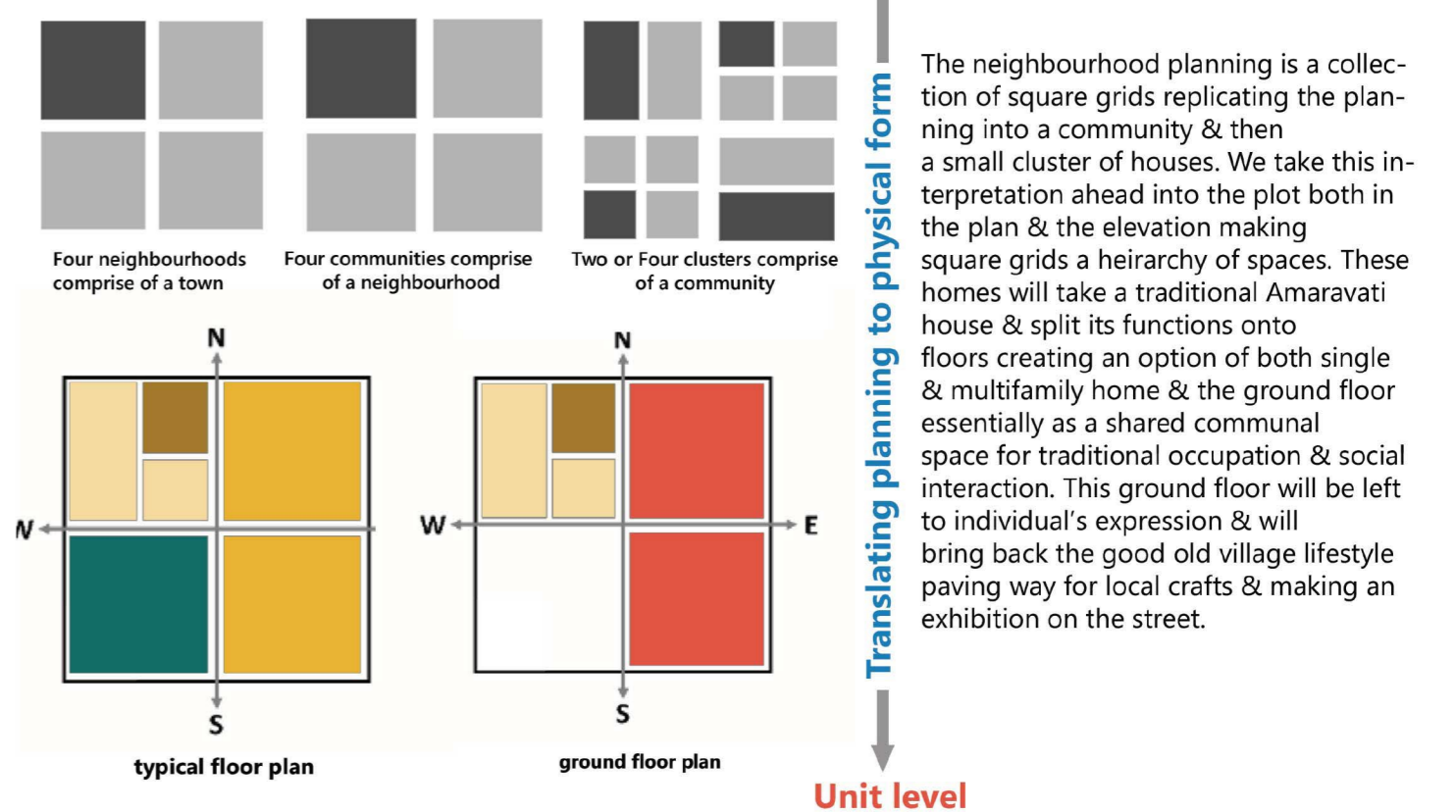


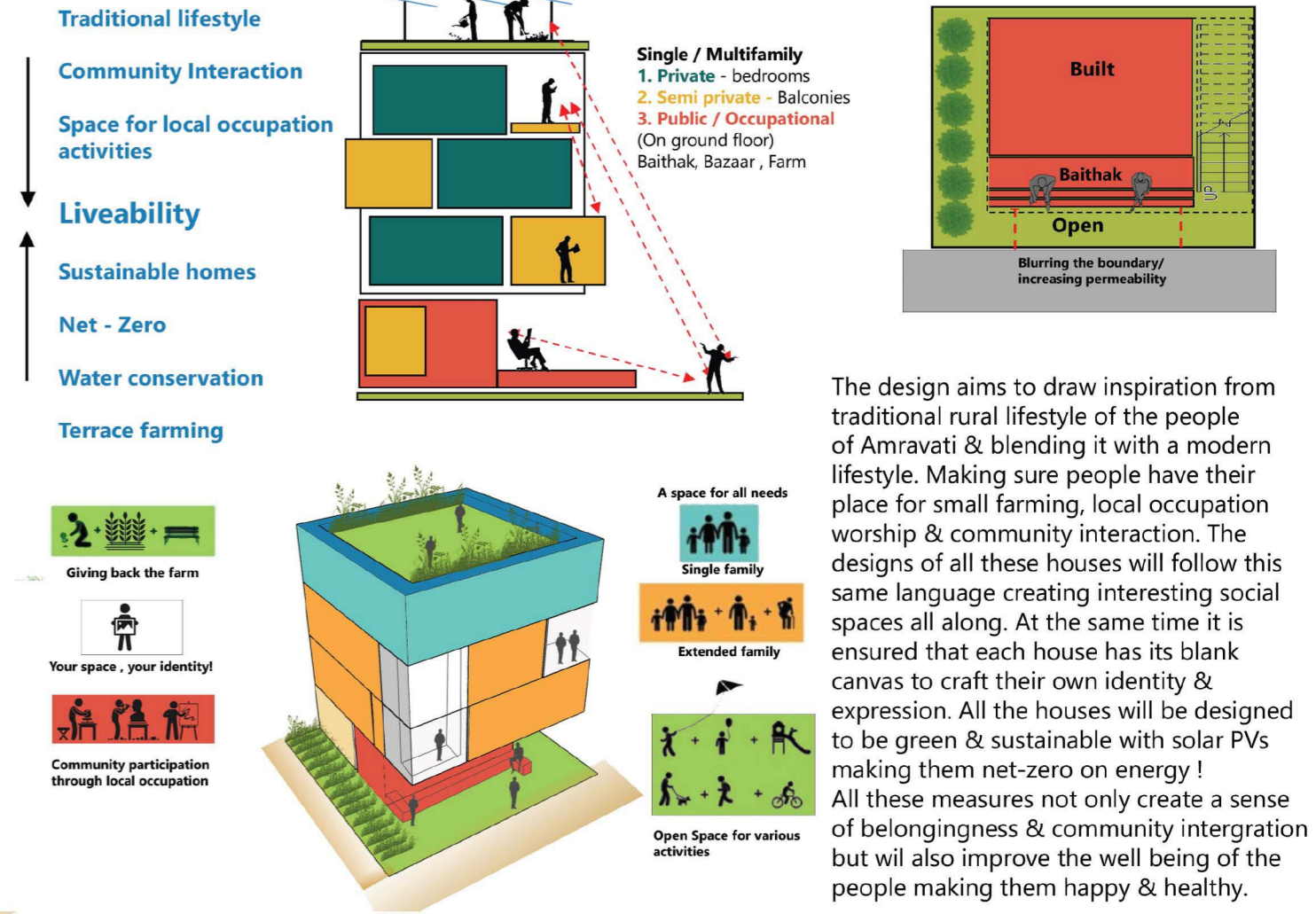
Amaravati - "The people's capital" is envisioned to be iconic, future ready & a Happy, Liveable & Sustainable city. We aim to connect this new town of Amaravati to the people through both its modern ideology & rich historical heritage and give back the citizens their cultural & communal identity in a modern avatar through our design.



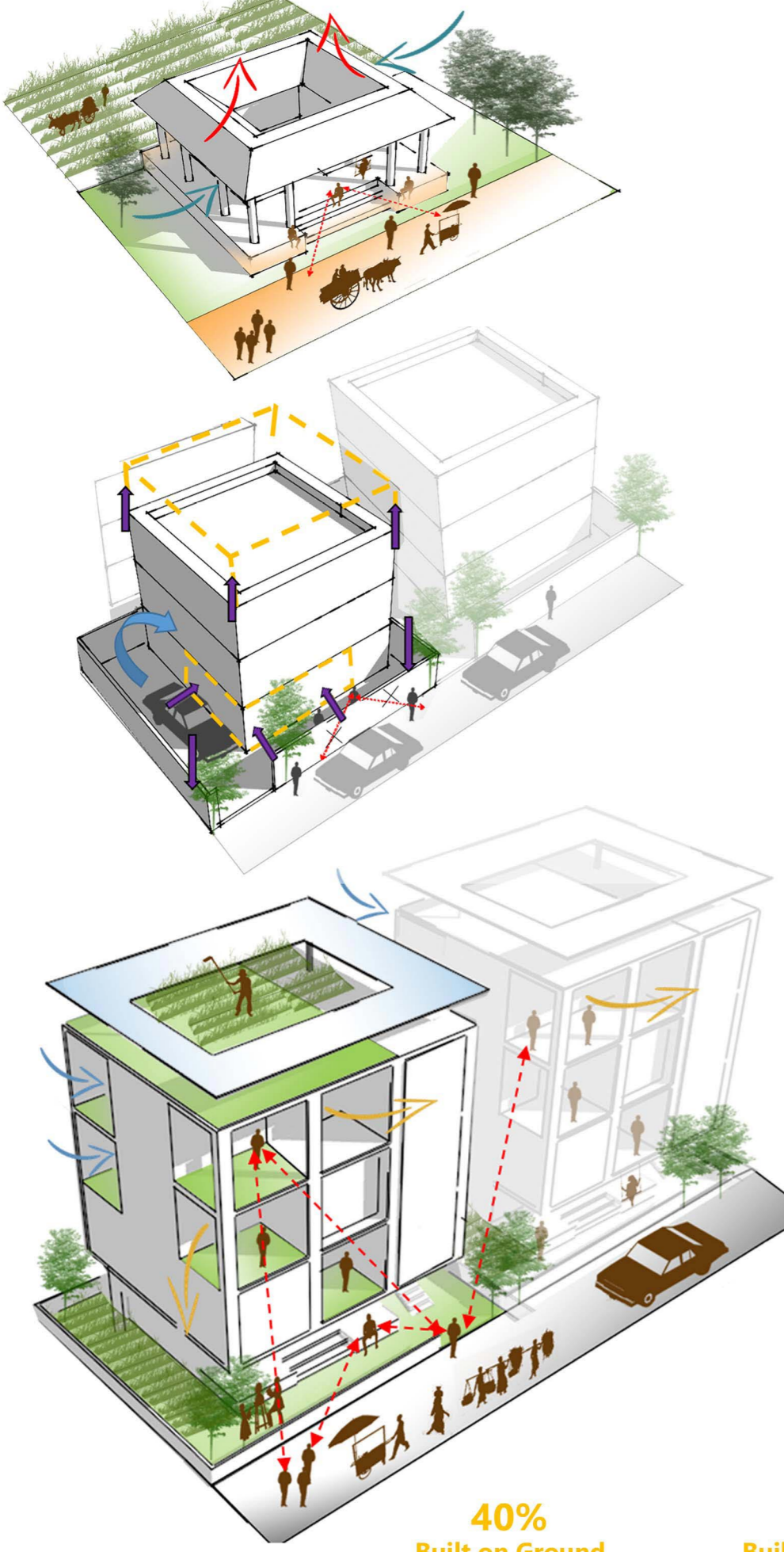
Completing the Story of Amaravati Community



Improving well being & happiness



Fusion of Traditions with Modernity



Large land area less built up area & ground coverage

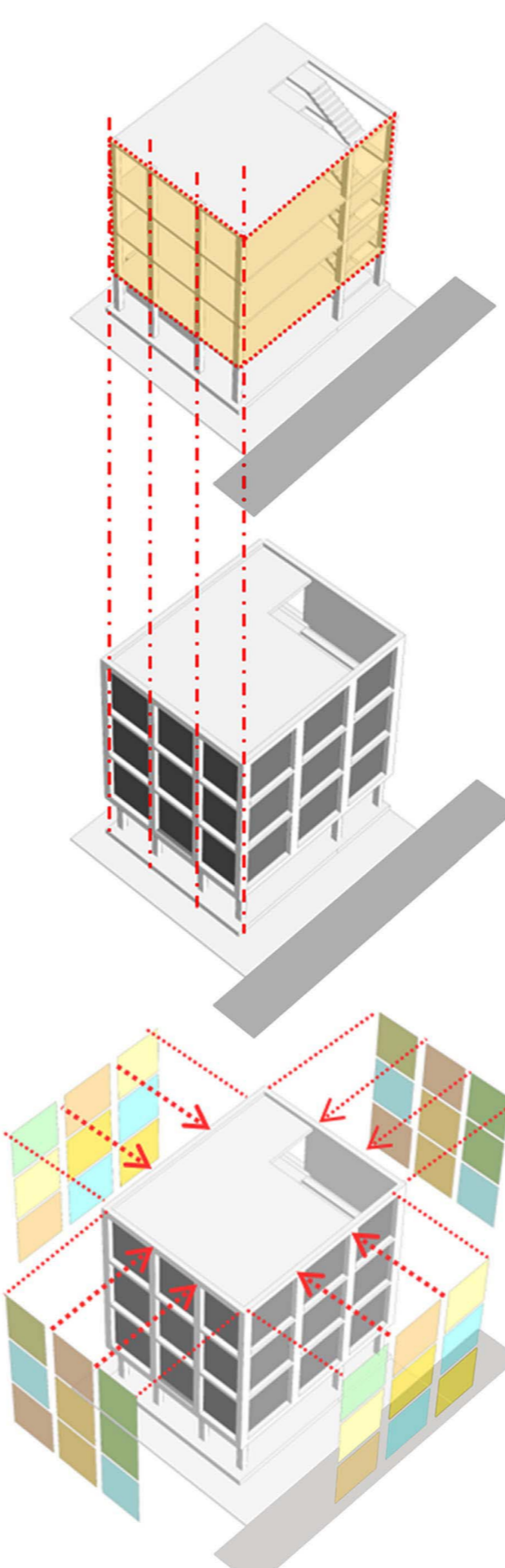
A traditional house in the village has an open plan, naturally ventilated with courtyard & front porch which encourages interaction. The house is designed as per the climate & ensures space for all activities & occupation. The farm was behind on a separate land.

Small Plot area More built up (FSI - 2) & More Ground coverage (70%) - As per local guidelines

A Modern house on the other hand has no identity, gives little scope of interaction & appears to have more space for cars than humans. It is totally dependant on artificial means of light & thermal comfort. Our approach is to bring a fusion of traditional spaces into a modern envelope. By adding a floor above & freeing up the ground floor, shifting the car parking behind & adding vernacular elements in a modern form.

Free up the ground Shifting one floor above - Same Plot area & built up (FSI - 2) as above but less Ground coverage (40%).

Our proposal creates the right blend of traditional open spaces translating courtyards to double height balconies allowing for natural ventilation, keeping the ground floor for community participation. The houses repeat to create a series of open & built spaces all very welcoming & of human scale. The roof & ground are made available for farming & gardening. The solar panels on the roof not only make the house Net-Zero but also shade the terrace for other activities to happen.



Design Principle: Modularity

- Modular But Not Repetitive
- Identity in Modularity
- Personalized Modularity
- Flexibility in Modularity
- Modular but Not Imposing

The intent behind the design was to offer the residents of these houses, a palette of design possibilities that is not only simple to execute but also modular in nature. This was achieved by breaking down the facade of these houses into panels, which can be used as in-fills between the basic structures, thereby generating various design options.

We try to avoid the imposition of designs on farmers and rather empower them by giving them an opportunity to exhibit their culture, traditions and values at an urban level. This will enable these houses to boast a sense of identity and character resonating the sentiments of these farmers.

Optimization

We try to optimize the positioning of basic structures and services such as the shafts, staircase and other as per Vaastu Shastra and try utilizing the full FAR. This would enable the farmer to design the interiors in accordance with their beliefs. This also helps in providing a well-defined massing for all plots that facilitates the prototypical designing of the facade.

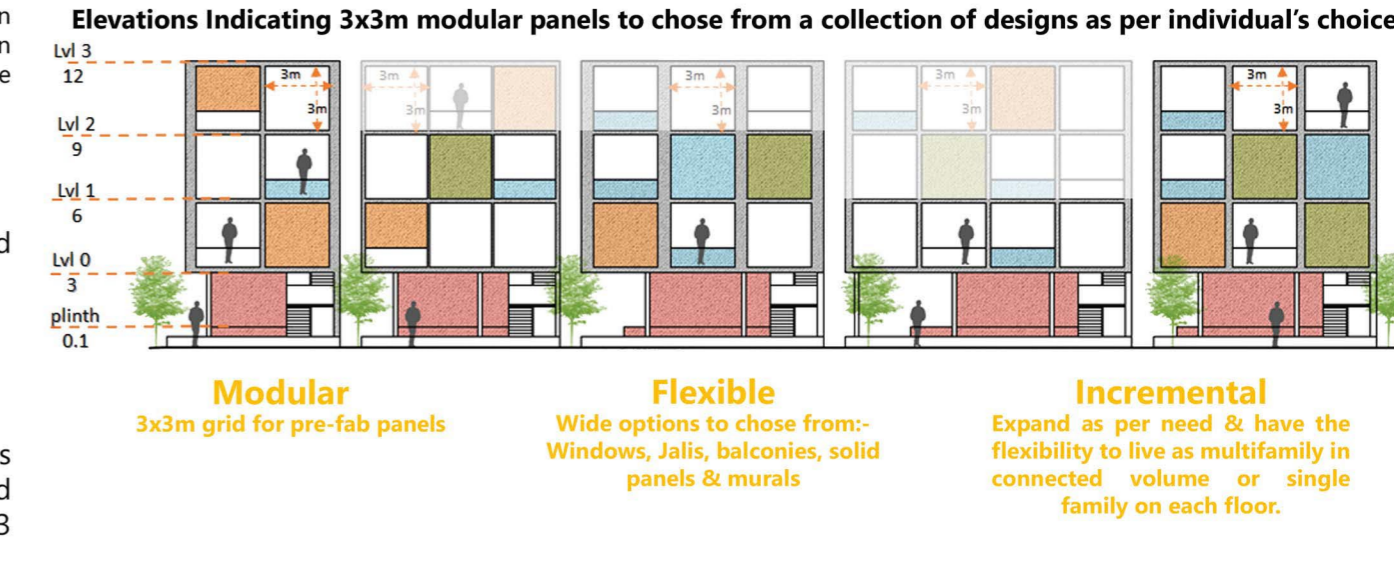
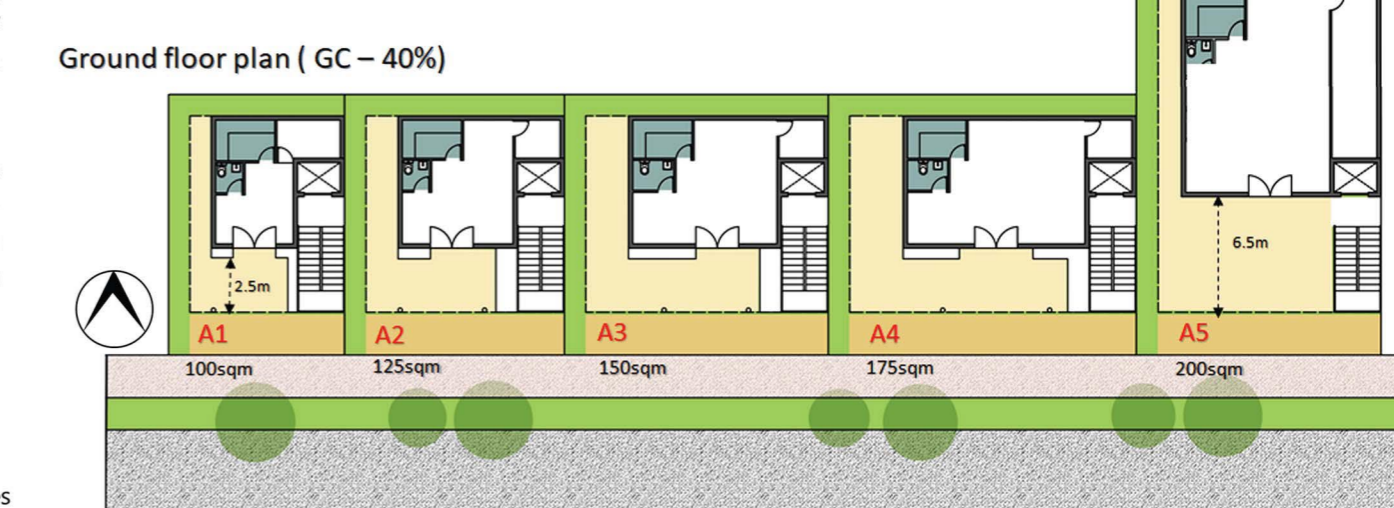
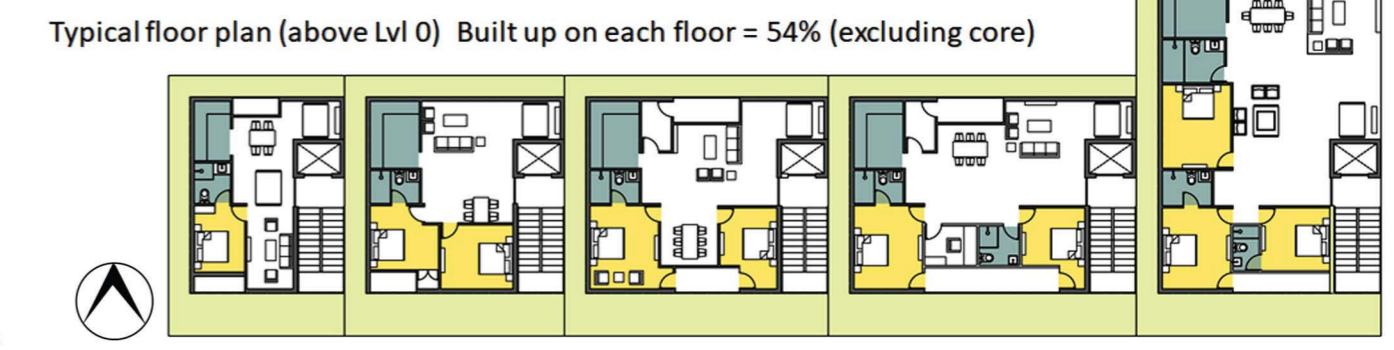
Prototyping of Modular Facade Panels

The idea is to split the facade into standard sized panels with different design patterns, colours and materials.

Permutations and Combinations

One of the most appealing and unique factor of this system is its ability to yield multiple permutations and combinations of designs using the repetition of a 3X3 grid.

Five plot sizes, different family types, different choices - One solution!



	Concept 1	Concept 2	Concept 3	Concept 4
Concept The concepts have been derived from various cultural aspects like dance form, fabric work and vernacular architecture.	Traditional Fabric Work: Ikat, Mangalagiri 	Traditional Dance Form: Kuchipudi 	Vernacular Architecture 	Minimalist Approach
Material Locally available materials like, Galaxy Granite, Laterite stone, Limestone have been Used.				
Elements Window Jalli (Screen): These screens cut the direct sun entering through the fenestration and also adds aesthetic value to the culturally rich capital of Andhra Pradesh				
Balcony Railing				
Opaque Panels These opaque panels give a canvas to the people to demonstrate and exhibit their art work, traditions in the facade.				
Terrace Pergola Supporting Solar PV's on terrace and shading the terrace at the same time.				
Entrance Gate Entrance has a lot of significance in the culture of people living here. Thus, to extenuate the entry, entrance gates have been designed and boundary walls have been kept permeable so as to maximize interaction.				

Concept Options to People

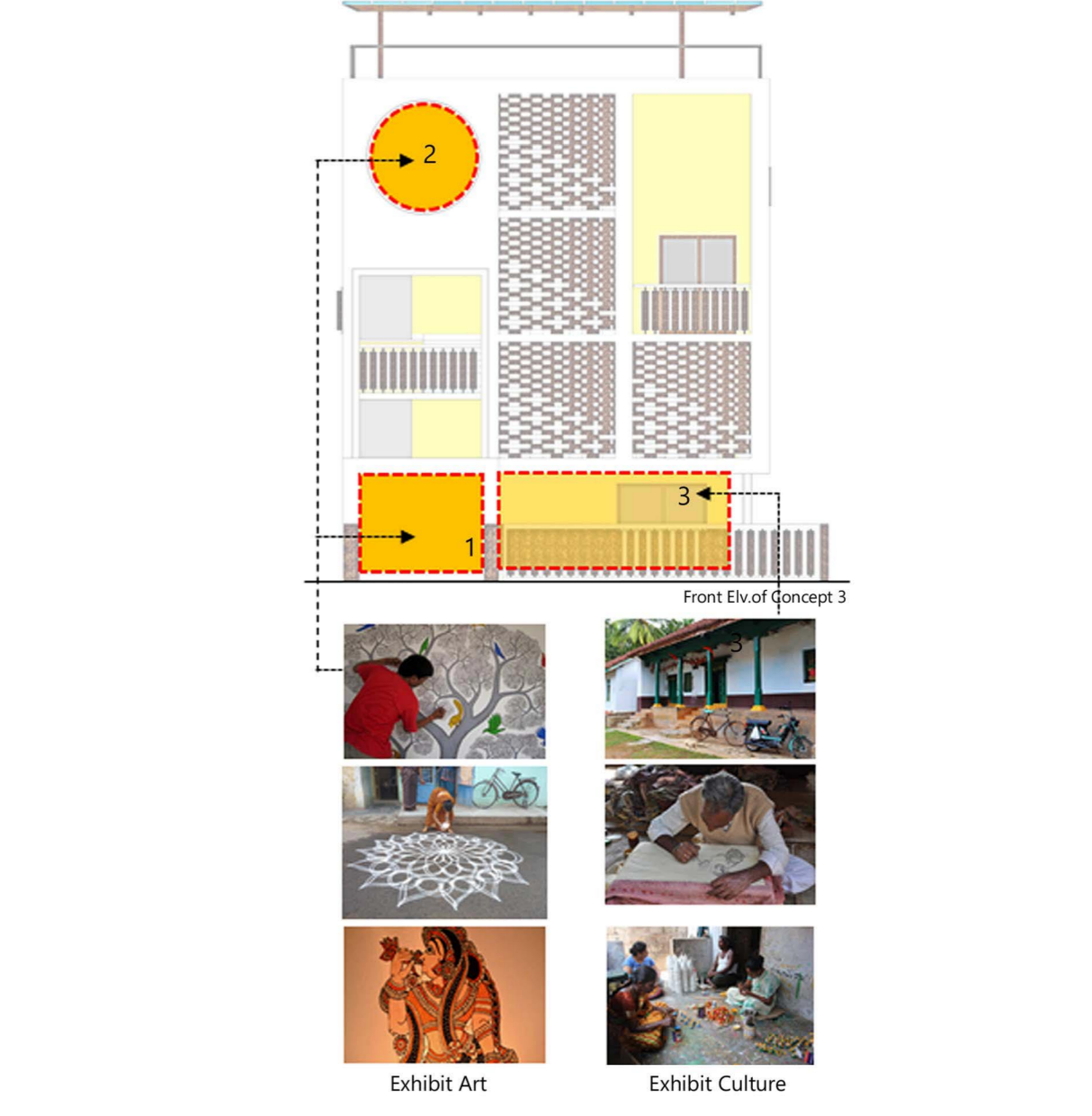
All these designs are achieved through the duplication of a 3X3 grid, which gives it an idiosyncratic appeal. The duplication of these 3X3 grids assists the usage of these designs for any orientation or FPR and makes it flexible design for different families with different preferences. It increases the number of permutations and combinations, resulting in multiple designs to suit the needs of all.

Options Within Concepts

After fixing on one option, the people can then move forward to choose from a variety of colours, materials and elements such as window screens, shading devices, balcony options and much more as per their preference for maintenance and budget.

Facade as a Canvas to Exhibit: Freedom to People

We wish to empower these families by providing them the freedom to exhibit their culture, values and traditions through the facade of their houses. These would be depicted through the use of Modules 1 and 2. In an attempt to give them a modern house with a traditional touch, the verandah on the GF has been designed with an intent seamlessly amalgamate old with new.



Concept 1: South facing Plot A3 (150sqm), Multifamily

Single Family 2 BHK Duplex
Single Family 3 BHK Duplex

- Multipurpose Room
- Toilet
- Kitchen
- Store
- Living + Dining Room
- Pooja Room
- Master Bedroom (3.7x3.7m)
- Bedroom (3x3m)
- Balcony

FAR Achieved: 2



Concept 3: West facing plot A3 (150sqm), Single Family

- Multipurpose Room
- Toilet
- Kitchen
- Store
- Living + Dining Room
- Pooja Room
- Master Bedroom (3.7x3.7m)
- Bedroom (3x3m)
- Balcony
- Study

FAR Achieved: 2



Concept 2: North facing plot A3 (150sqm), Multifamily

Single Family on each floor 2 BHK

- Multipurpose Room
- Toilet
- Kitchen
- Store
- Living + Dining Room
- Pooja Room
- Master Bedroom (3.7x3.7m)
- Bedroom (3x3m)
- Balcony

FAR Achieved: 2



Concept 3: East facing plot A3 Incremental (150sqm), Single Family

- Multipurpose Room
- Toilet
- Kitchen
- Living + Dining Room
- Master Bedroom (3.7x3.7m)
- Bedroom (3x3m)
- Balcony

FAR Achieved: 0.8

Mummy less Staircase Detail

Section Through Staircase



Sustainable strategies & Compliance with IGBC green homes rating

Climate analysis

DESIGN STRATEGIES: JANUARY through DECEMBER

1.0%	1 Comfort(89 hrs)
33.9%	2 Sun Shading of Windows(2972 hrs)
0.9%	6 Two-Stage Evaporative Cooling(81 hrs)
0.6%	7 Natural Ventilation Cooling(53 hrs)
1.6%	11 Passive Solar Direct Gain High Mass(140 hrs)
26.5%	14 Dehumidification Only(2318 hrs)
70.7%	15 Cooling, add Dehumidification if needed(6196 hrs)
99.9%	Comfortable Hours using Selected Strategies (8752 out of 8760 hrs)

ASHRAE Adaptive comfort band

Building envelope optimisation (Materials & resources)

Orientation 1 :-Longer axis East - West
Annual solar radiation = 253305 kWh
Faces in order of Max to Min radiation South, West, East, North
WWR designed - 15%, 10%, 15%, 30-50%
Optimized with shading - Min.30% on all sides

Orientation 1 :-Longer axis North-South
Annual solar radiation = 254776 kWh
Faces in order of Max to Min radiation West, South, East, North
WWR designed - 10%, 15%, 25%, 30-50%
Optimized with shading - Min.30% on all sides

Low energy & maintenance Materials

Solar PV Monocrystalline 6kWp production

Glazing display
Fritted glass with UPVC frame SHGC - 0.42 U factor (for 12mm frit) - 4.2 W/m2K

Glazing (others)
ECBC rated glass with UPVC frame SHGC - 0.42 (improved with shading) U factor (for 20mm cladding on 200mm AAC) - 0.8W/m2K

Local Materials (stones)
Laterite Marble Granite
Specific heat- 2.1Mj/m³k U factor (for 20mm cladding on 200mm AAC) - 0.8W/m2K

Wall & Structure
RCC framed with Hollow AAC block
Specific heat- 0.79Mj/m³k U factor (for 200mm AAC) - 0.7W/m2K

Window shading (Jali)
GFRC Bamboo Laterite

Pavers
Grass pavers

Optimizing solar gains by using Jali screens
Jali screens reduce effective opening of the window to 60% of its original opening size thus reducing its SHGC. Also Egg-crate type shading frames help cut maximum solar radiation on South & west facades

Building energy use & generation

Solar & Rainwater harvesting potential

Solar PV production capacity

Rooftop Area 40 sq.mt
Energy Generation 4,320* units per year.
Solar Capacity 5* kWp
Instantaneous solar radiation on average is 7 kWh/m2
For 1 kW Peak production the minimum power generation is 12.42 kWh/m2/year
Thus installation of minimum 3kW Peak production panels leading to 23 kWh/m2 which is sufficient to run the entire house

Water conservation techniques

Using low flush equipment
Domestic & Flushing Use

Water consumption for commercial use (litres per capita per day)	45	30% reduction	31.5
Water consumption for residential use (litres per capita per day)	135	30% reduction	94.5

Rainwater harvesting
Maximum runoff during a month = 6000lts
Capacity of tank required = 6m3

Rainwater collection from PV
Terrace Ground floor

Waste water recycling (optional)
Use of low maintenance DEWATS system for recycling waste water to use in flushing & landscaping

Energy Use Index

Using energy efficient appliances & LED lighting also reducing cooling loads by giving a robust facade & suggesting the use of efficient cooling techniques like VRF for Split ACs & ERV (Energy recovery ventilation) for centrally Air conditioned homes we can reduce Energy use Intensity of the house significantly

Comparison of Energy efficient (EE) and Business as usual (BAU) for lighting

BAU	EE
LPD=1.13 W/m²	LPD=0.53 W/m²
LPD=1.94 Btu/hr ft²	LPD=0.93 Btu/hr ft²

Equipment Power Density (EPD) comparison

BAU	EE
EPD=20 w/m²	EPD=12.2 w/m²

EPI reduction

BAU house	EPI of Energy Efficient homes
48	20