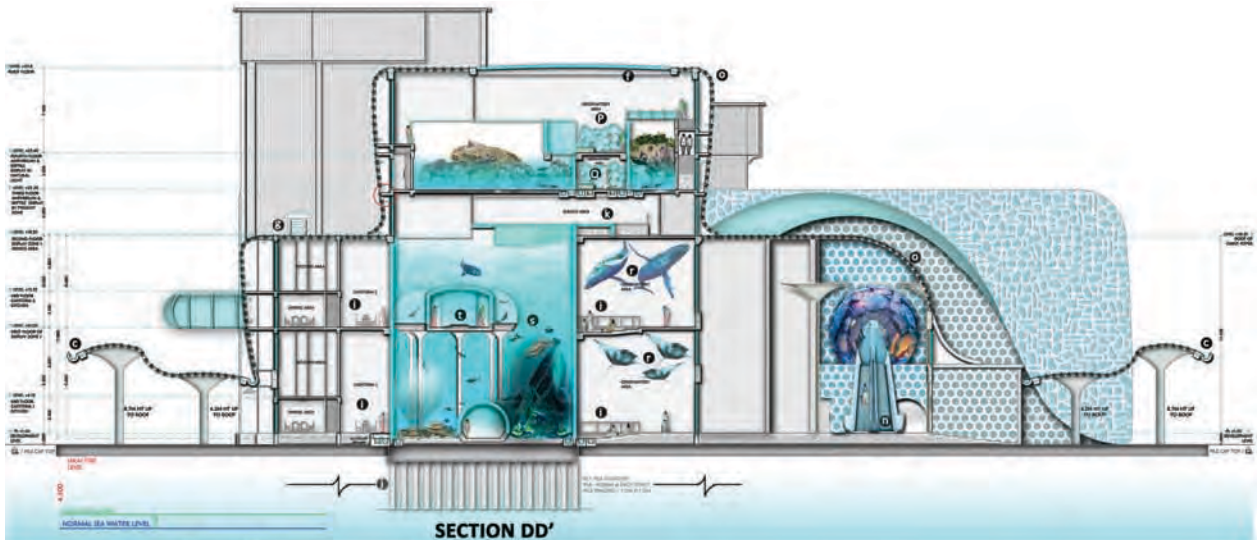
LEGEND

- L&M LAKSHADWEEP & MALABAR COAST
- KL&M KHAMBHAT, LAKSHADWEEP & MALABAR COAST
- K KHAMBHAT COAST
- FLAT ESCALATOR TOWARDS SECOND FLOOR OF L&M
- VISITOR CIRCULATION
- VISITOR ENTRANCE CIRCULATION
- VISITOR TOWARDS PRIMARY BASE
- POINT TOWARD NEW DIRECTION
- VISITOR CIRCULATION
- TRANSPORTATION CIRCULATION
- TRANSPORTATION OF MARINE SPECIES & EQUIPMENTS
- TRANSPORTATION OF GOOD'S
- LIFT TOWARDS DOWN FROM LIFT
- LIFT TOWARDS DOWN FROM LIFT
- LIFE ORIGIN EARTH
- LIFT TOWARDS UP
- STAFF CIRCULATION
- LIFT TOWARDS DOWN
- SECONDARY ENTRY FROM ZONE 1&2
- 0 PRIMARY BASE
- 1 MAIN BASE
- 2 MAIN FOYER
- 3 EXIT FOR MAIN & RECREATIONAL DISPLAY
- ↑ ENTRY POINT
- ↓ EXIT POINT



OVERALL GROUND FLOOR PLAN





TAXIDERMY OF DIFFERENT SPECIES OF SHARK DOUGONG, DOLPHIN AND ALL OTHER SPECIES OF MARINE MAMMAL , AMPHIBIANS & REPTILE ARE VISIBLE FROM DIFFERNT FLOORS.

**LEGEND**

- a Automatic Translucent Glass Louvers
- b Underwater Dolphin & Dougong Tunnel 195.81m Length & 1:18.65 Slope
- c Rain Water Harvesting
- d Jim Corbett Forest
- e Sunray Abstract RCC Louver
- f Aluminium Steel With Translucent Glass Roof
- g Duct With Aluminium Louvers
- h Twilight Jim Corbett Forest
- i Observatory Area
- j RCC Pile Cap Foundation
- k Service Area
- l Recreational Zone Dolphin & Dougong With Other Marine Species Giant Display Tank
- m Hydro Scissor Lift For Gaint Marine Species Transportation
- n Flat Escalator
- o Translucent Glass Roof
- p Amphibilan & Reptile Display in Natural Light
- q Amphibilan & Reptile Display in Twilight Light
- r Taxidermy Of Marine Species
- s Khambhat Coast Giant Display Tank
- t Underwater Khambhat Coast Tunnel 18m Length And With 360 Degree View Dome



**PLANNING CONCEPT**

As the facility will get a large number of visitors, special attention was given to the smooth movement of people visitors as well as staff and segregation of services. Attention is paid so that there is segregation of various movements.

**A. For Visitors :**

When visitor arrive from passenger ferry towards visitor jetty, they will located towards batch (II) entrance foyer (waiting area), with the help of electric cart or electric bus (until previous visitors complete their one round).

Electric vehicles move forward towards batch (I) entrance foyer for service check out and ticket counter. Visitors move towards Main foyer, which is center of motion around the aquarium, where visitors choose which zone such as main display zone or recreational zone or educational programs like to explore.

Giant foyer is exit point from (3) main display zone. Buruj is second exit point for visitor, who completes main display zone and recreational zone adjoining with 4D sky motion theatre and Aqua gift shop. Both the exit point take the visitor at Buruj, consist lift towards first floor of visitor jetty garden, to watch 360 degree views. Later on, move down from ramp towards ground floor of visitor jetty, for final exit.

**B. For Service and Supporting Staff :**

Staff will work in two batches, morning and night shift. 100 staff per batch will arrive from staff passenger ferry towards service jetty. They will be transfer on an electric bus and move towards batch (I) entrance foyer for checking. Then they go to supporting staff room for changing cloths and biometric checking in.

The staff works in many departments such as administrative, financial, reporting, announcement, guide room, taxidermy laboratory, workshop, marine medical and biological test-tube laboratory, instrument room, cafeteria kitchen room, educational program, Sea water purifying and pumping system, solar energy and rain water harvesting system, drainage and sewage treatment system, Electrical and Air-conditioning system, Water filtration and supply system, Automatic system etc.

20 fixed care taker staff will be staying in caretaker cabinet, divide in two batches of morning and night shift.

**C. Transportation of Marine Species and Equipment's :**

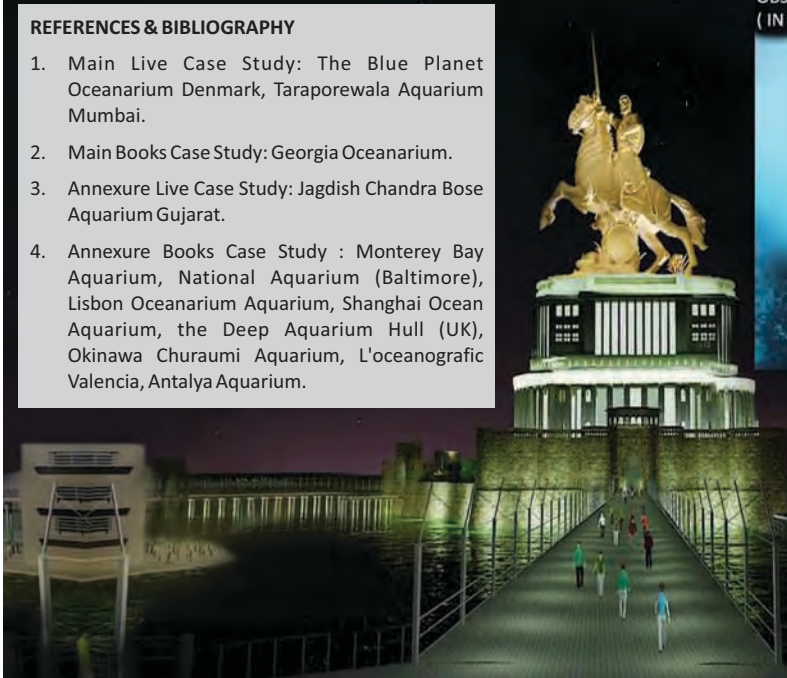
Marine Species and Equipment's are brought from service boat towards service jetty. Species or Equipment is first loaded in service truck and unloaded on dock; forklift will carry Marine Species or Equipment towards Oceanarium, with help service staff and service Elevator carrying capacity 2,500 kg towards destination display. But if marine species is huge in scale, service truck will directly transport towards hydro scissor lift carrying capacity 10-20 tons. Located in west and south side in recreational zone, where large marine mammals, fishes will be display.

**D. Transportation of Good's :**

Food supply for Cafeteria, Marine Species are brought from service boat per week only on Monday government which is a via service jetty.

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# WELCOME NEW IIA MEMBERS

## 21st Com 21st October, 2020 Meeting Online Elected Members

Sr. No.	Name	Memb. No.	Place
<b>ASSOCIATE MEMBERS ELECTED AS FELLOW MEMBERS OF THE INSTITUTE</b>			
1	Ar. Virendra Kumar Paul	F07320	Northern
2	Ar. Velu Subbaiah Sakthivel Raja	F09164	Tamil Nadu
3	Ar. Dinesh Raghavan E S	F18635	Tamil Nadu
4	Ar. Abhay Maruti Todankar	F16047	Maharashtra
<b>ARCHITECTS ELECTED AS ASSOCIATE MEMBERS OF THE INSTITUTE</b>			
1	Ar. Naresh Kumar Saroch	A24139	H. P.
2	Ar. George Bonny Rajan	A24140	Kerala
3	Ar. Rosin Jose	A24141	Kerala
4	Ar. Silpa S Babu	A24142	Kerala
5	Ar. Pavan Thomas	A24143	Kerala
6	Ar. Harneet Kaur	A24144	Punjab
7	Ar. Vijay Kumar Sahu	A24145	Chandigarh
8	Ar. Gopika A.	A24146	Kerala
9	Ar. Neethi Lizbeth Abraham	A24147	Kerala
10	Ar. Aswin Ipe Philip	A24148	Kerala
11	Ar. Gauravjot Singh	A24149	Punjab
12	Ar. Santhosh Varughes	A24150	Kerala
13	Ar. Reuben John Joseph Vettyil	A24151	Kerala
14	Ar. Bino Thomas	A24152	Kerala
15	Ar. Silvi Thomas	A24153	Kerala
16	Ar. Sanij Aby Thomas	A24154	Kerala
17	Ar. Jithin A K	A24155	Kerala
18	Ar. Yuvaraj S	A24156	Tamilnadu
19	Ar. Uvais K.	A24157	Kerala
20	Ar. Krishna Salim	A24158	Kerala
21	Ar. Subramaniam Manikandan	A24159	Tamil Nadu
22	Ar. Chandan Ranjan	A24160	Bihar
23	Ar. Deepak Modi	A24161	Bihar
24	Ar. Namrata Bhattacharjee	A24162	West Bengal
25	Ar. Unnatti Cholera	A24163	Gujarat
26	Ar. Seethapathi P B	A24164	Tamil Nadu
27	Ar. Kaaviya R	A24165	Tamil Nadu
28	Ar. Deepan Hariharan S	A24166	Tamil Nadu

Sr. No.	Name	Memb. No.	Place
29	Ar. Niket Sunil Upase	A24167	Maharashtra
30	Ar. Hariharan B	A24168	Tamil Nadu
31	Ar. Arunkumar R Raibagi	A24169	Karnataka
32	Ar. Relangi Sai Pavan	A24170	Telangana
33	Ar. Jaya Surya Uddavolu	A24171	Andhra Pradesh
34	Ar. Gaurav Singla	A24172	Haryana
35	Ar. B U Dhiren Kumar	A24173	Karnataka
36	Ar. Ashwani Kalia	A24174	Himachal Pradesh
37	Ar. Vijay Kumar	A24175	Himachal Pradesh
38	Ar. Tapas Jain	A24176	Haryana
39	Ar. Tejwant Singh	A24177	Punjab
40	Ar. Mehtab Alam Ansari	A24178	Punjab
41	Ar. Rajesh	A24179	Northern
42	Ar. Vikas Sharma	A24180	Northern
43	Ar. Deepti Srivastava	A24181	Uttar Pradesh
44	Ar. Vinay Prakash Saxena	A24182	Uttar Pradesh
45	Ar. Harish Kumar Bonu	A24183	Andhra Pradesh
46	Ar. Arunkumar D	A24184	Karnataka
47	Ar. Karthika K S	A24185	Karnataka
48	Ar. Nirupama G Patil	A24186	Karnataka
49	Ar. Niby Thomas Varghese	A24187	Kerala
50	Ar. Charudathan M B	A24188	Kerala
51	Ar. G Yogapriya	A24189	Tamil Nadu
52	Ar. Venkateswaran S	A24190	Tamil Nadu
53	Ar. Keerthana B	A24191	Tamil Nadu
54	Ar. Mohamed Yasin A	A24192	Tamil Nadu
55	Ar. Ankush Bhawsinka	A24193	Odisha
56	Ar. Medhavi Bansal	A24194	Maharashtra
57	Ar. Rushikesh C. R. Shripewar	A24195	Aurangabad
58	Ar. Rochit Deoraj Patle	A24196	Maharashtra
59	Ar. Homi Ajay Nashine	A24197	Gondia
60	Ar. Pavneet Balbir Singh Saluja	A24198	Maharashtra
61	Ar. Gaurav Nidariya	A24199	Madhya Pradesh

## A TRIBUTE TO



### Mr. Vijay Kumar Tribhuwan

Died on 17.11.2020



With profound grief & sorrow, we at IIA inform about the sudden passing away of Mr. Vijay Kumar Tribhuwan. He served the Institute for over 39 years with honesty & dedication. He endeared himself with his mild manners & a very pleasing personality. I and entire IIA family extends it's heartfelt condolences to the bereaved family & prays that, they be blessed with the courage & fortitude to bear this enormous personal loss. May the noble Soul of Mr. Vijay Kumar Tribhuwan rest in eternal peace

**Divya Kush**  
President IIA



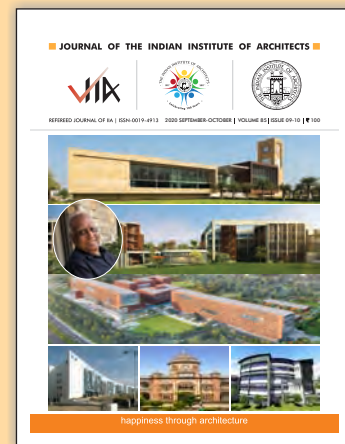
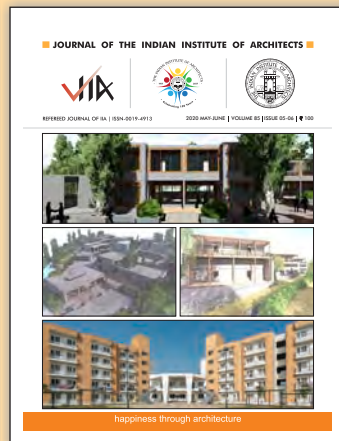
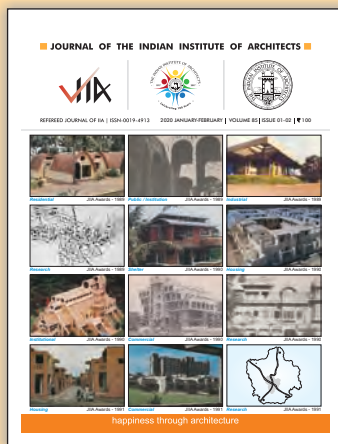
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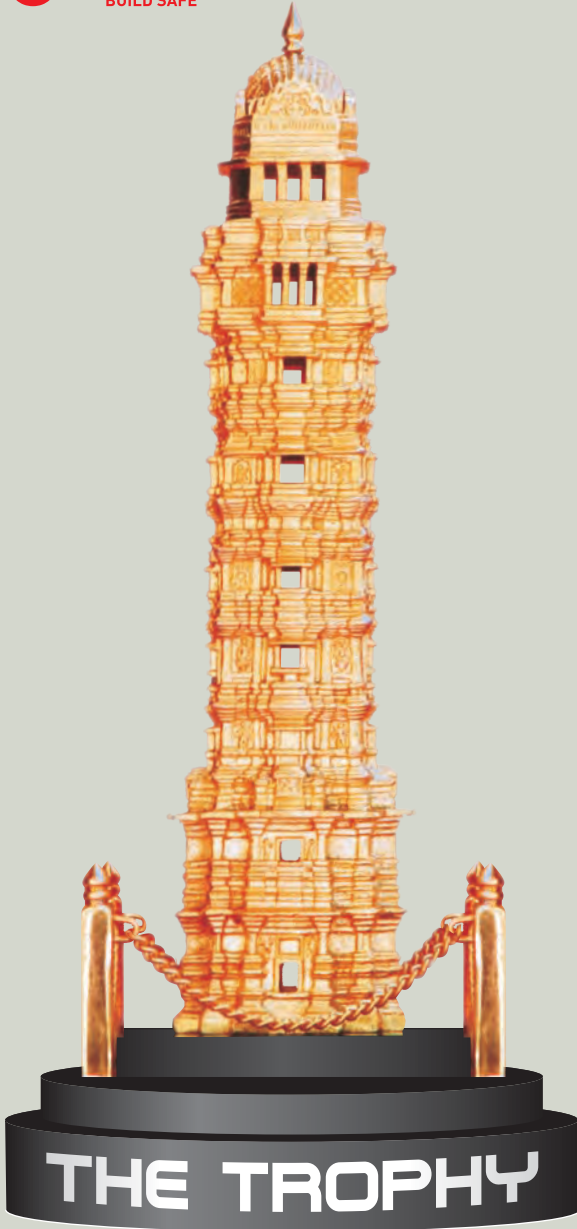
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