

Design

PORTFOLIO

Gurleen Kaur

1. Healthcare

2. Office

3. Master - Planning

4. Academic

5. **Waste - Art** <https://www.gurleenmatharu.com/the-awareness-project>

1. Healthcare

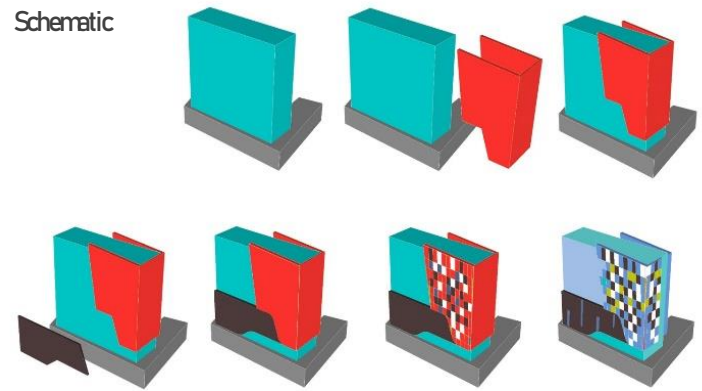


Children's Hospital, New Delhi

One of a kind Pediatric hospital, overlooking the tallest brick minaret in the world, Qutub Minar, has its concept sagaciously based on children's toys. With the challenges of a tight site, the project aims towards better comfort and wellness standard. The design on the other hand is playful and child-centric. Double skin façade with integrated solar system and passive ventilation are some of the key features of the building.



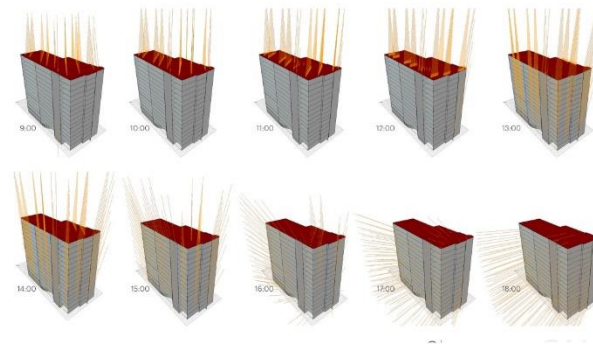
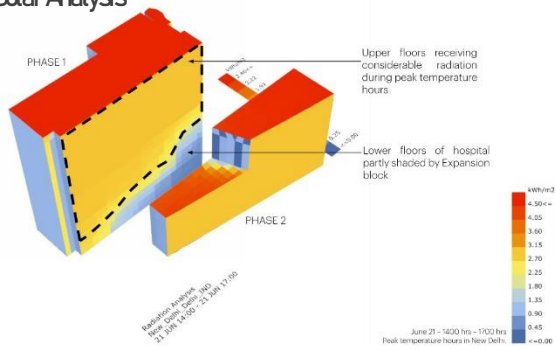
Schematic



Lite Brite- Double skin feature comprising of transparent solar panels and colored panes, along with simple vertical shading devices

Children's Hospital, New Delhi

Solar Analysis

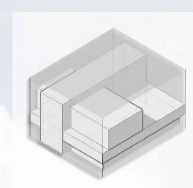
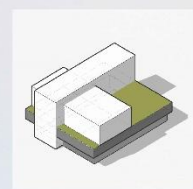
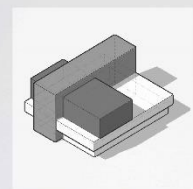


The facility consists of 180 beds across 17 floors with three basement parking levels, total built up area of 250,000 sqft. The site shape and byelaws provided the team with a small and fairly rectangular floor plate, which made the building form tall and slender.

2 Lac sq.ft
Built Up Area

210
Beds

G+6
+2 Basements



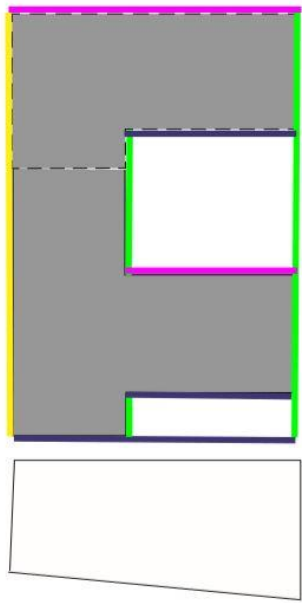
Aster IM Hospital, Nagpur

ASTER
IM THAPAR HOSPITAL NAGPUR

The design is based on the **Zero Mile** program that ensures a sustainable and healthy environment. The building is designed to be a **green building** with a focus on energy efficiency, water conservation, and indoor air quality. The building is designed to be a **green building** with a focus on energy efficiency, water conservation, and indoor air quality. The building is designed to be a **green building** with a focus on energy efficiency, water conservation, and indoor air quality.

The form derived out of a cuboid emphasizes the functional aspects of the building, with the diagnostic and treatment block forming the anchor, which ties together the two IPD towers creating healing landscaped terraces in between. The façade responds to the climatic conditions with vertical shading on the east & west, and horizontal shading on the south façade.

DESIGN CONCEPT SOLAR STUDIES



NORTH

- Prime Views towards landscaped terraces
- Need Least Shading and Control Device
- Large number of patient rooms

SOUTH

- Prime views towards landscaped terraces
- Need least shading and control devices
- Large number of patient rooms

EAST FACE

- Good Views of the surroundings and landscape
- Significant number of patient rooms.
- Sees Only Morning Sun and hence moderate sun control

WEST/ NORTH WEST

- Limited openings wherever possible
- In case of openings vertical fins/ louvres to provide shade

Aster IM Hospital, Nagpur

North Elevation



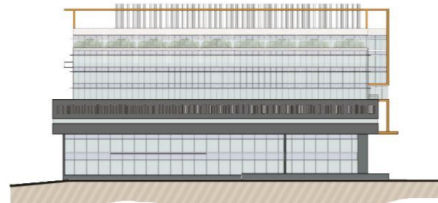
South Elevation



East Elevation



West Elevation

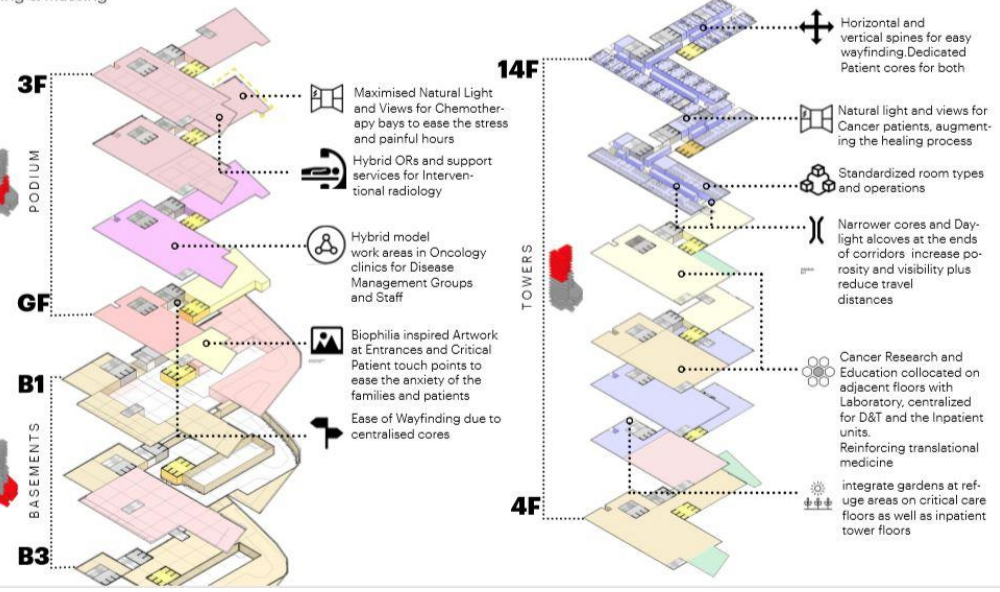
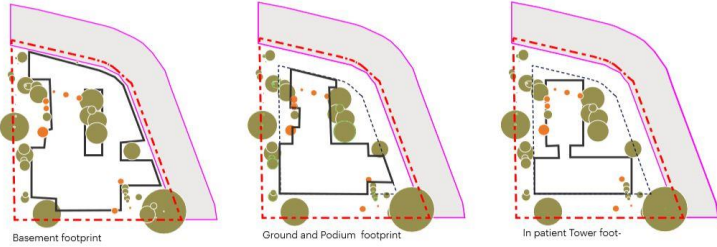




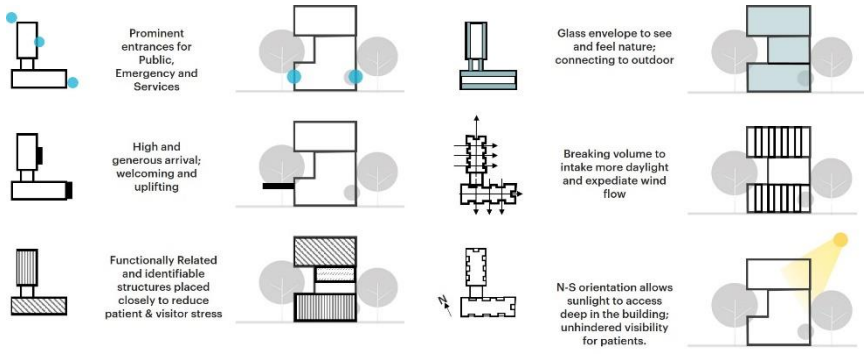
Tata Memorial Hospital

The strategies for early diagnosis, treatment management, rehabilitation, pain relief and terminal care have been established in a comprehensive and multidisciplinary approach for a total cancer care programme for this hospital. The building profile has emerged through a sensitive planning approach that minimises cutting of trees and is mindful of allowable setbacks. A compact centralised core minimises travel distances for staff, patient and visitors thus creating operational efficiency

Site Orientation

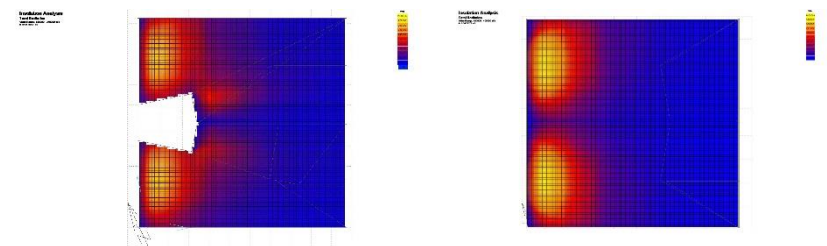


Grouping of Functions



Tata Memorial Hospital

Shading Skin Comparison

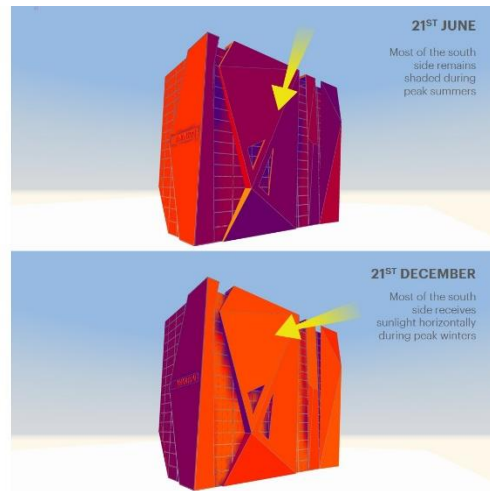
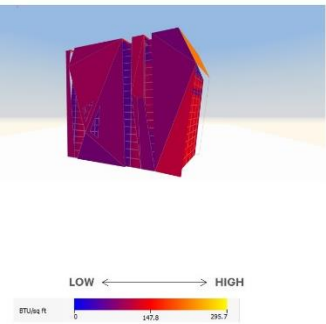
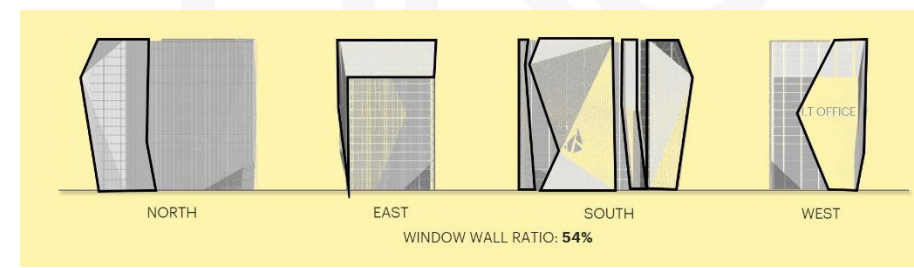
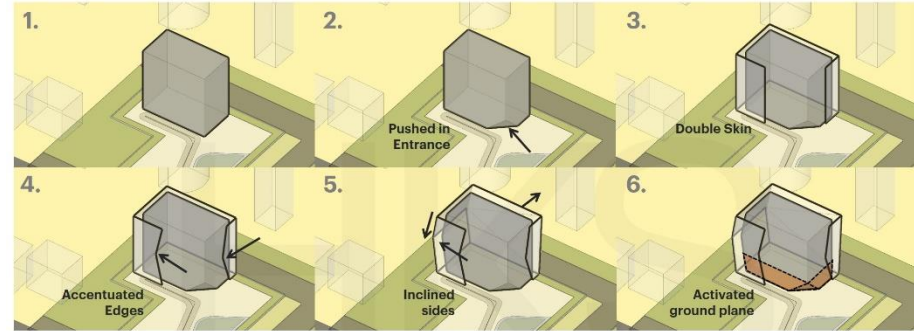


2. Office



I.T Office, Noida

A 50,000 sqm office building has its site overlooking the greater Noida expressway. Placed amidst the business park, the challenge was to design an aesthetically appealing façade along with a compact and efficient floor plate, giving maximum emphasis to the office work space and an inside-outside experience through the envelope.



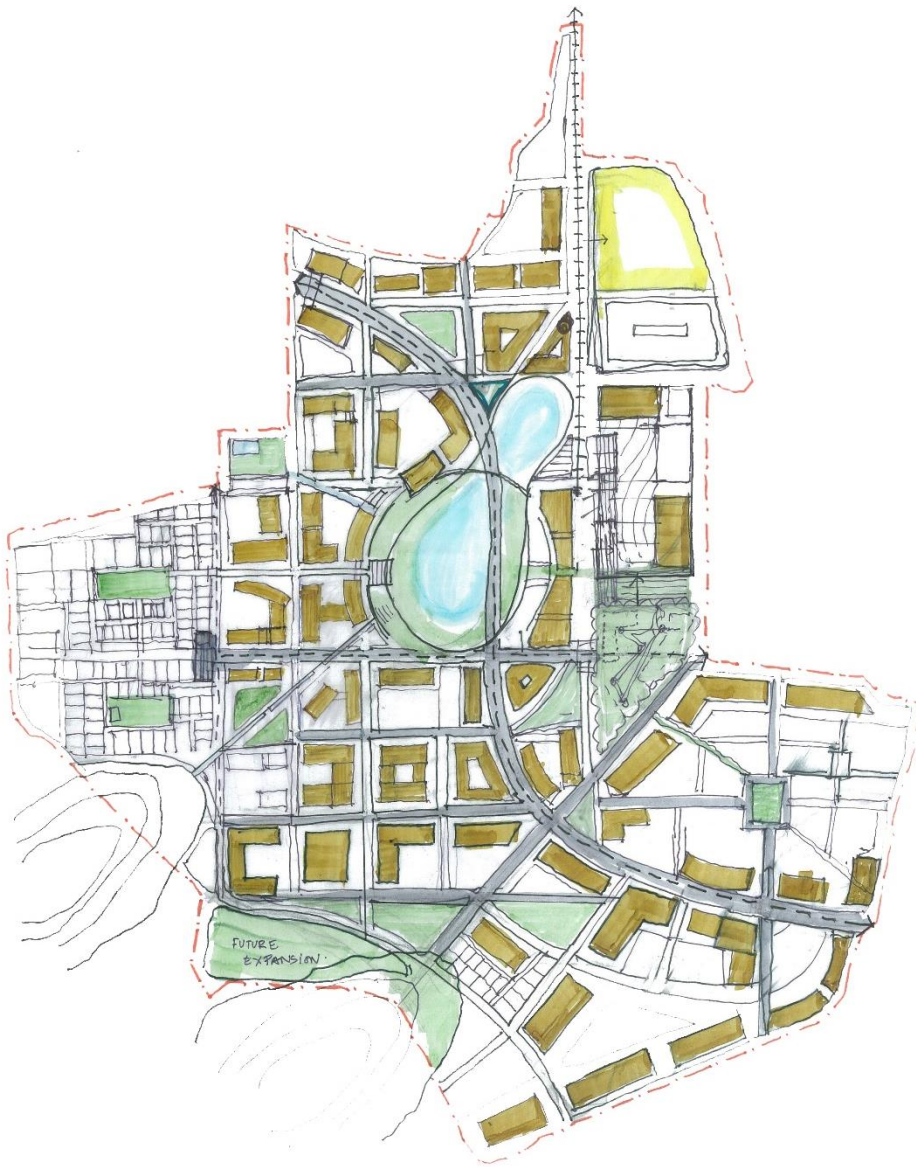
I.T Office, Noida

Design Derivatives: Peak Summer



Several design forms were practiced to check the efficiency of the floor plate and functional feasibility. The multi-faceted design was finalized for its compact development, maximum height achievability, iconic nature and more space provision for future expansion. The angles of the façade are designed as such to make the building self-shaded with respect to the year-round incident solar radiation received.

3. master-planning



VIZAG City Centre

HZL Iconic district seeks to re-imagine greater VIZAG into a one stop Destination for tourism and business. This project tends to create an urban destination with a combination of commercial, residential, supporting institutional and recreational areas for people across the country. The proposed interventions for the master-plan emphasized on enhanced public engagement, business/ retail districts and quality of life for the NRT/NRI community. The centrally located water body not just forms a vista to connect view, but it also has pedestrianized greenway to go through the Site and connect to city's open spaces at a macro level. Utilizing the Site's natural topography and green belt to create a viable leisure hub was also one of the key drivers.



Position Taj Mahal to serve as a catchment area for monuments in the vicinity. Shuttle Route and water trail route map for boats connecting and providing easy accessibility to various monuments of significance along the river shore.

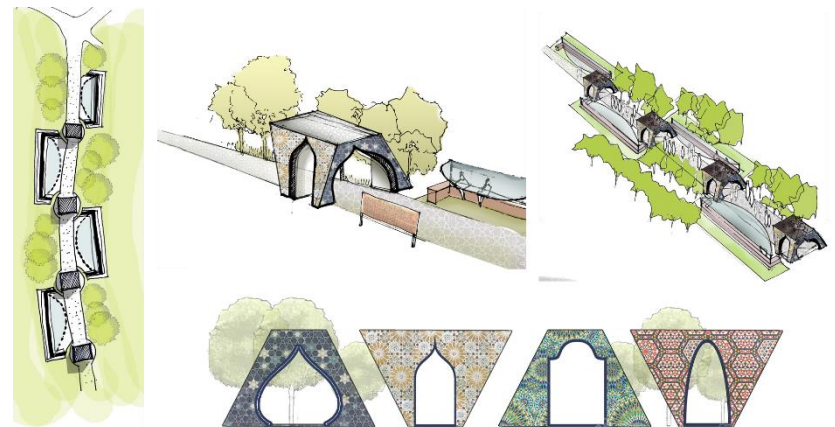


Proposal to be created for redevelopment of a shopping street all along the exit route. This will help preserving art & craft. This is a step towards reviving the Taj Ganj area and the local community.



Visioning of Boat Trail

Ministry of TOURISM



Position Qutub as a gateway to all offerings of Mehrauli and beyond. Key Driver - integrating the essence of 'Phool walo ki sair' in the user experience.

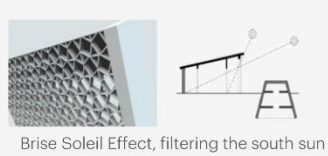
Development of these Iconic sites. The design involves interventions with the goal of increasing tourist footfall.

4. Academic



Climate Responsive Design Lamu, Kenya

According to the Psychrometric Chart, Lamu lies near the equatorial region, and has a hot and sweltering climate, with which passive strategies such as enhancing natural ventilation, use of wind energy and solar shading are best suited.

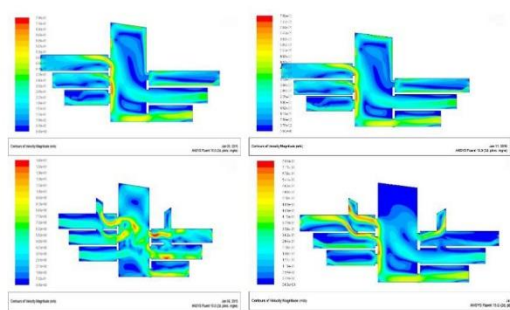
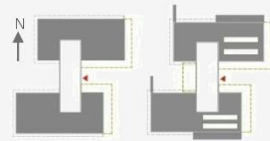


Brise Soleil Effect, filtering the south sun



Basic Master plan, Wind Pattern across the site, Shaded Pathways and Courtyards

The transformed energy efficient design is evolved from the Arabic architecture for example: use of Brise Soleil on the north and south facing to cut the direct radiation. Due to moderate temperature and high humidity, diurnal differences becomes low because of which the thermal mass cannot be relied upon. Cross ventilation with openings on the same floor causes high local air -exchange rates and restricted air flow in the rest of the building



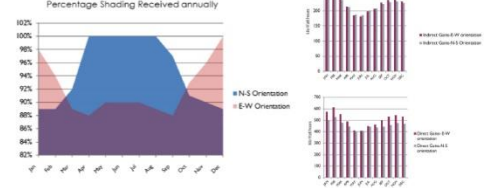
Inlets taken as Velocity Inlets with Turbulence Intensity as 10%, Inlets taken as Pressure Inlets with Turbulence Intensity as 3%



Wind Lobby



Positive and Negative pressure is induced by wing walls which helps in cross ventilation



The seven levels of the Thermal Sensation scale

Level	Sensation
1	Very Cold
2	Quite Cold
3	Cold
4	Comfort
5	Hot
6	Quite Hot
7	Very hot

Source: ASHRAE Handbook of Heating, Ventilation, and Air Conditioning, 2001, Outdoor comfort research issues, Energy and Buildings, vol.14(6), pp.3-10.

OUTCOM12a

The University of Nottingham, Faculty of Engineering, Department of Architecture and the Built Environment, NBS: Renewable Energy and Architecture, Module: RE10107, Module Co-ordinator and Lecturer: Author: Dr Mohamed Elmi

Outdoor Thermal Sensation Index Prediction Program

Outdoor Ambient Air Temperature, Deg C: 26

Direct Solar Radiation on Horizontal Surface, Wh/m²: 152

Outdoor Wind Speed, m/s: 4.2

Outdoor Relative Humidity, %: 70

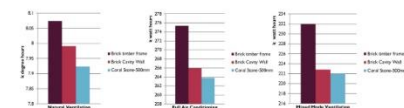
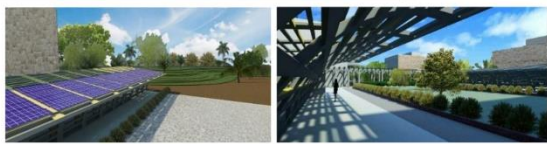
Surrounding Ground Surface Temperature, Deg C: 50

Outdoor Thermal Sensation Index: 3

Calculate Outdoor Thermal Sensation Index:

The Index shows the level of sensation, when coral stone is used as a material, the average direct radiation it offers is 152W/m2, & accordingly our building conditions falls between cold and comfortable in the sensation scale above.

Climate Responsive Design Lamu, Kenya

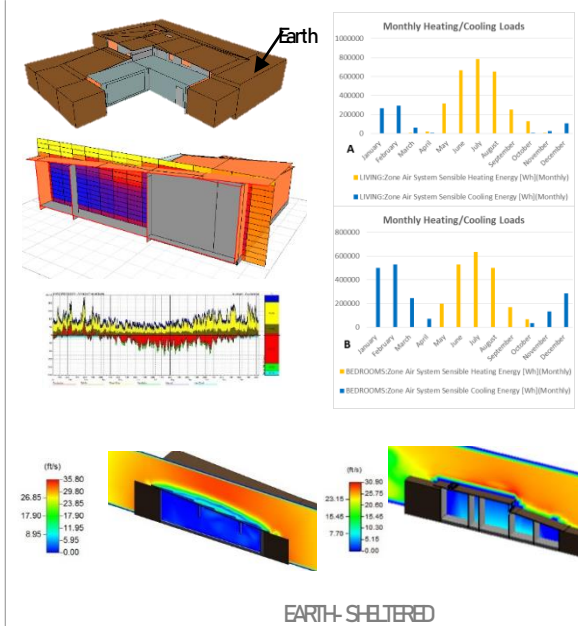
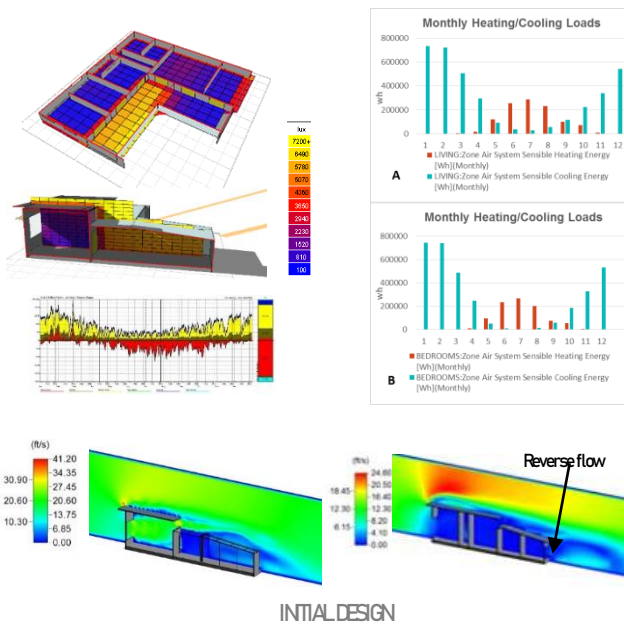




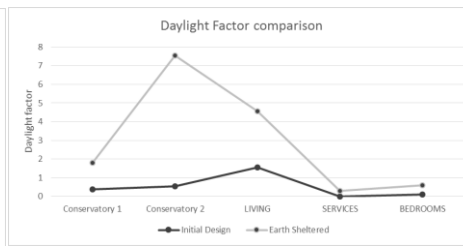
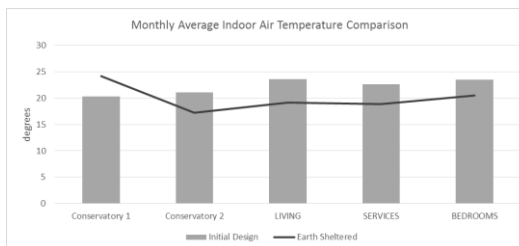
Skylights provided in the service zone for earth sheltered houses



In summers, the sun rises 28° south of east to 81° at noon and sets 28° south of west. This direction of the sun gives evidence that the south-east and south-west side are the maximum solar collector areas. Hence, all the five houses are oriented such that the conservatory area receives maximum sunlight. The north side of the houses are provided with maximum windows to receive 80% solar exposure in winter. Shading has been incorporated to confine the harsh sun in summer. In winter, the geometry is dissimilar, the sun strikes the east and west in the morning and afternoon at low angles.



Analysis and design of an experimental solar village with and without earth sheltering



COMPARISON



ISOVER Multi-Comfort Housing Competition

Set in the residential area of the Astana Expo, 2017, the Multi-Comfort Housing is formed by three concentric spaces which creates a mid transition space, giving the building their layout.

The **staggered** arrangement ensures natural ventilation and sunlight. **Renewable energy** systems such as integrated solar panels, Geothermal system, wind turbines and heat recovery ventilation is being applied in the buildings.

The material selection is done from the **Isover manual** with importance given to the U-value and thermal mass of the building envelope.

PUBLIC PLAZA-
CONNECTOR SPACE

