

TRIBAL COMMUNITY HOUSING

A THESIS

Submitted in partial fulfillment of the requirements for the award of

Bachelor of Architecture degree

By

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DEPARTMENT OF

ARCHITECTURE

SCHOOL OF BUILDING AND ENVIRONMENT

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY) Accredited

With Grade “A” by NAAC

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NOVEMBER 2021



DEPARTMENT OF ARCHITECTURE

BONA FIDE CERTIFICATE

This is to certify that this Thesis Report is the bonafide work of Haribalaji. K (37210015) carried out the Thesis entitled “Tribal community housing” under our supervision from July 2021 to November 2021.

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I, **Haribalaji. K** hereby declare that the Thesis Report entitled “**Tribal community housing**” was done by me under the guidance of **Ar.Kavitha**(Internal Guide), **Ar.Surya Rajkumar**(Internal Review Member), and **Ar.Kishore Panikkar**(External Guide) Sathyabama Institute of Science and Technology is submitted in partial fulfillment of the requirements for the award of Bachelor of Architecture Degree.



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THESIS SYNOPSIS

The Project was planned to be built residences for the tribes in attappadi. Attapaddi was a wide hill range of 249 sq.km in Kerala. In Attappadi Three Tribal Groups Are Living For A Long Period. Kurumbhas [Adikudi / Oldest]; Irulas [Predominant]; Mudugas [Later]. One Of The Predominant Tribal Groups Among Them Was Irulas. There Are 183 Hamlets [Ooru] In Attappadi Under Three Major Panchayat Splits; Agali, Sholayur, Pudur . This Project Explains About Irulas And Their Basic Need For Housing.

The thesis is all about a tribal community that needs shelter for living. The tribal community mentioned here was irulas or irulars. Irulas is a tribal community that lives in Tamil Nadu, Kerala, and Karnataka. The thesis covered irulas in Kerala who are in the need of shelter. The region they are living in was attappadi, which is the wide range of mountains and valleys in Kerala. In Malayalam *atta* means leech, *paddy* means the settlement, the name attappadi refers to settlements among the dangerous leech area. Though it was a reserve forest area *irular* means "dark people" in Tamil and Malayalam, from the root word *irul*, meaning "darkness." Irulas is basically known for snake catching. So they basically do their occupation and get food from the forest or the mother nature they believe.

To provide the shelter for irulas who lost their residence in the Kerala flood 2018. It focuses on the upliftment of the entire community. 300 people and 50 families of Adivasi [irulas] were rescued [from sholayur , agali panchayat]. So requirements include school, community center, football ground, and coconut farm.

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CHAPTER 1

INTRODUCTION

INTRODUCTION

The project was planned to be built for the tribes in Attappadi. There was an Attapaddi range of 249 sq.km in Kerala. In Attappadi, three tribal groups are living for a long period. kurumbhas [adikudi / oldest];irulas [predoattapaddi minant];mudugas [later].one of the predominant tribal groups among them was irulas..there are 183 hamlets [ooru] in attappadi under three major panchayat splits agali, sholayur ,pudur.This project explains the irulas and their basic need for housing.

AIM

The aim is to develop community housing for homeless Irula tribes in Attappadi.

OBJECTIVE

- a. To study the necessary codes and requirements of constructing hillside homes.
- b. To study the various building materials and their construction techniques

SCOPE

The scope of the research is to provide community housing and other essential spaces for the tribes to uplift the tribal community.

METHODOLOGY

1. Initial study of the topic

Mind mapping, analysis, and study of the Irula tribal groups and find the interconnections about the topic.



2. Data collection

A. Primary data collection

1. Discussions through calls with Natives

B. Secondary data collection

The data have been collected through

1. Video documentaries
2. Research documentaries
3. Research papers
4. Articles
5. Magazines
6. Vlogs

C. Tertiary data collection

1. News articles



3. Data analysis

A. Qualitative and quantitative analysis

1. Through research papers and proven case studies - qualitative
2. Statistic reports, precise measurements using valid datas - quantitative

CHAPTER 2

LITERATURE STUDY

ABOUT THE TRIBES - ATTAPPADI

Irular means "Dark people" in tamil and malayalam, from the root word *irul*, meaning "darkness." .traditionally, the main occupation of the irulas has been snake, rat-catching, and honey collection .in malayalam *atta* means leech, *paddi* means the settlement, the name *attappadi* means settlements among the dangerous leech area.

POPULATION /SEX RATIO; SHOLAYUR CENSUS 2011

Particulars	Total	Male	Female
Total No. of Houses	1,885	-	-
Population	7,012	3,507	3,505
Child (0-6)	722	354	368
Schedule Caste	594	279	315
Schedule Tribe	3,658	1,811	1,847
Literacy	71.43 %	76.75 %	66.08 %
Total Workers	3,777	2,201	1,576
Main Worker	2,847	-	-
Marginal Worker	930	403	527

table 2.1 census 2011

*sholayur panchayat split into two villages [sholayoor & sholayur] total population st
- 3658*

SEX RATIO;



Fig 2.1 sex ratio [2011]

TYPES OF IRULAS BASED ON LANGUAGE INFLUENCE;

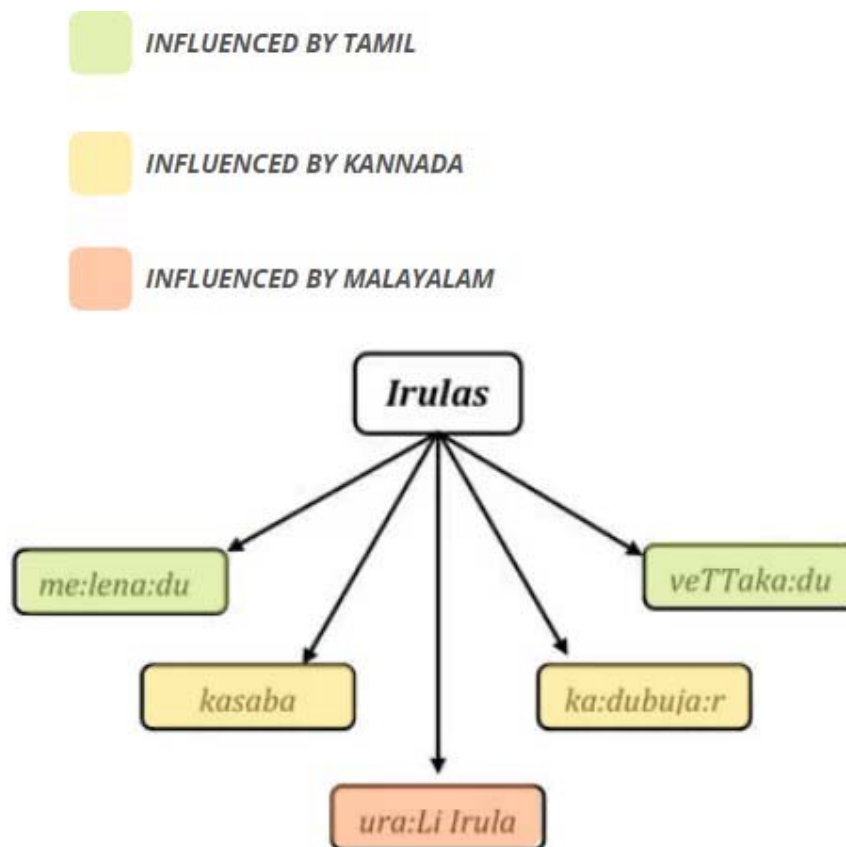


Fig 2.2 types of irulas

LITERACY RATE; [CENSUS 2011]

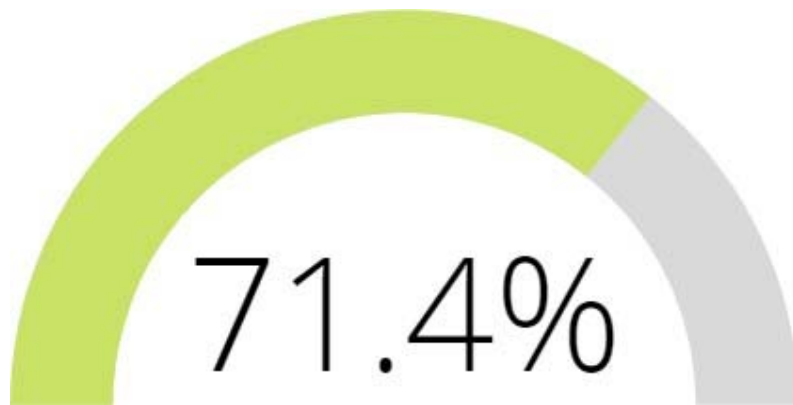


Fig 2.3 literacy rate [2011]

ECONOMIC RATE;[CENSUS 2011]

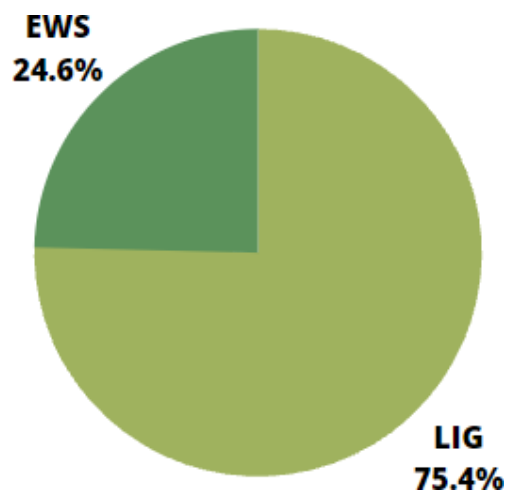


Fig 2.4 economic rate [2011]

CASTE RATE;[CENSUS 2011]

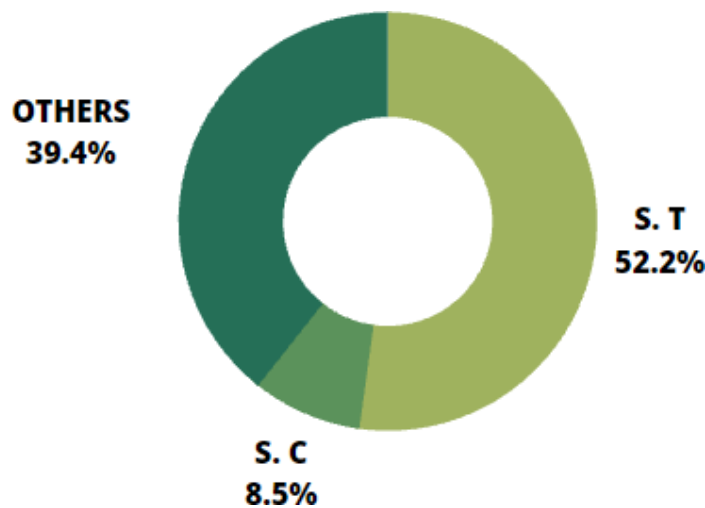


Fig 2.5 caste rate [2011]

WHY DO WE NEED A PROJECT FOR IRULAS, WHEN THEY HAVE A GOOD LITERACY RATE AND LIFESTYLE ALREADY?

KERALA FLOOD 2018 - ATTAPPADI

Many of the tribal community people lost their houses, agricultural land, and properties. .the predominant tribal group was irulas and kurumbhas who lost their shelter .kurumbhas were more vulnerable and won't trust other people, so they, went 20 km deep into the forest inside during the flood .100 people and 30 families of adivasi [irulas] were rescued [from sholayur, agali panchayat] .the government of kerala organize relief camps for the landless tribes .the relief camps were made in several places like mukkali, chemmannur, and other random places near any village .in chemmannur relief camp, the major part of sholayur tribes was settled and that's the new origin of sholayur grama [because they are from sholayur panchayat]

LITERACY RATE CHEMMANNUR; [AFTER FLOOD] - 2020



Fig 2.6 literacy rate [2020]

The literacy rate was increased due to the tribal upliftment campaign called "unarvu" by silent valley.

SEX RATIO CHEMMANNUR; [AFTER FLOOD]

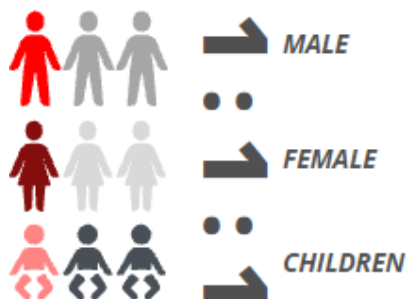


Fig 2.7 sex ratio [after flood]

After the flood the size of the irula family got reduced and there are many nuclear families than before .so they have an average sex ratio of 1:1

CASTE RATE CHEMMANNUR; [AFTER FLOOD]

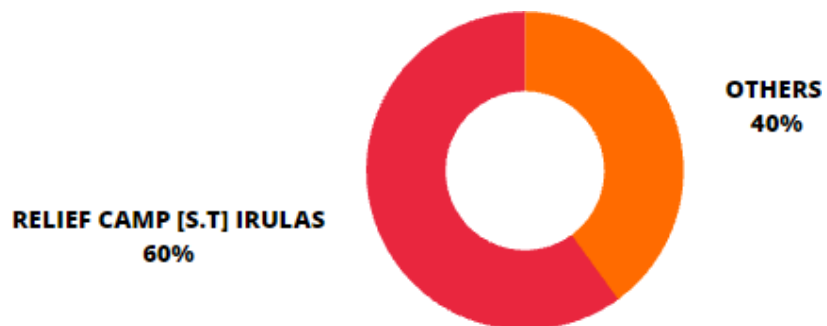


Fig 2.8 caste rate [after flood]

Data was collected by interview method [local residents in chemmannur]

ECONOMIC RATE; [AFTER FLOOD]

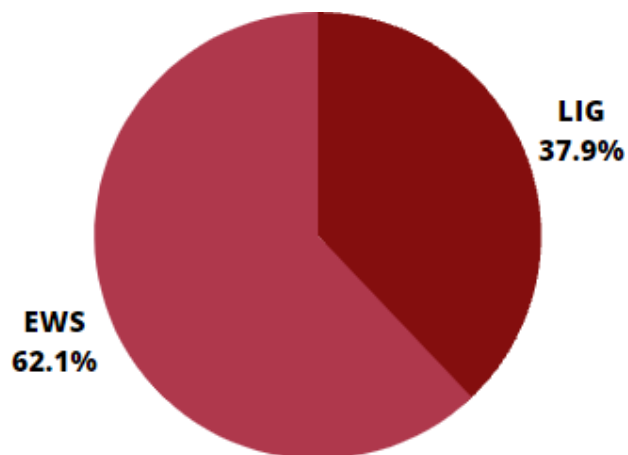


Fig 2.9 economic rate [after flood]

More than 50% of the lig lost their agricultural lands and shelter .the existing ews facing an economic crisis even worse than before.

AFTER THE FLOOD, THE RELIEF CAMPS BY THE GOVERNMENT OF KERALA

IRULA- SHOLAYUR GRAMA- CHEMMANNUR- ATTAPPADI

The relief camps in chemmannur had 300 migrant tribal people and 30 tribal families rescued from that disaster .the people who are made to stay there, most of them from sholayur panchayat .the new sholayur grama was termed because of many tribal migrants from the sholayur panchayat stayed there .it covers the spread area of 55.81 acres [taken approx from malleshwaran temple as the starting point of this village] .some existing other religions people stayed there [approx 40% of the total population]. the relief camps provided by the government of kerala for the tribes who lost their shelter in that disaster .these camps are temporarily made up of asbestos sheets and steel sheet structures

IRULA HOUSES SHOLAYUR GRAMA, CHEMMANNUR

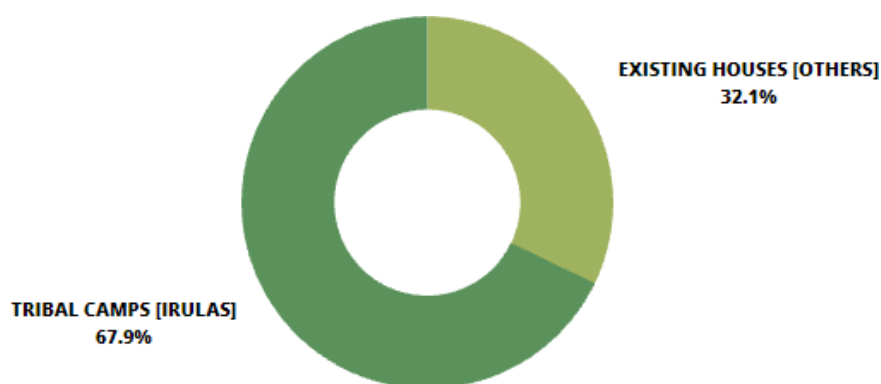


Fig 2.10 house ratio in chemmanur

Irulas average family size of 4 or 5 members per nuclear family, hence total number of families from 300 people is 65 families and 30 rescued family. a total of 95 families stayed in chemmannur camp. the total population of irulas stayed here was 440 people [taken approx] .data was collected by interview method [local residents in chemmannur]

THE SITE

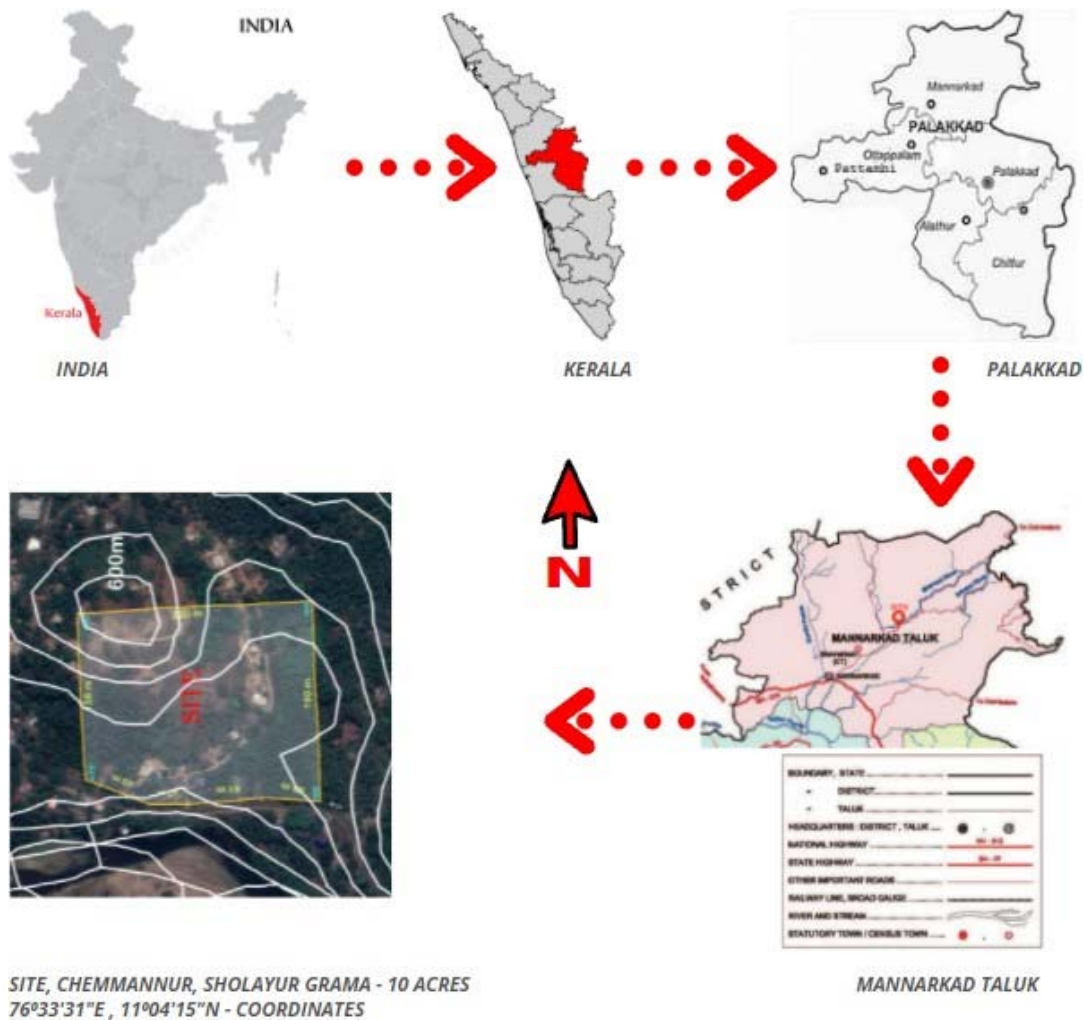
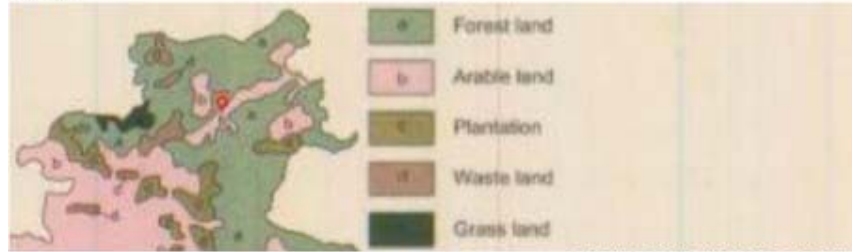
SITE - CHEMMANNUR - SHOLAYUR GRAMA -ATTAPPADI

Fig 3.1 site location

The site is located in sholayur grama, chemmannur , mannarkad taluk, palakkad ,attappadi, kerala .the site is located at the adjacent to mannarkad - annakati road. which was the only main road connecting attapadi to other neighbourhood villages. the irula tribe settlements on sholayur grama need a well-designed and properly built structure for living. so the site is taken to uplift the living of irula tribes

LANDUSE



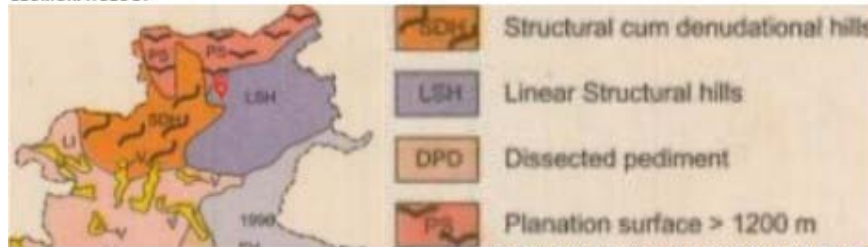
THE SITE FALLS UNDER ARABLE LAND

GEOTECHNICAL AND NATURAL HAZARDS



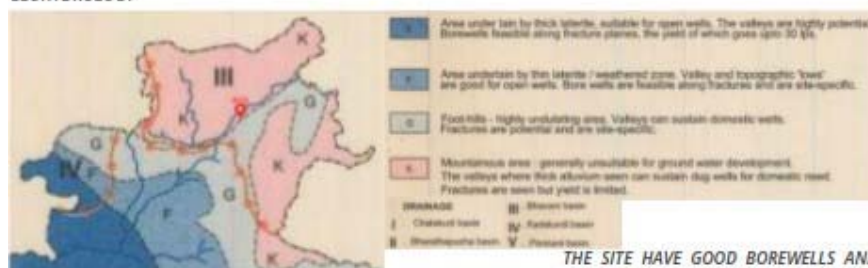
THE SITE HAS GOOD FOUNDATION CHARACTERISTICS

GEOMORPHOLOGY



THE SITE FALLS UNDER LINEAR STRUCTURAL HILLS

GEOHYDROLOGY



THE SITE HAVE GOOD BOREWELLS AND BHAVANI BASIN AS DRAINAGE PATTERN

Fig 3.2 landuse, geotechnical, geomorphology, geohydrology

The site is located 10 kms from silent valley. silent valley is a centre of attraction for tourism .the site is located 4 kms from mukkali junction .mukkali junction is a junction point of access from coimbatore other parts of kerala .the site is located near mallewaram temple which plays a major role in the culture of irulas .the site is located 31.8 kms from anaikatti .anaikatti is the border for tamilnadu- kerala .the site is located at the adjacent to mannarkad - annakati road. which was the only main road connecting attapadi to other neighbourhood villages. site is located in main access thus this can uplift the job, transportation and future

development of the area .it has ahad [attappadi hill area development] project for rules and jica [japan international corporation agency] together funded rs 253 crores for the development of irula tribes .hrds [highrange rural development society]- ngo helps for homeless tribes projects. the site acts as the centre of access from every village of adivasi. the state highway along the adjacent side of the site for easy transportation. this is one of the places for tourism, so future development can happen possibly.

SOIL TYPE IN TROPICAL WET CLIMATE - FOREST AREA

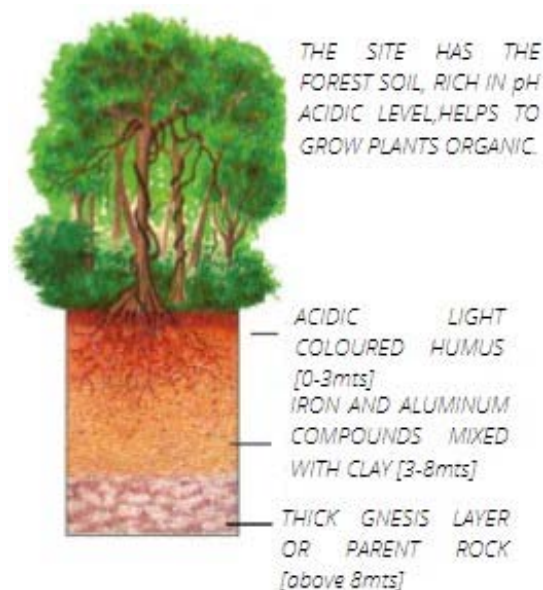


Fig 3.3 soil type

3.2 SWOT ANALYSIS

S-	Social	cohesion	&	Same	community
W-	Low	income		of	people
O-	Help	of NGOs	and	government	policy
T -	High chance of flooding				

LANDUSE



Fig 3.4 landuse

SUN PATH

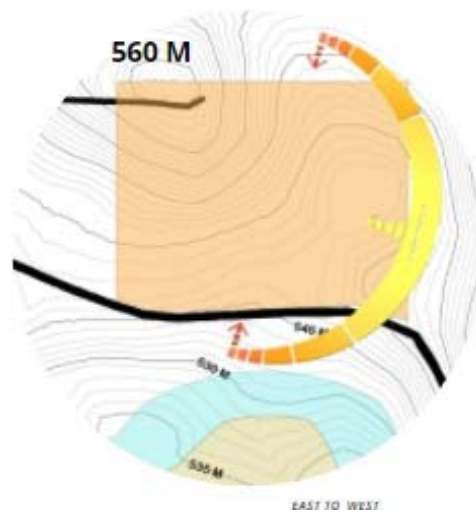


Fig 3.5 sun path

WIND DIRECTION

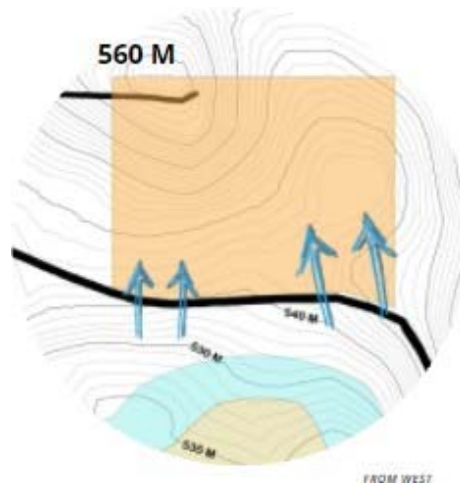


Fig 3.6 wind direction

NOISE ANALYSIS

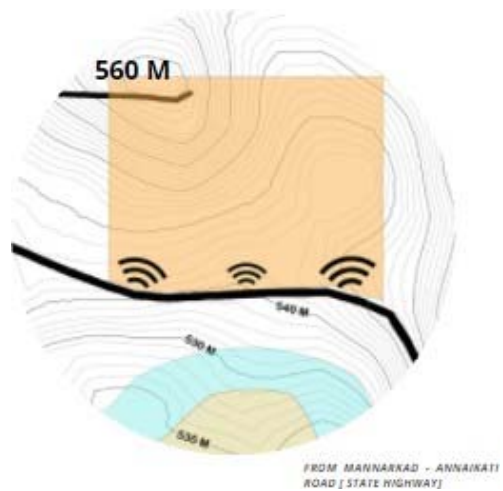


Fig 3.7 noise analysis

EXISTING BUILDINGS

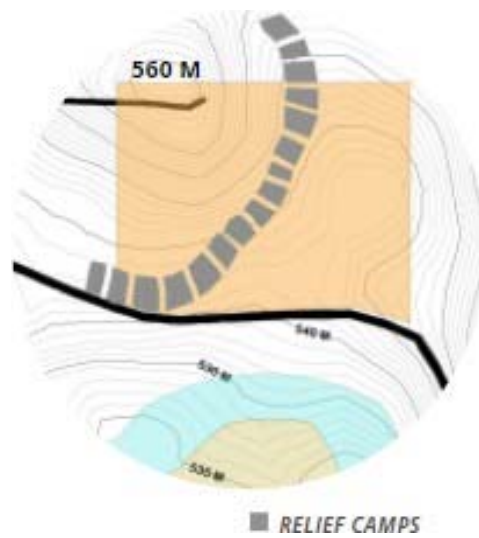


Fig 3.8 existing buildings

EXISTING TREE COVER

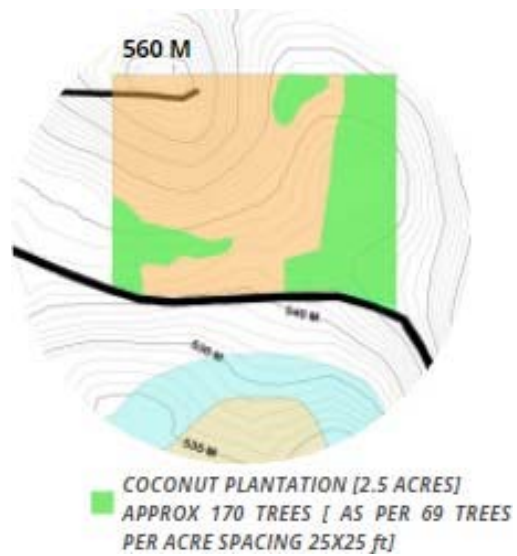


Fig 3.9 existing tree cover

DRAINAGE PATTERN

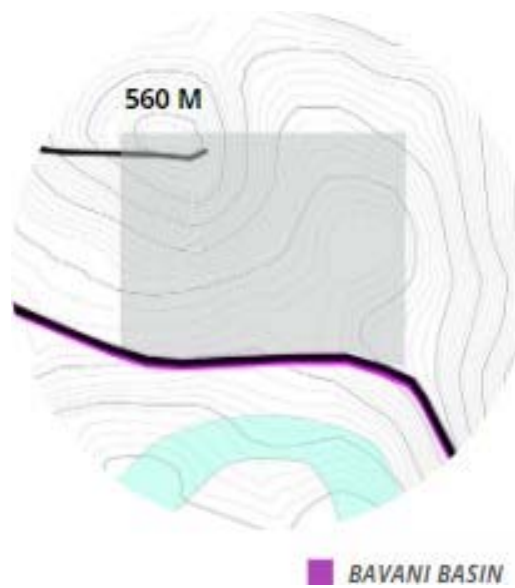


Fig 3.10 drainage pattern

VIEW ANALYSIS

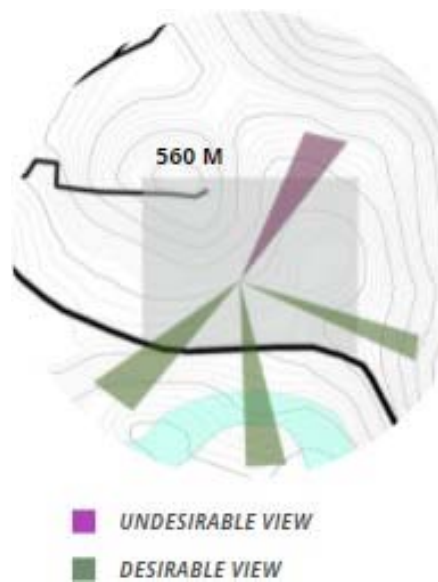
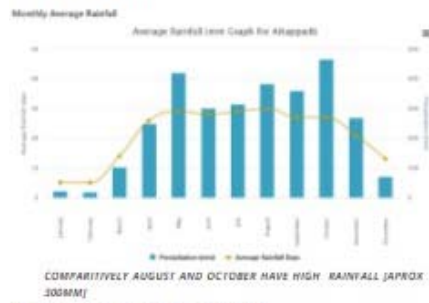


Fig 3.11 view analysis

CLIMATIC ANALYSIS

AVG. RAINFALL



AVG. SUNHOURS AND DAYS



AVG. WIND SPEED



AVG. TEMPERATURE

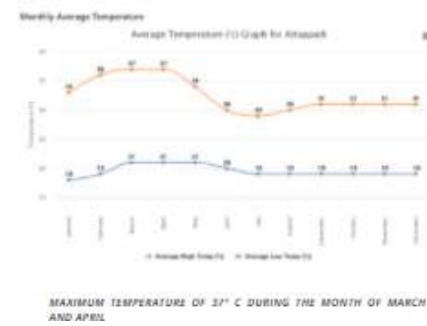


Fig 3.12 climatic analysis

CONTOUR ANALYSIS

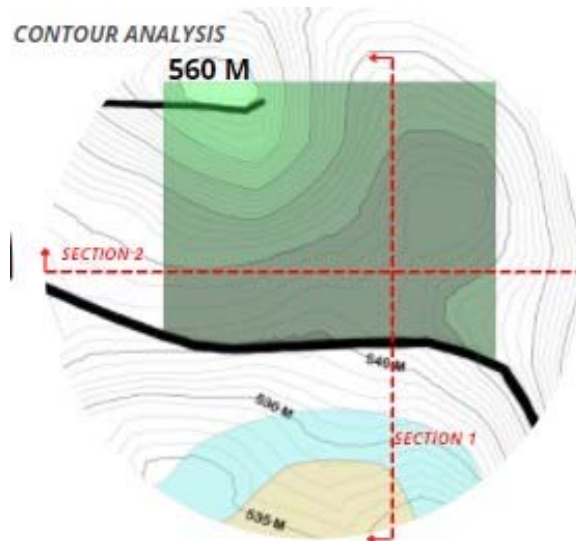


Fig 3.13 contour analysis

SITE SECTION



Fig 3.14 section 1

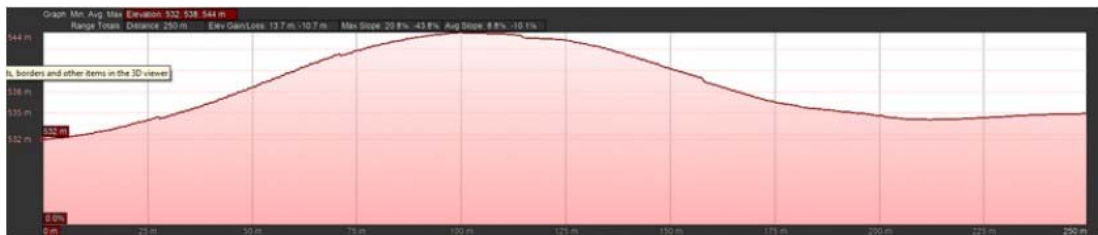


Fig 3.15 section 2

SLOPE ANALYSIS

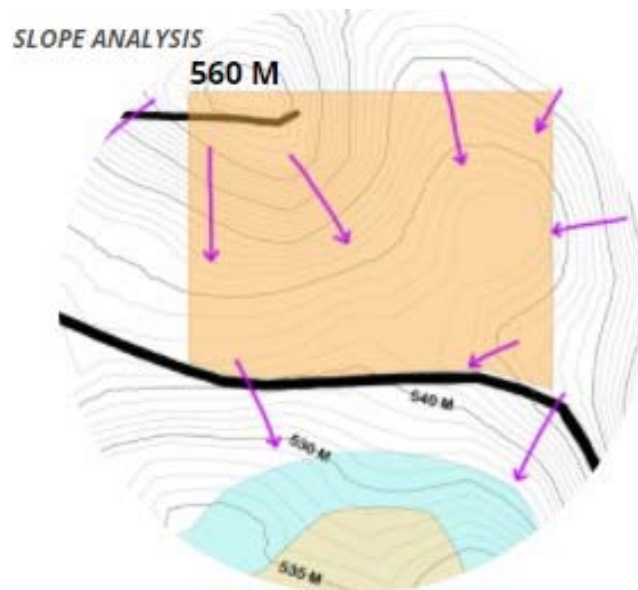


Fig 3.16 slope analysis

CHAPTER 4

4.1 DATA STANDARDS

The site falls under panchayat. so the standards is taken from kpbr [kerala panchayat building rules 2019]

Special provisions for tribal colonies [KPBR]

- a. The minimum distance between plot boundary abutting any street other than national highway, state highway, district roads notified by panchayats, the building other than compound wall or fence structure display structure shall be 1.0 metres
- b. no. of floors= 2 and stair room [limited]
- c. minimum distance between buildings = 1.5 m
- d. minimum front open space = 1.5 m
- e. individual toilets for each unit with septic tank

group a1 - residential

- a. one or multiple dwelling units
- b. educational building not exceeding 200 sq.m, office building not exceeding 50 sq.m

group b - education

- a. educational building exceeding 200 sq.m built-up
- b. sunday schools not exceeding 200 persons

group c - medical/ hospital

a. medical building exceeding 200 sq.m

group f - mercantile/ commercial

- a. buildings having the functions of selling purposes
- b. building above 10m ht = space given in front, rear, side
- c. 0.5m for every 3m ht [if the ht of building exceeding 10m]
- d. minimum open space = 50% of total site [should be left unpaved or paved with suitable material for percolation of rainwater]
- e. f.s.i = total floor area on all floors / plot area

Table 6 [KPBR 2019]

COVERAGE AND FLOOR SPACE INDEX (F.S.I)							
Sl.No.	Occupancy	Maximum permissible Coverage - Category I	Maximum permissible Coverage - Category II	Category - I Maximum permissible F.S.I.		Category - II Maximum permissible F.S.I.	
				Without additional fee	With additional fee of Rs 5000 per sq. metre for additional area	Without additional fee	With additional fee of Rs 5000 per sq. metre for additional area
1	2	3	4	5	6	7	8
1	Residential A1	65	60	3	4	2.5	-
2	Lodging Houses & Special Residential A2	65	55	2.5	4	1.5	2.25
3	Educational B	Upto Higher Secondary	35	35	2.5	3	1.5
		Others	50	45	2.5	3	1.5
4	Medical / Hospital C	50	45	2.5	3.5	2.5	-
5	Assembly D	40	35	1.5	2.5	0.7	1.25
6	Office E	60	50	3	4	3.00	-
7	Mercantile / Commercial F	65	60	3	4	2.75	3.5
8	Industrial-I G1	60	50	3.5	-	2.75	-
9	Industrial-II G2	60	35	3	-	2.50	-
10	Storage H	70	65	3	4	2.75	3.75
11	Hazardous I	45	40	2	-	2.00	-
12	Multiplex complex J	65	60	3	3.5	2.75	3

Table 4.1 KPBR 2019 FSI

CHAPTER 5

CASE STUDY

THE HOBBIT HOUSE, WALES, ENGLAND

Total area; 50 sqm,

Technique; berm elevation

Architect; Simon Dale

The House was built with maximum regard for the environment and by reciprocation gave us a unique opportunity to live close to nature.

KEY POINTS OF THE DESIGN AND CONSTRUCTION;

- a. Dug into hillside for low visual impact and shelter
- b. Stone and mud from diggings used for retaining walls, foundations etc.
- c. Frame Of Oak Thinnings (Spare Wood) From Surrounding Woodland
- d. Reciprocal roof rafters are structurally and aesthetically fantastic and very easy to do
- e. Straw bales in floor, walls, and roof for super-insulation and easy building
- f. Plastic sheet and mud/turf roof for low impact and ease
- g. Lime plaster on walls is breathable and low energy to manufacture (compared to cement)
- h. Reclaimed (Scrap) wood for floors and fittings
- i. Anything you could possibly want is in a rubbish pile somewhere (windows, burner, plumbing, wiring...)
- j. Woodburner for heating - renewable and locally plentiful
- k. Flue goes through a big stone/plaster lump to retain and slowly release heat

- l. The Fridge is cooled by air coming underground through foundations
- m. Skylight in roof lets in natural feeling light
- n. Solar panels for lighting, music, and computing
- o. Water by gravity from nearby spring
- p. Compost toilet
- q. Roof water collects in pond for garden etc.

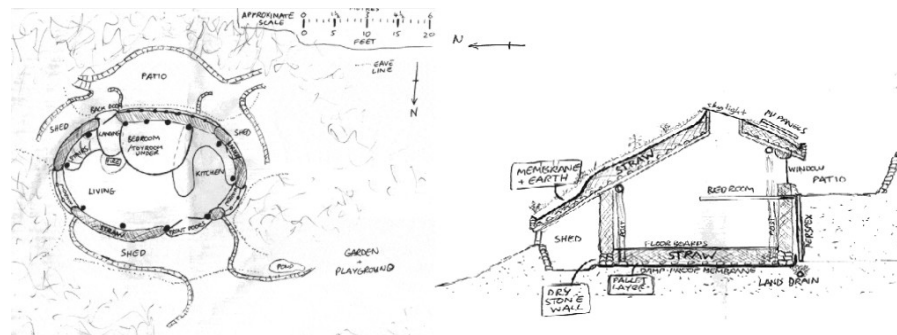


Fig 5.1 hobbit house plan, section, view



Fig 5.2 hobbit house construction phase

THE DESIGN PROCESS:

The design of the house comes mostly from the combination of the following considerations:

- Analysis Of Functions > Elements > Materials
- Site Survey (Slope, Features, Aspect, Access Etc.)
- Zoning, Relationships of activities and Requirements
- Aesthetic, Sculptural Play
- See How it goes, What works and feels good

CLIMATE ;

- Wales tends to be wetter than England, with slightly less sunshine.
- Temperatures in the coastal areas, however, can be very warm in summer ranging from 15°C (59°F) to rare highs of around 25°C (77°F)

BASIC FUNCTION	SUPPORTING ELEMENTS	PRIMARY CHOICE	REASONS WHY	REQUIREMENTS	SOLUTIONS
DRY	WATERPROOF	PLASTIC MEMBRANE AND EARTH	- AESTHETIC, LOW VISIBILITY AND NATURAL HARMONY. - FLEXIBLE DESIGN POSSIBILITIES - EASY - CHEAP	- PROTECTION FROM PUNCTURE - PROTECTION FROM UV.	SANDWICH MEMBRANE WITH HEAVY DUTY PLASTIC THEN STRAW
DRY	SUPPORTED ROOF	ROUNDWOOD TIMBER FRAME	- RENEWABLE, LOW ENERGY MATERIAL. - LOWER EMBODIED ENERGY THAN SAWN TIMBER. - AESTHETICALLY INTERESTING ON SITE, PLENTIFUL SUPPLY OF OTHERWISE USELESS OAK THINNINGS (4"-8"). - WORKABLE	FIDDLY TO INTEGRATE SQUARE COMPONENTS (EG. DOOR FRAMES ETC.)	- USE SOFT, NON-SQUARE MATERIALS FOR OTHER COMPONENTS (WALLS, ROOF ETC.) - BE INVENTIVE
WARM	WITH HEAT SOURCE	LOG BURNER	- RENEWABLE, NON-FOSSIL FUEL. - LOCAL PLENTIFUL SUPPLY. - MORE EFFICIENT THAN OPEN FIRE. - ALREADY BEEN GIVEN ONE.	- FLUE - HEARTH	USE STONE FROM EXCAVATION TO MAKE HEARTH, CHIMNEY AND THERMAL STORE
WARM	RETENTION	STRAW INSULATION BALE	- LOW EMBODIED ENERGY NATURAL BYPRODUCT. - FLEXIBLE DESIGN POSSIBILITIES - EASY - CHEAP	- PROTECTION FROM WEATHER, ANIMALS AND FIRE. - MUST BE ABLE TO BREATHE	- USE LIME PLASTER WHERE STRAW IS ABOVE GROUND. - USE AIR GAP - CREATING SPACERS AND PLASTIC WHERE STRAW IS AGAINST OR UNDER EARTH

Table 5.1 hobbit house inference

VILLA VALS, SWITZERLAND

Architects: Cma, Search

Year: 2009

Total Area; Villa -1500 Sqm

Barn- 200 Sqm

Technique Used; Hillside Elevation, True Underground

Text description provided by the architects.

Shouldn't it be possible to conceal a house on an alpine slope while still exploiting the wonderful views and allowing light to enter the building?

CLIMATE;

- a. Switzerland is located within a temperate climatic zone. in the west and northwest the influence of the temperate atlantic climate is felt more strongly, in the east the influence of the continental climate.
- b. The Climate is moderate with no excessive heat, cold, or humidity. from july to august the daytime temperature range is 18 to 28 °c (65° - 82° f) and from january to february the range is -2 to 7 °c (28° - 45° f). in spring and autumn, the daytime temperature range is 8 to 15 °c (46° - 59° f).

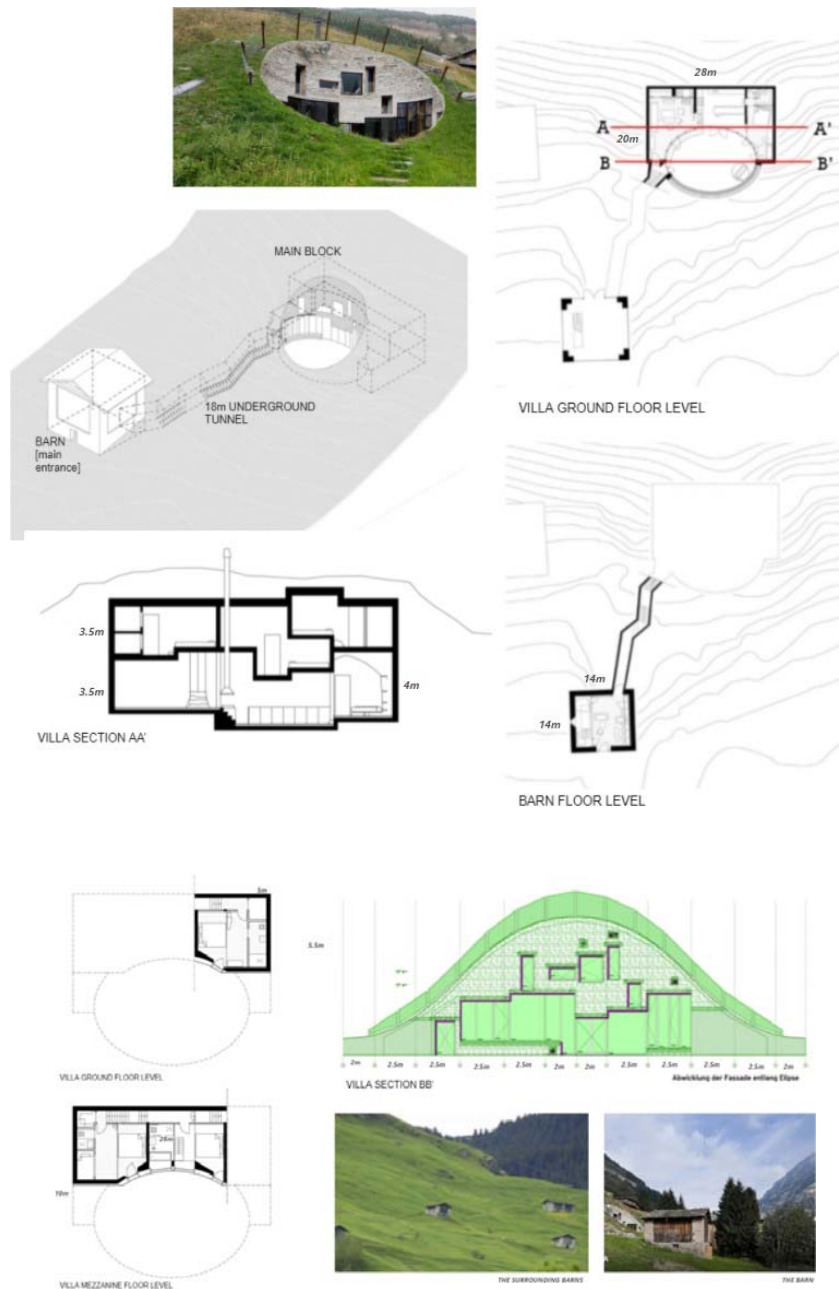


Fig 5.3 villa vals

CONCLUSION;

Natural water source. timber for heating purposes like bath. vals is famous for its bath and view of mountains

DOBRACA HOUSE IN KRAGUJEVAC , SERBIA

Municipality Located In Central Part Of Republic Of Serbia

Total Area; 50 Sqm Per Individual Unit

Technique; Hillside Elevation

DESIGN PROCESS

- a. The Bermed Underground Earth-Sheltered House was designed and inspired by the neolithic house from the archeological site Lepenski Vir in Serbia.
- b. The Measurement of the house from lepenski vir was the same one that we used for the design of the earth-sheltered house, in the case of the dobraca house in Serbia.
- c. The Terrain was suitable for implementing this kind of structure.
- d. The House was finished in 2008 and the monitoring of average temperature and wind was taken quarterly during the 2012 and 2016.

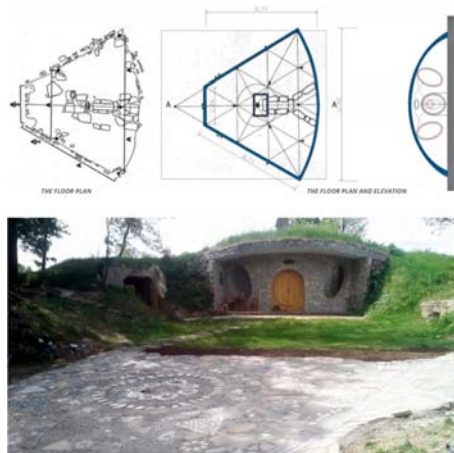


Fig 5.4 dobraca house

MONITORING SOME PARAMETERS

- a. The Daily temperature inside and outside the bermed earth-sheltered house in dobraca was analyzed with special emphasis on the insulation layers and wind speed during 2012 and 2016.
- b. According to the presented measurement, the temperature inside this bermed earth-sheltered house was in the range from a minimum of 15.8° c to a maximum of 20.6° c, which is close to the ideal human needs temperature
- c. Underground houses facing eastwards could make a significant heat reduction and noticed that the genuine lepenski vir neolithic house on the danube river has the same orientation as the Dobraca House In Kragujevac.
- d. The Concrete shell structure, with just bituminous coatings and green roof about 0.4m thickness provides nearly satisfies the temperature for comfortable living inside the house.
- e. At the Dobraca House location, the wind reaches the operating speed of the small wind turbine as an alternative energy resource.
- f. The Small wind turbine installed at a height of 10m above ground could produce around 2406 kwh of wind energy per year.

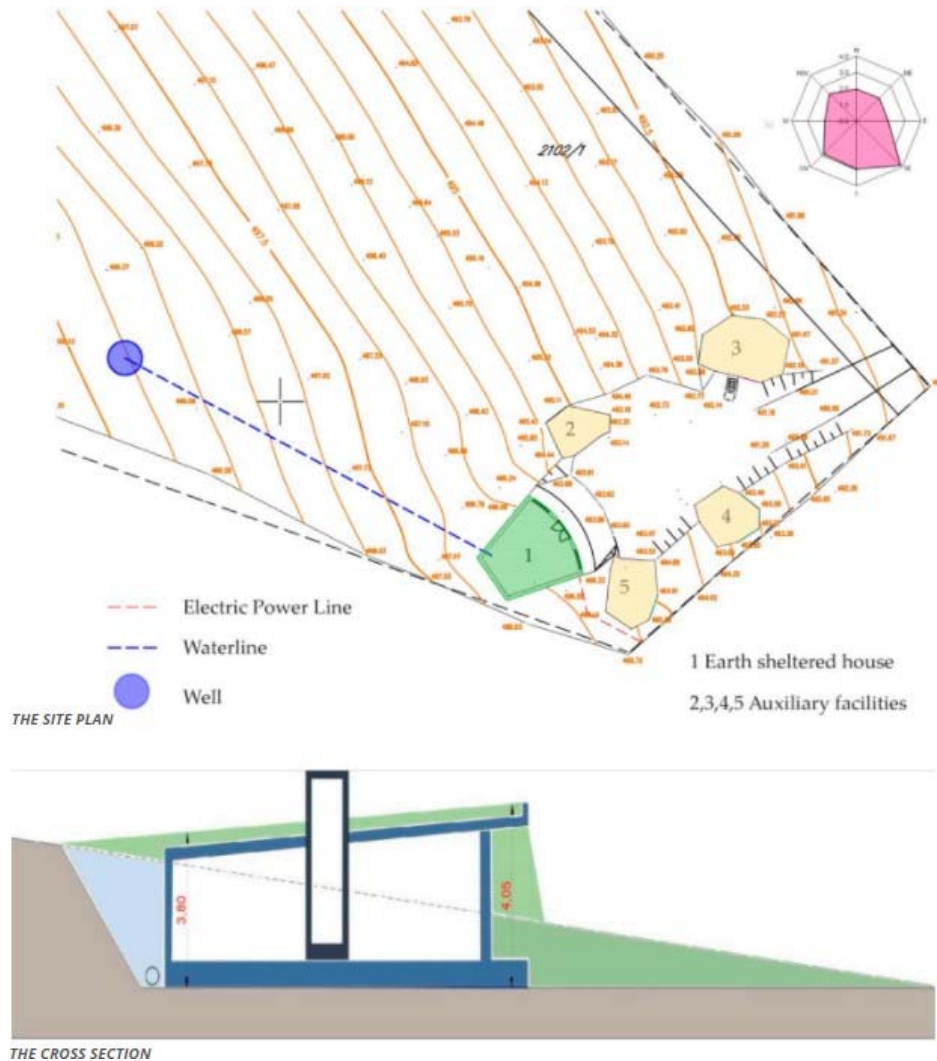


Fig 5.5 cross-section, site plan

- g. Since the energy consumption of this small house in dobraca with about 50 sqm floor space is below 2000 kwh, the wind turbine could provide all the necessary electricity energy to this house in future
- h. Currently, the Dobraca House uses electrical energy from kragujevac low voltage energy network as a part of the serbian high voltage electricity transmission system.
- i. According to the data presented in master plan for mountain rudnik, the average wind speed in this area is between 2.6- 4 m/s

- j. Average solar irradiation at the rudnik mountain, based on the data from master plan rudnik is relatively high and it is about 1320kwh, which has a great potential for using pv panels as the second alternative energy resource in the case of the dobraca house
- k. The information presented in this section is basic data that could be used for detailed research of the energy consumption of this house.

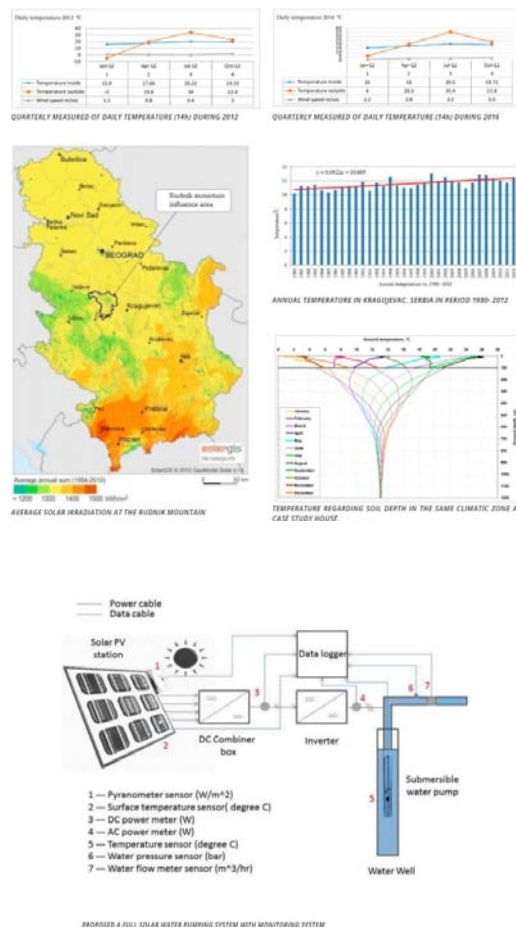


Fig 5.6 climatic aspects dobraca, passive techniques

- l. In the last 30 years, the annual temperature in kragujevac, has been raised to approximately one degree 'c.
- m. This temperature is almost equal, with the underground temperature over 10 meters in depth.

- n. It can be concluded that while monitoring monthly soil temperature at four m depth in the temperate zone, it is in the range 12- 15' c, which is close to the average annual temperature in Kragujevac, Serbia.
- o. The image shows the position of the 75m deep well, located 50m southwest of the house, with drinking water, but also for non- drinking requirements.

CONCLUSION;

At The Temperate Climate Zone, The entrance facing eastwards is one of the influential factors for keeping the temperature under 21 °c during the summertime, even if the outside temperature is above 35 °c. the green roof with just 0.4 m of soil, provides enough thickness for keeping the internal temperature stable.

CRITICAL ANALYSIS OF CASE STUDIES

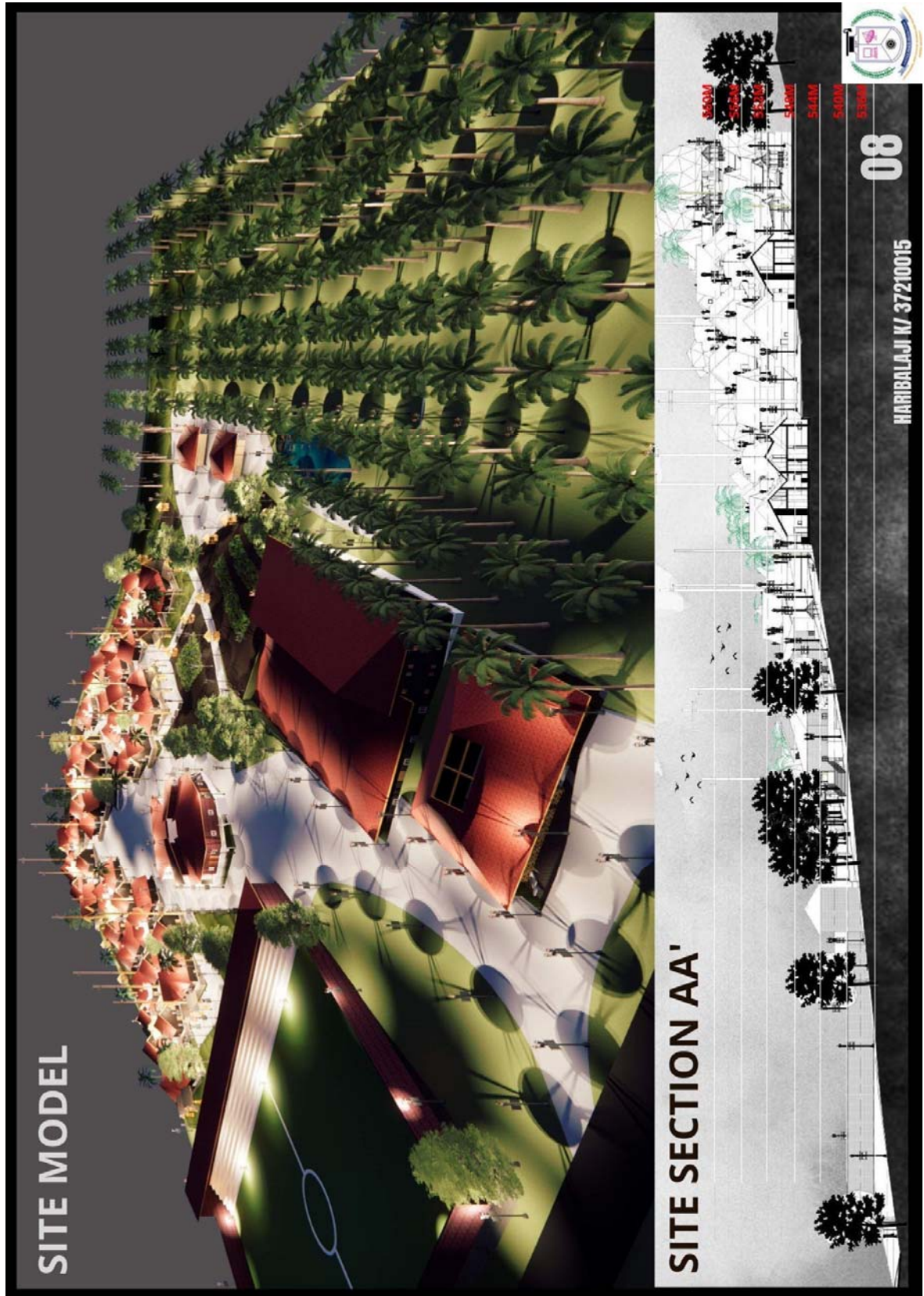
CASE STUDY	THE HOBBIT HOUSE	VILLA VALS	DOBRACA HOUSE	INFERENCE
LOCATION	WALES, ENGLAND	SWITZERLAND	KRAGUJEVAC, SERBIA	THERE SHOULD BE GOOD SOIL STABILITY
CLIMATE	MARITIME TEMPERATURE (Cfb)	TUNDRA	TEMPERATE CONTINENTAL CLIMATE	-
CONSTRUCTION MATERIALS	- TIMBER LOGS - PLASTIC MEMBRANE - STONES - WOODEN PANELS - STRAW BALES - LIME PLASTER	- CONCRETE - WEATHER PROOFING - STONES - TIMBER PANELS - TIMBER LOGS	- STONE MASONRY - WOODEN LOGS - CONCRETE	- USE ECO FRIENDLY AND LOCALLY AVAILABLE MATERIALS. - AVOID USE OF MATERIALS WHICH CAUSE HARM TO MOTHER EARTH.
SITE SURROUNDINGS	WOODLAND SURROUNDING	IN ALPINE SLOPES SURROUNDED BY SEVERAL BARNS	CENTRAL SERBIA MUNICIPALITY IN RUDNIK MOUNTAIN	DEPENDS ON THE AREA
TOTAL AREA	HOUSE- 50 SQ.M	VILLA- 1150 SQ.M BARN- 200 SQ.M	SINGLE UNIT- 50 SQ.M	AVOID USING LARGE AREAS. LARGER THE AREA, HIGHER THE RISK OF LAND SLIDING
SHELTERING TECHNIQUE	BERM ELEVATION 	HILLSIDE ELEVATION TRUE UNDERGROUND 	HILLSIDE ELEVATION 	TECHNIQUES DEPENDS ON SITE AND CLIMATIC FACTOR
BELOW GROUND LEVEL	0%	100%	100 %	DEPENDS ON THE TECHNIQUE AND SOIL QUALITY.
SURFACE GROUND LEVEL	60%	90 %	70%	DEPENDS ON THE TECHNIQUE AND SOIL QUALITY.
DEPTH	0 METRE	5 METRE	5 METRE	DEPENDS ON THE TECHNIQUE AND SOIL QUALITY.
ARCHITECTURAL PLANNING	SINGLE UNIT STRUCTURE INCLUDES LIVING, BEDROOM, KITCHEN AND WINDOW PATIO.	UNDERGROUND BERMED VILLA CONNECTED WITH A BARN THROUGH UNDERGROUND TUNNEL.	UNDERGROUND BERMED HOUSE IN A CLUSTER PLANNING	- ALL SPACES SHOULD HAVE EASY ACCESSIBILITY - AVOID COMPLEX STRUCTURES
USER CIRCULATION	THE ACTIVITY INSIDE THE BUILDING HAVE EASY ACCESS TO HAVE A LIVELY ATMOSPHERE.	CIRCULATION WAS MADE EASE, AND MADE IN A MANNER WITHOUT INTERRUPTING AND TO ENJOY THE ALPINES HILL VIEW	GOOD CIRCULATION IN AND AROUND THE BUILDING. THE CLUSTER PLANNING OF THE VILLAGE MAKES EASY CONNECTIVITY BETWEEN THE UNITS	CIRCULATION SHOULD BE USER FRIENDLY
INFERENCE FROM CASE STUDY	- FRIDGE IS COOLED BY AIR COMING UNDERGROUND THROUGH FOUNDATIONS - SKYLIGHT IN ROOF LETS IN THE NATURAL FEELING LIGHT - SOLAR PANELS FOR LIGHTING, MUSIC AND COMPUTING.	- TIMBER IS USED FOR HEATING PURPOSE OF THE BATH - NATURAL WATER SOURCE - PLANNED ALONG THE SLOPES WITHOUT SPOILING THE VIEW	- THE GREEN ROOF WITH JUST 0.4 M OF SOIL, PROVIDES ENOUGH THICKNESS FOR KEEPING THE INTERNAL TEMPERATURE STABLE. - USING WIND ENERGY FOR ELECTRICITY - NATURAL WATER SOURCE FROM WELL.	-

Table 5.2 critical analysis of case studies

DETAILED DRAWINGS



Sheet 6.2 site plan



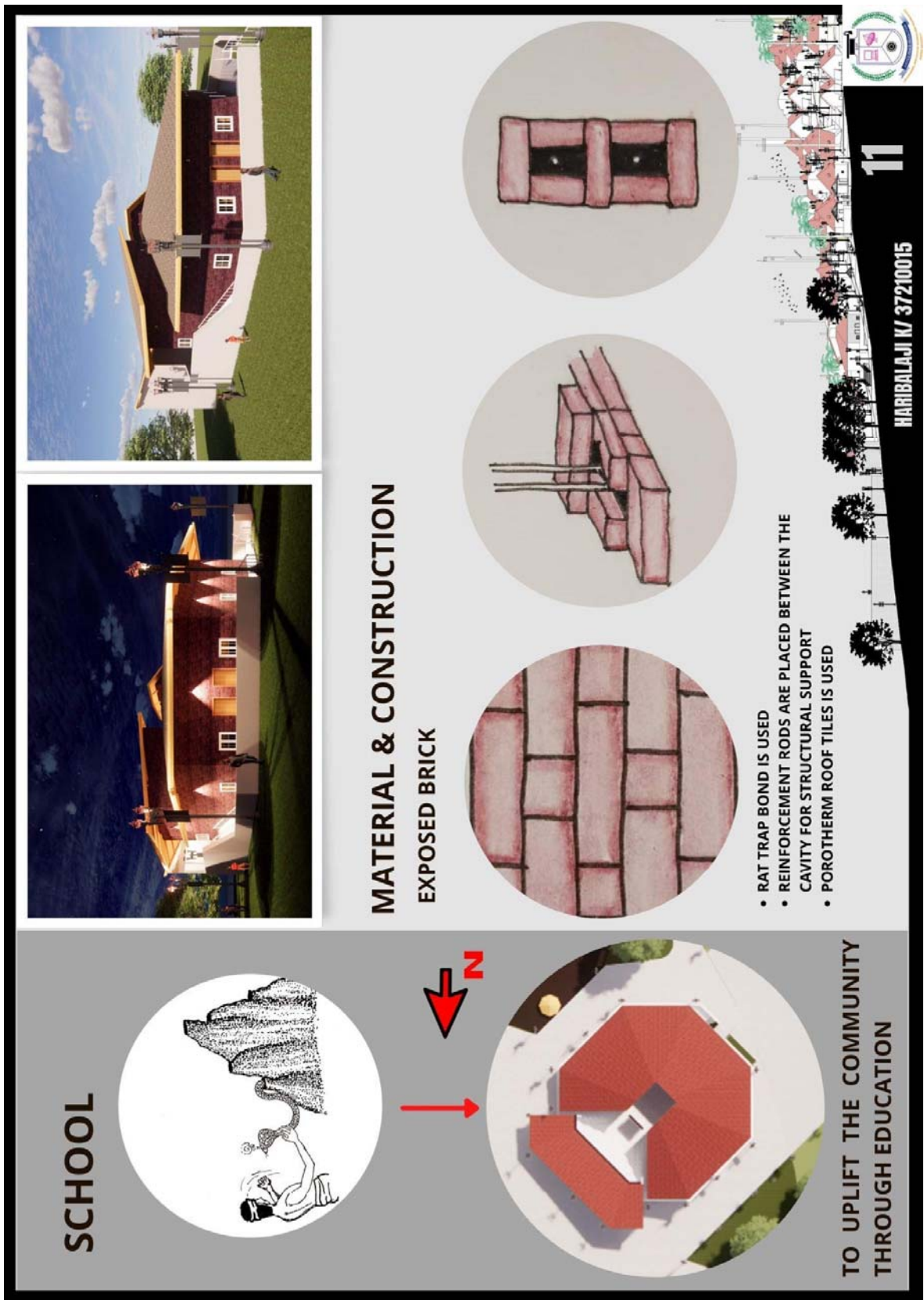
Sheet 6.3 site model and site section

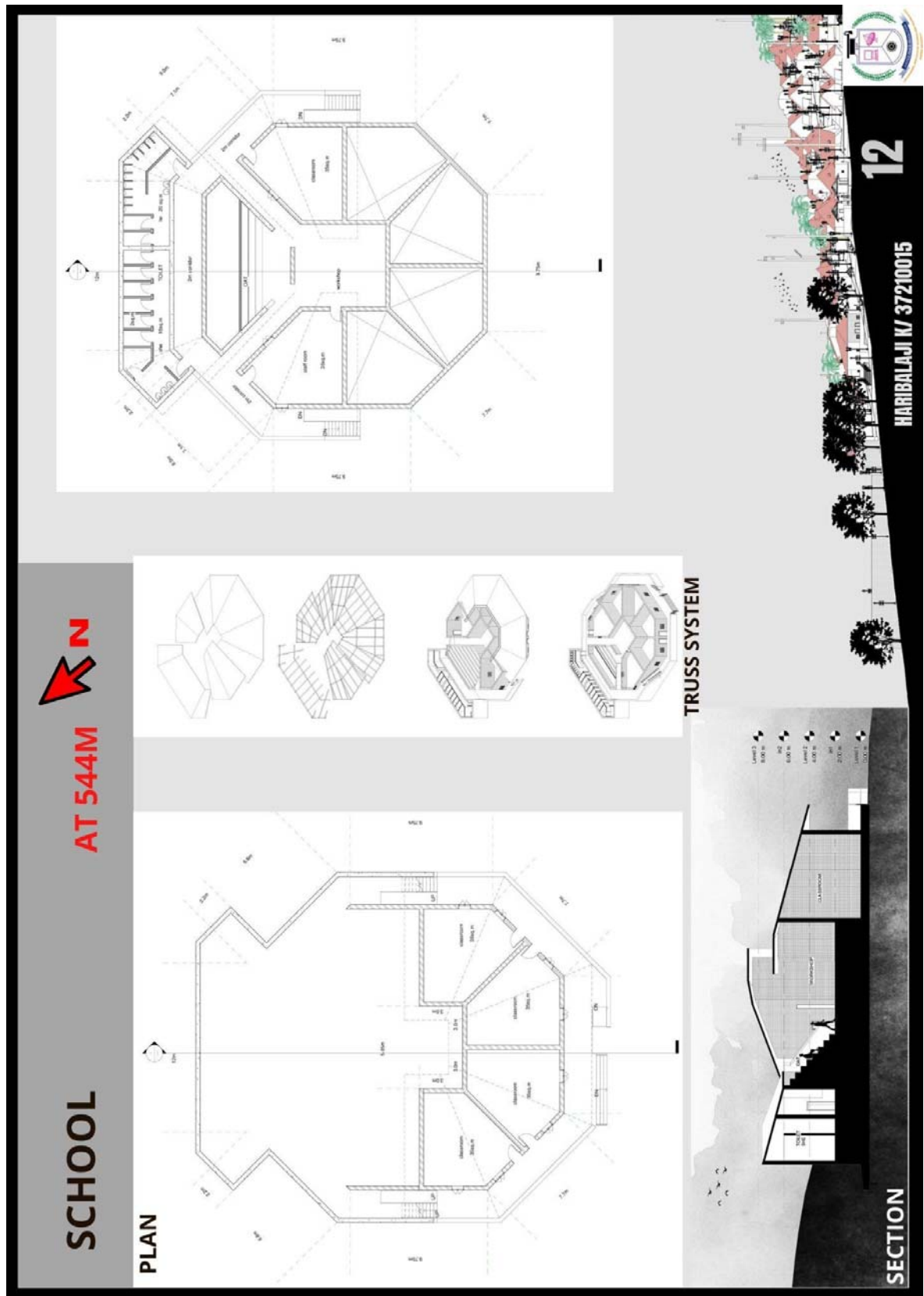


Sheet 6.4 residence



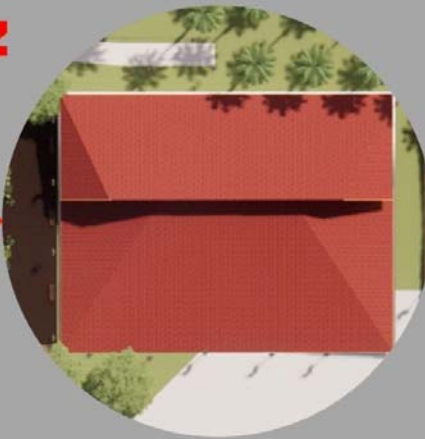
Sheet 6.5 residence plan, section



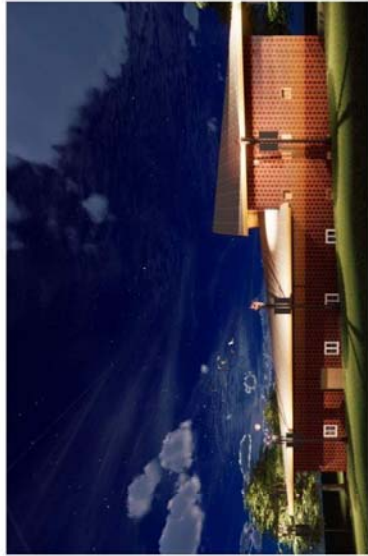


Sheet 6.7 school plan ,section

COMMUNITY CENTRE



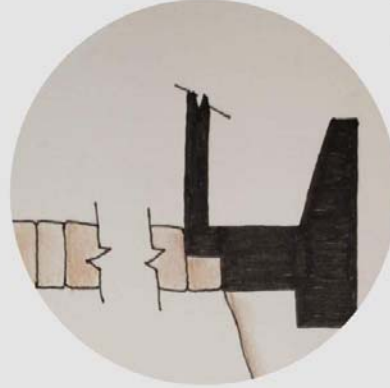
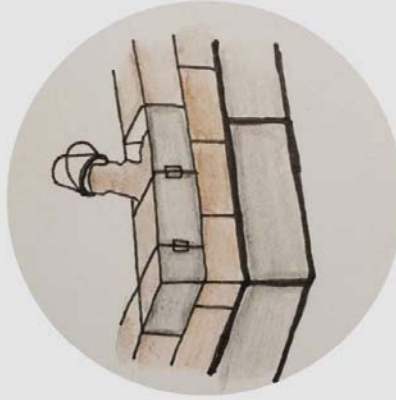
TO CREATE A PERMANENT
COMMUNITY SPACE FOR
IRULARS



MATERIAL & CONSTRUCTION

MUD BLOCKS

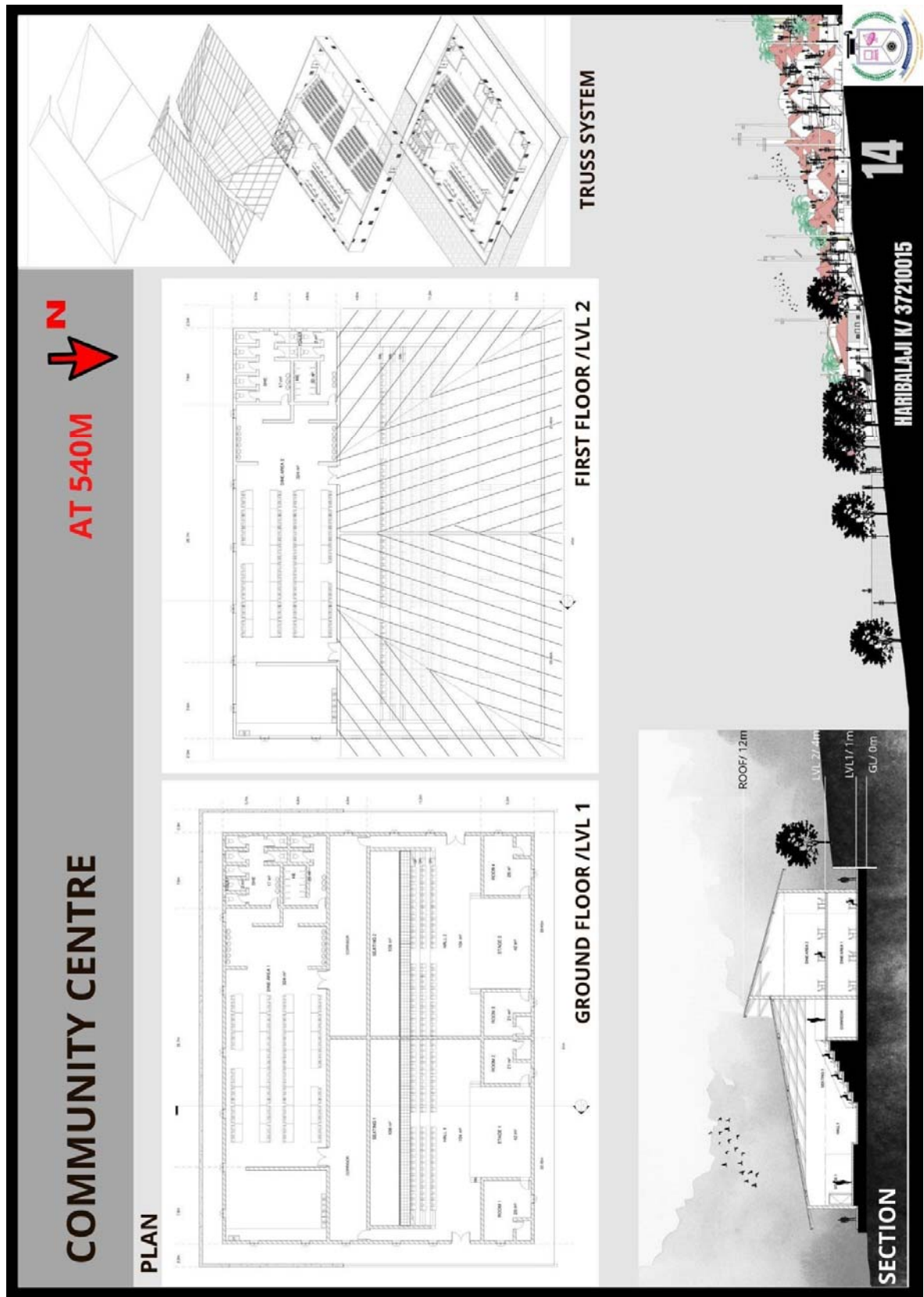
- MUD BLOCK MIXTURE CONSIST OF SOIL+KADUKKAI+JAGGERY+SAND+CEMENT+RED OXIDE
- THE BASIC FRAMING IS DONE FOR SHAPE AND STABILITY
- THE RETAINING WALL IS CONCRETE
- M30 CONCRETE IS USED
- ACRYLIC WATERPROOF PAINT IS USED TO PREVENT FROM WATER , HUMIDITY AND ANTI ALGAE



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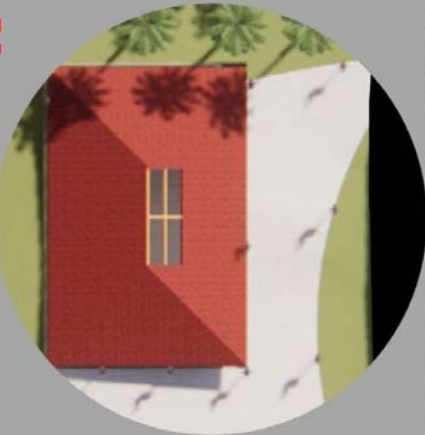
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Sheet 6.9 community centre plan, section

PHC

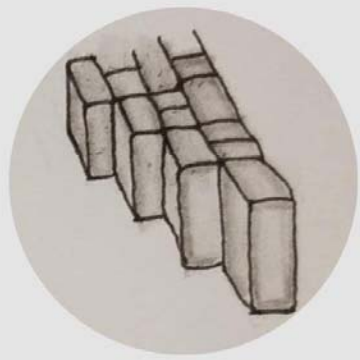


BASIC NEED FOR EMERGENCY
SNAKE BITE AND
PREGNANCY



MATERIAL & CONSTRUCTION

STONE MASONRY



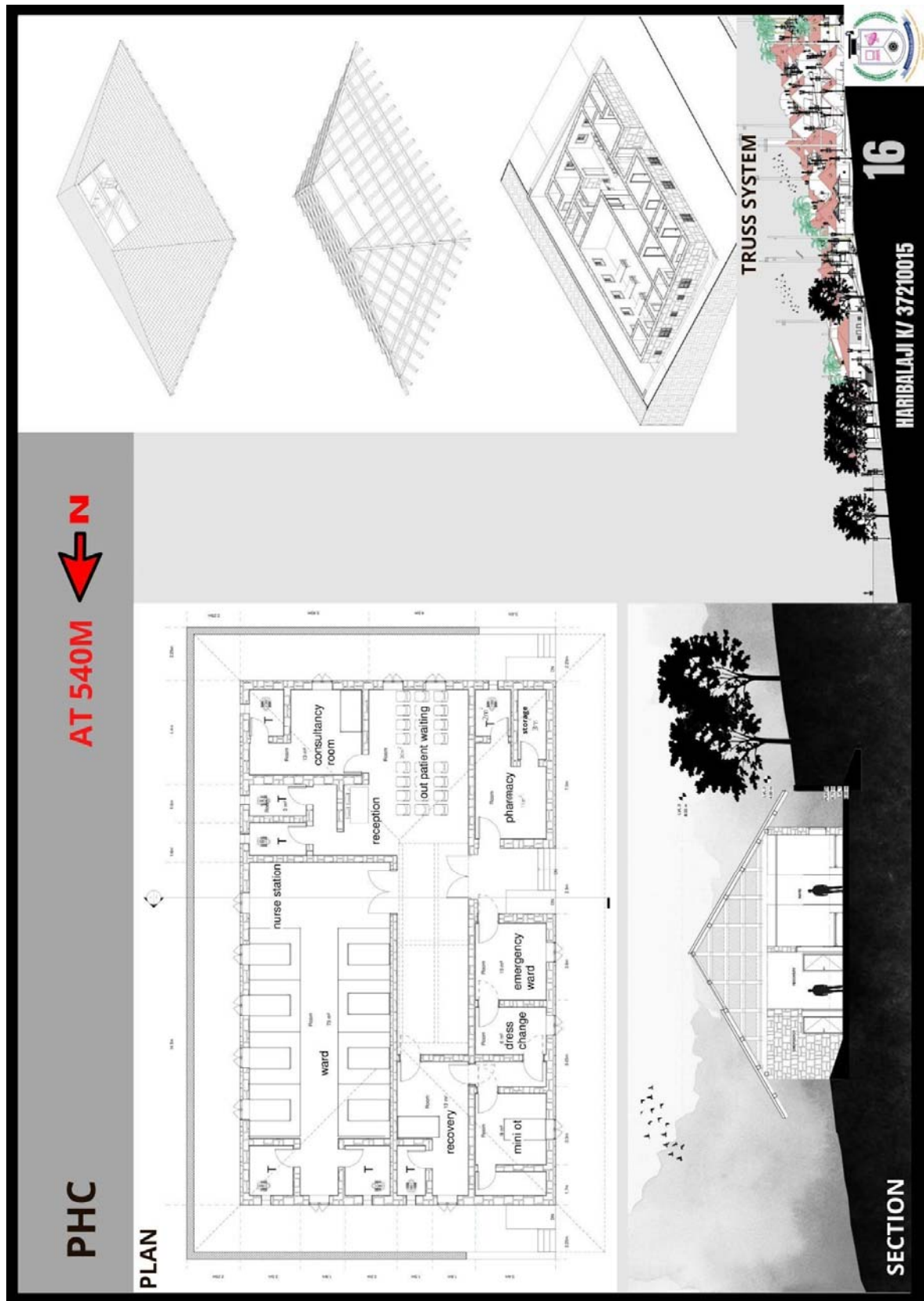
- LATERITE STONES ARE LOCALLY AVAILABLE AND USED FOR CONSTRUCTION, THO THE SITE FALLS UNDER LSH[LINEAR STRUCTURAL HILL]
- THE INTERLOCKING STONE MASONRY TECHNIQUE IS USED
- CEMENT +REDOXIDE [1:1] IS USED AS BINDING MATERIAL



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Sheet 6.11 phc plan, section



Sheet 6.12 football ground

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